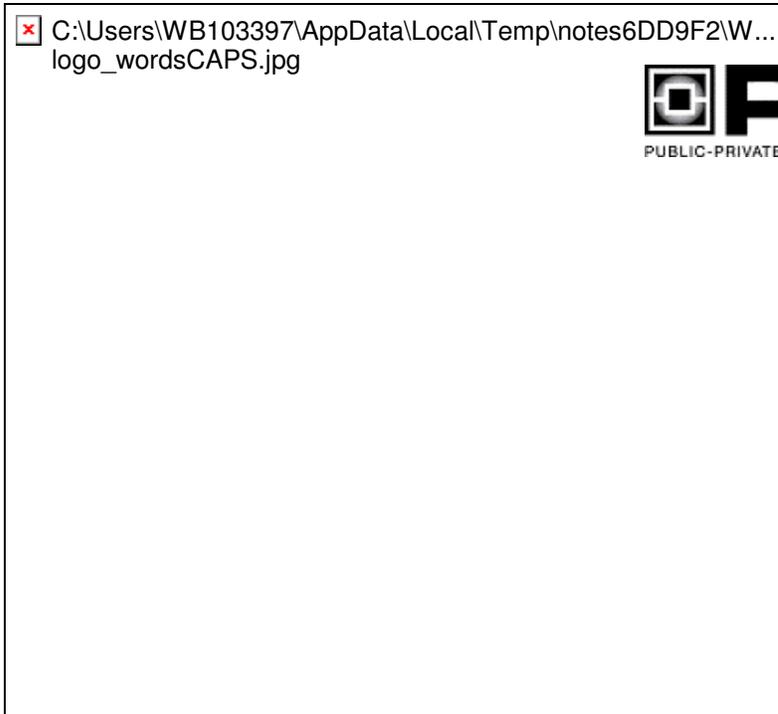


MONGOLIA

STRATEGY FOR PUBLIC-PRIVATE PARTNERSHIPS



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Executive summary

The current state of infrastructure in Mongolia is inadequate to meet the needs of economic development, driven to a large degree by the potential for exploiting Mongolia's substantial mineral reserves, and the demands of increasing the social and economic welfare of its population.

In carrying out this strategy, a long list of 123 infrastructure projects was analyzed to identify those that, on the basis of the information available, seemed most suitable for further investigation and potential development and structuring as public-private partnerships (PPPs).

This report sets out the criteria and methodology used to evaluate the list of possible PPP projects, and provides some recommendations to the Government of Mongolia (GOM).

Approach to project screening and evaluation

The following three-phase approach was developed to screen potential projects:

- **Phase 1 – short-listing.** The first component was a pass-fail test designed to eliminate projects that: (i) do not satisfy key basic criteria for PPP implementation, (ii) would not be suitable for IFC support, and (iii) or for which there is insufficient information to make a decision.
- **Phase 2 – ranking.** The second component entailed a *qualitative* evaluation of those projects which passed the Phase 1 test in order to generate a ranking of short-listed projects.
- **Phase 3 – further analysis.** The third component entailed further consideration of PPP structuring and viability issues, in part using international best practice and benchmarks, as well as quantitative analysis where sufficient project data was available.

Given the Mongolia context, emphasis was placed on setting key criteria for PPP screening not only to suit the scope of this analysis, but also for the purpose of knowledge transfer to the GOM (through the State Property Committee and Line Ministries), which will need to develop their own methodologies for developing project pipelines.

A preliminary evaluation of short-listed projects was reviewed and discussed with the GOM. Subsequent meetings were held to obtain feedback on the preliminary evaluation and additional information to enable the analyses to be finalized.

Recommendations were based on the data and information available at the time of this report. Should more accurate or different information become available, the results of the project evaluation may also change.

The list of selected project is intended to evolve over time and to be updated by the Government to reflect the current status of the PPP program.

The relevance of the findings

The Phase 1 short-listing identified a short-list of nine projects that appeared to have the minimum requirement for PPP implementation. They also meet some IFC criteria for advisory services support. In interpreting the findings and conclusions set out in this report, the following must be borne in mind:

- **Project selection for pilot PPP transactions.** This analysis and its findings contributes towards understanding relevant criteria for screening PPP projects and suggests some projects which might be worth evaluating further. However, it is GOM's responsibility to select the pilot projects for PPP implementation and those projects it selects might, for a variety of reasons, be different from the top ranking projects set out in the analysis. The nine projects have been selected on the basis of the information available at the time of this strategy. Should new factors become relevant for the project screening, the results of the screening might change.
- **Project evaluation and ranking.** In the Phase 2 analysis, weights were applied to the criteria as part of the scoring of projects. These weightings may be applied differently. It should be recognised that, for example, given the trade-off between social and economic impacts, the weights assigned should be in compliance with GOM's priorities and policy decisions. Should GOM apply different weights, the ranking of projects may differ from the results presented in this strategy. While ranking of projects is a useful starting point, more relevance should be given to the qualitative considerations developed in the evaluation process and to the additional considerations around PPP structuring and economic viability, as set out in the Phase 3.

Key conclusions

Key conclusions and recommendations which can be drawn from the project screening and evaluation are set out below:

- **Limited PPP opportunities.** When all key criteria are taken into account, only a few projects included in the long project list seem to have strong potential for structuring as PPPs. Some projects have potential for revenue generation and possible self-financing, but the majority are likely to be viable only with significant Government financial support.

- Projects which are linked to the development of mining activities score higher than others against the set of criteria. This is because the identified revenue stream appears more solid than in social infrastructure projects and the projects show potential to be commercially viable without significant Government support.
 - In addition to the mining related projects, high scoring projects are those where there are prospects either for end users payments and/or for the Government being off-taker in order to ensure a predictable revenue stream.
 - In social infrastructure, it might be worth investigating PPP opportunities, such as the University Campus and the Food factory, as opposed to residential units whose complexity and unclear demand might not suggest them as suitable PPP pilot projects.
- **Challenges for PPP implementation.** Even top ranking projects present complexities and issues which will need to be addressed if they are to be successfully implemented. Some of these issues relate, for example, to tariff setting in the energy sector, volume and demand risk in road projects, and PPP structuring in the University Campus project.
 - **Indicative project ranking.** The results of the project ranking suggest which projects seem to have better prospects for being implemented on a PPP basis. These are set out below.

Table 1: Project ranking

Name		Base Case
1.	Tavan Tolgoi Power Plant	95.0%
2.	“Food Factory”	71.2%
3.	Power Plant N.5	67.4%
4.	University Campus	60.4%
5.	Apartment block XIV	53.4%
6.	Khoshigtyn Hondy Highway	50.0%
7.	Power Plant in Dornod Province	45.4%
8.	Orhon Gobi Reservoir	44.4%
9.	“Sainshand” industrial park	44.2%

- The analysis is relative rather than absolute, with the resulting ranking having been established through a series of judgements, rather than through detailed analysis based on hard data and information. As such, the ranking should be considered as indicative and should not be interpreted as the result of an overly scientific approach. As set out, the ranking was driven by the amount and quality of information available on each

project. While sufficient data was available for some projects, others lacked enough information and basic assumptions about how they might be structured as PPPs had to be applied. Further analysis and development work could also well have an impact on these rankings.

- **Trade-off between socio and economic impact.** In selecting pilot PPP projects there is likely to be a trade off between socio and economic development impacts. Some projects which score high in terms of economic impact, comprising both the direct and indirect potential benefits to the country's economy, score lower in terms of social impact mainly due to the negative impact on the environment. The analysis attributes slightly more weight to the economic impact, should the Government decide to attribute more weight to the socio impact, again the project ranking may change.

Introduction

This report was prepared with financial support from the Public-Private Infrastructure Advisory Facility (PPIAF).

This section summarises the scope of work and the content and structure of the report.

Scope of work

The current state of infrastructure in Mongolia is inadequate to meet the needs of economic development, driven to a large degree by the potential for exploiting Mongolia's substantial mineral reserves, and the demands of increasing the social and economic welfare of its population.

The purpose of this strategy is to develop and apply a methodology and criteria to analyze a long list of projects and identifying those that, on the basis of the available information, appear most suitable for further investigation and potential development as public-private partnerships (PPPs).

In addition to PPP infrastructure projects that support the mining sector, which is of central importance to the Mongolian economy, many projects on the long list are non-mining related. The main objective was to identify projects from the long list of potential PPPs which appeared to be potentially suitable for a PPP structuring and which were consistent with the Government's priorities for infrastructure development.

A discussion on the context for the assignment and on the approach used for the analysis is set out in Section 2. This section is important to understanding the approach taken to develop the strategy.

Purpose and content of this report

This report sets out the criteria and methodology used to evaluate PPP projects and sets out findings and recommendations.

The remainder of this section is structured as follows:

- Section 2 sets out some key considerations relevant to the assignment, including an overview of the approach and recommendations in interpreting the results of the analysis.
- Section 3, 4, and 5 set out the methodology and the results of the analysis for each phase of the project analysis performed.

- Section 6 sets out observations on the overall PPP strategy arising from the work.
- Section 7 sets out key conclusions and recommendations.

Assignment context and issues

Introduction

In this section a rationale for the methodology adopted for this assignment is provided together with some of the relevant key concepts which have been applied.

Factors determining the approach

A number of factors have driven the approach adopted:

- **Understanding PPP and nature of PPP agreements.** The starting point for developing PPPs in infrastructure is to identify types of project where optimal risk transfer is likely to be realised and which are bankable by the private sector. In doing this, there will be inevitable trade-offs with public sector policy objectives. It is therefore important to have a view as which types of projects should be put into a PPP program, reflecting the ability to transfer types and magnitudes of risks and whether or not this reflects value for money. It is important to ensure that the PPP program is not limited to projects that are 'left-over' after all public resources have been allocated, since such an approach will be very unlikely to succeed.
- **The role of scoring methodologies in project pipeline analysis.** The short-list of projects was subjected to a *qualitative* analysis in an effort to rank them. The ranking process is only possible by assigning subjective scores and weights based on otherwise objective criteria. While this analysis is based on careful consideration of the information available and international best practice with PPP (subject to local constraints and realities), it is not a scientific analysis of the projects involved. Further analysis of the project pipeline, for example based on improved and updated information, should be based on the principles of the analysis rather than the specific scores and weightings applied.
- **The appropriateness of available information and data.** Since the government's PPP program is at a very early stage, it is reasonable that the GOM has no experience and limited capacity in PPP project screening, structuring and implementation. The required capabilities will be developed over time and mostly through learning by doing. There have been early efforts to create a PPP center of excellence, or PPP Unit, through empowering the State Property Committee (SPC). However, as a result of the early stage of the PPP program, the project descriptions and information available have not been directly relevant to screening and assessing the suitability of projects for PPPs. The GOM has been highly supportive in developing this strategy,

however, it has not been able to provide ideal amounts of information and data on projects included in the list, in large part due to its limited experience with PPPs.

- **Knowledge transfer.** During preparation of the strategy, the importance of setting key criteria for PPP screening was emphasized, not only to suit the scope of the analysis, but also for the purpose of knowledge transfer to the GOM (through the SPC and Line Ministries), which ultimately will need to develop their own methodology for project pipeline analysis. The list of selected projects is intended to evolve over time and be updated by the Government to reflect the current status of the PPP program.

The role of the analysis and the relevance of the findings

The analysis identified a short-list of nine projects out of 121 included in the long project list which seemed to have potentially the minimum requirement for PPP implementation. In interpreting the findings and conclusions set out in this strategy, the following must be borne in mind:

- **Project selection for pilot PPP transactions.** This analysis and its findings contributes towards understanding relevant criteria for screening PPP projects and suggests some projects which might be worth considering as PPP pilot projects. However, it is GOM's responsibility to select the pilot projects for PPP implementation and those projects it selects might, for a variety of reasons, be different from the top ranking projects set out in the analysis. The nine projects were selected and evaluated on the basis of the information available at the time of consultations and of the feedback received from the IFC, the World Bank and various government officials. Should new factors become relevant for the project screening, the results of the screening might change.
- **Project evaluation and ranking.** In the Phase 2 analysis, weights were applied to criteria as part of the scoring of projects, such that the GOM may decide to apply different weights. It is recognized that, for example given the trade-off between social and economic impacts, the weights assigned should be in compliance with GOM's priorities and policy decisions. Again, should GOM have different views on weights, the ranking of projects may differ from the results presented. While the project ranking is a useful starting point, more relevance should be instead given to the qualitative considerations developed in the evaluation process and to the additional considerations set out around PPP structuring and economic viability set out in the Phase 3.

The approach to project screening and evaluation

Taking into account the above, a three-phase approach was developed, namely:

- **Phase 1 – short-listing.** The first component was a pass-fail test designed to eliminate projects: (i) which do not satisfy key basic criteria for PPP implementation; or (ii) for which there is insufficient information to make an initial evaluation. As a result of the short-listing, the long list of 121 projects was reduced to a short list of nine projects.
- **Phase 2 – ranking.** The second component entailed a *qualitative* evaluation of projects which have passed Phase 1 in order to generate a ranking of short-listed projects.
- **Phase 3 – further analysis.** The third component entailed further consideration of PPP structuring issues and on viability issues, in part using international best practice and benchmarks, as well as quantitative analysis where sufficient project data was available.

Phase 1

At the commencement of the strategy, meetings focused on:

- understanding GOM priorities for infrastructure projects;
- gauging data and information on projects included in the long list which was provided prior to visits; and
- discussing the suggested methodology for project screening.

As a result of the consultations and information collected, it was determined that most of the projects on the long project list had not been populated according to the relevant criteria and the requirements for PPP transactions. As such, the Phase 1 approach involved a pass-fail test to identify selected projects which, on the basis of the information available, might meet the key requirements for PPP implementation. This test enabled the selection of nine projects to be considered for a qualitative project by project analysis. The criteria used for the pass-fail test are detailed in Section 4, the results of the analysis are set out in Section 4.

It is important to clarify that the nine projects which have been shortlisted and considered for further analysis are not to be interpreted as projects definitely viable for PPP, but rather as projects which appeared to have minimum requirements for PPP implementation, and further analysis is encouraged to assess their feasibility.

It should also be noted that some projects could have been suitable for private participation but were not short-listed. The main reason for this was that potential private partners had already been identified and so those projects could not be competitively tendered

Phase 2

The methodology entailed evaluating each project against a set of key criteria for PPP implementation. In some cases, assumptions on potential PPP structures for the projects in question were necessary. In order to allow for comparison, a scoring methodology which captured the qualitative considerations relevant to each project and which allowed projects to be evaluated and ranked against a set of criteria was developed. Results of the Phase 2 analysis are set out in Section 5. In order to appropriately interpret results, the following clarifications are in order:

- The scoring methodology should be interpreted as a mechanism for an indicative project ranking rather than as an exact scientific process – the scoring itself is subjective by nature and highly dependent upon the information at a given stage (and which may change over time).
- Specific weights in the scoring are likely to differ on the basis of policy priorities.
- In evaluating projects, rudimentary specific information and international experience in PPP projects were combined to: (a) infer suggested potential PPP structures; and (b) to identify key issues.
- The results of Phase 2 are not conclusive and further technical and financial analysis is required to assess the feasibility of the selected projects.
- Results were informed by information and data provided. In most cases, these were provided either by the GOM and or by the World Bank Group.

Phase 3

During Phase 3, further analyses on potential PPP structures, risk allocations and viability issues, were carried out on a project by project basis.

This analysis was undertaken, utilising the information available and international experience with implementing and structuring infrastructure projects. Inevitably, the dominant issues were similar for projects with similar characteristics (for example, for projects in the same sector or sub-sector). Therefore, these key structuring and viability issues were considered in parallel where appropriate. It should be emphasised that, in all cases, further analysis, over and above that conducted through the development of this strategy, will be required to determine technical and economic viability as well as appropriate PPP structures, through engineering and financial feasibility studies.

For some projects financial and economic analysis was carried out through the use of cash-flow modelling which was based on international benchmarks. A cash-flow based analysis for those projects where basic information (e.g. project specifications, capacities etc) was available when the analysis was undertaken.

The main benefit arising from the cash-flow modelling has been to identify key issues of economic viability, bankability and PPP structuring, such as the impact of different costs, commercial risks, user payments and subsidy needs in different projects. Such “first-cut” cash-flow analysis, however, should *not* be regarded as sufficient for assessing the pre-feasibility of the projects or in determining PPP options, which would be part of the scope of work for further PPP project preparation.

It is also important to point out that in some cases, the modelling analyses are based on assumptions on key inputs, such as investment costs.. The limited reliability of the modelling assumptions weakens the reliability of the modelling outputs and caution is encouraged in interpreting results and in drawing conclusions.

Conclusions

Project screening for PPP transaction requires a clear understanding of PPP concepts. It involves several “judgement calls” on particular projects, particularly given the limited information available. In the absence of such information, which cannot be substituted for, overly complex modeling, has the potential to be spuriously accurate. An approach has been developed and implemented which aims to balance the need for qualitative considerations with the desire for objective analysis, taking into account the limited amount of information, the length of the initial project list, and how this list was populated.

The GOM might decide to adopt this or a similar approach to project screening and updating the project pipeline over time. The detailed methodology is set out in the following sections of the strategy.

Phase 1: Pass-fail test

As outlined in Section 2, the objective of Phase 1 was to generate a short-list of projects for further consideration. The long list consisted of 121 projects that were provided by line ministries and the SPC. The section outlines the analytical approach taken, as well as the results in developing a short list of projects.

Overview of the approach

The approach involved applying several “pass-fail” criteria to the long list of projects. The criteria applied, together with the reasons for selecting them, are set out in Table 3.1.

Table 3.1: Criteria used in Phase 1

<i>Identifiable potential source of revenue</i>
<ul style="list-style-type: none">• This is the key requirement for a PPP transaction. A robust revenue stream is needed to enable the private sector to recover its up-front capital expenditure over the life of the project and deliver an appropriate risk-adjusted return.• This could take the form of services charges paid by the sponsoring ministry/authority, direct charges levied on users of the service/asset once operational or a combination of the two• In Mongolia, the mining companies play a significant role in providing a secure revenue stream for infrastructure projects. The involvement of mining companies is likely to be key in the identification of viable projects suitable for PPP implementation.
<i>Suitability for implementation through competitive tender</i>
<ul style="list-style-type: none">• The procurement approach is typically at the core of the PPP process, as effective competition should contribute to the realisation of value for money. Where there is a shortage of qualified bidders for a project, the overall PPP structure might be questioned since there is limited attractiveness to the private sector.• A competitive tender process will only be possible where there is no incumbent investor/developer with pre-existing rights for the development of the project.
<i>Availability of information</i>
<ul style="list-style-type: none">• A minimum quantity and quality of information is needed to evaluate a project, even at this preliminary stage. As a minimum, it must be possible to identify what the infrastructure need is, what the potential demand for the related service would be and reconcile the project proposition with the Government’s priorities.

As noted elsewhere, the key aspect of screening PPP projects is the identification of a revenue stream. While projects involving strong and secure end-user payments are likely to qualify, this is not the only form of revenue stream. Indeed, projects might be viable even without end-user payments if the government allocates a budget over the life of the contract to make performance-based payments to the private sector contractor to cover ongoing and

capital costs. This would be the case for with “public” or “merit” good characteristics, where the public sector is likely to be the purchaser/ provider of final services such as health and education. In addition, a government subsidy for a project where revenues are expected to be small (compared with ongoing and construction costs), such as capital grant, soft loan, user subsidy, etc., can mean the project is suitable for PPP.

Table 3.2 lists some of the important questions to be asked of a project during screening in order to identify a possible revenue stream and undertake further assessment. These questions are, again, indicative rather than comprehensive.

Table 3.2: Key questions in identifying

Question	Yes/ likely/ unlikely/ no
1. Are there likely to be end-user payments?	[...]
2. If so, are these likely to be significant volume and size to cover: Operating and maintenance costs Construction/ capital costs	[...]
3. Is government the purchaser of services?	[...]
4. What forms of government contribution or support are possible, if any? Availability payments Ongoing user subsidies Capital subsidies Volume guarantees or other contingent products	[...]

Results

The nine projects which progressed to Phase 2 are set out in Table 3.3, together with a brief background on each.

Table 3.3: List of selected projects

Name	Notes
Apartment blocks VII	Project identified as a priority by MRTAUD. Anticipated that housing will be privately developed, but that supporting social infrastructure will be a GOM responsibility. Government would need to subsidise provision of social infrastructure. Uncertain whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available.
University Campus	The GOM does not have funds to pay total construction and operating costs for new university accommodation, for example, through availability payments. Most colleges do not currently receive subsidies at present, such that the burden of funding is on tuition fees (that is, user charges). Some state universities receive an element of subsidy to cover estate costs. The tuition fees set by GOM are not sufficient for full cost recovery from

Name	Notes
	students. So while there is an identifiable source of revenue, the viability will depend on the regulation of tuition fees and the contribution of government.
Food Factory	Potentially can be structured in an attractive way with guaranteed offtake by the public schools. Information is limited at this stage and the potential PPP model is unknown.
Tavan Tolgoi Power Plant	Power plant would principally support mines – which will be expected to pay full cost recovery tariff – and also some domestic/ non-mining consumers (who will pay subsidised tariff). Forecast demand from Tavan Tolgoi (TT), Oyu Tolgoi (OT) and Tsagaan Suvarga (TS) around 600MW-yr.
Power Plant N.5	Immediate need for increased power and heat in Ulaanbaatar. Installed capacity needs to increase to 1.5GW in next 15-20 years to meet needs of population growth and urbanisation. Current capacity insufficient to meet city's power requirement in winter; such that power is currently imported from Russia. Project previously tendered (in 2008) as IPP but unsuccessful. ADB now providing technical assistance to GOM to develop a technical specification and bid documents.
Power Plant in Dornod Province	Expansion of existing Power Plant..Currently sparsely populated area but with potential for population growth and mining/oil firms.
Orhon reservoir	Users, including mining companies and private customers, provide a source of revenue and potential anchor off-take. The project would provide an alternative water source to support mining activities since the remaining life of ground water reserves, which are estimated to be 5 to 15 years. The project requires strong political will (and potential financial support), but it is not necessarily a priority.
Highway to Khoshigtyn Hondy	The tolling of the highway could provide a clear and credible revenue stream to fund the road, subject to sufficient traffic volumes. Construction for new airport expected to commence in 2011, although it is not expected to be ready for several years.
“Sainshand” Industrial Park	National Development Innovation Committee (NDIC) has medium term strategy for development of this project over next five years. Capital cost for all components as high as US\$10 billion. The project crucially relies on mine freight traffic flowing through the south east rail connections to Sainshand.

The remaining projects did not meet the key requirements for short listing. The breakdown of reasons for this is set out in Table 3.4. On the basis of the available information, some projects did not show sufficient revenue streams to justify a potential PPP structuring and some other projects are not eligible for a competitive tender. Other projects did not pass the test, because insufficient information was provided to assess their suitability for PPP implementation.

Table 3.4: Breakdown of results of Pass/Fail test

Category	Number	Pass-fail test
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Identified revenue stream	9	Pass
Revenue stream not identified	84	Failed
Not suitable for competitive tender	12	Failed
Lack of sufficient information	16	Failed
Total	121	

Annex A sets out detailed results of the pass-fail test on a project by project basis.

Conclusions

As a result of this analysis in Phase 1, the following points are relevant:

- **Government priorities.** It is a policy decision to assign priorities to projects. The results of the analysis were informed by the information during development of the strategy. It should be noted that some projects which were not shortlisted for lack of identifiable revenue streams are projects which would need Government support and, since they are not considered a priority, a budgetary allocation had not been identified. As GOM priorities change, the results of the analysis may change as budgetary allocations might be made available which were not so when the consultation process took place.
- **Desirability of project.** Projects which were preliminary assessed as not suitable for PPP implementation should not be treated as projects that should not be assessed further. In most of the cases, a project included in the list responds to an infrastructure need, identified by the relevant department, which most likely has to be addressed at some point by GOM.
- **Availability of information.** Only information made available during development of the strategy was considered. In many cases, the project descriptions which were provided did not include the appropriate information for PPP considerations (even at a 'pass-fail' stage). In a few cases, feedback from the GOM suggested that projects which initially passed the Phase 1 were not supposed to be screened for PPP implementation, for example because they are funded by state budget already or because they are not regarded as priority projects by the GOM. As the Government agencies and SPC develop the ability to produce and assess relevant project information for PPP, the list of shortlisted projects may increase.

Phase 2: Ranking short-listed projects

The objective of Phase 2 was to utilize qualitative data and experience from PPP internationally to score projects and generate a ranking of short-listed projects to inform the screening process. The section outlines the analytical approach and results of Phase 2.

Overview of the approach

Projects proceeding to Phase 2 were evaluated against a set of criteria, mainly on the basis of qualitative considerations. The criteria for scoring were the following:

- Appetite and prospects for private sector involvement;
- Ease and speed of implementation and structuring of the PPP transaction; and
- Potential socio-economic and development impact.

These criteria have been assessed on a qualitative basis, that is, without processing of analytical data and projections of financial, economic and social returns. In order to undertake this evaluation in an objective and balanced manner, a scoring approach was identified for each of the main criteria. Each criterion is explained below.

Appetite and prospects for private involvement

In order to attract private sector interest, it is essential that the project:

- is **affordable** – that is, project revenues must be able to cover costs, including financing costs;
- has an appropriate **risk allocation** – the risks allocated to the private sector partner either need to be manageable or else possible to insure or hedge; and
- is **bankable/financeable** – there must be a strong prospect that the project will be able to raise the required financing such that the project reaches financial close.

Table 4.1 sets out how these considerations were applied to the analysis given the context outlined elsewhere.

Table 4.1: Criteria to assess the likely private-sector appetite for a PPP projects

Criteria	Comments
Economic/financial viability and project bankability	<ul style="list-style-type: none">• The underlying economics of a project are central to whether or not it can be packaged as a PPP. While this is indirectly considered in other sections, it contributes to many different aspects of PPP suitability. In

Criteria	Comments
	<p>addition, project bankability, i.e. the prospects of a project reaching financial close, should be considered. This might apply where a project has greater prospects of raising finance if there is a hard currency revenue component or if the off-taker (e.g. utility company) has a sound financial footing.</p> <ul style="list-style-type: none"> • The potential structure and solidity of revenue flows was examined to identify fundamental risks that might deter investors. • The likely need for Government support has also been taken into account.
Investor appetite	<ul style="list-style-type: none"> • Since there might be lack of local capacity, it would be desirable to develop a local investor market through the PPP program. In order to do so, international presence might contribute to strengthen local capacity. Hence, it would be advisable to verify both local and international appetite from investors. • There are a number of international corporates, including mining companies, already investing in Mongolia which is encouraging for the PPP program. However, as noted elsewhere, international investor appetite for PPP projects will depend on a number of variables including project size (international investors will not be attracted when the project is below the minimum efficient size); and perceived levels of project/ country/ financial risk and the ability to hedge or manage risk exposure. Some regional investors will be interested in developing projects in power and transport sectors on the back of export credit financing. • Suitable contract design, e.g. structuring a larger contract instead on many smaller contracts, can also help to attract international private sector participation.

At this stage, the appetite for private sector participation is largely driven by the project economics and the more or less likely project viability. In addition to project economics, the potential interest of local or regional investors was also considered.

Implementation and structuring

Table 4.2 sets out the relevant components of this criteria, each of which has been assessed on a qualitative basis.

Table 4.2: Criteria to assess issues related to implementation and structuring of PPP projects

Criteria	Comments
Complexity of PPP structuring	<ul style="list-style-type: none"> • PPP structuring and procurement involves complex issues of risk allocation and long-term contracting, which in turn require time and resources in project development. The resources required for developing PPP projects can be substantial, particularly for ‘path-finding’ or break-through transactions. Therefore, it is desirable to ensure that those projects conducive towards a relative simple PPP

Criteria	Comments
	<p>structure are prioritised, since this will economise on the time and resources (and potential post-contract renegotiation) involved.</p> <ul style="list-style-type: none"> • A clear risk identification and allocation between the public and the private sector improves the simplicity of a PPP transaction.
Stable long-term planning horizon (i.e. few changes to level/ type of services over life of contract)	<ul style="list-style-type: none"> • PPP contracts relying on a public sector payment stream rather than user charges, require the Public Authority to enter into a commitment which may extend for 25 to 30 years and do not offer much flexibility to change the type or level of service provision once the project has reached financial close and the contract has been signed. This lack of flexibility means that these types of PPP transaction are most suited to projects with a stable planning horizon.
Compliance with PPP policy and concession law	<ul style="list-style-type: none"> • A clear policy framework is the foundation for long-term planning and contracting in a program. It is essential that priority projects deliver the objectives and rationale for the use of PPPs and comply with Mongolian PPP policy as it develops, as they will form ‘exemplars’ for taking the PPP program forward. In reality, the existing concession is broad and is likely to exclude few projects. • The Mongolian PPP policy identifies a number of private participation models that could be used for the delivery of shortlisted projects, including build-operate-transfer (‘BOT’), build-own-operate (‘BOO’) and design-build-finance-operate (‘DBFO’). While the PPP policy makes reference to the possibility of using other delivery methods, it would be advisable to select priority projects which fit one of the established model structures in the first instance, to improve the speed and likelihood of project delivery. • Along the PPP implementation, further legal requirements might have to be met.
Institutional/ regulatory environment	<ul style="list-style-type: none"> • Related to the above, projects that minimise the need for regulatory and institutional reforms should be prioritised. The enabling environment has been mainly assessed on sector by sector basis.
Public/ social acceptability	<ul style="list-style-type: none"> • International experience shows that projects subject to strong stakeholder and public opposition are likely to take longer in terms of project procurement and to be less successful once implemented. Therefore, those projects which are less likely to garner public opposition have scored higher than the others.
Project size sufficient to absorb procurement costs	<ul style="list-style-type: none"> • The likely costs of PPP procurement are significantly greater than for other types of public-sector procurement, for example, design and build, because of the need to structure detailed output specifications prior to the competitive tender process and agree contract terms before financial close. • This process requires substantial public sector resources in addition to specialist legal/ financial and technical advice. It follows from this that PPP’s are not cost-effective for small projects, unless these can be ‘packaged’ together. Other countries have found such bundling of projects useful in social infrastructure sectors where discrete projects or expenditures by an individual Public Authority may lack scale. • However, overly-large projects become less attractive without plenty of

Criteria	Comments
	Government support or involvement of International Finance Institutions.

Socio-economic development impacts

This criterion seeks to capture the socio-economic development impacts of each project. Sub-criteria could be separated according to those focussing mainly on social impacts and those focussing more on economic impacts.

Tables 4.3 and 4.4 set out the relevant components of the social and economic impacts respective.

Table 4.3: Criteria to assess the social impact of PPP projects

Criteria	Comments
Number of people with access/improved service	<ul style="list-style-type: none"> • The main absolute impacts of infrastructure provision concern the number of people with access to services, the quality of service experienced, and the end user cost of these services. This may be summarised as the overall reach and value for money of infrastructure, and will be reflected in direct and indirect impacts on other economic and social activity. • For the purposes of qualitative analysis, the strategy assesses and prioritises the potential reach of an infrastructure project on the basis of aspects such as project size, proximity to population and scope of services.
Distributional impact	<ul style="list-style-type: none"> • Infrastructure projects might also be prioritised by the extent to which the impacts are concentrated among lower income groups and those experience particular social problems. For example, the impacts of a rural road project are much more likely to be distributed among the poor than an intercity highway. In reality, there is often a direct trade-off between pro-poor impacts and overall project viability without public subsidy. • For the purposes of qualitative analysis, the analysis of scale of impact can be extended to determine whether affected users are likely or otherwise to occupy low income groups.
Environmental impact	<ul style="list-style-type: none"> • While some projects may involve a positive environmental impact, the likelihood is that projects will be prioritised for minimising negative environmental impacts such as pollution and other risks. This can remain as a qualitative sub-criteria, but clearly any catastrophic potential impacts or risks should be identified as a barrier to project development in the first instance.

Table 4.4: Criteria to assess the economic impact of PPP projects

Criteria	Comments
Private sector investment facilitated	<ul style="list-style-type: none"> • A clear and direct impact of a project is the ‘crowding-in’ effect in terms of financial resources. Given finite public resources, the extent to which a project can attract private capital where this would otherwise have not been the case allows resources to be freed for other uses. Private-sector finance will be more efficient where the incentives arising from risk transfer and investor/ lender oversight are greater than higher cost of government finance. Therefore, the greater the ratio of private to public/ donor funding in a project, the higher the priority it should receive. This will largely be determined by the underlying viability and PPP structure of the project. • For the purposes of qualitative analysis, the likely size of a project, necessary government contribution and the envisaged PPP structure as proxies for private-sector contribution are considered.
Fiscal impact	<ul style="list-style-type: none"> • Projects that make a direct net contribution to government finances should be prioritised to some extent, given the high opportunity cost of government resources. This might be because private-sector provision reduces the burden of a particular infrastructure asset or service through improved management (although restructuring costs may be required upfront). Concession fees, lease payments and tax revenues may all feature. It should be noted that projects that make a net contribution to government revenues are likely to be viable in their own right and so the main benefit for government would be a reduced financing liability. • For the purposes of qualitative analysis, an examination of the potential contribution to fiscal position will be considered by: (i) the fiscal burden of alternative provision of infrastructure services; (ii) the direct revenues and economic activity likely to be generated from the project (and so likely fees and tax revenues); and (iii) any likely upfront windfalls in terms of asset sales or concession fees (accepting that this is unlikely for the current list). • It must be noted that this criterion partially overlaps with the one above.
Wider economic impact and contribution to economic growth	<ul style="list-style-type: none"> • Infrastructure projects can have direct and indirect impacts on wider economic activity and growth. In particular, infrastructure services are often interlinked and can enhance economic activity through networks of activities. • For the purposes of qualitative assessment, a judgement will be made on whether a project is likely to reduce costs for users of transport, power, water and other services and so enhance overall productivity. In addition, assessments of whether a project is likely to alleviate a given bottleneck, e.g. by reducing load shedding in power, queues for transport access or delays to border crossings, could be carried out. • Clearly, infrastructure projects aimed at supporting the mining activities are likely to have a significant impact on economic growth.

Scoring methodology and project ranking

The scoring methodology was deliberately kept simple to enable maximum transparency. Each sub-criterion was scored out of five. Weights were then assigned to the sub-criterion to reflect relative importance and the evidence available under that sub-criterion to produce a weighted average score out of five for the overall category. This approach to project ranking is described in more detail below.

Scoring methodology

A basic scoring of each sub-category out of five was sought to maintain a simple and transparent approach. For each of the key criterion, this is processed into a percentage score based on the weighting of each sub-criterion. This percentage scores for the key criteria are then weighted themselves to get an overall score through which to rank projects.

Suggested approach to weighting

Key criteria

The weights applied to each of the key criteria are based on the key aspects of preparing PPP projects and understanding of government priorities. The following weights have been applied:

- Appetite for private sector involvement shall be weighted highest (50% of the total), since this refers to underlying features of a PPP project. The project cannot be offered to market or raise finance without meeting a threshold of viability or bankability. It is also the most objective criterion, although some assumptions of the proposed PPP structure (e.g. availability payments) may be necessary.
- Implementation/ structuring and socio-economic impact are weighted in similar ways (20% and 30% of the total respectively). As noted elsewhere, the ease of implementation for a given project is a flexible feature (i.e. a project can be simplified) while project complexity will not necessarily be a critical barrier. While socio-economic impacts are an important underlying feature and reflect policy priorities. For example, the government make determine that the overall socioeconomic impact is less or more important for pilot projects than the ease of structuring, and this may even change over time.

The key point to remember is that, while the weights assigned in this strategy are those of the authors, it will be up to GOM, the SPC and Line Ministries to assign weights with which they feel comfortable.

Sub-criteria

The same is true of the weighting of sub-criteria, described in Table 4.5 below. These are again informed by the key aspects of PPP project preparation, but also the understanding of government priorities. For example, the government seems to favor projects that accelerate economic growth over those with broader social impacts. Again the specific choice of weight will be up to the stakeholders involved.

Table 4.5: Weights assigned to sub-criteria

Private-sector appetite	Weight	Notes
Economic viability	80%	Economic viability and overall bankability are the key determinants of PPP <u>Indicators:</u> solid revenue stream, reliability of off-taker, hard currency components, donor appetite
Investor appetite	20%	Investor appetite is likely to follow from viability, although investors will prefer some project types <u>Indicators:</u> well understood PPP model, risk identification and allocation, adequate size, strategic relevance for regional investors
Socio-economic impacts	Weight	Notes
Private investment	20%	Private investment is a key aim of the PPP program <u>Indicators:</u> likely private revenues, project size
Fiscal impact	20%	Partly reflects value for money for the government <u>Indicators:</u> private revenues, up-front fees to government.
Economic growth	20%	Enhancement of economic activity and growth <u>Indicators:</u> links to other economic activity
Number of people	20%	Reflects the purpose, scope and reach of services <u>Indicators:</u> proximity to population, usability of services
Distributional impact	10%	Growth is a priority over anti-poverty impacts <u>Indicators:</u> proximity to poor population, affordability of service
Environmental impact	10%	Environmental impacts are not a priority <u>Indicators:</u> expected GHG impact
Implementation/ structuring	Weight	Notes
Structure complexity	30%	Projects with a simple structure are more likely to reach financial close and avoid ex-post disagreements <u>Indicators:</u> risk identification and allocation, well understood PPP model

Planning horizon	20%	Long term horizons are key for private investment <u>Indicators:</u> demand for services over the long-term
Enabling environment	20%	The institutional framework for the project should be in place with limited reform required <u>Indicators:</u> is sector conducive towards PSP
Public acceptability	20%	The execution and management of a PPP will be more effective in the absence of public opposition <u>Indicators:</u> politically sensitive user payments; political sponsorship; perceived public benefit
Sufficient project size	10%	Project must absorb the significant procurement costs for PPP <u>Indicators:</u> is the size above a min. threshold

It should also be noted that the indicators used for different projects, given the information available, involve some overlap between sub-criteria and key criteria. Rather than indicating any ‘double counting’, this reflects feedback effects of some aspects of PPP. For example, the economic viability for a BOT project may also influence the likelihood of government raising fiscal revenues or the likely scale of private investment.

When using project size as an indicator for extent of private investment and the ability of the project to absorb procurement costs, thresholds have been used by which to judge. For example, based on experience of procurement costs and project size, it is likely that smaller projects of less than US\$30 million in cost score *zero*; projects up to US\$60 million score *three*; and above US\$60million score *five*.

For private investment, the project size is scored proportionately up to US\$400 million (so a project of US\$80 million would score *one*); anything above this receives maximum marks. This is, therefore, a relatively simple rather than highly prescriptive approach – indeed the threshold of US\$400 million was agreed since it provides a sensible level of variation in scoring (while not biasing towards some very expensive projects). Similarly, for the number of people with access or improved access to services, a rudimentary estimate is made based on information provided or local population likely to benefit. This is compared to a threshold of 100,000, such that a project affecting 60,000 people would score *three*. This threshold provides a sensible level of variation between projects.

Example of scoring

Tables 4.6 and 4.7 show a worked example of scoring sub-criteria and key criteria respectively for a hypothetical project. The unweighted score of 12 for implementation and structuring equates to a weighted score of 54% for the key criteria, given the ‘sub-weights’ involved. This score of 54% is then assigned a weight of 20% in the overall scoring, meaning implementation and structuring contributes 10.8% to an overall score of 60.6%.

Table 4.6: Scoring of sub-criteria for a hypothetical project

Sub-criteria	Score (out of five)	Weight	Weighted score
Structure complexity	4	30%	1.2
Planning horizon	3	20%	0.6
Enabling environment	3	20%	0.6
Public acceptability	1	20%	0.2
Sufficient project size	1	10%	0.1
		Composite score:	2.7 (out of 5) = 54.0%

Table 4.7: Scoring of key criteria for a hypothetical project

Key criteria	Unweighted score	Weight	Weighted score
Implementation/ structuring	54.0%	20%	10.8%
Socio-economic	46.0%	30%	13.8%
Private sector appetite	72.0%	50%	36.0%
		Composite score:	60.6%

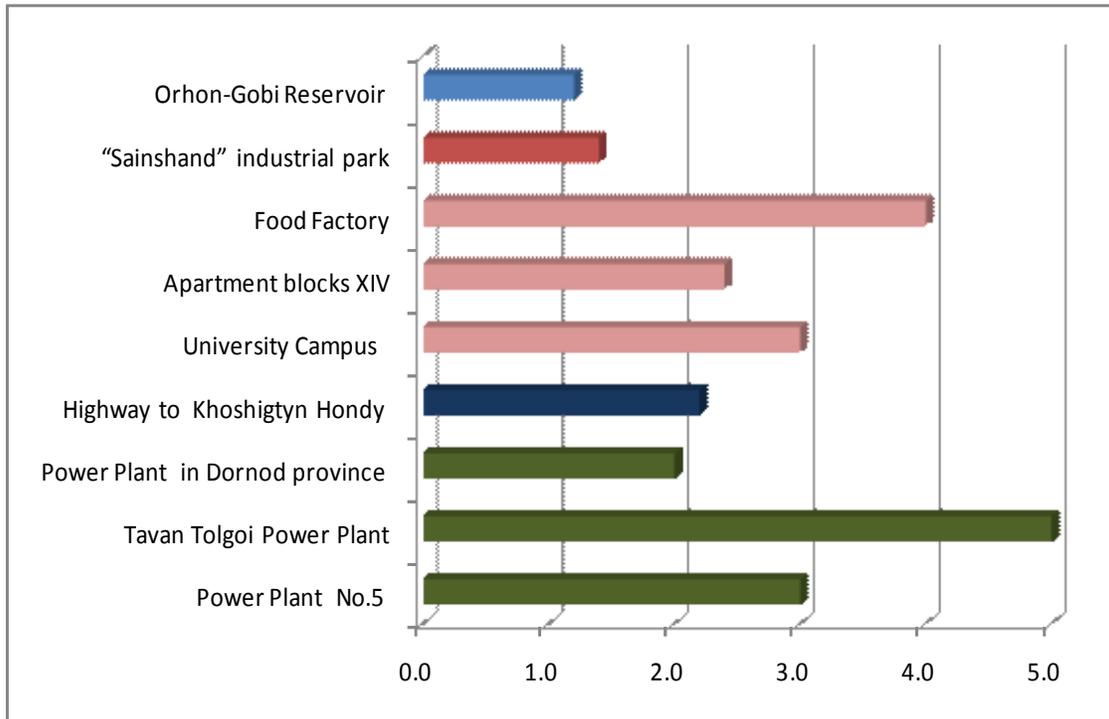
Summary of assessment and results

The summary results of the project assessment against each of the three key criteria are set out in this section. Detailed evaluation tables have been prepared for each project as well. These are set out in Annex B.

Summary of assessment for appetite and prospect for private sector participation

Figure 4.1 shows the results of the assessment of appetite for private sector participation. Annex C sets out the full inventory of scoring for each project.

Figure 4.1: Summary of assessment for appetite and prospects for private sector participation



The following observations arise from the analysis:

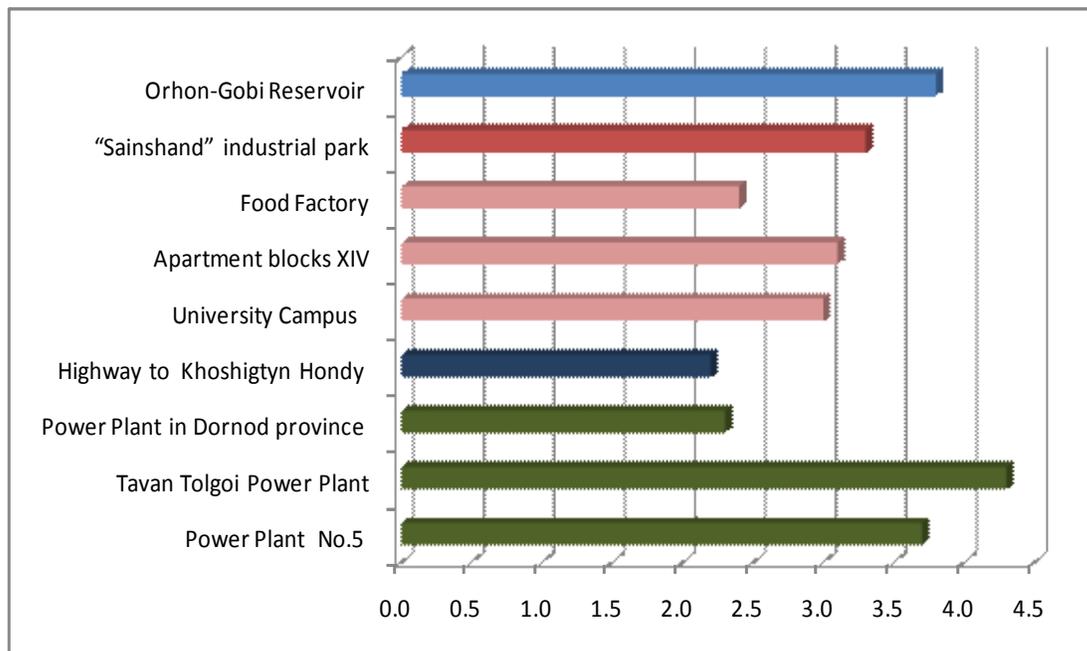
- Projects with robust revenue streams from private sector purchasers of services score significantly higher than other projects. These revenue streams are, in most cases, related to the provision of services to the mining companies whose demand for those services and financial resources creates strong viability. This can be seen with the Tavan Tolgoi power plant where mining companies are expected to be off-takers.
- In other cases, the prospect of sufficient revenue streams comes from the Government willingness to be either off-taker or buyer of services. This explains the estimated private sector appetite for Power Plant N.5 or for the Food factory project.
- End-user payments is typically a key component of other projects which score high against this criterion. For example, the Highway to Khoshigtyn Hondy project might be able to secure a clear source of private funding (i.e. user tolls). The road is linked to international air traffic and it is plausible that this will contribute to interest from regional investors. However, it does not score high relative to other projects, because, according to the GOM, traffic projections suggest that volumes might not be sufficient to make the project viable without some financial support the Government is not willing to provide.

- There seem to be prospects for private investor appetite for residential projects coming from real estate developers, however the economic viability is linked to the willingness of people to rent or buy residential units. There is uncertain demand for fixed housing and integrated services, while budget allocations are likely to be required to ensure long-term payment for social infrastructure.
- Substantial challenges are anticipated to attract private sector interest in the Orhon Gobi Reservoir and in the “Sainshand” industrial park. In the water sector, the current tariff are unlikely to make the project viable and political constraints could be an impediment to set economic tariffs. The “Sainshand” industrial park viability is subject, among other factors, to a large investment in the West-East railway.

Summary of assessment for socio-economic development impact

Figure 4.2 shows the results of the assessment of socio-economic development impact.

Figure 4.2: Summary of assessment of socio-economic development impact



The analysis suggests that:

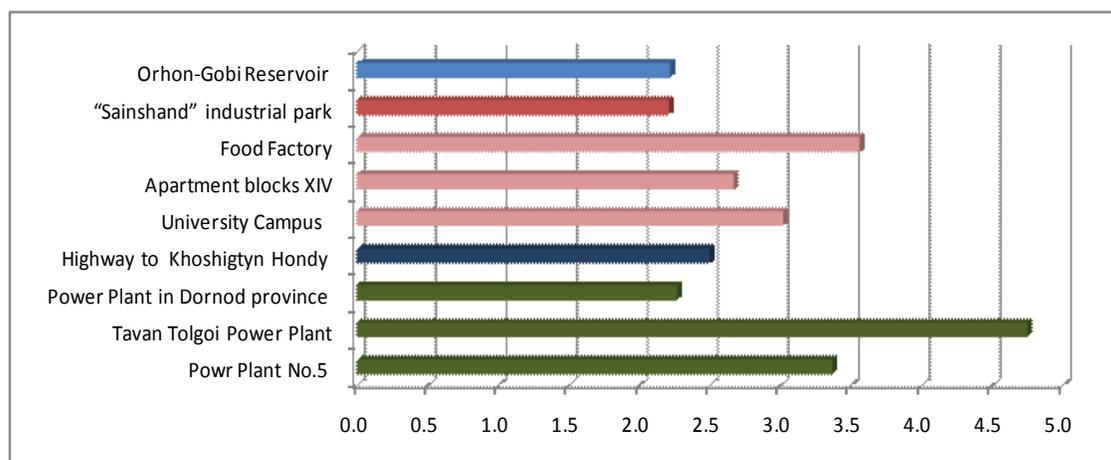
- Social infrastructure projects and water projects score high in terms of their creating access to new or improved services, but they score relatively low in their direct and indirect economic impacts.
- Projects which aim to support mining activities, such as the Tavan Tolgoi power plant, score well for the expected significant contribution to economic growth, as well as other aspects.

- Larger projects (in terms of capital costs) score high in terms of their direct economic impacts since project size is used as a proxy for private sector facilitated. For example, this explains the high scores of the Sainshand industrial park and the Orhon Gobi reservoir.
- Another component of the economic impact is the potential fiscal benefit or cost. In this regard, most projects score fairly low since significant government support is likely to be required. The exceptions are the Tavan Tolgoi power plant, the Power Plant in Dornod province and the Sainshand industrial park where there might be prospects for viability without government support and thus potential for a concession fee or revenue sharing mechanism which would have a positive fiscal impact
- It is worth noting that these results reflect the assessment of two separate components –the social and the economic impact of projects – and that there is a likely trade-off between the two.

Summary of assessment for implementation and structuring issues

Figure 4.3 shows the results of the assessment of implementation and structuring issues.

Figure 4.3: Summary of assessment of implementation and structuring issues



The analysis suggests that:

- Projects score similarly in relation to some components; that is, the long-term stable horizon, the legal and enabling environment and sufficient size to absorb transaction costs¹. There is greater variety in the scoring against the structure complexity and, to some extent in the assessment of public acceptability.

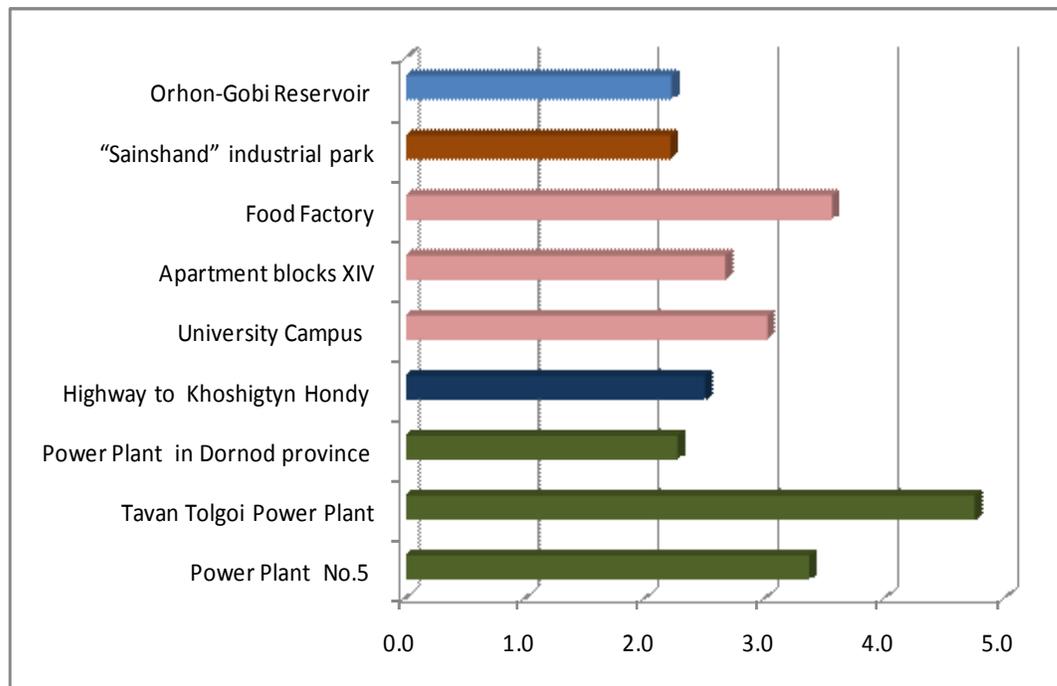
¹ All projects are estimated sufficient size to absorb transaction costs except for the Food Factory whose estimated size is USD 12m.

- Projects with a relatively simple and well understood PPP model are likely to score higher than projects where the transaction is likely to involve greater complexity and creativity. For example, the energy projects and the Highway project received high scoring for PPP structuring, whereas the residential apartments received relatively low scores, due to the need of bundling housing and social infrastructure components and to the complexity of the mortgage programs. The Sainshand industrial park project is also penalized for PPP structuring complexity.
- The majority of the projects are likely to receive large public support, Tavan Tolgoi and the Food Factory, whose need, either economic or social, is well understood, received the highest score; projects whose viability might require tariff increase and thus, might be less easily accepted by citizens, scored lower.

Summary of scoring

The summary of scoring is shown in Figure 4.4.

Figure 4.4: Overall summary of scoring



The major observations from the analysis are:

- The Tavan Tolgoi power plant scores higher than any other shortlisted projects against the criteria used. This is because the identified revenue stream, linked to the mining business, is more solid than in social infrastructure projects, and because it has the potential to be commercially viable without Government support.

- In addition to Tavan Tolgoi power plant,, high scoring projects are those where there are prospects for the Government/public entities to be an off-taker or buyer of services in order to ensure a solid revenue stream. Under the assumption that the GOM is willing to provide support, the Food Factory and the power plant N.5 result to be the second and the third top ranking project, respectively.
- In social infrastructure, it might be worth also assessing the viability of the University Campus and the residential units project, Apartment block XIV, even if, for this latter, the complexity and unclear demand suggest the project might not be suitable to be a PPP pilot project. The University Campus and the Apartment block XIV project, result to be the fourth and fifth top ranking project, respectively.
- It is sensible to keep the Khoshigtyn Hondy Highway project in the PPP project pipeline but since the new airport has not been built yet, effectively there is not any current need to develop this infrastructure.
- A PPP structure for the Sainshand industrial park and the Orhon –Gobi reservoir seem quite complex and their economic viability fairly uncertain. Overall, it is not advisable to select neither one nor the other project for the PPP pilot program.

Ranking and sensitivity analysis

As set out above, weights were assigned to the three criteria for the purpose of project ranking. Weighting is subjective by nature, as is assigning weights to socio-economic impacts, which should be a Government policy decision.

In order to provide evidence of scoring and ranking results, should different weights be used, sensitivities applying different weights were developed. This analysis is based on the following assumptions:

- The Base Case summarises total scoring using the approach outlined above, i.e. 50% weight to appetite for private sector participation, 30% to socio-economic development impact and 20% to the implementation and structuring criteria.
- Scenario A provides total scoring if equal weights are applied to each of the three key criteria.
- Scenario B provides total scoring if 50% weight is given to the socio-economic development impact, 20% to the implementation and structuring criteria and 30% to the appetite for private sector participation.

The sensitivity analysis shows that the total scoring for each project changes according to the different scenarios but the top ranking projects are the same across scenarios. In the lower end of the ranking, some changes can be noticed from one scenario to the other. Table 3.8 sets out the sensitivity analysis results.

Table 4.8: Sensitivity results

Name		Sensitivity		
		Base Case	Scenario A	Scenario B
1.	Tavan Tolgoi Power Plant	95.0%	94.0%	92.2%
2.	“Food Factory”	71.2%	70.7%	64.8%
3.	Power Plant N.5	67.4%	70.0%	70.2%
4.	University Campus	60.4%	60.7%	60.4%
5.	Apartment block XIV	53.4%	54.7%	56.2%
6.	Khoshigtyn Hondy Highway	50.0%	54.0%	50.0%
7.	Power Plant in Dornod Province	45.4%	48.0%	46.6%
8.	Orhon Gobi Reservoir	44.4%	49.3%	54.8%
9.	“Sainshand” industrial park	44.2%	48.7%	51.8%

Conclusions

In Phase 2, the results of the analysis suggest the following:

- **Limited PPP opportunities.** Only a few projects included in the long project list seem to have strong potential for PPP when all key criteria are taken into account. Some projects have potential for revenue generation and self-financing but the majority are likely to be viable only with significant Government financial support.
- **Challenges for PPP implementation.** Even top ranking projects present complexities and issues which will need to be addressed if they are to be successfully implemented. Some of these issues relate, for example, to tariff setting in the energy sector, volume and demand risk in road projects and PPP structuring and project cost in railway projects.
- **Indicative project ranking.** The results of the project ranking suggest that the Tavan Tolgoi power plant, the Food factory and Power Plant N.5 are the three projects with better prospects for being successfully implemented on a PPP basis. However, the analysis is relative rather than absolute, with the resulting ranking having been established through a series of judgements, rather than through detailed analysis based on hard data and information. As such, the ranking should be considered as indicative and should not be interpreted as the result of an overly scientific approach. The ranking was driven by the amount and quality of information available on each project, while for some projects a fairly sufficient set of data were provided. In some instances, basic assumptions and understanding of the envisaged PPP structuring were assumed. Further analysis and development work could well have an impact on these rankings.

- **Trade-off between socio and economic impact.** In selecting pilot PPP projects there is likely to be a trade off between socio and economic development impacts. Some projects which score high in terms of economic impact, comprising both the direct and indirect potential benefits to the country's economy, score lower in terms of social impact mainly due to the negative impact on the environment. The analysis attributed more weight to the economic impact. Should the Government decide to attribute more weight to the socio impact, project ranking may change.

Phase 3: Further issues relating to PPP structuring and viability

Introduction

In Phase 3, further analysis on short-listed projects was undertaken. This included both economic viability and PPP structuring issues. Observations have been grouped into the categories, namely:

- *Possible transaction structure.* Suggests potential PPP structures for the projects and sets out the options and issues involved.
- *Risk allocation.* Summarises the risk identification allocation and mitigation issues based on the transactions structure options identified above.
- *Government obligations.* Suggests the likely need for Government support, including guarantees and direct financial commitments.
- *Sector and cross sector impediments.* Identifies potential delays to the project from the point of view of PPP transaction implementation.
- *Economic valuation.* Provides some further analysis of project viability, in apart through quantitative assessment.

The above have been explored for eight selected projects. Regardless which projects will be selected for PPP pilot implementation, it would be beneficial to the PPP program to take into account the findings on PPP structuring issues and economic viability as regards a wider range of projects. Also, since the PPP pilot projects have not been selected yet, the findings should help the Government in its decision making.

This section presents an section setting out some of the key concepts and ideas. It then presents the eight short-listed projects (in no particular order):

- Apartment blocks XV.
- School lunch program (Food factory).
- University campus.
- Power project 5.
- Tavan Tolgoi power plant.
- Orhon-Gobi.

- Highway to Khoshigtyn Hondy.
- Sainshand industrial park.

Some analysis has been also developed for the Dornod Province power plant, which is one of the short-listed projects and for other projects which were initially short-listed, but have been at later stage not considered for PPP implementation on the basis of the additional information and feedback received from the GOM. This further analysis is set out in Annex E.

Definitions

There are a number of models of private sector participation in infrastructure, primarily distinguished by two key factors, namely: (i) the degree of risk allocation between the public and private sectors; and (ii) the length of the contract period.

Figure 5.1 provides some details on the various models for private participation in infrastructure, highlighting which models are considered as PPPs and which are not.

Figure 5.1: Spectrum of PPPs including level of risk assumed by the private sector

	Type of model	Description	Level of risk assumed by the private sector	Length of contract (years)	Capital investment	Asset ownership	Most common sector in developing countries
	Service contract	Contract for infrastructure support services such as billing	Low	1-3	Public	Public	<ul style="list-style-type: none"> • Water utilities • Railways services
Broad definition of PPPs	Management contract	Contract for management of a part/ whole of the operations	Low/ Medium	2-5	Public	Public	<ul style="list-style-type: none"> • Water utilities
	Lease contract	Contract for management of operations and specific renewals	Medium	10-15	Public	Public	<ul style="list-style-type: none"> • Water sector
	Build-Own-Transfer (BOT) contract	Contract for investment in and operation of a specific component of the infrastructure service	High	Varies	Private	Public/ Private	<ul style="list-style-type: none"> • Energy sector IPPs • Highways • Sanitation/ desalination plants
	Concession	Contract for financing and operations and execution of specific investments	High	25-30	Private	Public/ Private	<ul style="list-style-type: none"> • Airports/ ports/ rail • Energy networks
	Divestiture/ Privatisation	Contract of transfer of ownership of public infrastructure to the private sector	Complete	Indefinite	Private	Private	<ul style="list-style-type: none"> • Telecoms

Models of private participation such as service, management and lease contracts come under a broad definition of PPPs but do not involve any transfer of investment risks, which are a significant component of infrastructure development. There are examples of management contracts where the risk transfer to the private sector is significant (for example, where the remuneration to the private sector is materially linked to performance). In addition, there are some examples of lease contracts where the private sector is responsible for some (limited) investments. However, for the most part, it is helpful to distinguish management contracts

and leases from ‘core PPPs’ which are usually long term in nature and involve substantial investment by the private sector.

Different models of core PPPs are discussed below.

BOT-style contracts

A Build-own-transfer (BOT) arrangement involves a private sector investor developing new infrastructure according to agreed performance standards using its own capital, and will own/operate the asset for a period set by the contract – sufficient to allow it to recover its investment costs through user charges. These user charges, for example power or water tariffs, rail fees and access charges, etc., may be set, regulated or guaranteed by the government and must be sufficient to allow the company to recover its costs over the life of the contract.

A full concession contract will usually involve much greater responsibility to the private sector for development and provision of an infrastructure service, with less specification over different infrastructure components.

DBFO-style contracts

A variation on core PPPs is a Design-build-finance-operate (DBFO) approach, pioneered in the UK under the Private Finance Initiative (PFI). A private investor develops and operates facilities based on ‘output’ specifications decided by the public sector. Under the contract, the public sector does not own the asset, but pays the contractor a stream of committed revenue payments for the use of the facilities during the contract period. Once the contract has expired, the ownership of the assets either remains with the private sector contractor or is returned to the public sector, as per the original terms of the contract.

The key feature of a DBFO contract is that the private sector receives a fixed performance-based payment stream from the government, often in the form of an ‘availability payment’. This payment usually has adjustments for contractor performance, assessed through Key Performance Indicators (KPIs). The PFI type model has been mostly applied to social infrastructure projects such as schools and hospitals in the UK. Their applicability relates to UK government policy on these social infrastructure services being regarded as merit goods – i.e. such that the government provides direct health and education services free of charge to users.

The direct applicability of the DBFO model to lower income countries relies on the capacity of country governments to provide a regular payment stream to the contractor, the poor creditworthiness of some country governments, and, therefore, the higher cost of capital (and lower value for money) in the potential contract.

Risk allocation in a DBFO is shown in Table 5.1. As stated above, the value of the PPP arises through the transfer of construction risk and management of operating performance

(for stated services) to the private sector. Also, synergies are available from having the party designing and constructing the asset also operating and maintaining it (although this must also meet the service requirements of the public entity providing the core service such as schooling/ healthcare).

Table 5.1: Risk allocation in a DBFO

Risk	Allocation
Construction risk	Private
Financing risk	Private
Operating performance risk	Private
Market risk	Public

The key government requirements of a DBFO structure include:

- allocation of departmental budgets to cover the costs of the private party over period (sometimes guaranteed by the Ministry of Finance); and
- clear specification of services to be provided and key performance indicators (KPIs).

Other relevant models

Where supporting infrastructure investments are required to support a new facility (e.g. high voltage power lines in a remote area to transmit power from a new generating plant), and there is a potential conflict of interest arising from integrated ownership, a design-build-divest approach may be suitable.

In this event, an investor in an IPP would be required to develop and finance supporting infrastructure which, once constructed, would transfer (either on a compulsory or optional basis) to the ownership of another entity responsible for operation and ongoing maintenance. This arrangement would enable assets to be developed in a timely manner at a suitable specification and technical standard to support core operations, but would ensure that, through suitable contracting arrangements for the operating period, the power plant would supply to all parts of the grid. This also has direct relevance to mining operations, where mining firms are given a concession for power generation but there is a policy imperative for them to supply to the grid as a whole.

In theory, with the core investor taking construction risk, the ongoing operations and maintenance operations should be attractive for other prospective investors.

Apartment blocks XIV

The residential projects all involve a combination of housing development (private and social) on the one hand and supporting social services (education, health) on the other. Essentially, these might represent the bundling of several different *types* of project based on location.

Apartment blocks XIV is the key priority project in the residential sector. This section considers both the PPP options for residential projects and the proposed featured of this project in particular.

PPP structuring

Investments being considered for PPP include supporting social services (i.e. health clinic, kindergarten, school, training center, cultural center, sports center etc.), as well as the development of the residential units themselves. The combination of social housing and supporting facilities in the project means that the project resembles a social infrastructure project.

Options

There are two main PPP options:

- **BOO/ BOT.** A private developer might develop the projects as a BOO or a BOT according to government specifications and recover the costs of this through specified or regulated residential rents, as well as fees for education or health services. The private partner would be responsible for commercial and market aspects of the project including marketing and selling units and collecting user payments (rents). This project is similar to a private housing development.
- **DBFO.** Where government is the provider of final services, it is more common for social infrastructure (including social housing) to be developed on a DBFO basis whereby a private party receives a performance-based ‘availability payment’ from the relevant government authority and in turn undertakes buildings maintenance and some ancillary services (cleaning, catering, etc.).

The long-list of projects raises the possibility of a DBFT structure. In this case, the private sector would not undertake any operations and maintenance for the building and so there would be little risk transfer. The government would be effectively selecting a construction developer (as per a public procurement) and borrowing the money from the same entity to finance the works. This would offer poor value for money, since the project would have to recover the cost of private finance without offsetting against any efficiency savings.² A

² The value for money concept rests upon the counterfactual that government can borrow at a rate cheaper than a private party. While there are examples of an infrastructure project receiving a credit rating above the sovereign, this would not be the case for a project whose payments/ revenues rely upon the government itself.

DBFT would not differ in a material way from a publicly procured project, and so should not be considered as a PPP.

Considerations

The government stated its preference to pursue the project under a BOO/ BOT structure, i.e. where the private partner is responsible for collecting user revenues. The main problem with this is that ‘cost recovery fees’ are unlikely to be affordable (see below). Indeed, a private party will be exposed to market risks (associated with a low income group) that increase their required return and so the cost recovery fees charged. These questions of viability must be addressed by economic analysis and potentially government subsidy/ support.

The second complication is over the provision of supporting social services such as health and education. While there are likely to be operational synergies for the private partner in undertaking building design, construction and maintenance (as well as ancillary services such as cleaning), the synergies in teaching and health provision are less clear. These roles might be contracted out to a third party. However, if government remains the provider of education and health services, but the private-sector is responsible for fee collection, the private partner will be exposed to commercial market risks beyond its scope. For example, its ability to collect fees will depend on the quality of teaching provided by the government.

Therefore, it is suggested that, as a minimum, the social infrastructure elements of the project be structured as a DBFO should the government be the provider of health and education services. Otherwise, if the private partner is expected to provide social services, an integrated residential and supporting infrastructure project may be plausible. However, the residential component itself, let alone supporting services, is not likely to be viable.

Risk allocation

This risk allocation under an integrated DBFO model is set out in Table 5.1. While construction and operational efficiencies can be sought from the private sector, they are protected from the specific market risks.

By contrast, in a BOO/ BOT, even if the provision of education and health services were separated from the project, the private sector would still bear market risks (volume, price and credit risks involved with selling apartments). On the one hand, the private partner would have to provide financial/ mortgage services or building rental services to potential buyers. The IFC have performed a high-level assessment of willingness to pay (see “Economic Viability” below). In addition, they would have to bear the initial risks (social and political) of relocating Ger people from different areas.

The key aspect of the value for money test is that the efficiency gains made possible by private construction and operation of infrastructure outweigh the additional costs of private finance.

In addition, it is not clear whether the private partner will be expected to provide core social services as part of the contract. Remember, PPP only offers value for money where risks are transferred to those best placed to manage them. It is not clear that a private party would best placed to manage market risks associated with health and education provision.

Government obligations

As set out above, under a DBFO structure, the government must allocate departmental budgets to cover the costs of the private party over the period of the contract, and these departmental payments are often underwritten by the Ministry of Finance. In addition, the public sector would be responsible for relocating people from Ger areas and implementing teaching and healthcare services. Given the private sector is remunerated through availability payments, it is largely insulated from the risks associated in doing this. For example, the social housing and supporting infrastructure may operate under capacity for a given period, but government would still be obliged to make all fixed payments to the concessionaire (and operational payments, so long as performance criteria are met).

Alternatively, under a BOT/ BOO structure, the private partner assumes the various market risks identified above. Given its ability to manage these risks is limited, its cost of capital and ability to raise project debt is likely to be high. This increases overall project costs, and so puts even greater pressure on willingness to pay. Therefore, upfront or ongoing subsidies or guarantees are going to be needed to reduce the purchase prices charged to residents living in Ger areas for residential units.

Land acquisition and resettlement may also be issues for Ger area residents who are unwilling to give up their land. This involves upfront risks (execution risks analogous to construction risk or uptake risks similar to market risks) which are highly difficult to manage. In particular, lenders are particularly averse to such execution risks. The legal framework, the responsibility of government, needs to be reviewed to determine the basis and conditions (e.g. just compensation) for Government to acquire the land currently inhabited by residents of Ger areas.

Finally, the government needs to be committed to developing the required supporting infrastructure in a timely manner.

Impediments to the project

There are advantages to including different social infrastructure investments within one contract as a DBFO, particularly if it enables economies of scale in transaction costs. However, it may also introduce complexity, for example in terms of the arrangements for ancillary services to be provided at the health clinic and the school. These issues would need to be determined by a technical pre-feasibility study.

The main issue with the residential projects, regardless of PPP structure, is the potential lack of demand from inhabitants of Ger areas to move to more permanent dwellings (if at greater costs). This must be considered a risk for the government (who will have to commit to paying the concessionaire regardless). If social and economic feasibility studies confirm that there is no appetite for relocation then the projects ought not to progress. The wider issues in a BOT/ BOO revolve around private sector risk allocation and overall project viability.

Economic viability

Next steps

In order to determine the economic viability of the projects, feasibility studies are required to determine the basic technical specifications of the investments (size/ capacity, technological and service requirements, etc.). These feasibility studies will result in a set of design options that will allow SPC and the line ministry to compare costs with outputs (number of pupils, hospital beds, emergency care facilities, etc.). The SPC also needs to develop the capacity to undertake a value for money test, comparing the efficiencies in private construction with the added cost of private finance.

Willingness to pay

An initial viability test was undertaken. Given the preference for a BOT/ BOO structure, it sensibly looks at willingness to pay among potential users.

The project will provide residence for 15,000 households. The monthly payments for users under this overnight capital cost and under different assumptions for cost and profile of mortgage finance is shown in Table 5.2. At an estimated cost per unit of c.US\$30,000, combining this with an analysis of willingness to pay³, even the highest income group are unlikely to pay the lowest monthly payment of US\$158 per month (5% over 30 years). A recent study provided by the Ministry of Transport suggests that that cost per household could be as high as US\$91,000. This increases the minimum monthly payment to close to US\$500.

Table 5.2: Monthly payments for average resident given US\$30,000 capital cost

Amortization	5 years	10 years	15 years	20 years	25 years	30 years
Interest rate						
5%	US\$ 559	314	233	194	172	158
10%	639	394	318	284	267	257
15%	723	484	414	387	375	369
20%	810	578	518	497	490	486

³ Expected housing budget by income classes in urban and rural areas, in Ulaanbaatar, and nationally (Source: ADB study based on data from HSES 2007-2008)

Clearly, under these assumptions and high-level analysis, the project is not viable under a BOT/ BOO structure. Furthermore, as noted above, the level of market risks associated with the project will increase the cost of capital for the project. This is not to mention the contractor's assessment of the creditworthiness of the individual buyers.

Therefore, in order to pursue the project as a BOT/ BOO, the government would have to provide support in terms of direct ongoing and capital grants, credit support for mortgage customers, and other measures.

Alternatively, under a DBFO structure, the government would have to commit to annual budgetary allocations, but the overall cost of capital may be less given the private sector's reduced risk exposure. This may improve, but is unlikely to solve, the viability issue.

School lunch program (Food factory)

The project consists of the establishment of a food processing and distribution network designed to produce hot school meals of a certain specification to State secondary school pupils in Ulaanbaatar. It can be considered as a social infrastructure project.

PPP structuring

The government will purchase these core services on behalf of end users (schoolchildren), such that it provides the market for the project. Therefore, it makes sense that the private-sector partner does not accept market risks such that a DBFO model is likely to be appropriate. This means that the line ministry will make performance-based payments to a private concessionaire who will construct and operate a facility capable of producing a given number of school meals to a specified level of quality.

Risk allocation

Risk allocation would be similar to other social infrastructure projects, although there would be a greater transfer of operating risk. The DBFO would cover all processing equipment and food production, i.e. the core services of the infrastructure, although the concessionaire would remain insulated from market risk.

Government obligations

As with other social infrastructure projects based on availability payments, the government must have a clear specification of services to be provided and must allocate appropriate departmental budgets. The Ministry of Education, as the contracting authority, must also oversee quality standard (though independent inspection or otherwise) and enforce KPIs on the private contractor.

Impediments to the project

The key difficulty with structuring and implementing the project is likely to be the lack of flexibility inherent in PPP contracting, while service requirements and technology may change over time. Tastes and demand for higher quality meals may change over time. Any changes in technology are likely to reduce the operating costs of the concessionaire in ways that are difficult to predict. Greater flexibility might be introduced by having a variable component of the availability payment (such that it can respond to higher desired food quality, for example) or by having the government share in some technology driven benefits.

In either case, long-term contracting may not be possible for these services. This would need to be determined by the feasibility studies. A key issue will be the length of contract required for investors to obtain a return on their investment.

Economic viability

In order to determine the economic viability of the projects, feasibility studies are required to determine a set of design options that will allow SPC and the line ministry to compare possible costs with outputs (number of meals, quality of meals, etc.).

The IFC have undertaken cash-flow analysis to provide some initial evidence on viability, based on a range of initial overnight capital cost estimates of US\$32m and a phased construction of facilities. Operating costs include raw materials at US\$1 per meal and average O&M expenditure per meal of US\$0.20, denominated in local currency. At full operation, 217,424 meals are expected to be prepared per day for 170 days a year. This amounts to total annual operating costs of around US\$44.3m (in real 2011 prices) at full operations.

Table 5.3 shows annual capital charges under different assumptions, given a 15-year payback for the DBFO. Assuming the higher estimate for capital costs and a discount rate of 10-15%, annual capital charges will be US\$4.4m-5.5m. Added to the operating costs, the annual availability payment for the project would be up to US\$49.8m. This does not account for a gross mark-up on operating costs to cover overheads and operational risks. Given the services covered include the production and delivery of meals, the project is unlike normal PPPs where the majority of costs are capital costs. This changes the risk profile of the business, such that financial viability must consider gross margins (i.e. the mark-up on Opex).

Table 5.3: Annual capital charges under different assumptions

Discount	0%	5%	10%	15%	20%
Upfront cost					
US\$ 12m	US\$ 0.8m	US\$ 1.2m	US\$ 1.6m	US\$ 2.1m	US\$ 2.6m
US\$ 16m	1.1	1.5m	2.1m	2.7m	3.4m

US\$ 20m	1.3	1.9m	2.6m	3.4m	4.3m
US\$ 24m	1.6	2.3m	3.2m	4.1m	5.1m
US\$ 28m	1.9	2.7m	3.7m	4.8m	6.0m
US\$ 32m	2.1	3.1m	4.2m	5.5m	6.8m

This analysis effectively assumes that the capital expenditure on the project is exactly sufficient for the number of targeted students, i.e. there is full capacity utilisation. On the one hand, asset utilisation need have no bearing on viability should there be both fixed and variable cost components to the availability payment. However, required capacity might be uncertain (and hard to judge from the public sector point of view during bid evaluation).

In addition, there might be benefits from additional capacity. Bidders should be encouraged to show innovative ways of providing value for money. If there are significant economies of scale in producing hot meals, it may be that a private bidder seeks to construct a facility with a greater capacity than that needed for the contracted amount of school meals. In doing so, it can used the guarantee a given level of utilisation from the supply of school meals and create value through additional revenues. This means the government should receive more favorable bids if the facility is allowed to sell to the private sector.

The government might benefit from the potential upside through: (i) lower availability payments; and/ or (ii) revenue sharing mechanisms over time. At the same time, a careful procurement exercise will be needed to ensure that bidders are not over optimistic about the potential for upside revenues and economic due diligence is as complete as possible.

In summary, initial cost analysis suggests that annual availability payments could be as high as US\$50 million in real terms. The government will need to commit to this for 15-years in order to ensure viability. It might achieve considerable savings through sharing the potential spin-off revenues available to the PPP company.

University campus

The University Campus is potentially a highly complex project and greater clarity is needed on project specifications and the scope of private participation.

PPP structuring

The University Campus is currently being planned as a BOO model. This suggests that the government is keen for a private investor to have operational control higher education services, i.e. undertaking teaching and research at the new facilities. This might be most similar to the joint-venture arrangements whereby international universities establish an overseas campus (for example the currently stalled New York University Abu Dhabi PPP). Such a venture would have to recover costs through tuition fees (and other direct revenues). However, as noted elsewhere, this would be highly problematic where (i) willingness/ ability to pay is below cost recovery fees, and (ii) where fees are capped by the government at very

low levels. It is doubtful, even with control over fees, whether a private party will be willing to take market risk for a University Campus. This would need to be determined in a pre-feasibility study.

The more sensible approach is for specific investments are identified as being suitable for DBFO arrangements. For example, in the UK, student accommodation has been included as a PPP, since there are ancillary services which can be transferred to the private sector, such as cleaning and catering. Teaching facilities and research labs might also be considered (as part of a feasibility study). The government would then pay a concessionaire a performance based availability payment to construct and manage these facilities, making them available to a given standard for students, lecturers and researchers.

Risk allocation

As with the other social projects procured as a DBFO, the concessionaire is not subject to market risk for the reasons above. As with health and schools projects, the transfer of operational or performance risk focuses on clear, defined activities such as buildings maintenance, cleaning and catering.

Teaching and research, the core services of higher education, are undertaken and provided under existing (public or quasi-public sector) institutional arrangements and are not part of the PPP. In a practical sense, were these to be part of the PPP, it is unclear how a DBFO contract might specify these services. In addition, there are likely to be few synergies in building construction and maintenance and core higher education activities. If the private sector were to provide services that are unclear, unfamiliar and subject to change, it would increase the cost of capital for the project.

That said, equipment, machinery and other components of the university with high upfront costs can be provided and maintained by the PPP company.⁴ The specifications for this will need to be agreed at the project feasibility stage. However, a possible problem with this is that the private sector will be financing and maintaining capital goods that it will not be operating, since lecturers and researchers will be operating them. If the private sector is exposed to a risk it is unable to manage, the cost of capital is likely to increase. The exact distribution of services needs to be determined at the feasibility stage.

Government obligations

In order to successfully execute a DBFO project, it must be determined which services will be included in the transaction, as noted above. As with the other social infrastructure projects

⁴ Hospital PPPs in Egypt are currently being designed this way, such that the private sector will fund equipment.

the government must specify the services it requires, the relevant KPIs and make budgetary allocations.

The government must also be able to commit to be able to credibly provide vital services that are not included in the PPP itself.

Impediments to the project

If packaged as a DBFO project, there may be few overall impediments to the project. However, it should be noted that a full university campus is a large undertaking and, given some aspects will require government financial commitments, existing estimates may underestimate the costs involved.

Economic viability

In order to determine the economic viability of the project, feasibility studies are required to determine a set of design options that will allow SPC and the line ministry to compare possible costs with outputs (number of students, scope of facilities, etc.).

Potential problems with the BOO approach for a University Campus in Mongolia were set out above. However, it has been suggested that the Chinese and Indian governments are able to make a degree of grant and soft loan available to fund the project. While this sort of ‘viability-gap’ funding will improve the affordability of a BOO structure, it should be noted that there are significant investment risks around such a deal. The New York University Abu Dhabi will have a 2,000-student capacity and will cost around US\$1.5 billion. In addition, even if all capital costs were covered by grant and concessional finance, tuition fees will need to be sufficient to cover ongoing operating and maintenance costs for the buildings *and* the cost of teaching and research.

Although it is unclear whether a private partner would undertake core teaching and research activities, it would still need to be covered under budgetary allocations. Table 5.4 shows potential capital costs associated with the project, and annual payments for servicing these costs assuming a 30-year contract under different discount rates. With upfront costs of just under US\$1.7 billion and a discount rate of 10% to 15%, this amounts US\$180 million to US\$260 million per year.

Table 5.4: Annual capital charges under different assumptions

Discount	0%	5%	10%	15%	20%
Upfront cost					
US\$ 1,000 mil.	US\$ 33 mil.	US\$ 65 mil.	US 106 mil.	US\$ 152 mil.	US\$ 201 mil.
US\$ 1,200 mil.	40 mil.	78 mil.	127 mil.	183 mil.	241 mil.
US\$ 1,400 mil.	47 mil.	91 mil.	149 mil.	213 mil.	281 mil.
US\$ 1,600 mil.	53 mil.	104 mil.	170 mil.	244 mil.	321 mil.

US\$ 1,800 mil.	60 il.m	117 mil.	191 mil.	274 mil.	362 mil.
US\$ 2,000 mil.	67 il.m	130 mil.	212 mil.	305 mil.	402 mil.

The existing number of students is 80,000 and is projected to increase to 100,000 by 2020. This generates an annual O&M cost (including academic salaries, non-academic salaries, utilities, student supplies and maintenance) of US\$154 million (denominated in local currency in 2010 prices). Assumptions for unit costs are taken from regional comparators.

The total projected annual cost of the project for the government paying an availability payment would be US\$330 million to US\$415 million (or up to US\$5,000 per student for 80,000 students). While expected fees per student are equivalent of US\$306 per student, this amounts to only US\$25 million per year. This is clearly an extremely large project with significant associated construction and operating risks. The government and its advisers may want to determine what features of the project (e.g. student accommodation) can be delivered under PPP in a way that delivers value for money.

As noted elsewhere, a private provider is unlikely to assume the significant market risks in the higher education sector, especially since it is driven by the government policy environment. The growth in student numbers, the setting of fees, research revenues, and the recruitment of academic staff is all dependent on the policy environment. The government will need to establish supporting infrastructure.

Power project 5

Three power projects were assessed as part of Phase 2. There is more information available for Tavan Tolgoi in the South Gobi area and Power Plant 5 in Ulaanbaatar than for the project in Dornod Province. Ultimately, many of the issues cut across the three projects.

PPP structuring

Structuring transactions and investments in the power sector with private participation is often the first phase for PPP in many emerging markets. Power generation is a capital intensive sunk investment that is likely to deliver output over a period of 20 years to 30 years. Privately operated power generators are often known as Independent Power Producers (IPPs) to distinguish those of the incumbent state operator. Mongolia is in the process of separating generation operations from transmission and distribution networks to distinguish between some of the competitive and natural monopoly elements of the power system.

IPPs can be structured as competitive entities receiving a market wholesale price for power and from a supplier or system operator sourcing the ‘cheapest’ source of power. In emerging markets; however, such so-called “merchant plant” approaches are unlikely to be appropriate

since there is unlikely to be a liquid and competitive wholesale power market and the private sector will be unwilling to assume the market risk involved. At Power Plant 5, end users will be commercial and domestic customers of the power utility. The power utility is responsible for connecting users, distributing power and collecting bills. The IPP company is not able to manage these activities and so will not wish to be subject to such risks.

The common structure for an IPP is for the private sector to bid competitively a tariff rate per kilowatt hour of output as part of a power purchase agreement (PPA) with the state-owned utility company over a specified number of years. This PPA is likely to be on a 'take-or-pay' basis, meaning that the utility company is obliged to purchase the output of the IPP at the agreed rate. This gives rise to an arrangement known as competition *for* the market rather than competition *in* the market (as would be the case with merchant plants competing against each other). Take or pay contracts mean that the power utility/ government is exposed to all market risks, i.e. it may not be able to sell the power. Given there is a residual demand for power in an established urban area, this is unlikely to be an impediment for Power Plant 5.

A related structure is for the IPP to receive availability payments for fixed components (capital and fixed O&M) combined with a payment or tariff linked to output purchased. This provides the utility with more flexibility, although there would need to be much tighter specification of operating and maintenance performance criteria.

It is expected that Power Plant 5 would be structured as a conventional IPP on a take-or-pay basis.

Risk allocation

A fixed tariff on a take-or-pay basis insulates the IPP from market risks (since the utility company is responsible for selling the power and collecting payments). The IPP is subject to construction, financing and operating performance risks.

Another important feature of PPP structuring for IPPs is the arrangements for fuel costs. Variable costs of fuel are a key risk in thermal power generation. Governments have often assumed this risk by treating fuel costs as a pass-through, i.e. structuring the tariff with a variable component to cover any movements. In addition, fuel costs are often denominated in hard currency, such that changes in the currency will determine viability over time. In many early IPPs in the 1990s, utility companies paid power tariffs in US dollars and so assumed all currency risks (associated with financing and fuel). Both of these government measures to ensure project bankability expose them to contingent liabilities.

The government is in a good position to absorb these risks for Power Plant 5 since it is the 'owner' of coal that will be used to power the mines. If the IPP faces the extraction costs of coal from Tavan Tolgoi (which is estimated at US\$20 per tonne) then the government makes no 'economic rent' or profit on the sale of its mineral wealth. If the IPP faces the 'opportunity cost' of the coal to the IPPs (which has been identified at around US\$80 per tonne for sale in China), so that the government takes its economic rent, then the utility must

reflect this cost in the tariff it pays to the IPP. The cost of the increased tariff is exactly the economic rent made by the government (i.e. US\$60 per tonne). Therefore, the government has the scope to stabilise the fuel price faced by the IPP company operating Power Plant 5.

Currency movements may change the economic cost of extracting coal (i.e. above US\$20), although the main impact will be on overall financing risk. It makes sense for the government/ utility company to pay the PPA tariff in hard currency since it has a growing source of hard currency revenue (in the form of mineral exports) and the overall trend is for foreign exchange appreciation. This will reduce the overall cost of capital for the IPP.

A further risk in IPPs is the financial strength of the utility providing the PPA. In many cases, public power utilities have unmanageable financial obligations and are operationally inefficient. The risk of them defaulting on the PPA, faced by the IPP, must be considered as a project risk, although this can be managed by government guarantees. The bankability of the power utility may well increase over time as sector liberalisations lead to rationalisation of its operations. Furthermore, as government revenues from mining increase, the 'sovereign ceiling' on the utility's creditworthiness is likely to increase.

Government obligations

As noted, government has several obligations in an IPP transaction:

- The power utility will be responsible for managing market risks, balancing demand and supply, connecting new customers, and collecting payments from users. Any necessary (high voltage) transmission upgrades will need to be agreed with the IPP (i.e. over construction, financing and operations over time).
- The government will directly have to facilitate a long-term purchase arrangement for coal. In addition, the Ministry of Finance may be responsible for any government guarantees on the utility's PPA. Any contingent liabilities, particularly around currency risk, will need to be reflected in the national accounts.
- In terms of policy and regulation, the government will need to maintain the movement towards effective competition and liberalisation of the power market through clear regulatory rule and procedures.

Should planned reforms including the reform of power retail tariffs be insufficient by the time a private bidder is selected, the government will have to provide subsidy and guarantee payments by the utility company.

Impediments to the project

There are potential impediments to all of the IPP projects, for example in terms of agreeing the risk mitigation measures highlighted above.

Power Point Number 5 will sell power and heat to residential and commercial urban areas in Ulaanbaatar. Retail tariffs are currently held down below cost recovery and are unlikely to increase. The key issue is whether the power utility will pay a tariff that allows cost recovery while abiding by the current retail tariff (likely incurring a loss in the process). The Energy Regulatory Authority plans to increase the price of electricity in five stages through 2014.

Technical studies must be completed to determine capacity, efficiency, location and supporting infrastructure investments. The government must also formally terminate the previous tender process.

Economic viability

The relevant feasibility analysis and technical evaluation has yet to be undertaken for any of the power projects. However, the preliminary financial analysis, based on international comparators, has the below implications. Annex D describes the modelling approach and assumptions used for the analysis of economic viability.

Power Plant 5 will address the need of increased power and heat in Ulaanbaatar, particularly during winter. Power is currently being imported from Russia, while existing generation facilities are old and have distribution heat losses.

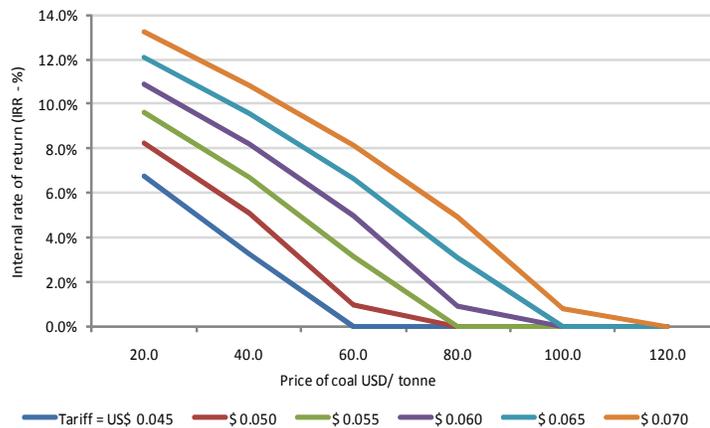
The simple levelized cost analysis, set out in Table 5.5, shows the breakdown of costs. The base case assumes coal costs are at their economic cost of extraction from Tavan Tolgoi, i.e. US\$20 per tonne, and that overnight capital costs are US\$1,700 per kW net capacity, or around the cost of a comparable facility in India. This is a fairly conservative assumption.

Table 5.5: Levelized cost analysis (USD/ kWh)

Expense	Cost (USD per kWh output)		
	8.0%	10.0%	12.0%
Discount rate	8.0%	10.0%	12.0%
Construction cost	0.022	0.027	0.031
Fixed O&M	0.006		
Variable O&M	0.002		
Fuel cost	0.010		
Break-even tariff	0.040	0.045	0.049

The cash-flow analysis shows the post-tax unleveraged project IRR at different coal prices assuming different tariff levels. The results are set out in Figure 5.2.

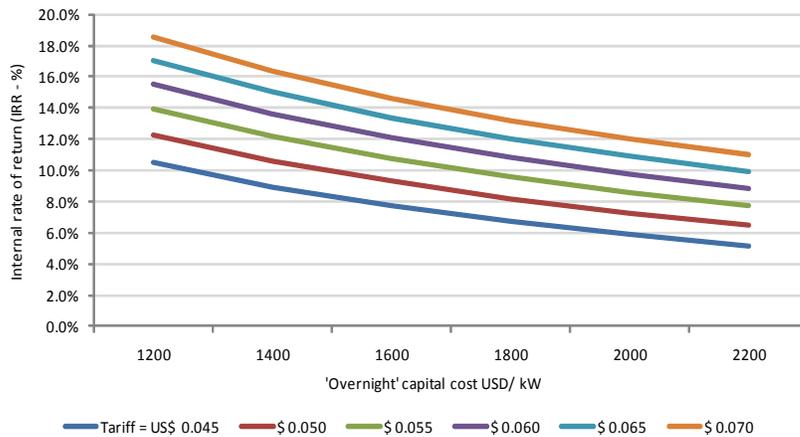
Figure 5.2: Unleveraged project IRRs at different fuel costs and tariffs



On the basis of the preliminary assumptions used, at a coal cost of US\$20 per tonne, a wholesale tariff as little as 5.5 cents per kWh could deliver a return of close to 10%. Where coal costs are the opportunity cost, i.e. around US\$80 per tonne, economic tariffs are between 8.5 and nine cents. Given the assumptions used, every US\$20 per tonne fuel cost adds around one cent to the break-even tariff (on a levelized basis).

Figure 5.3 below shows the equivalent for varying levels of capital cost, given a fuel cost of US\$20 per tonne.

Figure 5.3: Unleveraged project IRRs at different capital costs and tariffs



In order to compare the above estimated unleveraged project IRR with an indicative target IRR of potential investors, we used some empirical evidence of cost of capital for similar projects. These are set out in Annex D. For the power sector, we used evidence from take-or-pay IPPs in Sub-Saharan Africa and adjusted these for the lower country risk profile for Mongolia.

The range of returns resulted to range between 8.8% and 12.1%. This should not be regarded as definitive; the effective target IRR from potential investors is unknown at this stage and further analysis should be undertaken.⁵ The main issue with Power Plant 5 is whether an economic tariff will be forthcoming from the public utility. Given this risk and the lack of anchor off-takers from the mine (the potential lower ‘bankability’ of the utility compared with the mines), one might tentatively expect a more realistic cost of capital to be between 10-12%, at the higher range of the identified benchmark.

The bid documents for the original tender listed a capital cost of around US\$1,400 per kW capacity. In addition, according to the ECA report, fuel costs will be lower since the economic cost of extraction from the Baganuur mine is around US\$14.20 per tonne. A slightly higher O&M cost and lower energy value for coal with slightly higher output efficiency were also combined. The net effect on economic viability is dominated by the lower fuel cost, which means that a wholesale tariff of 5-5.5 cents would be required to deliver an unleveraged project IRR of 10.5-12.1%, within the range of the international benchmark.

⁵ These should include the development of a comprehensive financial model for the IPPs and the undertaking of consultations with investors to test their appetite for investing in this or similar project opportunities in Mongolia.

However, there is uncertainty over the level of wholesale tariff the utility company (and the government) will pay, given the subsidy of retail tariffs. For example, if the wholesale tariff were just 3.5 cents, the project IRR would be only 4.9%.

There is a lack of clarity over the existing costs of power generation, transmission, distribution and supply. A reasonable initial estimate of a wholesale tariff for Power Plant 5 is five and a half cents, which is half a cent lower than the current retail tariff (six cents). This is clearly not sufficient to recover the transmission, distribution and billing costs and therefore an increase in the retail tariff is vital for full cost recovery.

Tavan Tolgoi power plant

The Tavan Tolgoi power plant will supply thermally generated power to the Tavan Tolgoi, Oyu Tolgoi and Tsagaan Suvarga mines in South Gobi.

PPP structuring

The PPP structure for the Tavan Tolgoi Power project is largely determined by the overall feasibility of the project, i.e. the proposed power demand from nearby mines and additional residential demand.

One possible approach is that the mining companies themselves are responsible for building and operating new power generating facilities. However, this has potential complications. If power generation is controlled by one mine and sold to others, the arrangements for how access priced and governed is must be specified. Even then, there may be potential conflicts of interest, for example as world commodity prices change the incentives and power demand for different mines will change. If the power operation is controlled as a joint venture between the different mines, a complex governance structure may be required, while many of the problems of divergent interests may still apply.

Alternatively, the project could be structured as a regular IPP tendered competitively to third-parties under a BOT/ BOO arrangement. The off-take arrangements between the mines and the IPP company can largely be negotiated on a commercial basis to meet reciprocal needs (e.g. the flexibility of payments and tariffs. An additional advantage is that the government can include additional generating capacity for non-mine users in the area to facilitate economic and population growth. This can be done by specifying the size and terms of additional capacity for which the IPP is paid on a take-or-pay or availability payments basis.

Risk allocation

As noted above, the key risks for an IPP are market risks associated with off-take arrangements, commodity price risk and currency risk.

Off-take arrangements for Tavan Tolgoi can be either directly between the IPP company and the mining companies or with the government power utility as an intermediary. The regulatory and infrastructure requirements for the IPP to sell directly to the mines (without the utility company as an intermediary) should be explored in terms of optimising the risks involved. International mining companies are likely to be financially strong credit-worthy counter-parties and so it makes good sense for the IPP company to arrange PPAs with each of the power companies. Market risks here are determined by the mining operation. While the IPP company will not want to be exposed to these risks, there may be some room for flexibility in payment between them (given the IPP will also be purchasing coal).

If additional capacity is required for non-mining purposes then a PPA with the utility-company (who are in turn responsible for local distribution and billing) must be negotiated. Given the market risks associated with this incremental capacity, the PPA might be structured on the basis of take-or-pay or availability payments.

The IPP company will likely negotiate its fuel purchase arrangements at the same time it negotiates the PPA with the Tavan Tolgoi mine. This allows various risk mitigation opportunities. If both fuel costs and tariffs for power sold to the mine are fixed, or if changes in the price of coal is passed-through to tariffs, the IPP company is insulated from fuel cost risks.

It is likely that all PPAs will be paid in hard currency, insulating the IPP company from foreign exchange risk. Mining companies have access to hard currency revenues and sophisticated hedging products. Given local currency appreciation and increasing government hard currency revenues, the government will be in a position to guarantee the hard currency price in the PPA for additional residential generating capacity purchased by the utility.

While these measures reduce the cost of capital for an IPP company, it is important that the private power company is responsible for the operational risks it can effectively manage. This might affect the procurement process. For example, a more flexible tender process where selection is based around technical capabilities is possible, since responsibility for negotiating PPAs can be left between a preferred bidder and the mining companies.

Government obligations

The main government role for the Tavan Tolgoi project is to ensure an effective design and structuring period, including specification of any additional generating capacity it deems necessary for regional development purposes. If additional generating capacity is required, the government, as the owner of the power utility purchasing the power, will need to make certain commitments in the PPA, in particular assuming market and foreign exchange risks. For example, it will need to decide how to allocate hard currency payments (through a financial guarantee product or direct through its funding of the utility company).

If the state power utility is connecting new customers and expanding coverage in the region, it must allocate investments to this.

Impediments to the project

Tavan Tolgoi appears to be the most viable of the power projects in terms of private participation. There is a need to agree the demand from mines in the South Gobi region, to determine any additional capacity for residential and industrial use, and allow for the contract to be extended to include up to an additional 300MW of capacity. The purchase and payment arrangements for this additional capacity, for example the level of tariffs negotiated in the PPA for sale to new residential customers, will need to be determined.

There are structuring complications as highlighted above, so it is recommended that the project is kept relatively simple, i.e. as an independent IPP rather than one made-up of a consortium of mining firms.

Economic viability

The key issues for Tavan Tolgoi include:

- specifying demand from Tavan Tolgoi, Oyu Tolgoi and Tsagaan Suvarga relative to non-industrial use (which is likely to be subject to lower tariffs);
- determining the impact of different coal prices on user tariffs; and
- the impact of higher capital costs as a result of air cooling (rather than water) technology.

The basic economic analysis developed for Tavan Tolgoi power plant is similar to that for Power Plant 5. One might expect Tavan Tolgoi to have a lower cost of capital if bilateral off-take agreements with mining companies are more bankable than a PPA with the power utility. In which case, and given the potential retail tariff issues discussed elsewhere, the cost of capital for Tavan Tolgoi may be to the lower end of these estimates compared to Power Plant 5 (perhaps 8.5-10%).

At an overnight capital cost of US\$1,700 per kW net capacity, a tariff of around 5.5 cents delivers an economic return. As capital costs rise to nearer US\$2,000, due to technology issues (air cooling, rather than water, technology will increase upfront costs), tariffs must rise to six cents or above. At coal prices of US\$80 per tonne and capital costs of US\$2,000 per kW, a tariff of nine cents is required to generate a reasonable economic return (9.6%). On the other hand, if capital cost were to fall to US\$1,400 due to Chinese construction and technology and coal prices remained at US\$20, wholesale tariffs could fall below five cents. Overall, a wholesale tariff of 5.5 cents with a capital cost of US\$1,700/ kW and coal cost of

US\$20 per ton results in an unleveraged project IRR of 9.6%. This appears to be within the range of 8.5%-10% used as a benchmark from international experience.

Orhon-Gobi

The two water and sanitation projects are fairly different in scope and requirements, thus for the purpose of this analysis they are considered separately.

PPP structuring

The Orhon-Gobi project can theoretically be structured as a BOO/ BOT, with a concessionaire contracted for a long period (30 years) to construct, finance and manage the reservoir and pipelines, entering into long term sales agreements with mines who can provide 'anchor-demand'. Additional sales, under long-term contracts, could be made to water utilities in different locations. However, this potential off-take has not yet been clarified. Mining companies might be reluctant to enter into long-term contracts for water supply if they demand greater flexibility on extraction (i.e. to increase extraction when prices are high). Given the off-take risks involved and the enormous capital costs, the unit price of water is likely to be high on a cost recovery basis. The project is likely to thus be subject to a "viability-gap", justifying a level of upfront subsidy.

The project can alternatively be structured as a DBFO, whereby the government provides, on a take-or-pay basis, a unit price for the supply of water to different regions (with components for capital, fixed O&M, variable O&M and pumping costs).

Risk allocation

On the assumption that the project is structured as a DBFO, the concessionaire is insulated from market risks and is left with more manageable construction, operating and financing risks (assuming FX financing). This means that the government assumes significant market risks.

Responsibility for collection of water payments can be either with the government or the concessionaire, although the latter would need appropriate incentives to do so. If it were the responsibility of the government to collect payments and market the water service, then incentives are aligned with risk allocation. However, this doesn't necessarily mean that the public sector is best able to manage the risks. There may be a case for availability payments to be in some way contingent on successful marketing of water on the part of the PPP company.

The government might accept currency risk, for example matching the currency of the availability payment to that of the project finance. Potential customers (mines) are generating

revenues in hard currency, so payments received could be held in some sort of debt servicing facility for this purpose.

There are also environmental risks to consider. While a feasibility study can determine the likely cost of maintaining a large pipeline (e.g. in the event of damage resulting from cold weather), it is less difficult to specify the procedures for environmental factors such as drought in the north or, conversely, increased water sources in the south. The concessionaire will require guarantees or insurance against certain environmental outcomes.

Government obligations

The key government obligations in a DBFO model are to specify the outputs it requires, key performance indicators, and to make budgetary allocations to pay for the desired services. It must also factor any contingent liabilities arising from guarantees over the environment or currency depreciation.

Since the government is subject to market risks in a DBFO, it must also design effective incentives for the private sector to market services and collect payments on its behalf. If the government did not wish to be subject to market risks and instead could provide some sort of upfront subsidy in a BOT-structure, this might be an alternative.

Impediments to the project

The key impediments and sources of delay will revolve around determining the potential demand for water from mines and municipalities and the resulting scope of the infrastructure (pipeline and pumping capacity). This assessment will determine the appropriate PPP structure, which will be the starting point for a tender process.

Environmental issues may also be a source of delay.

Economic viability

Engineering, environmental and economic feasibility analysis is required to determine the technical and PPP options for taking the project forward. In particular, construction, operating, maintenance and pumping cost estimates are required for different reservoir and pipeline capacities to determine overall fixed and variable costs.

As noted elsewhere, it is clear that large mineral resources in the Gobi region have created industrial and residential water demand where existing water supply is very low. There is additional potential demand from industry and agriculture. However, the remaining life of ground water reserves in South Gobi is estimated at between five and 15 years, such that the urgency of the project is unclear (mines will want to deplete these supplies).

As noted above, given uncertainties over demand and large project costs, the project is unlikely to be viable on a cost recovery basis. The government would thus have to provide upfront ‘viability-gap’ funding under a BOT/ BOO structure or ongoing availability payments under a DBFO structure.

Highway to Khoshigtyn Hondy

The key issue in transport project from a structuring and risk mitigation point of view is the fact that there is a degree of uncertainty over forecast traffic and users of the facility.

PPP structuring

Road projects typically present opportunities to recover the costs of new infrastructure through user charges. However, road PPPs can be structured in various ways to allocate risks and to ensure bankability, given the key features of a particular project. Roads that relieve congestion in urban areas or highways between areas of concentrated population and commerce are more likely to support necessary volumes, and users are more likely to be willing and able to pay, such that the project has more scope for cost-recovery tolling under a BOT model.

On the other hand, rural roads with limited traffic are unlikely to be able to support private participation through tolling revenues and so availability payments under a DBFO approach might be optimal for an efficient PPP. This has been the approach in Chhattisgarh State in India, which has undertaken a fairly extensive road PPP scheme. Availability payments may also be required where there is public opposition to tolling. If the government is reluctant for users to be charged but wants a degree of (traffic) risk transfer, it can agree to pay an amount (or “shadow toll”) for each user.

The Khoshigtyn Hondy Highway is likely to be conducive to tolling given it is connecting the city with the a new airport (and so has a captive market of relatively affluent users). With tolled roads, a key component of analysis is whether there are nearby or alternative routes, i.e. the level of competition for the new road. Where the aim is to alleviate congestion on existing roads, tolls can be set to optimise traffic flow (subject to a minimum cost-recovery level). It must also be clear *ex ante* under what circumstances the government could construct a competing toll/ free road over the life of the contract. The airport highway will be the main route to a new purpose built airport for Ulaanbaatar.

The key consideration for toll roads (and for the airport project itself) is again market volume and pricing risk and the measures available to mitigate these risks. Traffic flows and ability/willingness to pay are difficult to forecast particularly for long-term contracting. Given the uncertainties to which toll road operators are subject, governments have offered minimum revenue or minimum traffic guarantees, thus a form of contingent subsidy (for which the concessionaire may or may not be charged a fee) and a fiscal risk exposure. The advantages of the Khoshigtyn Hondy Highway are that (i) it is possible to come up with estimates of use

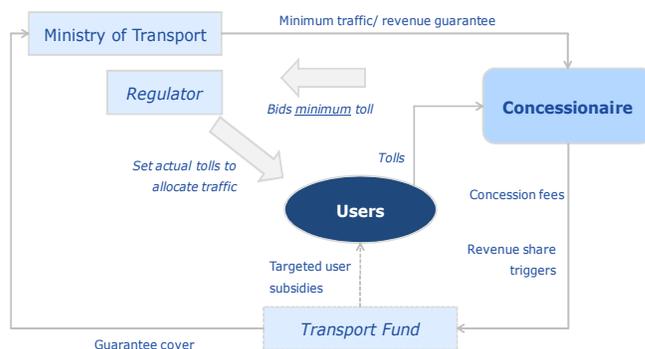
over time based on the analysis of expected airport use (although these estimates themselves are subject to caveats), and (ii) users are expected to have strong willingness to pay.

Risk allocation

The aim for toll roads to ensure operation and fee collection risk remains with the private sector without exposing the concessionaire to such a high cost of capital that tolls are unaffordable. An approach that has developed over time in the road PPP sector in Chile is for private entities to bid a minimum toll associated with cost recovery, and for a regulator to then set tariffs above this level to allocate traffic flows. A minimum revenue guarantee then reduces the exposure of the concessionaire to lower than forecast demand, in turn reducing their cost of capital.

In return, the government could charge for this guarantee, or alternatively could dictate a revenue sharing mechanism, whereby a proportion of revenue above a certain ‘triggered’ level is paid into a special fund. This provides a degree of redeemability to the contingent subsidy provided, covering the fiscal liability it creates and enabling the government to mitigate market risks faced by the concessionaire. The relevant role and responsibilities are shown in Figure 5.4.

Figure 5.4: Guarantees in a toll road scheme in Chile



An alternative also used in Chile and the UK is a ‘least present value of revenue’ approach, whereby interested parties bid a level of revenue required to cover costs (in PV terms). The PPP contract ends when this level of revenue is reached – if traffic is better than expected, ownership reverts to the government early; if volumes are less, the PPP is extended. While this mitigates volume risks, it has cash-flow implications for the concessionaire.

Government obligations

Toll roads on a BOT basis are therefore likely to entail several government roles:

- Provider of support mechanisms to improve bankability such as revenue guarantees or other viability-gap mechanisms.

- Manager of fiscal liabilities arising from above.
- Possibly regulator of tolls to control traffic movements, although this is likely to be less relevant for an airport highway monopoly.
- Provider of subsidies to lower income users.

Key impediments

The key impediment to the successful implementation of the project is the status of the new airport. Construction is expected to commence in 2011, although it is not expected to be ready for several years. There may be significant advantages in structuring the new airport as a PPP, or even bundling the airport and highway given the similar traffic risk profile. The status of the airport must be resolved before the highway project can move forward.

In addition, further technical and economic analysis is required to determine toll levels, toll structure, design options, traffic growth, and willingness to pay. Capital and operational cost assessment is also necessary, as well as resolution of land issues (e.g. resettlement, compensation), if any, would have to be considered.

Economic viability

While forecast airport passenger traffic figures are available, converting this into potential highway users and so revenues involves assumptions on persons per car, the number of 'meet & greet' per passenger, taxi utilisation, etc. while generating freight traffic involves assumptions on aspects such as the size of freight truck size. The implication is that forecasting traffic volumes is inherently uncertain. This section uses estimates to bring out the key issues involved.

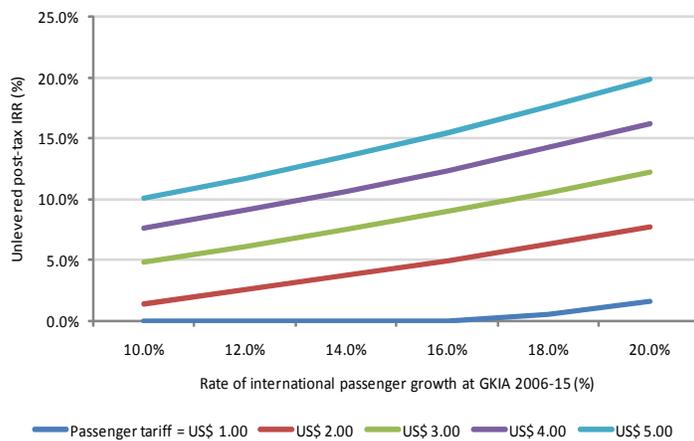
The key issues in the highway project are the forecast rate of airport traffic growth and the user tariff charged for car use. Conservative assumptions have been used for the rate of passenger traffic growth at the new airport based on the Infrastructure Strategy for Mongolia (i.e. there is no passenger growth after 2016).

Annex D provides an analysis of appropriate benchmarks for the cost of capital. UK PPP projects would tend to have a cost of capital of less than 8.5% for projects with availability payments. However, the earlier road projects designed with shadow tolls, and so transferring traffic risk to the private sector, imply a cost of capital of around 10.5%. The impact of Mongolian country risks would be to put a premium on required equity returns as well as to reduce gearing and increase the cost of debt. This means that 8.4-12.4% provides a sensible range for less risky projects with availability payments, while anything between 13% and 16% where there is full traffic risk.

For a toll road, there is theoretically full transfer of traffic risk. However, this is potentially mitigated by two factors for this project. Firstly, it is a highway with slightly more predictable but also robust demand (given its links to the airport and the greater ability of users to pay). In addition, currency risk may be mitigated due to the possibility of hard currency revenues given its links with the airport. Secondly, it may benefit from minimum revenue guarantees provided by the government. Overall, these features will make the risk profile below the range predicted above. A range of 12% to 13% is possibly a conservative (i.e. high) compromise.

Figure 5.5 shows the relationship between traffic growth and car tolls. Growth of 15% or more was forecast in the period 2006-15. At this rate, a toll for cars of US\$4.50 generates an unleveraged IRR of 13%. The projected returns are highly sensitive to the toll charged. Returns fall by more than three percentage points if the toll is reduced by one dollar. The rate of airport traffic growth is similarly a key determinant of returns. If passenger numbers grow by only 10%, then a toll of more than US\$6.30 is required to maintain a return of close to 13%.

Figure 5.5: Unleveraged project IRRs at different rates of growth in airport traffic 2006-15



Base numbers consider a capital cost of US\$500,000 per kilometre as per the Land Transport Study. This is likely to be a conservative (i.e. high) assumption.

Operating and maintenance costs are estimated somewhere between the government estimate and the recommended estimate contained in the Mongolia Infrastructure Report, at US\$9,000 per kilometre per year. Figure 5.6 examines the impact of different cost estimates.

Figure 5.6: Unleveraged project IRRs at different capital and O&M costs

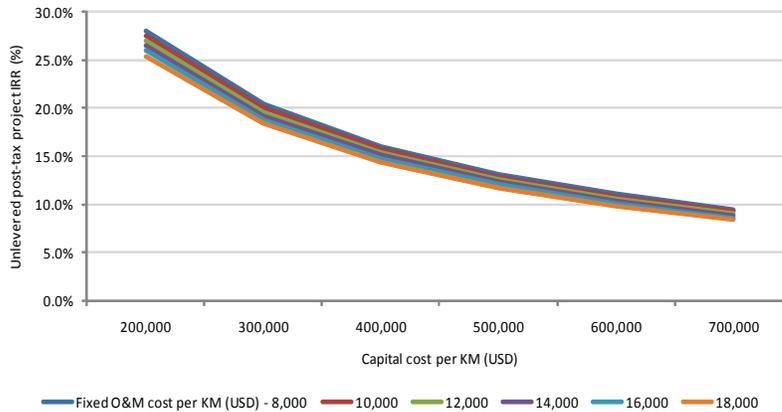


Figure 5.5 shows that project returns are not hugely sensitive to O&M cost assumptions, although they are more sensitive to assumption of capital cost.

Sainshand industrial park

PPP structuring

Industrial parks tend to have a fairly complex PPP structure. Large capital expenditures might be undertaken separate from the concession, such as land preparation, construction of connecting roads and power connections, etc. This reduces the financing burden on the one hand and keeps the scope of works and services for the main industrial park. A BOO concession could be granted to a developer (in return for a concession fee) who would build and finance the industrial park including processing facilities, internal roads and power connection, buildings and complementary value adding facilities. They would then rent or lease these facilities to industrial companies and investors who would be responsible for value adding activities.

The premise of the industrial park project is that there are economies of scale and scope in consolidating processing activities in a single location. This relies upon significant volume from mines, and along with the railway project, can be seen as part of a development corridor. It is understood that there are currently only two mines (including Tavan Tolgoi) which would supply raw materials to the facility, although it is expected that more will follow in time. Given the success of the park will depend on the volumes of material input and the successful sale of processed goods, the key for a developer to invest will be to tie mines to long term contracts. The developer will need a better understanding on which mines will be included in the market over time.

Risk allocation

The government can mitigate some potential financing risks by undertaking some of the bulk investments itself (as noted above). Industrial park projects are highly capital intensive and it

is likely to be desirable for the government to remove some of the Capex from the concessionaire's balance sheet. However, for the industrial park facilities themselves, there is full risk transfer to the private sector. The commercial and operational risks associated with processing will be allocated to industrial firms, since the concessionaire will receive medium term rent/ lease payments.

One way for the government to mitigate the uncertainty over what volume of output will be processed at the mine is to agree to a profit/ revenue sharing approach with the concessionaire whereby there is no concession fee in the early days but that it increases quickly with additional processing activities.

Government obligations

In addition to specifying its desired outputs and measures of performance, the obligations of the government, including government owned utility companies, shall include preliminary land preparation and site identification as well as any connection of high voltage power transmission lines, trunk roads, water facilities, etc. The government shall also have to carefully consider, based on economic feasibility studies, the concession fee arrangements and how they might mitigate some of the risks faced by the concessionaire.

It may be that, even with revenue sharing, the project is not viable in its own right. In this case, the government ought to consider how it might channel subsidy to address the viability gap, for example through cheap loans, competitive capital grants, etc.

Key impediments

The industrial park is highly reliant on the railway project taking place and so is likely to be delayed until the status is clarified. The largest impediment currently to enacting a PPP will be the viability issue and sourcing sufficient volumes to enabling sustainable value adding activities.

Economic viability

Currently, two mines, Tavan Tolgoi and Oyu Tolgoi, have been identified as sources of raw material to be processed at the plant. A study by the Boston Consulting Group (BCG) indicates that the economic opportunities available for processing and export to China are large.

However, it is likely that considerably greater volume will be required to make the project economically viable. Full technical and economic feasibility studies examining options for facilities, costs and end markets should be undertaken. In addition, it should be remembered that Mongolia's geographic remoteness and the transport costs of transshipment are likely to put it at a cost disadvantage for many industrial products.

Conclusions

The main issues identified in this section relate mainly to the possible PPP structuring of the selected or similar projects, related risk allocation and on economic viability issues which need to be addressed, if projects are considered as PPP pilot projects.

All projects are at a very early stage of the PPP project cycle and often, a PPP structure has not clearly been identified yet. The analysis set out in this section draws significantly on experience in PPP development and structuring and on knowledge of PPP international experience. However, having applied generic considerations to the context of the selected projects allowed to provide some considerations on a project by project basis.

Overall the analysis provide considerations on project specific issues which might be addressed by an efficient PPP structuring. However it must be taken into account that further investigation and analysis might lead to conclude that some of these projects are very unlikely to bankable.

The analysis also suggests that some other issues, like tariff issues, would require improvements of the enabling environment for PPP to attract private investors.

Overall PPP strategy

Introduction

The recommendations in this section are based on high-level review of the roles and responsibilities of the various institutions involved in the PPP program, the current understanding of the PPP process in Mongolia, and on international best practice in implementations of PPP programs.

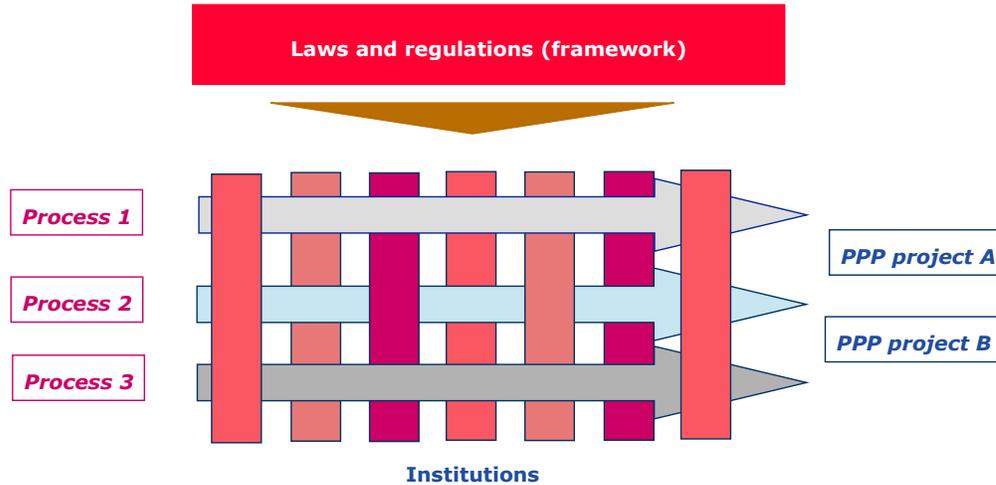
Observations on the overall PPP strategy in Mongolia

Observations are grouped into key institutional arrangements and groups of competencies which are relevant to an enabling environment for PPP. These are the following:

- **A legal and regulatory framework** comprising a framework of enforceable laws and regulations which improves predictability for all parties as regards likely outcomes, thus improving confidence on all sides.
- Strong **capable public institutions** with responsibility for managing/ facilitating PPP processes and enforcing PPP agreements that minimise confusion and promote efficiency. Required competencies might be grouped into the following three broad, but separate, groups of competencies:
 - Policy development, dissemination, monitoring and enforcement.
 - Individual project sponsorship, design, preparation, execution and monitoring.
 - Financial management of funded and contingent obligations.
- Efficient, effective and coordinated **PPP processes**, built around the project cycle, that minimise transaction costs.

At a highly simplistic level, Figure 7.1 attempts to illustrate these aspects diagrammatically.

Figure 6.1: PPP framework, institutions and processes



Legal and regulatory framework

Key concepts

The core PPP enabling legislation can comprise a single PPP law, together with sector specific legislation, or sometimes a series of other laws and regulations which, taken together, can provide the necessary authorities to enter into PPP contracts. In many countries, certain types of PPPs, particularly concessions, can rely on pre-existing privatisation legislation.

Taken together, however, the legal framework needs to clearly specify private sector investment rights, clear and transparent procurement processes, contractual arbitration processes, remedial actions for bankruptcy/ payment defaults, amongst others. There also needs to be a clear delineation of the capacity for different institutions to enforce contracts.

The economic regulatory framework needs to be developed alongside the legal PPP framework, to reduce regulatory risks and promote private sector confidence.

There is often a tension, however, between what investors prefer and what is often seen as being regulatory best practice. For many years and in many countries, the policy aim has been to create independent regulatory bodies – that is, *autonomy* from government and with considerable *discretionary* powers. In practice, most regulators have not been free from government influence, but many have employed a high degree of discretionary power, often used ill advisedly. The result has been the creation of a regulatory risk which has often been difficult for international investors, never mind domestic ones, to insure against.

Although, in the absence of renegotiation that is less able to deal with major changes to the operating context, “regulation by contract” would seem to offer investors and lenders greater

confidence than full discretionary regulation, particularly where a regulatory institution has no track record of impartial regulation⁶.

Status in Mongolia

- **The Concession Law and the PPP Policy.** A Concession Law has recently been approved in Mongolia and a PPP policy is been drafted. Additional guidelines and law amendments are likely to be developed in the future. It took several years for the Parliament to approve the Concession Law. This experience suggests that approval of legislative amendments may require several years and this could slow down the PPP process, since it is not unlikely that some legislative amendments will become necessary to complete the pilot PPP transactions.
- **Lack of exhaustive regulatory and legislative framework.** Overall an adequate regulatory and judicial framework to licence, set tariffs and protect the interests of consumers, whilst managing international private sector investors is yet to be established. This issue appears to be a key impediment to international financial interest in recent years, especially in some sectors. While some improvements have been achieved in the energy sector, in some other sectors Government policy and orientation seems to be still unclear. This is the case of health and education sectors, where reforms are still underway and this might be a disincentive to private sector participation.
- **Energy sector regulation.** The Energy Regulatory Authority (ERA) of Mongolia regulates energy generation, transmission, distribution, dispatching and supply of energy. Established in July 2001, the ERA issues licenses and sets tariffs in power sector. However it seems that economic tariffs are still not set independently from Government which continues to influence the tariff setting process.
- **Social tariffs and need for subsidy.** Tariffs, both in the energy and in the water sector are kept low and are not sufficient to allow companies to recover investment and operating costs. The GOM has been traditionally subsidized the water and energy sector heavily and there seems to be awareness that, unless operators are allowed to charge economic tariffs, the GOM will have to continue to provide subsidies. Energy tariffs have increased over the last years, however they are still assessed as too low to attract private sector investors.

Policy development, dissemination, monitoring and enforcement

⁶ Other forms of limiting the discretionary powers of regulators are also being considered as a way of addressing this problem.

Key concepts

A number of institutions need to feed in to the development of a PPP policy. Policy ownership should be broad based with widespread acceptance.

PPPs differ most by way of the types and magnitude of risks that they shift to the private sector. At a minimum, a government is likely to want to transfer a degree of performance risk to the private sector. Typical projects might involve the introduction of a management contract for the provision of water and sanitation services. At the other extreme, there may be a desire to transfer full market and financing risks to the private sector, through the award of concessions for roads, ports, airports etc.

In general, the greater the range and magnitude of the intended risk transfer, the more challenging the PPP will be. The more challenging the PPP, the greater the likelihood that the role of the public partner will be all the greater, in terms of the need to provide direct and contingent support to projects.

Depending upon this, there is a corresponding need for capacity on the public side to design and transact the projects. Thus, the nature of the types of PPPs targeted will have a major impact on the government side skills required to take them to market. Even where it is only performance risk that is being transferred, there is a major challenge in developing and monitoring appropriate contractual arrangements.

Given all the above, it is insufficient just to enact a PPP policy. It is important that its implications are understood widely, thus dissemination is especially important, especially to the line ministries and contracting authorities who will be expected to deliver the policy.

Implementation needs to be monitored and, in the extreme, enforced where there is material non-compliance, such as projects where there is agreement that should be put into the PPP program being financed by the traditional public sector route.

Status in Mongolia

Key observations as regards Mongolia include:

- **The institution responsible for this function.** Among the institutions involved in the PPP program, the National Development and Innovation Committee (“NDIC”) is responsible for policy development and dissemination required to promote and implement the PPP program. It is encouraging that the importance of this role for a successful PPP program has been acknowledged and that an institution has been identified to perform this role.
- **PPP knowledge and experience.** Given the early stage of the PPP program, there is limited knowledge of PPP within NDIC, and in general among the institutions involved in the PPP process. In none of the infrastructure sectors, is there any

experience in private sector participation through PPP arrangements. For example, there seems to be a limited knowledge of risk allocation and its implications on PPP structuring and project cost. Given the above, the policy creation and dissemination role is particularly important for the successful implementation of the PPP strategy in Mongolia.

- **Distinct role and function within the PPP process.** The policy development and dissemination function is distinct from the project development function (see below). It requires different skills and different responsibilities. This role should not be confused with other key PPP functions. During meetings with Government agencies it was indicated that NDIC, is currently screening and evaluating projects for PPP implementation. If that is the case, there might be some overlap in the screening and evaluation of potential projects between the NDIC and other institutions, and this may delay and/or increase the cost of the PPP program. A clear and distinct allocation of roles and responsibilities among institutions which limits overlapping of functions is strongly encouraged.
- **Enforcement of the PPP program.** The PPP program can be enforced to different degrees. If there is any intention to enforce the program, an institution has to be responsible for enforcing it and it should have enough power to do so. The GOM might consider how much the PPP strategy should be enforced and make sure that a proper institution to perform this enforcement role is appointed.

Project sponsorship, design, preparation, execution and monitoring

Key concepts

One of the most common constraints to infrastructure PPPs in developing countries is the inability of the government to originate and develop bankable projects. As a result, they are highly reliant on the private sector to develop projects, which are often provided on an unsolicited basis⁷. Whilst an advantage of the private sector developing projects is that they are developed with an understanding of what will be bankable, against this, they are typically developed very much from the perspective of private investor priorities without adequately capturing public sector priorities.

It is not necessary for a line ministry or other contracting authority to be an expert in developing and transacting projects. However, it is important that the processes involved and the implications that flow from particular decisions are well understood. This is important

⁷ Often projects are developed on the basis of an open solicitation where government specifies a particular output – say 1,500 mega watts of generating capacity and invites the private sector to come forward with potential solutions. This is different to a government identifying a specific opportunity and then assessing private sector interest in it, as it gives the private sector considerably more scope to develop its own solutions. In some instances, there can be merits to such an approach, especially where the private sector is willing to risk the upfront project development expense.

because it is typically the line ministry, provincial or local authority that is the contracting counter-party to the vehicle providing the desired PPP service. As such, the line ministry needs to live with the consequences of any contract for a considerable period of time.

Another weak link in successfully implementing PPP projects is the capacity for contract monitoring and enforcement. Whilst these processes are more downstream, it is important that the sponsoring authorities, periodically monitor the contractual performance of the private concessionaire and institute regular review and oversight mechanisms to provide early warning signals, should there be a risk of the operator renegeing on key contractual terms.

Status in Mongolia

The following was observed:

- **The institution responsible for this function.** The State Property Committee (SPC) is in charge of this function within the Government. Key functions of the SPC will include: screening and evaluating projects for PPP implementation, developing and structuring PPP transactions, in collaboration with line ministries and negotiating with private sector parties. Given the relevance of this role it is encouraging that a clear institution has been identified for undertaking this role.
- **Acknowledging limited experience in PPP.** Given the early stage of the PPP program, there is neither the expertise nor in depth knowledge in PPP transactions, even within the SPC. It is usual for and advisable for ministries and institutions involved in PPP transactions, to hire expert advisors to develop and execute transactions. The learning by doing process will be more productive and less painful if the Government invests in advisory services from transactions experts. The third party advisory support should aim not only to give execution to the PPP program but also to contribute to the strengthening of PPP capabilities among government agencies, and SPC in particular.
- **Building internal capabilities.** In addition to the “learning by doing” experience, other recommended approaches include capability building programs and secondments of private sector experienced professionals to SPC. It would be crucial for the GOM to develop and keep widening knowledge on PPP transactions if the long-term sustainability of the PPP program is aimed to be achieved.
- **Consensus and sponsorship** It is important that a consensus is achieved amongst government agencies involved in the PPP program and that PPP initiatives are sponsored. The role of SPC within the PPP program might not be fully acknowledged among line ministries and this may cause delays in PPP program implementation. Further, the SPC, which is responsible for suggesting PPP projects to the Cabinet for approval, ranks below the line ministries in terms of authority. It is unclear whether or not SPC has received sufficient sponsorship and autonomy to execute its mandate.

Should that be the case, the implementation of the PPP program might be seriously delayed by lack of consensus and/or lack of sufficient authority to make decisions when consensus is not achieved.

- **Unclear definition of roles:** It seems that the roles of the NDIC and the SPC are not always clearly defined with respect to PPP project development. They both seem to undertake a similar role in screening projects and their analysis may sometimes overlap. Lack of clarity in the process and in the definition of roles may have implications on the allocation of responsibilities and related accountability issues. Best practice encourages a more clear distinction and attribution of roles and responsibilities that is informed, among other factors, by the core competencies, the degree of ownership, and the level of independence of each institution involved in the PPP process.

Financial management of funded and contingent liabilities

Key concepts

Most PPP transactions entail financial obligations which are to be met by the Government. Typically, the Ministry of Finance (MoF)/ Treasury is responsible for managing a given country's finances, however it is not that unusual where there are powerful line ministries for them to agree government commitments with investors and then to expect the Ministry of Finance (MOF) to sign up to sometimes highly onerous terms as a *fait accompli*. In order to ensure that PPP projects do not create excessive financial obligations, it is crucial for the Government, prior to any commitment, to assess the financial obligations involved in each PPP transaction and, once commitments are taken, to do the fiscal management of related liabilities.

A further problem is that although funded commitments are recognised, contingent ones are often either ignored or else totally undervalued.

It is, therefore, essential that the PPP framework and processes provide for the MoF to be involved at all critical stages of the project cycle. In particular, the need for any potential public financial commitments – whether funded or contingent – need to be brought to the attention of the MoF as soon as they become likely and all commitments must be approved.

A further problem is that although funded commitments are recognised, contingent ones are often either ignored or else totally undervalued.

To undertake this role effectively, the MoF requires specialists who are able to assess such financial risks – the debt management office is often a good place to situate such a team. The skills required comprise macroeconomic, project finance appraisal, public debt management, and legal especially. The latter is included as some contingent obligations can arise from the particular drafting of contractual documents.

Status in Mongolia

The following was observed:

- **Gate keeper role in the PPP program.** Most of the PPP transactions identified involve long-term financial obligations, even if to a different extent depending upon the PPP structuring and risk allocation. On the basis of the meetings with SPC, it seemed that SPC has a clear understanding of the role of the Government in PPP contracts and on the liabilities involved. However it is unclear who would be responsible for this function, among the institutions involved in the PPP process and whether available skills are sufficient to ensure that this important role is properly undertaken.
- **Management of contingent liabilities.** When it comes to the overall assessment of the government exposure, there is a risk that these contingent liabilities are not accurately and systematically considered. A few recommendations in this regard are:
 - Government should have the capability to evaluate whether or not it is necessary to provide a form of guarantee, to decide which form is most appropriate, and to negotiate it with the private party.
 - Once issued, the guarantee generates a contingent liability for the Government. Monitoring the impact of these liabilities on the total Government exposure should be an important task of the public finance function.
- **Investing in appropriate skills.** Evaluating and monitoring the risk of contingent liabilities requires strong financial skills and expertise. The GOM should not underestimate the complexity of these activities and the technical expertise required to undertake them.

PPP processes

Key concepts

Finally, it is important that the roles and responsibilities of different institutions are clearly defined in PPP processes and that such processes are standardised to limit confusion and improve efficiency. Overlapping roles or cross cutting responsibilities can unnecessarily 'bureaucratize' processes.

The PPP project cycle comprises different stages, from the setting of the enabling environment for PPP to the post implementation monitoring and support. Each stage requires participation from many different government bodies. Each individual country needs to develop systems which fit their own particular institutional architectures.

Status in Mongolia

Key comments include the following:

- **The origination process for PPP projects.** At this stage, the process for originating PPP opportunities is not optimal. The project list that was assessed for the strategy has not been populated taking into account the key concepts for PPPs identified. Public sector projects and private sector projects are inherently different.. The starting point for PPPs is to identify types of project where optimal risk transfer is likely to be realised, which are bankable by the private sector. In doing this, there will be inevitable trade-offs with public sector policy objectives. It is therefore important to have a view as which types of projects should be put into a PPP program, reflecting the ability to transfer types and magnitudes of risks and whether or not this reflects value for money – not to limit the program to projects that are left over after all public resources have been allocated. Such an approach will be very unlikely to succeed.
- **Need for guidelines for developing a project pipeline.** The PPP process does not identify prescriptive guidelines and criteria for developing an official and approved project pipeline for PPPs. On one hand, there seems to be a consensus that these guidelines are missing and are to be developed. Even if it seems to be SPC's responsibility to screen projects for the PPP pipeline, it would be useful if prescriptive guidelines for screening projects, including specific criteria for assessment were developed, disseminated and applied thoughtfully by each institution responsible for developing or contributing to the project pipeline. For example, line ministries or government agencies submitting applications for PPP projects to the SPC should be requested to fill different forms and provide different project information compared to what they provide for state-budget approvals. The current documents do not provide sufficient information and analysis to assess whether or not the proposed project is suitable for development on a PPP basis.
- **Undefined role of SPC in the project development activities:** There is no clear procedure setting out how the SPC should co-operate with the Line Ministries or other Government agencies, who supposedly, are public sponsor for a PPP project, during the project development activities. Lack of co-ordination among public parties involved in the PPP transaction might heavily slow-down the structuring and closing of pilot projects.

Conclusions

The Overall PPP strategy

The overall environment for PPP in Mongolia is underdeveloped. The key steps which have been taken includes the approval of a Concession Law and the drafting of a PPP policy, which should be approved soon. In relation to the PPP enabling environment, a few observations can be made:

- **Legal and regulatory framework.** Overall an adequate regulatory and judicial framework to licence, set tariffs and protect the interests of consumers whilst managing international private sector investors is yet to be established. This issue appears to be one key impediments to international financial interest in recent years, especially in some sectors. While some improvements have been achieved in the energy sector, in some other sectors the Government policy and orientation seems to be still unclear.
- **Institutional arrangements.** Key institutions responsible for the PPP program have been identified.. The SPC, which sits below the Line Ministries, will take responsibility for screening PPP projects and proposing them to the cabinet for approval. The SPC should also be involved in the development and structuring of PPP transactions. However, the way in which the SPC will co-ordinate with the Line Ministries is not clearly defined. The National Development and Innovation Committee (“NDIC”) is responsible for policy setting and reforms which might be required to promote and implement the PPP program. It encouraging that some key functions and roles have been identified, however, there might be some overlap in the role of screening and evaluation of potential projects between the NDIC and the SPC. There seems to be a limited involvement of the Ministry of Finance in the PPP process and it is unclear how the gate-keeper role will be performed since the Ministry of Finance does not have veto rights on approval of PPP transactions, but instead only provides opinions and recommendations to the Parliament.
- **PPP process.** It is important that institutions involved in the PPP program have a view as which types of projects should be put into a PPP program, reflecting the ability to transfer types and magnitudes of risks and whether or not this reflects value for money. Since at its early stage. the origination process for PPP transaction is not optimal and does not reflect the key concepts for PPPs. Developing criteria for screening and guidelines for government agencies to use in submitting their applications to SPC for PPP projects should contribute to improve the quality of the PPP project pipeline.

Given all the above, for the purpose of well supporting the implementation of the PPP pilot projects, capability building programs aimed at strengthening the government’s capabilities in all of the above areas should be considered.

Conclusions and recommendations

This section sets out key conclusions and recommendations, as well as next steps.

Key conclusions from the project analysis

Key conclusions and recommendations which can be drawn from the project screening and evaluation are set out below:

- **Limited project opportunities.** Given the amount of information available when the analysis was performed, it has been possible to identify only a limited number of projects potentially suitable for PPP implementations. The short list of nine projects developed as a result of the analysis is a preliminary list which identifies some potential projects for PPP implementation. The project list is supposed to change and evolve over time taking into account, among other factors, the Government's priorities and the ability to identify alternative PPP structuring for projects which have not been currently included in the list. As the Government will improve its understanding of PPP key requirements, more projects opportunities might be identified by Line Ministry or by SPC.
- **Evaluation and ranking of selected projects.** Among the nine selected projects, some would seem to have potential for revenue generation and self-financing but the majority are likely to be viable only with a significant direct Government support.
 - **Top ranking project:** the Tavan Tolgoi power plant, which is linked to the development of mining activities scores the highest against the set of criteria. This because the identified revenue stream appears more robust than in social infrastructure projects and the project shows potential to be commercially viable without a significant Government support.
 - **Other top recommended PPP pilot projects:** in addition to the mining related project, high scoring projects are those where there are prospects for Government being off-taker or buyer of services in order to ensure a solid revenue stream. These are the food factory, the power plant N5 and the University Campus.
 - **Unlikely recommended PPP pilot projects:** are the residential units project, and the Khoshigtyn Hondy Highway. For the former, the project complexity and unclear demand from residents of the Ger areas suggests lack of suitability for PPP implementation. For the latter, the lack of current demand for the highway suggests considering this project in future years, should the traffic

projections support a PPP implementation, with or without Government support.

- **Not recommended PPP pilot project:** the power plant in Dornod province, the Orhon- Gobi Reservoir and the Sainshand industrial park score in the bottom half of the ranking scale. The overall result of the assessment against the set of criteria suggests that these projects have, at least at this current stage, very little prospects for PPP implementation.
- **Trade off between socio and economic impact.** In choosing PPP pilot projects there is likely to be a trade off between socio and economic development impact. Some projects which score high in terms of economic impact, comprising both the direct and indirect potential benefits to the country's economy, score lower in terms of social impact mainly due to the negative impact on the environment. Slightly more weight was attributed to the economic impact; however, should the Government decide to attribute more weight to the socio impact, the project ranking may change.
- **Challenges for PPP implementation.** Even top ranking projects present complexities and issues which are to be addressed for a PPP implementation. For example, some of these issues relate to tariff setting in the energy sector, volume and demand risk in road projects and PPP structuring and project cost in railway projects. Addressing these issues is likely to require investments to improve the ability of the GOM to efficiently develop and structure projects and also interventions aimed at improving the enabling environment for PPP in Mongolia.

Recommendations the overall PPP strategy

Although not an exhaustive assessment of the PPP strategy, the following recommendations are meant to strengthen the Government's ability to implement a successful PPP Program:

- **Strengthening the regulatory and judicial framework** The regulatory and judicial framework to licence, set tariffs and protect the interests of consumers whilst managing international private sector investors should be improved. While some improvements have been achieved in the energy sector, in some other sectors the Government policy and orientation seems to be still unclear.
- **Ensuring separation of roles and responsibilities.** An internal assessment and dissemination of roles and responsibilities of institutions involved in the PPP program should contribute to improve accountability of institutions involved in the PPP strategy.
- **Investing in PPP knowledge and guideline dissemination.** For the purpose of well supporting the implementation of the PPP pilot projects, capability building programs aimed at strengthening the government's capabilities to develop and structure projects be considered.

- **Disseminating PPP guidelines.** Developing criteria for screening and guidelines for government agencies to use in submitting their applications to SPC for PPP projects should contribute to improve the quality of the PPP project pipeline.
- **Allocating a portion of the state budget to the PPP program.** The implementation of the PPP program, including the development and structuring of PPP pilot projects, requires a budget allocation to fund project development costs, such as advisory services for feasibility assessment and transaction support as well as other expenses which are likely to occur during the project structuring.

Annex A: Long project list

Revenue stream not identified	
Project	Phase 1 notes
Central Waste Water Plant of U City	<p>WWTP for urban area. Quality of waste water treatment in UB currently inadequate, needs either rehabilitation or replacement. Project in two phases: Phase 1 - 2010-12 and Phase 2 - 2013-16. Improvements to waste water treatment plant will include expanding the central treatment building, improving level of bio cleaning and increasing capacity. Following completion capacity will be increased to 230,000 sq m per day with purification level of 90-95%. Pollution of Tuul river will also be improved. Although currently designated as an DBFT, it could be an effective DBFO given urban demand and the construction of new housing. Capital cost c.\$300m. Chinese bank apparently interested in investing plus possibility of donor finance from ADB (who are looking at the reform of water and waste water in UB).</p>
Infrastructure of “Zuun Selbe” (Eastern Selbe) apartment blocks	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Project No. 3 (apartment blocks in Zuun Selbe district). Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself. No unique revenue stream established - likely to be included in main project.</p> <p>Private developer unlikely to want finance utilities (a) it does not operate (i.e. it assumes risk for something it does not control) and (b) that can be installed effectively by existing utilities under negotiation with developer.</p>
Infrastructure of apartment blocks VII	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Project No. 5 (apartment blocks VII). Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself. No unique revenue stream established - likely to be included in main project.</p> <p>Private developer unlikely to want finance utilities (a) it does not operate (i.e. it assumes risk for something it does not control) and (b) that can be installed effectively by existing utilities under negotiation with developer.</p>
Apartment blocks in the vicinity of Mongolian National Broadcaster (MNBTB)	<p>Project to provide apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 4,200 households in current Ger area.</p> <p>Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available - therefore unlikely to generate ongoing revenues.</p>

<p>Infrastructure of apartment blocks around Mongolian National Broadcaster (MNBTB)</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Project No. 7 (apartment blocks in the vicinity of Mongolian National Broadcaster). The project is identified as a priority by MRTCUD, but the government would need to fund the construction of utilities/ supporting infrastructure. Private sector operation/ maintenance of infrastructure once completed is not currently anticipated by Government.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>“Gandantegchilen Monastery” apartment blocks</p>	<p>Project to provide apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 300 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream. Furthermore, the small number of residential units included in this project will decrease the potential for direct contributions from users of services/ infrastructure compared with larger apartment block complexes.</p>
<p>Infrastructure of “Gandantegchilen Monastery” apartment blocks</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Project No. 9 (Gandantegchilen Monastery apartment blocks). Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>“Denjyn Myanga” apartment blocks</p>	<p>Project to provide apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center etc.) for 1,000 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream.</p>
<p>Infrastructure of “Denjyn Myanga” apartment blocks</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Project No. 11 (Denjyn Myanga apartment blocks). Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>

<p>Apartment blocks in the vicinity of Hanyn Material</p>	<p>Project to provide apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 1,000 households. Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available therefore doubt about ongoing revenues. Social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream.</p>
<p>Infrastructure of an apartment blocks in the vicinity of Hanyn Material</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Project No. 13 (Hynyn Material apartment blocks). Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Infrastructure of “Buyant Ukhaa” complex apartment blocks</p>	<p>Engineering infrastructure & utilities (roads, heating, water, waste water, etc.) to support the development of apartment blocks in Buyant Ukhaa area of Ulaanbaatar. Info. available - Project identified as a priority by MRTCUD.</p> <p>Private developer unlikely to want finance utilities (a) it does not operate (i.e. it assumes risk for something it does not control) and (b) that can be installed effectively by existing utilities under negotiation with developer. No unique revenue stream established - likely to be included in main project.</p> <p>Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available - therefore unlikely to generate ongoing revenues.</p>
<p>Infrastructure of “Bayangolyn Am” complex apartment blocks</p>	<p>Engineering infrastructure & utilities (roads, heating, water, waste water, etc.) to support the development of apartment blocks in Bayangolyn Am area of Ulaanbaatar (not current Ger area). Info. available - Project identified as a priority by MRTCUD</p> <p>Private developer unlikely to want finance utilities (a) it does not operate (i.e. it assumes risk for something it does not control) and (b) that can be installed effectively by existing utilities under negotiation with developer. No unique revenue stream established - likely to be included in main project.</p> <p>Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available - therefore unlikely to generate ongoing revenues.</p>

<p>Infrastructure of “Urgah Naran” apartment blocks</p>	<p>Engineering infrastructure & utilities (roads, heating, water, waste water, etc.) to support the development of apartment blocks in Bayangolyn Am area of Ulaanbaatar (not current Ger area). Info. available - Project identified as a priority by MRTCUD</p> <p>Private developer unlikely to want finance utilities (a) it does not operate (i.e. it assumes risk for something it does not control) and (b) that can be installed effectively by existing utilities under negotiation with developer. No unique revenue stream established - likely to be included in main project.</p> <p>Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available - therefore unlikely to generate ongoing revenues.</p>
<p>Infrastructure of “Shine Yarmag” (New Yarmag) complex apartment blocks</p>	<p>Engineering infrastructure & utilities (roads, heating, water, waste water, etc.) to support the development of apartment blocks in Bayangolyn Am area of Ulaanbaatar (not current Ger area). Info. available - Project identified as a priority by MRTCUD</p> <p>Private developer unlikely to want finance utilities (a) it does not operate (i.e. it assumes risk for something it does not control) and (b) that can be installed effectively by existing utilities under negotiation with developer. No unique revenue stream established - likely to be included in main project.</p> <p>Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available - therefore unlikely to generate ongoing revenues.</p>
<p>Infrastructure of “Ireedui” (Future) complex apartment blocks</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Ireedui complex apartment blocks. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in a wider project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Infrastructure of “Four Season’s Garden” complex apartment blocks</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for the Four Season's Garden complex apartment blocks. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in a wider project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Infrastructure of “Golden Park” complex apartment blocks</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for the Golden Park complex apartment blocks. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in a wider project. Project not currently identified as a priority by MRTCUD so limited information available.</p>

<p>Infrastructure of “Erin” complex apartment blocks</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for the Erin complex apartment blocks. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in a wider project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Apartment block # 19</p>	<p>Project to provide apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 1,500 households. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Engineering infrastructure of apartment blocks # 19</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks #19. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Apartment block “Eermel”</p>	<p>Project to demolish existing apartments and construct new apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 750 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream. Furthermore, the small number of residential units included in this project will decrease the potential for direct contributions from users of services/ infrastructure compared with larger apartment block complexes.</p>
<p>Engineering infrastructure of apartment blocks “Eermel”</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for Eermel apartment blocks. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Apartment blocks along Narny road</p>	<p>Project to demolish existing apartments and construct new apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 1,000 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream.</p>

<p>Engineering infrastructure of apartment blocks along Narny road</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks along Narny road. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Apartment block in the vicinity of Dund river</p>	<p>Project to demolish existing apartments and construct new apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 1,000 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream.</p>
<p>Engineering infrastructure of apartment blocks in the vicinity of Dund river</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks in the vicinity of the Dund river. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Apartments for lease</p>	<p>Project to build, operate and transfer 2,000 apartments for lease to low and mid income residents.</p> <p>There is an established PPP model for the provision of social housing, in which the management of the housing stock becomes the responsibility of the private sector contractor, whilst the public sector continues to own the housing and takes responsibility for letting to tenants. A well structured transaction can offer benefits in terms of transfer construction and service provision risks from the public sector to the private sector, whilst maintaining good value for money. However the public sector is required to pay a revenue stream which covers both these elements over the course of a long-term contract, typically 25-30 years, on a performance-related basis. The public sector also retains tenancy risk and is responsible for rent collection.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. However, it is difficult to envisage a situation in which GOM would be in a position to provide the necessary annual payments or subsidy required to generate a viable revenue stream to the private sector.</p>
<p>Engineering infrastructure of apartments for lease</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks for lease. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself. No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>

<p>Apartment blocks in Baganuur District</p>	<p>Project to construct new apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 1,000 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream.</p>
<p>Engineering infrastructure of apartment blocks in Baganuur District</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks in Baganuur District. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Apartment blocks in Bagakhangai District</p>	<p>Project to construct new apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 800 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream.</p>
<p>Engineering infrastructure of apartment blocks in Bagakhangai District</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks in Bagakhangai District. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>Apartment blocks in Nalaikh District</p>	<p>Project to construct new apartment blocks and supporting social infrastructure (school, kindergarten, clinical center, vocational training center, cultural center, sports center and shopping center) for 2,000 households.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. Residential units could possibly be privately developed, but social infrastructure aspects of project likely to require some Government subsidy to generate a viable revenue stream.</p>
<p>Engineering infrastructure of apartment blocks in Nalaikh District</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks in Nalaikh District. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>

<p>Engineering infrastructure of sub project on apartment blocks in province centers</p>	<p>Supporting infrastructure/ utilities (roads, water, waste water, etc.) for apartment blocks in provincial centers. Usually role of developer to agree these installations with utilities, etc. and to then pay for service rather than finance local works itself.</p> <p>No unique revenue stream established - likely to be included in main project. Project not currently identified as a priority by MRTCUD so limited information available.</p>
<p>“Inter-Soum Center” pilot project</p>	<p>Planning and construction of complex social infrastructure buildings and facilities in 96 separate locations.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. No clear revenue stream identified - Government or Soums would need to subsidise provision of social infrastructure and unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream across multiple local centers.</p>
<p>Project on construction a paved road from Yarmag bridge to Bayanzurkh post</p>	<p>Construction of 17.6kms of paved road. Engineering design/ drawings already prepared.</p> <p>Project identified as a priority by MRTCUD. Government's anticipated model is for private sector to finance and perform works for upgrading/ new construction; road will then be handed back to the Government which will operate as a toll road in an attempt to cover operating costs. Traffic/ tolls not sufficient for BOT without Government support - not clear that government support is available. Possible opportunity to include 'operations' in scope of private sector provision, but Government yet to reach a decision.</p>
<p>Project on construction a highway of Altanbulag-Ulaanbaatar route</p>	<p>Construction of 367km of highway on the Altanbulag - Ulaanbaatar route. Project not currently identified as a priority by MRTCUD so limited information available. However, unlikely that traffic/ tolls will be sufficient for BOT without Government support - not clear that government support is available.</p>
<p>Project on construction a highway of Ulaanbaatar-Zamyn Uud route</p>	<p>Construction of 630km of highway on the Ulaanbaatar-Zamyn Uud route.</p> <p>Project not currently identified as a priority by MRTCUD so limited information available. However, unlikely that traffic/ tolls will be sufficient for BOT without Government support - not clear that government support is available.</p>
<p>Project on construction a paved road of Undurkhaan-Choibalsan route</p>	<p>Construction of 87kms of paved road.</p> <p>Project identified as a priority by MRTCUD. Government's anticipated model is for private sector to finance and perform works for upgrading/ new construction; road will then be handed back to the Government which will operate as a toll road in an attempt to cover operating costs. Traffic/ tolls not sufficient for BOT without Government support - not clear that government support is available. Possible opportunity to include 'operations' in scope of private sector provision, but Government yet to reach a decision.</p>
<p>Project on construction a paved road of Choibalsan-Ereentsav route</p>	<p>Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.</p>

Project on construction a paved road of Undurkhaan-Munhkhaan-Baruun Urt route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Baruun Urt-Erdenetsagaan-Bichigt route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Undurkhaan-Norivlin route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Norivlin-Bayan Uul-country border route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Ulaanbaatar-Mandalgobi route	Construction of 104kms of paved road. Project identified as a priority by MRTCUD [DN: Check whether part of roads master plan?]. Government's anticipated model is for private sector to finance and perform works needed for upgrading/ new construction; road will then be handed back to the Government which will operate as a toll road in an attempt to cover operating costs. Anticipated traffic/ toll revenue not sufficient for BOT without Government support. Possible opportunity to include 'operations' in scope of private sector provision, but Government yet to reach a decision.
Project on construction a paved road of Mandalgobi-Dalanzadgad route	Construction of 173kms of paved road. Project identified as a priority by MRTCUD. Government's anticipated model is for private sector to finance and perform works for upgrading/ new construction; road will then be handed back to the Government which will operate as a toll road in an attempt to cover operating costs. Traffic/ tolls not sufficient for BOT without Government support - not clear that government support is available. Possible opportunity to include 'operations' in scope of private sector provision, but Government yet to reach a decision.
Project on construction a paved road of Dashinchilen-Bulgan route	Construction of 121kms of paved road. Project identified as a priority by MRTCUD. Government's anticipated model is for private sector to finance and perform works for upgrading/ new construction; road will then be handed back to the Government which will operate as a toll road in an attempt to cover operating costs. Traffic/ tolls not sufficient for BOT without Government support - not clear that government support is available. Possible opportunity to include 'operations' in scope of private sector provision, but Government yet to reach a decision.
Project on construction a paved road of Khutag Undur-Teshig-Baga Ilenh route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.

Project on construction a paved road of Tarialan-Moron route	Project identified as a priority by MRTCUD. As a non-mining inter-urban road it is unclear that there is demand for paved roads and tolling is possible given limited volumes. Not clear there is government budget for a shadow toll or availability payment approach. Current preferred DBFT approach does not include O&M aspect so risk transfer is limited - an O&M based private participation is possible but unlikely due to lack of viability and lack of government budgetary allocations.
Project on construction a paved road of Ogiin Nuur-Battsengel-Ikh Tamir route	Project identified as a priority by MRTCUD. As a non-mining inter-urban road it is unclear that there is demand for paved roads and tolling is possible given limited volumes. Not clear there is government budget for a shadow toll or availability payment approach. Current preferred DBFT approach does not include O&M aspect so risk transfer is limited - an O&M based private participation is possible but unlikely due to lack of viability and lack of government budgetary allocations.
Project on construction a paved road of Tsahir – Tosontsengel route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road from intersection on the west to Tosontsengel to Nomrog-Songino soums	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Songino soum-eastern bank of Hyargas lake route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of eastern bank of Hyargas lake-Nomrog-Naranbulag-Ulaangom route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Nomrog-Tsagaan Tolgoi (Artsuuri) route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Tosontsengel-Uliastai route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Uliastai-Altai route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Altai-Bugat route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Bugat-Burgastai route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.

Project on construction a paved road of Altai-Darvi route	Project identified as a priority by MRTAUD. As a non-mining inter-urban road it is unclear that there is demand for paved roads and tolling is possible given limited volumes. Not clear there is government budget for a shadow toll or availability payment approach. Current preferred DBFT approach does not include O&M aspect so risk transfer is limited - an O&M based private participation is possible but unlikely due to lack of viability and lack of government budgetary allocations.
Project on construction a paved road of Darvi-Manhan route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Bayankhongor-Baidrag route	Project identified as a priority by MRTAUD. As a non-mining inter-urban road it is unclear that there is demand for paved roads and tolling is possible given limited volumes. Not clear there is government budget for a shadow toll or availability payment approach. Current preferred DBFT approach does not include O&M aspect so risk transfer is limited - an O&M based private participation is possible but unlikely due to lack of viability and lack of government budgetary allocations.
Project on construction a paved road of Baidrag bridge-Altai route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Bayankhongor-Bayanleg route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Bayanleg-Gurvantes route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Bayankhongor-Gurvanbulag route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Gurvanbulag-Uliastai route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Uliastai-Dorvoljin route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Dorvoljin-Sarkhairkhan bridge route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on construction a paved road of Sarkhairkhan bridge-Myangad bridge of Khovd route	Project not currently identified as a priority by MRTAUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.

Project on construction a paved road of Khovd-Ulaangom route	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
Project on rehabilitation of 350km paved route in Ulaanbaatar city	Project not identified as a priority by MRTCUD so limited information available. As a non-mining inter-urban road it is unclear that there is demand for paved roads and tolling is possible given limited volumes. Not clear there is government budget for a shadow toll or availability payment approach. Current preferred DBFT approach does not include O&M aspect so risk transfer is limited - an O&M based private participation is possible but unlikely due to lack of viability and lack of government budgetary allocations.
Project on construction a 212km paved road in Ulaanbaatar city	Project not identified as a priority by MRTCUD so limited information available. As a non-mining inter-urban road it is unclear that there is demand for paved roads and tolling is possible given limited volumes. Not clear there is government budget for a shadow toll or availability payment approach. Current preferred DBFT approach does not include O&M aspect so risk transfer is limited - an O&M based private participation is possible but unlikely due to lack of viability and lack of government budgetary allocations.
Project on construction of foot bridges in 7 points/locations of Ulaanbaatar city	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
“Ulaanbaatar Logistics” project	Project not currently identified as a priority by MRTCUD - i.e. unlikely to provide the necessary annual payments or subsidy required to generate viable revenue stream.
International airport in Dalanzadgad soum, Umnugobi province	Upgrade airport at Dalanzadgad including provision of a paved runway to accommodate international flights and serve the forecast population (10,000 people) and support tourism. No additional information, e.g. potential use and revenues, views of airlines, construction costs, etc. - i.e. economic viability must be clarified.
Increase of heat supply	Extension of heating network in UB city. Seen as realistic project, but not sponsored by MMRE. Originated by Mayor's Office or possibly private sector driven. Would only be viable/ needed if combined heat and power plant does not progress
Tuul-Songino Water Resources Complex	Tuul Songino Water Resource JSC was established in November 2006. The company was established to maintain three energy/ infrastructure projects, namely “Underground Water Supply of Ulaanbaatar City,” “Waste Water Treatment Facility,” and “Pumped Storage Power Station.” On 24th March 2010 the Financial Regulatory Commission stopped trading of shares in Tuul Songino Water Resource JSC on as the company declared its inability to implement the “Tuul Songino Water Resources Complex” project. The project was the main purpose of the company but Tuul Songino announced that the project is economically impossible to be implemented during its annual general meeting held on December 31st, 2009.

<p>Landscaping embankments of rivers Tuul and Selbe, complex development</p>	<p>Objective of project to collect water during the flood times and store in a reservoir - objectives of project centered around landscaping of rivers, environmental issues and flood protection rather than water operations/ water quality in UB (nothing to do with USUUK). Anticipated benefits include: (i) increasing water surface area to reduce pollution; (ii) controlling water contamination; and (iii) providing an alternative water source for UB. Capital cost c.\$700m. Little revenue generation - small contribution from selling building materials extracted from reservoir site and tourism from creation of nature reserve. No indication of government budgetary allocations.</p>
<p>Competitive tender not possible</p>	
<p>Project</p>	<p>Phase 1 notes</p>
<p>Project on construction a paved road of Ukhaa Hudag-Gashuun Sukhait route</p>	<p>Road under construction by Gobi Road LLC (wholly owned subsidiary of Energy Resources LLC) for coal transportation from Uhaa Hudag coalfield in Tavan Tolgoi to Chinese boarder at Gashuun Sukhait. (NB. It is believed that this road is not being built to the technical specification needed to transport coal from all four coal fields in the Tavan Tolgoi area once these fields have been developed - 100+ trucks per day.)</p>
<p>Project on construction a paved road of Oyu Tolgoi-Gashuun Sukhait route</p>	<p>Road under construction by Ivanhoe Mines Mongolia Inc (a JV between Ivanhoe Mines Inc and Rio Tinto PLC) for the transport of equipment to build concentrators at Oyu Tolgoi (OT) mine. Once mine is operational will be used for the export of copper (70 trucks per day). Construction costs \$1m per km. Road forms part of National Road Plan and will eventually form part of the National Road Network; discussions about public access ongoing.</p>
<p>Project on construction a paved road of Tavan Tolgoi – Khanbogd-Hangi route</p>	<p>Construction of 435km paved road for transport of minerals. Two-lane highway currently under construction, expected to be completed in July 2012.</p>
<p>Project on construction a paved road of Naryn Sukhait-Shivee Khuren route</p>	<p>South Gobi Sands LLC is currently in negotiation with GOM for licence to construct as a 2 lane highway in each direction ('private road' under Concession Law) from its mine at Ovoot Tolgoi to the Chinese boarder at Ceke which will be used for the export of coal. Capital cost \$50m, which will be funded directly by mining co (zero debt). South Gobi Sands have engaged Leighton to do the design & build. Intention is to operate road as a BOT and charge other mines for using road (no public use, coal traffic only) - consideration should be given to regulation and access agreements. Capacity of road will be 30-35m tonnes of coal p.a. (assuming 24/7 operations). Expected environmental benefits include less dust, improved safety (by separating coal and local traffic). Road does not serve a population corridor - 35kms from Gurvantes, 1 or 2 gers local to road. After 20yrs ownership will pass to GOM at zero cost.</p>
<p>Thermal Power Plant at river Mogoi</p>	<p>Licence has been granted and MMRE has signed an agreement with private sector, so project unlikely to be suitable for competitive tender. Government will be offtaker.</p>

Shivee-Ovoo project	Large scale (4,800MW) power generation and export to China- up to 10% of power generated will be available for use in Mongolia. Capital value c.\$5 billion, including upgrade of Shivee-Ovoo coal mine to increase capacity to provide volume needed for power generation. Chinese company interested in development/ investment, but project has been under negotiation since 2005. Project apparently close to signing framework agreement, so unlikely to be suitable for competitive tender.
Overhead power lines for Ulaanbaatar-Mandalgobi route	Small works to connect central grid with S. Gobi. Already awarded to private sector so not likely to reach competitive tender.
Overhead power lines for Baganuur-Choir route	Expansion of existing network to connect copper mine to regional center. Already granted contract for BT, so unlikely to be suitable for competitive tender
Overhead power lines for Choir-Tsagaan Suvarga route	Already granted contract for BT, so unlikely to be suitable for competitive tender
Gashuun Sukhait Port	Border crossing project for shipment of minerals to China. Identifiable revenue from mining activities and relatively simple PPP structure in terms of rehabilitate, finance and operate. However, construction has already started and it is managed by local government.
Shivee Hureen Port	Border crossing project for shipment of minerals to China. Identifiable revenue from mining activities and relatively simple PPP structure in terms of rehabilitate, finance and operate. As above, the project will be funded by state/municipal budget.
East West railway	Project identified as a priority by MRTUCUD, and currently under preparation. Clear revenues from Tavan Tolgoi and other mines, long term environment seemingly conducive for contracting. The project represents a strategic investment to transport coal from TT, but it is not the most efficient approach. Exporting through Russia would cost five times more than exporting from China. Should coal, or other resources be transported through China at the Zamyn-Uud border, further investment is likely to be needed because the railway connecting Sainshand to the border is already congested. Negotiation in process for building infrastructure.

Information insufficient to assess suitability for PPP

Project	Phase 1 notes
Project on construction of new apartment blocks upon demolishing existing apartments in some districts of the capital city	Project not currently identified as a priority by MRTUCUD - insufficient additional information.
Sub project on apartments for provincial centers	Project not currently identified as a priority by MRTUCUD - insufficient additional information.

Project “Auto Terminal in Zamyn Uud soum, Dornogobi province”	Project might be a priority by MRTCUD; too little information to advance at this stage
To rehabilitate existing old railway of Sukhbaatar-Zamyn Uud route	Insufficient information at this stage.
Producing energy out of waste processing	Seen as realistic project, but not sponsored by MMRE and a lack of information at this stage. Originated by Mayor's Office or possibly private sector driven.
Establishment of “Ikh Toiruu” loop grid network	Seen as realistic project, but not sponsored by MMRE and a lack of information at this stage. Originated by Mayor's Office or possibly private sector driven.
Project “E-School”	Insufficient information at this stage.
Center for Distance Diagnosis and Treatment	Insufficient information at this stage.
National Stadium	Insufficient information at this stage.
Project “Health E-System”	Insufficient information at this stage.
Project “Unified/Consolidated Portal of the Government”	Insufficient information at this stage.
Project “Management System of Business Records and Permissions	Insufficient information at this stage.
Bulgan port	Insufficient information at this stage.
Power Plant N3	Insufficient information at this stage.
Burgastai port	Insufficient information at this stage.
Edernet PP	Insufficient information at this stage.
Short-listed projects	
Project	Phase 1 notes

Apartment blocks XIV	<p>Complex priority multi-sector project requiring provision of 10,000 housing units plus supporting social infrastructure including health clinic, kindergarten, school, training center, cultural center, sports center and service area (shopping) in a current Ger area of Ulaanbaatar. Project identified as a priority by MRTAUD.</p> <p>Anticipated that housing will be privately developed, but that supporting social infrastructure will be Government responsibility. Government would need to subsidise provision of social infrastructure. Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available.</p>
Project on construction a highway to connect Ulaanbaatar city with an airport at Khoshigtyn Hondy	Construction of 53km expressway to new airport in Ulaanbaatar. Construction for new airport expected to commence in 2011 [status of airport should be clarified - Japanese funding has been promised, however project might developed on a PPP basis with potential benefit from integrating concession with Expressway].
Project on “Sainshand” industrial park	NDIC has medium term strategy for development of this project over next five years. Process coal and other industrial activities. Capital cost as high as c.\$10 billion. Would rely on rail traffic flowing through the south east - linked to rail connections to Sainshand. Dependent on the progression of the railway.
Tavan Tolgoi Power Plant	<p>Seen by MMRE as a priority project for Mongolia. Generation of 300MW in first phase with possible expansion for a further 300MW. First 300MW will be a stand alone IPP, future 300MW connected to grid (may require separate PPA). Power plant would principally support mines - which will be expected to pay full cost recovery tariff - and possibly also small volume of domestic consumers (local population) who will pay subsidised tariff. Forecast demand from mines - TT 200MW, OT 320MW and TS 100MW. NDIC preference to increase capacity enable supply of mines and local population.</p> <p>Currently OT has short-term agreement to import power from China (for four years or until mine is operational arrangement only) then obliged to buy from TT power plant. Energy Resources granted licence to build a 18/60MW power station [conflicting reports about size] to burn 'midlings' (by-product of washing coking coal) and thermal coal to support their mining operations at TT. Intention is for this project to be structured to operate as a commercial entity, potentially with investment from offtakers, (OT and TT mines both interested in equity contribution,) Mongolian investors and the private sector. Aim for project to be fully operational in 5yrs.</p>

Power Plant No.5	<p>Seen by MMRE as a priority project for Mongolia. Immediate need for increased power and heat in UB - Current installed capacity in UB = 800MW; needs to increase to 1.5GW in next 15-20yrs to meet needs of population growth and urbanisation. Current capacity insufficient to meet city's power requirement in winter; currently importing power from Russia. Increased capacity mainly needed for heat. Two options: i) combined heat and power plant (project #93); or ii) separate heat and power (in which case heat only boilers required in city - project #96 - and power plant could be located closer to mines to save transport costs). If combined heat and power option taken forward, would create capacity to make the current heat system sustainable and negate the need for #96. Previously tendered (in 2008) as IPP but unsuccessful. ADB now providing technical assistance to GOM to develop a technical specification and bid documents. Anticipated capacity 300MW, capital cost c.\$1m per MW.</p>
Power Plant in Dornod province	<p>Expansion of existing power plant to supply sparsely populated area - potential as an IPP only with clear PPA.</p>
Establishment of Orhon-Gobi Reservoir	<p>Water conveyance project using fresh water in north to supply coal mines in S. Gobi. Capital cost circa. \$570m; users (mining companies and a few private customers) would be charged for water. Project expected to provide an alternative water source to support mining in S. Gobi - remaining life of ground water reserves estimated 5-15 years. Suggestion that insufficient due diligence at TT and water demand by mine effecting availability of water for herders; OT on other hand using underground water from separate ancient aquifer. Turkish Government apparently interested in investing in project. If there is sufficient political will and subsidy it could work, but not necessarily a priority.</p>
University Campus and town of Information & Technology	<p>Project will consolidate a number of large universities in UB onto a single site outside the city center (including University of Science & Technology, National University of Mongolia, medical college and teacher training college). Objective to reduce pressure on services, public transport etc. Seen as a priority project by SPC and described as 'ready for tender' - administration for campus development established and land earmarked (will transfer to PSP on long-term licence to occupy/ operate). Possible project structures proposed by GOM include BT and BOT. However, no regulatory environment established for education and mechanism for the recovery of capital/ operating costs currently unclear.</p> <p>GOM does not have funds to pay total construction/ operating costs of new university accommodation, e.g. through availability payments. Most colleges do not receive Government subsidies at present and depend on tuition fees. Some state universities receive an element of subsidy to cover estate costs but students still pay tuition fees. Tuition fees are set by Government - currently MNT 1.5 million to 2 million p.a. (\$1,200-1,500), not sufficient for full cost recovery from students. Government pays some tuition fees and would like to provide free education, but unclear where funds for this could come from. Waiving tuition fees altogether likely to be an impediment to PPP. Until a secure revenue stream can be identified, private sector interest in project is unlikely. SPC would like to attract international investment as Mongolia short of management expertise in education sector.</p>

Project “Food Factory”

Potentially can be structured in an attractive way with guaranteed offtake by the public schools. Information is limited at this stage and the potential PPP model is unknown.

Annex B: Summary of Phase 2 analysis

Residential project

One project in the residential sector was evaluated. It is worth noticing that the GOM is actively pursuing the development of urban areas and this project has been identified as priority project, among a long list of residential projects. However, should similar projects be identified as a priority, similar considerations will probably apply.

Table B1 below sets out the results of the project evaluation.

Table B1: Apartment blocks XIV

Name	Cost	Sector
Apartment blocks XIV	US\$430 million	Residential
Summary		
<ul style="list-style-type: none"> Construction works of modern large scale complex apartment blocks with commercial centers that create favorable living, working and recreational conditions for the population in zone A of the city, converting Ger area into apartment blocks and reducing air pollution and soil & water contamination. Construction of buildings and facilities as complex, such as apartments for 10,000 households, kindergarten, clinical centers, commercial centers, etc, with green zone for leisure of the population. 		
Phase 1 assessment		
<ul style="list-style-type: none"> Project identified as a priority by MRTAUD. Development of housing and social infrastructure will be Government responsibility, but the private sector will have to recover costs from sale/rent of apartments. The Government would need to allocate budget for the provision of social infrastructure. Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it was available. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	15 or 54.0%	<p>Project scores low on <u>Structure Complexity</u>, since it involves the bundling of several different types of project across sectors. For example, different types of risk are involved in a housing project compared to a health sector PPP. Also scores low on <u>Enabling Environment</u>, given the ongoing reforms in the health sector and the lack of precedents of similar diverse projects.</p> <p>Despite increasing urbanization contributing to a reasonably stable <u>Planning Horizon</u>, there may be issues over <u>Public Acceptability</u> given the relocation of people from Ger areas.</p> <p>The estimated size for social and housing infrastructure is US\$430 million which is a <u>Sufficient Size</u> to cover transactions costs.</p>

Socio-economic impacts	20, or 62.0%	<p>Scores high on <u>Private Investment</u>, due to its size and quite low on <u>Fiscal Impact</u> because the project is highly likely to require significant government commitments, directly in terms of availability payments, and indirectly in terms of social services to become viable.</p> <p>Will have limited positive impact on <u>Economic Growth</u> through increased access to education and healthcare (e.g. productivity and life expectancy).</p> <p>Will have direct impact only on the <u>Number of People</u> relocated (around 46,000), although these are likely to be from lower income groups, giving a positive <u>Distributional Impact</u>. Likely to have a positive <u>Environmental Impact</u> in terms of reduced domestic air pollution and improved quality of water & sanitation services.</p>
Private-sector appetite	6, or 48.0%	<p>The <u>Economic Viability</u> of the public communities projects is linked to the willingness of people to rent or buy residential units. In this respect, there is uncertainty around demand for housing and integrated services from people living in Ger areas, given the likely higher cost. Budgetary allocations are likely to be required to ensure the long-term payments for social infrastructure (and potentially to support the housing developments).</p> <p>There is strategic interest in the sector and, according to the GOM , construction companies are keen in being first mover , since there potential for further similar developments.</p>
Overall score	53.4%	
Further considerations		
<ul style="list-style-type: none"> • The key issue with this project is the complexity of the PPP structure and the need for clarity on the concession items. Social housing as well as infrastructure for other social services (health, education) can be packaged as a PPP, but it needs to be clarified whether the housing development will be a private project or a PPP. It might also be sensible to separate different social infrastructure. • The limited affordability to pay rents or to buy may affect project feasibility, since the GOM is not willing to provide subsidies for property acquisitions. 		

Other social infrastructure projects

Other projects in social infrastructure sector include the University Campus and the Food Factory. They both related to the educational sector but they are obviously different in the most of the relevant PPP aspects.

Overall, both projects score relatively well. Regardless the structuring challenges, a PPP model could be identified and the socio-economic impacts could be envisaged. Issues of economic viability mean that the projects are likely to require Government financial support, the extent of the which will depend on the definite risk allocation in the PPP arrangement.

It is worth noting that, given the effort to ensure an objective approach, the Food Factory project scores relatively low against some criteria which are driven by project size. However, the potential for replicating the project in different areas might enable a larger transaction to be structured (or at least use some of the lessons learned in others).

Table B2 sets out an evaluation summary for these two projects.

Table B2: University campus

Name	Cost	Sector
University Campus	US\$1,644 million	Social
Summary		
<ul style="list-style-type: none"> • The project involves the construction of a complex for 100,000 university students including engineering, library, research laboratory, sports, cultural and arts facilities; and including a “University of Science and Technology” as high-tech cluster (or “Oyuni” – Intellectual – town). Construction work will include supporting infrastructure, classroom building, student dormitory, laboratory, research institute, and apartment for teachers and research fellows, service point. • The project consolidates a number of large universities in UB onto a single site outside the city center (including University of Science & Technology, National University of Mongolia, medical college and teacher training college). The objective is to reduce pressure on services, public transport etc. It is seen as a priority project by SPC and described as 'ready for tender' - administration for campus development established and land earmarked (will transfer to PSP on long-term licence to occupy/ operate). • SPC would like to attract international investment as Mongolia short of management expertise in education sector. 		
Phase 1 assessment		
<ul style="list-style-type: none"> • The GOM does not have funds to pay total construction and operating costs for new university accommodation, e.g. through availability payments. Most colleges do not currently receive subsidies at present, such that the burden of funding is on tuition fees. Some state universities receive an element of subsidy to cover estate costs. The tuition fees set by GOM (currently MNT 1.5 million to 2 million p.a. or \$1,200-1,500) are not sufficient for full cost recovery from students. So while there is an identifiable source of revenue, the viability is likely to depend on the regulation of tuition fees and the contribution of government. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes

Implementation and structuring	17, or 62.0%	<p>The project scores moderately low on <u>Structure Complexity</u>. The type of concession will be recommended by the ongoing feasibility study. Currently, concession based arrangements such as BOT are being considered, which would expose the concessionaire to market risks and give them responsibility for diverse activities. DBFO models have been used elsewhere for capital spending in education and universities.</p> <p>The <u>Enabling Environment</u> is unclear since there is no regulatory environment established for education and mechanism for the recovery of capital/ operating costs currently unclear. Some clarity is needed on the central planning and funding environment, while system reform gives rise to some uncertainty. However, there seems to be political support for the project and commitment to establish a favorable environment to develop it.</p> <p>A known and increasing demand for high education should give rise to a stable <u>Planning Horizon</u>. The <u>Project Size</u> appears to be sufficient to absorb project costs. <u>Public Acceptability</u> is likely to be high with strong government sponsorship.</p>
Socio-economic impacts	18, or 60.0%	<p>The project scores low on <u>Private Investment</u> and <u>Fiscal Impact</u>. Although a medium sized project, it is likely to require significant government contributions and or donor contributions (fees are unlikely to recover O&M and capital cost in themselves).</p> <p>Investments in skills (human capital) are expected to have positive long-term contribution to <u>Economic Growth</u>, while the project contributes towards Mongolia's MDGs and Science and Technology Master Plan.</p> <p>The <u>Number of People</u> with improved access to infrastructure services is likely to be more than 100,000, although they are unlikely to be poorer people. The <u>Environmental Impact</u> is limited although there is some potential for greater energy efficiency.</p>
Private-sector appetite	6, or 60.0%	<p>The <u>Economic Viability</u> will be a function of the PPP structure, appetite to raise fees, and the likely government commitments (subsidies and budgetary allocations). For example, the Government might share the initial capital cost. (as mentioned in the project description). It must be tested how tuition fees might be expected to change to enable full cost recovery (ongoing and capital costs), the necessary funding shortfall, and the scope for government budgetary allocations.</p> <p>International higher education markets are becoming globalised, so there may be some <u>Investor Appetite</u> (especially given Chinese and Indian interest).</p>
Overall score	60.4%	
Further considerations		

- The key issue for the university campus is the choice of PPP structure and the items to be included under a PPP. The long list suggests a BOT arrangement. In a BOT, the concessionaire would be responsible for various diverse aspects (e.g. retail outlets, campus maintenance, etc) which might increase the complexity of the PPP. It would expose the concessionaire to market risks (fee collection, dropout rates, etc.) and would rely upon the tuition fees set by government. However, if there was upward flexibility on fees, a BOO/ BOT would allow an international university or firm to enter the market and drive up standards. Alternatively, a DBFO structure based on availability payments would enable the government to retain responsibility for the provision and cost of education services and reduce private risk transfer, at the expense of fiscal liabilities in the future. The concessionaire would not be exposed to market risks.
- The status of the project should be clarified, since it is reported that the project shall have a CNY 270 million donation from Chinese government and a US\$20 million soft loan from the Indian government.

Table B3: Food factory

Name	Cost	Sector
Food Factory	US\$32 million	Social
Summary		
<ul style="list-style-type: none"> • Food Factories shall be established in major cities (Ulaanbaatar, Darkkhan, Orkhon) and shall provide complex services of production and delivery of food for secondary school students, and shall supply kindergartens with processed food products (enriched milk, drinks, dairy products, vegetables, fruits, bakeries, etc.). Food Factory shall receive food raw/unprocessed materials, produce, refrigerate and pack foods and provide delivery services to schools. All together 217,424 pupils would be covered by lunch program. It is envisaged that competitive selection will begin in 2010, with 100% coverage by 2013. 		
Phase 1 assessment		
<ul style="list-style-type: none"> • Potentially can be structured in an attractive way with the Government being buyer of services. Information is limited at this stage and the potential PPP model is unknown. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	19, or 84.0%	<p>Project scores high on <u>Structure Complexity</u>. Food supplies for schools is an unconventional sector for long term PPP (usually more supply contracts), but there is a potentially simple PPP structure based on DBFO. Potential replication means this could be a ‘path-finding’ PPP. <u>Planning Horizon</u> likely to be positive since demand for food from students reasonably stable over time. <u>Enabling Environment</u> likely to be benign since there are no specific regulatory issues. Besides, rules governing this type of business are currently under approval process.</p> <p><u>Public Acceptability</u> is likely to be high, given previous problems with food quality. Health and education of young students are seen as top social priority.</p> <p><u>Project Size</u> is small in terms of absorbing PPP costs.</p>

Socio-economic impacts	16, or 48.0%	<p>Project scores low on <u>Private Investment</u> since the size of the project is limited and risk transfer is incomplete. In terms of <u>Fiscal Impact</u>, School fees are unlikely to recover asset O&M and capital cost, such that government meets the shortfall through performance-based payments to private sector (unless enough revenue is generated through ancillary sales). Government is anticipating subsidies from State budget to pay for food supply to state schools.</p> <p>Project is likely to improve nutritional standards among young and so improve productivity, however the benefits are only indirect for <u>Economic Growth</u> and limited in scale and scope.</p> <p>In terms of <u>Number of People</u>, more than 217,424 pupils likely to benefit from improved scope of services, including low income groups attending state schools</p>
Private-sector appetite	8, or 80.0%	<p><u>Economic Viability</u> is possible in the assumption of government's budgetary allocations as the buyer of services. There is also scope for ancillary revenues through sales to private schools. Challenge is to establish a solid revenue/business model which will deliver required returns.</p> <p>Strategic relevance to regional investors cannot be identified. Potentially local companies with sufficient expertise and appetite.</p>
Overall score	71.2%	
Further considerations		
<ul style="list-style-type: none"> The key challenge for the project shall be to determine a PPP structure that does not expose concessionaire to market risks, but that is also flexible insofar as there are likely to be changes in service requirements over time. Under detailed feasibility study, it may be that simple contracting is more efficient. 		

Energy sector

Three projects have been evaluated in the energy sector: the Tavan Tolgoi power plant, the Power plant N.5 and the power plant in the Dornod province.

The Tavan Tolgoi power plant and the Power Plant number are Greenfield investments, the Power Plant project in the Dornod province is an expansion of existing infrastructure. The three projects presents similar implementation and structuring issues, even though with different degrees of complexity. Overall, the Tavan Tolgoi projects scores significantly higher than the other two power plants for the following key reasons:

- The prospect of having the mining companies as anchor off-takers of energy output has a significant impact on tariff issues and, as result, on the likely viability of the project.
- The Tavan Tolgoi project can potentially make a substantial contribution to economic growth through facilitating the development of the mining sector and South Gobi regional economy.

Tables B4, B5 and B6 below set out the scoring for each project against the given set of criteria.

Table B4: Tavan Tolgoi power plant

Name	Cost	Sector
Tavan Tolgoi IPP	US\$300 million or larger	Power
Summary		
<ul style="list-style-type: none"> Seen by MMRE as a priority project for Mongolia. Generation of 300MW in first phase with possible expansion for a further 300MW. First 300MW will be a stand-alone IPP, future 300MW connected to grid (may require separate PPA). To build power constructions and facilities, to produce and own power/electricity 		
Phase 1 assessment		
<ul style="list-style-type: none"> Power plant would principally support mines – which will be expected to pay full cost recovery tariff – and also some domestic/ non-mining consumers (who will pay subsidised tariff). Forecast demand from Tavan Tolgoi (TT), Oyu Tolgoi (OT) and Tsagaan Suvarga (TS) around 600MW-yr. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	24, or 96.0%	<p>The project scores high for <u>Structure Complexity</u> since the IPP model with ‘take or pay’ power purchase agreement (PPA) in emerging markets is well understood. The <u>Planning Horizon</u> is likely to be a strong point since energy demand from TT and OY is fairly predictable.</p> <p>The <u>Enabling Environment</u> appears clear enough to attract investors in energy, including an independent regulatory (ERA) in place. <u>Public Acceptability</u> is likely to be high since it is well known that a power plant is needed in the South Gobi area.</p> <p>The <u>Project Size</u> is sufficient to cover procurement costs.</p>
Socio-economic impacts	23, or 86.0%	<p>The scale and potential risk transfer possible in the project allows a significant <u>Private Investment</u>. There is also a potentially positive <u>Fiscal Impact</u>, in the assumption that mining companies will be charged a full recovery tariff (competitive IPP would generate value for money compared to other power options for the mines). If the public utility is the off-take, the government is potentially exposed to some collection risk, although this should be minimal with mining firms.</p> <p>The project will have a strong effect on <u>Economic Growth</u> through the exploitation of mineral resources in the South Gobi area. It may also enable the supply of power to third parties.</p> <p>The <u>Number of People</u> likely to be impacted may be high, since the population of South Gobi region expected to grow from 10,500 to 120,000 by 2020. Supply of some power supply to population living in South Gobi and mining area itself. Likely to be an <i>a priori</i> negative <u>Environmental Impact</u> due to air pollution (although some scope for new technologies and efficiencies). The relevant counterfactual would be non-exploitation of the coal mine, which is not desirable in other respects.</p>
Private-sector appetite	10, or 100.0%	Overall <u>Economic Viability</u> is strong, with clearly identified off-takers from the private sector. There is likely to be strong <u>Investor Appetite</u> among regional developers and investors (particularly if linked to export credit financing).
Overall score	95%	

Further considerations
<ul style="list-style-type: none"> • Key issues are around the available purchase price for coal fuel, the choice of generating technology (i.e. the need for air cooling rather than water cooling), and tariff issues. There may be scope for cross-subsidy of any domestic users. • Another key issue to clarify the power demand from the different mines, since there are conflicting reports. Currently OT has short-term agreement to import power from China (for four years or until mine is operational) and is then obliged to buy from the new IPP. Energy Resources has been granted a licence to build a small power plant at Tavan Tolgoi to burn ‘midlings’ (by-product of washing coking coal) and thermal coal to support mining operations.

Table B5: Power Plant Number 5

Name	Cost	Sector
Power Plant No. 5	US\$400 million	Power
Summary		
<ul style="list-style-type: none"> • Construction works of a thermal power plant to supply power and heat demand and ensure reliable operation of power and heat of Ulaanbaatar city. Seen by MMRE as a priority project for Mongolia. 		
Phase 1 assessment		
<ul style="list-style-type: none"> • Immediate need for increased power and heat in Ulaanbaatar. Installed capacity needs to increase to 1.5GW in next 15-20 years to meet needs of population growth and urbanisation. Current capacity insufficient to meet city's power requirement in winter; such that power is currently imported from Russia. Project previously tendered (in 2008) as IPP but unsuccessful. ADB now providing technical assistance to GOM to develop a technical specification and bid documents. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	20, or 76.0%	<p>The project scores moderately for <u>Structure Complexity</u> since although the IPP model with ‘take or pay’ power purchase agreement (PPA) in emerging markets is well understood, there may be issues arising from public utility purchasing power and having to plug the difference between break-even wholesale prices and the low retail tariffs.</p> <p>The <u>Planning Horizon</u> is likely to be a strong point since energy demand from UB is fairly predictable. The <u>Enabling Environment</u> appears clear enough to attract investors in energy, including an independent regulatory (ERA) in place. <u>Public Acceptability</u> is likely to be moderate since, on one hand it is well known that a power plant is needed in Ulaanbaatar, on the other, the risk of tariff hike makes the project less popular. There may be potential social or political issues over the need for subsidies or increased retail tariffs. The <u>Project Size</u> is sufficient to cover procurement costs.</p>

Socio-economic impacts	19, or 64.0%	<p>The scale and potential risk transfer possible in the project allows a significant <u>Private Investment</u>. However, a significant liability is created for the government power utility, since it sells power to customers at a rate lower than the economic tariff that must be paid to an independent generator.</p> <p>The project will have a positive effect on <u>Economic Growth</u> through increased power reliability, efficiencies for firms in urban area and reduced need for back-up generation.</p> <p>The <u>Number of People</u> likely to be impacted includes the population of Ulaanbaatar, including the potential supply of heat and power to poorer areas. Likely to be a negative <u>Environmental Impact</u> due to air pollution particularly in the urban environment. The relevant counterfactual would be alternative fossil fuels.</p>
Private-sector appetite	6, or 48.0%	<p>Overall <u>Economic Viability</u> is dependent on the wholesale tariffs attainable. If the public utility is not willing or able to pay an adequate tariff, the project is likely to be unviable. There is likely to be strong <u>Investor Appetite</u> among regional developers and investors (particularly if linked to export credit financing), although the previously failed IPP may reduce demand. Overall, the investor appetite is likely to be lower than appetite for Tavan Tolgoi IPP.</p>
Overall score	67.4%	
Further considerations		
<ul style="list-style-type: none"> Key issues for this project include fuel and capital costs, but mainly revolve around whether an economic tariff will be forthcoming from the public utility. 		

Table B6: Power Plant in Dornod province

Name	Cost	Sector
Power Plant in Dornod province	US\$70 million	Power
Summary		
<ul style="list-style-type: none"> Expansion of existing plant for 60MW thermal power plant in eastern Dornod Province. 		
Phase 1 assessment		
<ul style="list-style-type: none"> Currently sparsely populated area but with potential for population growth and mining/oil firms. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes

Implementation and structuring	16, or 58.0%	<p>The project scores moderately low for <u>Structure Complexity</u> since although the IPP model with ‘take or pay’ power purchase agreement (PPA) in emerging markets is well understood, there may be issues arising from public utility making investments in transmission grid as well as having to plug the difference between break-even wholesale prices and the low retail tariffs. Additional complexities arise from unclear demand for outputs and related off taker issues and from potential difficulties in negotiating ownership of the existing plant.</p> <p>The <u>Planning Horizon</u> may be fairly stable if mining and industrial off-takers are confirmed. The <u>Enabling Environment</u> appears clear enough to attract investors in energy, including an independent regulatory (ERA) in place. <u>Public Acceptability</u> is likely to be low since it is unclear whether this project is perceived as a priority or not. Less public acceptability than Power Plant N.5. In any case, the project is not deemed a priority by MMRE. The <u>Project Size</u> is sufficient to cover procurement costs.</p>
Socio-economic impacts	13, or 46.0%	<p>The project lacks scale compared to the other power projects and so will be limited in terms of the gross <u>Private Investment</u> it facilitates. If mining and industrial users are willing to purchase power, then cost recovery is possible, but otherwise a liability is created for the government power utility, since it sells power to domestic customers at a rate lower than the economic tariff.</p> <p>The project will have a limited positive effect on <u>Economic Growth</u> unless it provides supply to mining operations. The contribution to the mining business is not confirmed at this stage of the analysis.</p> <p>The <u>Number of People</u> likely to be impacted includes the population of Dornod Province, some 73,900 people in remote areas. Likely to be a negative <u>Environmental Impact</u> due to air pollution.</p>
Private-sector appetite	4, or 40.0%	<p>Overall <u>Economic Viability</u> is dependent on whether mining and industrial companies are willing and able to enter into purchase agreements. These two factors are quite uncertain at this stage of the analysis. Likely grid integration and upgrades required. There is likely to be strong <u>Investor Appetite</u> among regional developers and investors (particularly if linked to export credit financing), although the previously failed IPP may reduce demand. Due to uncertainty around demand, appetite from investors is expected to be lower than appetite for both the other two IPPs.</p>
Overall score	45.4.%	
Further considerations		
<ul style="list-style-type: none"> This project is at a very early stage and very little analysis has been done to date. The next steps should be to clarify what potential mining users might be in the area. In addition, the merits of integrating the existing power plant into the grid for the rest of the country should be explored, since this will offer advantages from a system management perspective. 		

Water and sanitation

One project was evaluated in the water and sanitation sector: the Orhon water reservoir. This project scores quite high in terms of socio-economic development impact and poorly against the other two criteria.

Tables B7 below sets out the scoring for each project against the given set of criteria.

Table B7: Orhon reservoir

Name	Cost	Sector
Orhon-Gobi Reservoir	US\$550 million	Water
Summary		
<ul style="list-style-type: none"> Large mineral resources in the Gobi region have created industrial and residential water demand. Existing water supply is very low and intensive desertification is a problem. The project would provide water for industry and agriculture; urban and rural residents; to mitigate environment degradation. It involves construction of a water reservoir compass capacity with 232 million cubic metres, a 30MW power plant and 900 km of water transfer pipes to convey water from north of Mongolia to Gobi. . 		
Phase 1 assessment		
<ul style="list-style-type: none"> Users, including mining companies and private customers, provide a source of revenue and potential anchor off-take. The project would provide an alternative water source to support mining activities since the remaining life of ground water reserves is estimated 5-15 years. The project requires strong political will (and potential financial support), but it is not necessarily a priority. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	14, or 48.0%	<p>The project scores low on <u>Structure Complexity</u>. The PPP arrangements are unclear, including offtake complexity and risk allocation. The GOM has indicated that it is planning to construct the project using foreign loans. The project is likely to require government purchase of water to limit (volume/design) risks. Since the project implies the use of a river flowing into China, negotiations might be needed with border country. Technical issues, like the risk underground water freezing, might increase complexity as well.</p> <p>In terms of <u>Planning Horizon</u>, there is a strong possibility of changing requirements and usage over time. Furthermore, the <u>Enabling Environment</u> is unclear, since there are unknown regulatory institutions and potential decentralised governance (spread across several provinces).</p> <p>While there may well be <u>Public Acceptability</u> for the project, tariffs for domestic users are likely to be sensitive and there may be opposition to displacing water between regions. The <u>Project Size</u> is sufficient to absorb procurement costs.</p>

Socio-economic impacts	23, or 76.0%	<p>As a large project, there is potential to enable significant <u>Private Investment</u>, although this will depend on risk transfer and viability. However, the significant risks and public support required means the project scores low on <u>Fiscal Impact</u>. There are potential issues with cost recovery in tariffs and the specific sources of revenues (e.g. anchor off-takers) are unclear. The project will have a positive impact of <u>Economic Growth</u> if it can be clarified that it is needed for the mining activities in next 10 years.</p> <p>The project may create services for a large <u>Number of People</u> given its size and extensive transfer pipes. The project will provide by high quality drinking water for residents of eight slums such as Oyu Tolgoi, Tavan Tolgoi, Mandalgobi, Dalanzadgad etc., and also up to 1.5m livestock, up to 3,000ha of land of pasture and arable. Existing quality and quantity of water is low. The project will thus contribute towards <u>Economic Growth</u>, particularly if it can be clarified that it is needed for the mining activities in next 10 years.</p> <p>The <u>Environmental Impact</u> may be positive if it allows reduced degradation of Gobi region and creates lakes and afforestation (although some concerns over water resource displacement). On the other hand, the project contains risks in terms of environmental management.</p>
Private-sector appetite	3, or 24.0%	<p>The <u>Economic Viability</u> of the project is unclear, because there are conflicting reports on demand for additional water from the mines (in the next 10 years). There is a suggestion that there has been insufficient due diligence at Tavan Tolgoi mine such that water demand is affecting the availability of water for herders, such that there is a need for alternative sources of water. By contrast, Oyu Tolgoi appears to be using underground water from separate aquifer (although this is presumably finite). Once these issues are clarified, the viability and related issues might score higher.</p> <p>Willingness of the Government to provide subsidies if needed, is unclear.</p> <p><u>Investor Appetite</u> is likely to be positive – the Turkish Government is apparently interested in the project.</p>
Overall score	44.4%	
Further considerations		
<ul style="list-style-type: none"> The key for this project is that the issues over technical feasibility and the demand from mines is clarified. 		

Transport

In the transport sector the Highway to Khoshingtyn Hondy was evaluated.

The highway project does not present substantial structuring issues, but the economic viability is strictly dependent upon the building of the new airport and the traffic projections.

Table B8 below sets out the scoring for each project against the given set of criteria.

Table B8: Highway to Khoshigtyn Hondy

Name	Cost	Sector
Highway to Khoshigtyn Hondy	US\$90 million	Transport
Summary		
<ul style="list-style-type: none"> Project to construct a highway to connect Ulaanbaatar city with an airport at Khoshigtyn Hondy over 53km. Road would be fully tolled, transferring at least some traffic risk to the private sector. 		
Phase 1 assessment		
<ul style="list-style-type: none"> The tolling of the highway would provide a clear and credible revenue stream to fund the road, subject to sufficient volumes. Construction for new airport expected to commence in 2011, although it is not expected to be ready for several years. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	19, or 74.0%	<p>The <u>Structure Complexity</u> can be limited, as tolls roads are relatively well established and understood in PPP. There are various risk mitigation measures and approaches (minimum revenue guarantees, revenue sharing, least PV of revenue tendering, etc.). Some construction risks specific to road projects might increase complexity.</p> <p>The <u>Planning Horizon</u> may also be stable since demand is likely to grow over time as the airport increases traffic (common in emerging markets). Traffic forecasting is potentially more realistic than many toll roads due to airport.</p> <p>There is previous experience of private participation in roads sector through the mines, indicating a supporting <u>Enabling Environment</u>. There is no specific issue with transport framework but there is a need to clarify regulatory/ tariff setting structure in line with PPP contract.</p> <p>There is likely to be strong <u>Public Acceptability</u> of the project, given sponsorship from MRTAUD, while the service is likely to be affordable to users (willingness to pay) due to the perceived benefit from reduced journey time. The <u>Project Size</u> is likely to be sufficient to support procurement costs.</p>

Socio-economic impacts	13, or 44.0%	<p>The project scores low on <u>Private Investment</u> due to relatively small project size, although a higher proportion of this may be from private sources than other projects. Assuming new airport is built, full toll road and volume risk transfer to the private sector may allow concession fees and revenue sharing arrangements could boost the <u>Fiscal Impact</u>. However, since the government is anticipating lack of sufficient traffic volumes to cover costs, subsidies to some users might be required, thus limiting the potential positive fiscal impact. If the PPP is funded through shadow tolls or availability payments, explicit budgetary allocations are required.</p> <p>Improved highway transport will facilitate business activities in terms of reduced travelling time and ease of transportation. Overall transport links are a key contribution to domestic and international trade and are likely to have a positive impact on <u>Economic Growth</u>, which, due to traffic volumes, would be still limited.</p> <p>The direct impact in terms of <u>Number of People</u> is limited because it is restricted to airport users. The <u>Distributional Impact</u> is also limited.</p> <p>Reduced traffic congestion would have positive <u>Environmental Impact</u>, although not if additional volume is facilitated. Community severance and disruption to migratory path as a result of construction could be an issue.</p>
Private-sector appetite	5, or 44.0%	<p><u>Economic Viability</u> is subject to the building of the new airport which has not started yet. It is unclear whether or not the forecast traffic is sufficient to cover costs. Clear source of private funding from users, who might include relatively affluent travellers. However, if traffic does not generate enough revenue to cover costs, budgetary allocations would be required.</p> <p>The road is linked to international traffic and so is likely to generate significant regional interest (potentially from airport investors).</p>
Overall score	50.0%	
Further considerations		
<ul style="list-style-type: none"> The key issues for the expressway are the status of the airport and how the PPP structure can mitigate volume risk. The status of the airport should be clarified since it would work as PPP in itself, with potential benefit from integrating concession with Expressway (to mitigate third party construction risk for example). 		

Logistics

The “Sainshand” industrial park was evaluated in the logistic sector.

The Sainshand industrial park has the purpose of conducting value adding activities for mining outputs. Even if there seem to be a rationale for such investment, there are several concerns about structuring issues and the economic viability of the project whose initial capital cost has been estimated equal to US\$4.7 billion. It is worth noticing that the project is wholly reliant on the traffic from the East-West railway which has not been built yet.

Tables B9 below sets out the scoring for each project against the given set of criteria.

Table B9: Sainshand industrial park

Name	Cost	Sector
“Sainshand” industrial park	US\$4,700 million	Logistics
Summary		
<ul style="list-style-type: none"> • Construction works of industrial park “Sainshand” and its infrastructure, with the purpose to conduct value adding activities for raw materials (e.g. processing coal and other industry). • The infrastructure components will include a coke plant, a metallurgy complex and a 1.5 GW power plant, although water supply and other supporting infrastructure would not be included under the concession items. 		
Phase 1 assessment		
<ul style="list-style-type: none"> • National Development Innovation Committee (NDIC) has medium term strategy for development of this project over next five years. Capital cost for all components as high as US\$10 billion. The project crucially relies on mine freight traffic flowing through the south east rail connections to Sainshand. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	15, or 52.0%	<p>The project scores low on <u>Structure Complexity</u>, since the proposed PPP structure, including public and private roles, is unclear. The project involves several components and may require a consortium with all required technical expertise. In terms of <u>Planning Horizon</u>, the project is part of a long-term plan to process and export minerals rather than exploit and export only, with the aim to create greater added value for Mongolia's economy. However, this has not yet been tested.</p> <p>There are few significant envisaged issues in terms of the <u>Enabling Environment</u>, although the arrangements for regulating rents and rates for industrial firms. The project seems to have adequate <u>Public Acceptability</u> in terms of government support, since it will create employment in the area and leverage the mining business.</p> <p>The <u>Project Size</u> is sufficient to cover procurement costs.</p>
Socio-economic impacts	19, or 66.0%	<p>If the project is found to be self-sustaining and there is sufficient risk transfer and private participation, then there may be an enormous amount of <u>Private Investment</u> generated. However, it is unlikely that viability will be sufficient to have a positive <u>Fiscal Impact</u>. Even where the project is self-sustaining, it is likely to require an upfront government commitment.</p> <p>Potential high impact on <u>Economic Growth</u> available from value adding activities, including greater skills etc. (according to BCG report, the GDP growth will be 45% higher if a process & export model is adopted).</p> <p>The project does not score high in terms of <u>Number of People</u> because of the limited population (although this may change) in the area and the fact that local population are not the main consumer of the infrastructure services provided in an industrial park. It scores the same for <u>Distributional Impact</u>.</p> <p>Potential scale efficiency at a centralised industrial area may reduce the <u>Environmental Impact</u> of industrial activity.</p>

Private-sector appetite	4, or 28%	<p><u>Economic Viability</u>, will depend upon the added value generated by the coal processing activities and the presence of railway. The processing/ industrial/ value add activities within the industrial park must be self sustaining. The BCG study supports the case for an industrial park to process coal. However, this must be offset by the huge capital costs and the lack of clarity on whether these will be fully recovered.</p> <p>The viability is reliant on the West –East railway which has not been built yet.</p> <p><u>Investor Appetite</u> will depend on the number of entities using the industrial park and potential industrial purpose. If the project is packaged well and attracts significant industrial users, likely to be significant interest.</p>
Overall score	44.2%	
Further considerations		
<ul style="list-style-type: none"> • The project is wholly reliant on the traffic from the new railway (both from the west and east). • Ultimately, the project will depend on the scale of value addition undertaken at the industrial park. If exporting outputs and competing with transit areas (e.g. China), the viability is doubtful given the transport costs (all input costs into finished/ semi-finished goods are multiplied by the transport costs). 		

Annex C: Summary of project scoring

Figure C1: Summary of unweighted scores

PHASE 2										
SUMMARY OF UNWEIGHTED SCORES										
	Apartment blocks XIV	Highway to Khoshigtyn Hondy	“Sainshand” industrial park	Tavan Tolgoi PP	Power Plant No.5	Power Plant in Dornod province	Orhon-Gobi Reservoir	University Campus	Food Factory	
	Residential	Transport	Logistics	Energy	Energy	Energy	Water	Social infrastructure	Social infrastructure	
Overall scoring										
<i>Criteria</i>	<i>Score</i>									
Implementation and structuring	15.0	19.0	15.0	24.0	20.0	16.0	14.0	17.0	19.0	
Socio-economic impacts	20.0	13.0	19.0	23.0	21.0	13.0	23.0	18.0	16.0	
Private-sector appetite	6.0	5.0	4.0	10.0	6.0	4.0	3.0	6.0	8.0	
Total	41.0	37.0	38.0	57.0	47.0	33.0	40.0	41.0	43.0	
Implementation and structuring										
<i>Sub-criteria</i>	<i>Score</i>									
Structure complexity	2.0	4.0	1.0	5.0	3.0	2.0	1.0	2.0	4.0	
Planning horizon	3.0	3.0	3.0	5.0	5.0	3.0	2.0	3.0	5.0	
Legal compliance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Enabling environment	2.0	3.0	2.0	4.0	4.0	4.0	2.0	3.0	5.0	
Public acceptability	3.0	4.0	4.0	5.0	3.0	2.0	4.0	4.0	5.0	
Sufficient size	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	
Total	15.0	19.0	15.0	24.0	20.0	16.0	14.0	17.0	19.0	
Socio-economic impacts										
<i>Sub-criteria</i>	<i>Score</i>									
Private investment	5.0	1.0	5.0	5.0	5.0	1.0	5.0	2.0	0.0	
Fiscal impact	2.0	2.0	3.0	5.0	2.0	3.0	1.0	2.0	2.0	
Number of people	2.0	2.0	1.0	5.0	5.0	4.0	5.0	5.0	5.0	
Distributional impact	5.0	1.0	2.0	2.0	4.0	2.0	4.0	3.0	5.0	
Environmental impact	4.0	3.0	3.0	1.0	1.0	1.0	4.0	3.0	3.0	
Economic growth	2.0	4.0	5.0	5.0	4.0	2.0	4.0	3.0	1.0	
Total	20.0	13.0	19.0	23.0	21.0	13.0	23.0	18.0	16.0	
Private-sector appetite										
<i>Sub-criteria</i>	<i>Score</i>									
Economic viability	2.0	2.0	1.0	5.0	3.0	2.0	1.0	3.0	4.0	
Local appetite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
International appetite	4.0	3.0	3.0	5.0	3.0	2.0	2.0	3.0	4.0	
Total	6.0	5.0	4.0	10.0	6.0	4.0	3.0	6.0	8.0	

Figure C2: Summary of weighted scores

PHASE 2										
SUMMARY OF WEIGHTED SCORES										
	Apartment blocks XIV	Highway to Khoshigtyn Hondy	“Sainshand” industrial park	Tavan Tolgoi PP	Power Plant No.5	Power Plant in Dornod province	Orhon-Gobi Reservoir	University Campus	Food Factory	
	Residential	Transport	Logistics	Energy	Energy	Energy	Water	Social infrastructure	Social infrastructure	
Overall scoring										
<i>Criteria</i>	<i>Score</i>									
Implementation and structuring	0.5	0.7	0.5	1.0	0.8	0.6	0.5	0.6	0.8	0.7
Socio-economic impacts	0.9	0.7	1.0	1.3	1.1	0.7	1.1	0.9	0.7	0.7
Private-sector appetite	1.2	1.1	0.7	2.5	1.5	1.0	0.6	1.5	2.0	2.0
Total	2.7	2.5	2.2	4.8	3.4	2.3	2.2	3.0	3.6	3.6
Implementation and structuring										
<i>Sub-criteria</i>	<i>Score</i>									
Structure complexity	0.6	1.2	0.3	1.5	0.9	0.6	0.3	0.6	1.2	1.2
Planning horizon	0.6	0.6	0.6	1.0	1.0	0.6	0.4	0.6	1.0	1.0
Legal compliance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Enabling environment	0.4	0.6	0.4	0.8	0.8	0.8	0.4	0.6	1.0	1.0
Public acceptability	0.6	0.8	0.8	1.0	0.6	0.4	0.8	0.8	1.0	1.0
Sufficient size	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0
Total	2.7	3.7	2.6	4.8	3.8	2.9	2.4	3.1	4.2	4.2
Socio-economic impacts										
<i>Sub-criteria</i>	<i>Score</i>									
Private investment	1.0	0.2	1.0	1.0	1.0	0.2	1.0	0.4	0.0	0.0
Fiscal impact	0.4	0.4	0.6	1.0	0.4	0.6	0.2	0.4	0.4	0.4
Number of people	0.4	0.4	0.2	1.0	1.0	0.8	1.0	1.0	1.0	1.0
Distributional impact	0.5	0.1	0.2	0.2	0.4	0.2	0.4	0.3	0.5	0.5
Environmental impact	0.4	0.3	0.3	0.1	0.1	0.1	0.4	0.3	0.3	0.3
Economic growth	0.4	0.8	1.0	1.0	0.8	0.4	0.8	0.6	0.2	0.2
Total	3.1	2.2	3.3	4.3	3.7	2.3	3.8	3.0	2.4	2.4
Private-sector appetite										
<i>Sub-criteria</i>	<i>Score</i>									
Economic viability	1.6	1.6	0.8	4.0	2.4	1.6	0.8	2.4	3.2	3.2
Local appetite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
International appetite	0.8	0.6	0.6	1.0	0.6	0.4	0.4	0.6	0.8	0.8
Total	2.4	2.2	1.4	5.0	3.0	2.0	1.2	3.0	4.0	4.0

Annex D: Modelling Assumptions

The general approach for the basic modelling used in this strategy has been to generate post-tax real project IRRs and to compare these to benchmarks for the cost of capital. This Annex describes the basic considerations in determining appropriate benchmarks, as sets out the assumptions and approach used to modelling power, road and rail projects.

Cost of capital research

For modelling purposes, a target IRR of selected projects was estimated on the basis of evidence of equity returns for infrastructure projects in developing and developed countries. Benchmarks for different projects were identified and indicative costs of capital for similar projects in Mongolia were estimated. In order to do this, indicators for sovereign spreads were also taken into account. Derived estimates were then compared with other sources of cost of capital to arrive at reasonable ranges.

Benchmarks

Table E1 presents some evidence on the cost of capital for PPP projects of different types and in different geographies.

Table E1: Evidence on cost of capital for PPP projects

Example	Nominal ROE	Inflation adjustment	COD	Gearing	Implied WACC
UK PPP/ PFI (1990s and 2000s)	13-18% (3)	3.0%	4.3-8.0% (4)	93% (2)	4.7-8.5%
UK Shadow toll roads (1990s) (5)	28-32%	3.0%	9.1%	91.3%	10.5-10.8%
African IPPs (2000-08)	16-22% (1, 2)	3.0%	7-10% (2)	70% (1, 2)	8.5-12.7%

(1) Eberhard and Gratwick (2010)

(2) Based on own transactions experience and reports in Project Finance Magazine

(3) Range in early PFI was 15-17% (NAO 2006), matured in the range 13-18% (Bain 2008)

(4) Low end of the range for availability-based projects, higher for rail PPPs (using nominal PFI bond yields in 2006, BarCap and RBC Market Monitors)

(5) Bain 2008

The UK is used for two examples since it has a long history of PPP projects (with relatively available information):

- For UK PPP/ PFI projects in the 1990s and 2000s, generally, DBFO projects based on availability payments, required returns on equity have fallen and are lowest in social sectors such as hospitals. The higher end of the range for equity returns and cost of debt might apply to more complex transport projects (such as the now defunct London Underground PPP). The implied post-tax real WACC would be in the range 4.7-8.5%.
- It should also be noted that the real post-tax cost of capital in regulatory determinations in UK infrastructure (power, water, transport, etc.) have been in the range 4.5-6.0%. These are generally regulated monopolies whose operational risks are well understood and priced, and so this is likely to represent a floor.
- In contrast, early road PPPs were based on shadow tolls where the private party was exposed to traffic risk. Given these were also early transactions and there was less experience with packaging PPP risks, nominal equity returns were as high as 32%. This was also possible thanks to higher gearing than is traditionally possible in emerging markets. These projects would have a high WACC of more than 10.5%.

For recent IPPs in East Africa, based on fixed PPAs with take-or-pay arrangements, nominal post-tax equity returns have been around 20% whilst gearing is around 70%. This implies a post-tax real WACC of between 8.8 and 12.7%.

Sovereign risk

For emerging markets, additional country risks must be factored into both the required return on equity and the gearing that can be achieved.

In considering country risk in Mongolia, the sovereign debt markets can be informative. However, Mongolia has virtually no public or publicly traded debt, meaning that there are no benchmarks for international investors⁸. A planned sovereign issue for 2010 has been scaled back from more than US\$1 billion following the European sovereign credit crisis. Indeed, the crisis has increased average emerging market spreads above UK Treasuries from 231bps to 315bps according to JPMorgan's EMBI Plus Index (Bloomberg Business Week). Nonetheless, Mongolia is rated B1 by Moody's and BB- by Standard and Poor's (equivalent with Philippines, Bangladesh, Serbia, Uruguay and Venezuela). The average spread in 2010 for Philippines 10-year US dollar sovereign issues over US Treasuries is 165bps (Bloomberg). The spread for Serbia's 15-year dollar issue is around 350bps.

It is also worth noting that Mongolia has a better sovereign rating than Kenya and other East African countries that have successfully launched IPPs in recent years.

⁸ Mongolia has less than US\$2 billion foreign debt, much of it on concessionary terms, or about 40% of GDP.

Estimating hurdle rates in Mongolia

On the basis of the above evidence, target IRRs for three types of project in Mongolia were estimated assuming a gearing of 70:30 and a debt pricing of 7-10%, with world inflation at around 3%. The estimates are as set out in Table E2 below.

Table E2: Estimates of cost of capital for PPP projects

Type of PPP projects	Nominal ROE	Inflation adjustment	COD	Gearing	WACC
DBFO	14.5%-21.0%	3.0%	7.0% -10.0%	70.0%	8.4% -12.1.4%
Transport project with volume risk	29.5%-35.0%	3.0%	7.0%-10.0%	70.0%	12.9%-16.6%
IPPs	16.0%-20.0%	3.0%	7.0%-10.0%	70/0%	8.8%-12.1%

Source: CEPA

- **DBFO projects.** Required returns on equity will be at least 150-300bps above those in the UK, such that a range for real post tax project IRRs will be **8.4-12.4%** depending on operational risks (mid-point **10.4%**).
- **Traffic risk.** The required returns for projects with traffic risk can be very high, as shown in the UK examples. Factoring-in lower gearing and higher country risks, the cost of capital could be anything between **12.9-16.6%** (mid-point **14.7%**). This implies that there would be a large benefit to include risk mitigation measures, such as minimum revenue guarantees, in these projects to reduce the cost of capital to somewhere more similar to the estimates for DBFOs.
- **IPPs (with fixed tariffs).** Estimates of similar required returns on equity to African projects, perhaps with lower country risk (particularly given readily available dollars in Mongolia) were made. A sensible range would be **8.8-12.1%** (mid-point 10.4%).

Other evidence on cost of capital

Evidence of target project IRRs and returns to private infrastructure in developing countries confirmed the reasonableness of the above estimates:

- UBS Investment bank provides a typical infrastructure fund IRR target **ranging from 10.0% to 15.0%**, depending on the individual characteristics of the assets.⁹;
- An assessment of the financial performance of infrastructure service operators in developing countries shows that between 1998 and 2002, the average cost of capital in developing countries varies **from less than 11.0% to over 15.0%** across regions and sectors¹⁰.

⁹ <http://www.portfinanceinternational.com/downloads/UBS.pdf>

¹⁰ "Are returns to private infrastructure in developing countries consistent with risks since the Asian crisis ?" Antonio Estache, Maria Elena Pinglo. World Bank Policy Research Working Paper 3373, August 2004.

Power sector

Financial analyses for three power projects were conducted. Generally, Dornod and Tavan Tolgoi use the same assumptions, while Power Plant 5 differs slightly. This approach is not definitive, but indicates the key issues over tariffs, fuel and capital costs.

The financials of the plants are independent of capacity, although there may be some scale effects above a certain threshold.

Capital costs

A variety of sources to calculate 'overnight' capital costs for kW of net capacity were used. These include the following:

- A report of comparable lignite coal fired generators in Eastern Europe (SEEC 2007) provides an estimate of EUR 1,113 which is converted at contemporary exchange rates and uplifted to today's prices to get a figure of around US\$1,370.
- The ECA report provides a range of estimates, as low as US\$1,110 using Chinese technology and as high as US\$1,700 using Indian comparators. Base assumptions are conservative, uplifting this high-end estimate to US\$1,785/kW.

The analysis examines a range of assumptions for capital costs and the effects on project returns.

For Power Plant 5, a lower capital cost is used to reflect the estimated costs quoted in the bid documents released in 2008.

O&M costs

Using the SEEC report, fixed O&M costs are estimated EUR 32.69 per kW-year (uplifted from 2007), while variable O&M stands at EUR 1.83 per kW-hour. This means that (given the technical assumptions below) a total O&M cost of US\$54.55 per kW-year, which is considerably higher than the ECA report of US\$33.

For Power Plant 5, a slightly higher fixed O&M cost was used to reflect relatively higher cost quoted in the ECA report.

Fuel costs

There are a range of possible fuel costs, as high as US\$120 per tonne for Australian coal in 2010 according to the World Bank Pink Sheet. However, as made clear in the ECA report, the cost of extraction from Tavan Tolgoi is US\$20, while it is even less from Baganuur (US\$14.20 from Power Plant 5). A higher coal price for the plant in Dornod (US\$40) was

used. The opportunity cost of coal (selling through China) excluding transit costs is around US\$80, but any difference between this price and the extraction cost is pass through for the government and so not relevant to the analysis.

Table E2 shows how these assumptions vary with source, including the heating value of coal.

Table E2: Fuel assumptions

Source	Cost	Energy
World Bank Pink Sheet	US\$120 per tonne	6300 kcal per KG
ECA – TT extraction costs	US\$20	5,100
ECA – China sales price for TT	US\$80	
ECA – Banguur Mine	US\$14.20	3,600

Technical assumptions

The technical assumptions allow the completion of simple cash-flow model:

- According to the SEEC report, assumptions for net outages (Forced and Maintenance Outage Rate (FOR+MOR)) are 19%.
- There are 0.001163 kWh of electrical output per kcal energy.
- According to the ECA report, thermal efficiency is 33% for Tavan Tolgoi and Dornod, and 36% for Power Plant 5.

Additional assumptions

Additional assumptions include: (i) a tax rate of 22.8% based on the World Bank’s Doing Business report; and (ii) development/ procurement costs of US\$500,000; (iii) the construction period is four years; and (iv) the period of the concession is 30-years and assets are fully depreciated with no terminal payment.

Roads sector

The key assumptions in modelling the roads project are based around traffic volumes. Since these are high uncertain and potentially complex, there should not be too much emphasis put on the final figures, although, given the data available for the airport, traffic forecasting might be more sensible than for other road projects.

Traffic volumes

The figures stated in the Mongolia infrastructure Report for international, domestic and freight traffic at the airport were used. These were then uplifted for the period stated in the report, and no growth beyond 2016 (which is a conservative assumption was assumed. These assumptions are shown in Table E3.

Table E3: Base airport statistics

Statistic	Volume	Growth rate	Period
International passengers	292,348 arrivals, departures	15%	2005-16
Domestic passengers	163,305 arrivals, departures, transit	3%	2005-16
Freight traffic	2,459 tonnes	5%	2005-16

There are then several steps and assumptions involved in translating these numbers into car and truck use (it is assumed anyone using a bus instead of a car will pay the equivalent toll):

- To get a number of car users, the following was used:
 - A proportion of air travellers are in transit. Since 20% of domestic travellers (36% of the total) are foreign, all of which are assumed to be in transit, there is a total of 7.2% passengers.
 - It was assumed that a full 95% of those passengers going to the airport will use the road since it will have a monopoly.
 - There will be an average of two users per car.
 - There will be an average of two ‘meet and greet’ users per airport passenger.
 - No assumptions were made on issues surrounding taxi use other than those above.
- The key assumption for freight traffic is that 5% is in transit, 95% of airport freight will use the airport, and each truck using the road will have a one tonne capacity. Since freight traffic is a small proportion of the total, a fixed tariff of US\$10 was assumed.

While this is a relatively sensible methodology, there needs to be extensive due diligence on traffic volumes, including statistical analysis of different outcomes (e.g. ‘Monte Carlo analysis’) to determine levels of traffic risk.

The toll per car user is the variable element used to generate a revenue stream.

Capital and O&M costs

The Land Transport Strategy estimates a capital cost of US\$500,000 per kilometre. The Mongolia Infrastructure Report Annex has somewhat lower estimates. The ASI Report for Chhattisgarh presents useful comparator figures for capital costs.

There is a wide range of possible O&M costs. Current GOM road proposals are as low as US\$3,300 per kilometre, whereas the authors of the Mongolia Infrastructure Report use a figure of US\$15,000. Again, the Chhattisgarh report provides a useful comparison.

Other assumptions

Additional assumptions include: (i) a tax rate of 22.8% based on the World Bank’s Doing Business report; and (ii) development/ procurement costs of US\$500,000; (iii) the construction period is two years; and (iv) the period of the concession is 30-years and assets are fully depreciated with no terminal payment.

Rail Sector

The rail project separates the track development and operations (TrackCo) and the train operations (TrainCo), and considers the implications under different arrangements. The modelling focuses only on the 400 km segment west of Sainshand, since it is only this area for which we have sensible freight volumes. The increase in average freight costs for the full 1,100 km was calculated without an increase in volumes.

Traffic

The freight traffic is calculated as a total volume of ‘net tonne kilometres’ based on the output of mines, volume not transported, and distance therein. This is based on estimates in the Land Transport Report and the demand for power generation locally.

Table E4: Freight traffic using railway

Source	Volume	Used locally	Distance
Tavan Tolgoi	15.0m	2.18m	400km
Oyu Tolgoi	2.0m	1.5m	400km
Tsagaan	250,000	0	150km
Other traffic	50,000 (growing 2% pa)	n/a	400km

TrackCo costs

The capital costs of building the railway are estimated between 1.3-2.0m per kilometre based on the Land Transport Report¹¹, with a base case of US\$1.8 million towards the higher end.

Operating costs for TrackCo are all taken from the Land Transport Report:

- Fixed maintenance cost of US\$4,000 per annum per kilometre.
- Variable maintenance cost of two cents per net tonne-kilometre.

¹¹ Land Transport report: “A line capable of carrying 25m tonnes of minerals a year in a moderate terrain such as South Gobi, would normally be constructed as a Class II Railway in China, with a ruling grade of 0.6%. The cost of such a line is estimated at US\$ 1.3m-2.0m per route KM...”

TrainCo costs

The Land Transport Report quotes variable O&M for train operations (including labor, material, fuel, power, R&M, etc.) of 0.8 cents per tonne-kilometre.

The calculation of rolling stock costs is estimated from a feasibility study in a similar environment (Jordan). Locomotives are estimated to cost US\$3.2 million per annum, with wagon at about US\$88,000 (with a capacity of 130 tonnes per wagon). The Land Transport Report estimates a capacity per train of 1,700 tonnes (or 13 wagons per train). It is assumed that one round trip per train per day is achieved, such that 20 sets of one locomotive and 13 wagons is purchased. This means that there is a rolling stock cost of US\$87 million.

Other assumptions

Additional assumptions include: (i) a tax rate of 22.8% based on the World Bank's Doing Business report; and (ii) development/ procurement costs of US\$500,000; (iii) the construction period is two years; and (iv) the period of the concession is 20-years and assets are fully depreciated with no terminal payment.

Annex E: Preliminary analysis of additional projects

This annex sets out results of a preliminary assessment of projects which were considered at an early stage of the assignment as potential PPP projects. In light of feedback received by the GoM, there seems to be little prospect for PPP implementation for these projects, because a state budget has already been approved and /or projects are not deemed as priority projects by the GoM. As a result of the feedback received, the assessment was revised and these projects did not pass the Pass/Pail test of Phase 1.

Considerations set out on each of project might be useful to the GoM to build knowledge on PPP issues which might be applied to similar projects in the future. This annex sets out the evaluation of the following projects:

- Zuun Selbe” apartment block;
- Apartment blocks VII;
- Central waste water treatment plant;
- West-East Railway;
- Goshun Suk hait Port; and
- Sliven Hure Port.

Table F1: Zuun Selbe” apartment block

Name	Cost	Sector
“Zuun Selbe” Apartment blocks	US\$138 million	Residential
Summary		
<ul style="list-style-type: none"> Construction works of a new apartment block along river Zuun Selbe (Eastern Selbe). Complex multi-sector project requiring provision of 3,142 housing units plus supporting social infrastructure including health clinic, kindergarten, school, training center, cultural center, sports center and service area (shopping) in a currently undeveloped residential area of Ulaanbaatar. 		
Phase 1 assessment		
<ul style="list-style-type: none"> Project identified as a priority by MRTCUD. Anticipated that housing will be privately developed, but that supporting social infrastructure will be Government responsibility. Government would need to subsidise provision of social infrastructure. Uncertain whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it were available. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	10, or 42.0%	<p>Project scores low on <u>Structure Complexity</u>, since it involves the bundling of several different types of project across sectors. For example, different types of risk are involved in a housing project compared to a health sector PPP. Also scores low on <u>Enabling Environment</u>, given the ongoing reforms in the health sector and the lack of precedents of similar diverse projects.</p> <p>Increasing urbanization contributes to a reasonably stable <u>Planning Horizon</u>, and there are less likely to be an issue over Public Acceptability given the area is not currently a Ger area.</p> <p>The estimated size for social infrastructure projects is US\$17 million (excluding housing element), which is small for a PPP and so may lack <u>Sufficient Size</u> to cover transactions costs.</p>
Socio-economic impacts	15, or 42.0%	<p>Scores low on <u>Private Investment</u> and <u>Fiscal Impact</u>. Residential units will be developed by private sector, such that Private Investment in infrastructure components will relate only to US\$17 million. The projects are highly likely to require significant government commitments, directly in terms of availability payments, and indirectly in terms of social services.</p> <p>Will have some positive impact on <u>Economic Growth</u> through increased access to education and healthcare (e.g. productivity and life expectancy).</p> <p>Will have direct impact only on the <u>Number of People</u> relocated (around 14,370), although these are likely to be from lower income groups, giving a positive <u>Distributional Impact</u>. Likely to have a positive <u>Environmental Impact</u> in terms of reduced domestic air pollution and improved quality of water & sanitation services.</p>

Private-sector appetite	5, or 56.0%	<p>The <u>Economic Viability</u> of the public communities projects is linked to the willingness of people to rent or buy residential units. In this respect, there is uncertainty around demand for housing and integrated services from people living in Ger areas, given the likely higher cost. Budgetary allocations are likely to be required to ensure the long-term payments for social infrastructure (and potentially to support the housing developments).</p> <p>There is little strategic interest in the sector and few other reasons to expect significant <u>International Appetite</u>, although it may be more appropriate for local developers.</p>
Overall score	49.0%	
Further considerations		
<ul style="list-style-type: none"> The key issue with this project is the complexity of the PPP structure and the need for clarity on the concession items. Social housing as well as infrastructure for other social services (health, education) can be packaged as a PPP, but it needs to be clarified whether the housing development will be a private project or a PPP. It might also be sensible to separate different social infrastructure. 		

Table F2: Apartment blocks VII

Name		Cost	Sector
Apartment blocks VII		US\$300 million	Residential
Summary			
<ul style="list-style-type: none"> • Converting Ger areas, close to the center of the UB city, into apartment blocks. • To build, operate and transfer buildings and facilities, such as apartment blocks for 7,000 households, school of 7,560 pupils, kindergarten of 1,900 children, Clinical Center, Vocational Training Center, and commercial centers with green zone as a complex. 			
Phase 1 assessment			
<ul style="list-style-type: none"> • Project identified as a priority by MRTAUD. Anticipated that housing will be privately developed, but that supporting social infrastructure will be Government responsibility. Government would need to allocate budget for the provision of social infrastructure. Uncertainty about whether current residents of Ger areas have appetite to move into (more expensive) permanent housing if it was available. 			
Phase 2 assessment			
Evaluation criteria	Score	Notes	
Implementation and structuring	12, or 44.0%	<p>Project scores low on <u>Structure Complexity</u>, since it involves the bundling of several different types of project across sectors. For example, different types of risk are involved in a housing project compared to a health sector PPP. Also scores low on <u>Enabling Environment</u>, given the ongoing reforms in the health sector and the lack of precedents of similar diverse projects.</p> <p>Despite increasing urbanization contributing to a reasonably stable <u>Planning Horizon</u>, there may be issues over <u>Public Acceptability</u> given the relocation of people from Ger areas.</p> <p>The estimated size for social infrastructure projects is US\$46 million (excluding housing element), which is small-medium for a PPP and so may lack <u>Sufficient Size</u> to cover transactions costs.</p>	
Socio-economic impacts	17, or 46.0%	<p>Scores low on <u>Private Investment</u> and <u>Fiscal Impact</u>. Residential units will be developed by private sector, such that Private Investment in infrastructure components will relate only to US\$46 million. The projects are highly likely to require significant government commitments, directly in terms of availability payments, and indirectly in terms of social services.</p> <p>Will have some positive impact on <u>Economic Growth</u> through increased access to education and healthcare (e.g. productivity and life expectancy).</p> <p>Will have direct impact only on the <u>Number of People</u> relocated (around 32,200), although these are likely to be from lower income groups, giving a positive <u>Distributional Impact</u>. Likely to have a positive <u>Environmental Impact</u> in terms of reduced domestic air pollution and improved quality of water & sanitation services.</p>	

Private-sector appetite	5, or 56.0%	<p>The <u>Economic Viability</u> of the public communities projects is linked to the willingness of people to rent or buy residential units. In this respect, there is uncertainty around demand for housing and integrated services from people living in Ger areas, given the likely higher cost. Budgetary allocations are likely to be required to ensure the long-term payments for social infrastructure (and potentially to support the housing developments).</p> <p>There is little strategic interest in the sector and few other reasons to expect significant <u>International Appetite</u>, although it may be more appropriate for local developers.</p>
Overall score	50.6%	
Further considerations		
<ul style="list-style-type: none"> The key issue with this project is the complexity of the PPP structure and the need for clarity on the concession items. Social housing as well as infrastructure for other social services (health, education) can be packaged as a PPP, but it needs to be clarified whether the housing development will be a private project or a PPP. It might also be sensible to separate different social infrastructure. 		

Table F3: Central waste water treatment plant

Name		Cost	Sector
Central WWTP of UB city		US\$1.1 million	Water
Summary			
<ul style="list-style-type: none"> The quality of wastewater treatment in the capital is currently inadequate. The project involves rehabilitation of the existing waste water treatment plant and pre-treatment facilities in Ulaanbaatar (including industrial waste) to enable environmentally friendly technologies. It would expand the central treatment building to improve the level of bio cleaning, and enable a capacity of 230,000m³ per day, with wastewater purification of 90-95%. Project in two phases in 2010-12 and 2013-16. 			
Phase 1 assessment			
<ul style="list-style-type: none"> There is likely to be increasing demand for urban water and wastewater facilities given increasing urban demand and the construction of new housing. 			
Phase 2 assessment			
Evaluation criteria	Score	Notes	
Implementation and structuring	14, or 64.0%	<p>The project scores relatively high for <u>Structure Complexity</u>, since there are several well-understood options that offer value for money (see further considerations). The <u>Planning Horizon</u> is relatively steady given expanding demand from urban areas.</p> <p>The <u>Enabling Environment</u> should be supportive given there is a single location and governance framework. However, utility companies (government owned) have limited experience in private sector participation.</p> <p><u>Public Acceptability</u> should be high since it is accepted that there is a need for improved services, but there is potential for opposition to any tariff rises or private participation.</p> <p>Currently, the <u>Project Size</u> is insufficient to absorb transaction costs, however size seems to be underestimated.</p>	
Socio-economic impacts	17, or 54.0%	<p>The project scores low for <u>Private Investment</u> and moderately for <u>Fiscal Impact</u>. The small project size limits the volume of private investment. While under some PPP models there might be an upfront payment to the government, it is likely that the government will have to absorb some risk associated with collection of user fees while it may also decide to provide subsidy to mitigate any potential tariff increases (unless improved efficiencies outweigh this effect).</p> <p>Improvement of water service will have some (small) effect on health, etc., but scale of project and impact is very limited. Increasing the capacity for industrial waste may boost <u>Economic Growth</u>.</p> <p>The project will impact a high <u>Number of People</u> in Ulaanbaatar (given improved services in urban areas) and is likely to have a positive <u>Distributional Impact</u>. Depending on the size of the project, it is likely to have a strong <u>Environmental Impact</u> due to reduced pollution of the Tuul River and ground water, contamination of soil.</p>	

Private-sector appetite	6, or 60.0%	Given the limited scale of the project its overall <u>Economic Viability</u> as a PPP is unclear. There are several PPP structures that may provide value for money for the government (see further considerations), but government budgetary commitments and/or user subsidies may be required. <u>Investor Appetite</u> may be high since international firms tend to be interested in water projects with favorable risk allocation, but limited scale of project unlikely to be favored by investors.
Overall score	59.0%	

Further considerations

- The key issue with this project is its size. If it can be clarified that the works are more than US\$1.1 million and the project can be structured sensibly (e.g. through an availability payment approach), then this could be an attractive pilot project.
- Another key issue is the PPP structure. Greenfield wastewater treatment facilities can be structured with availability payments as a DBFO to prevent exposure to collection fee risk. In contrast, expansion urban water projects in the 1990s were often structured as leases, such that the concessionaire was responsible for collecting user fees and paid a lease payment to the government for use of the existing asset. A combination might be a Rehabilitate, Operate, Transfer/ Own (ROO/ ROT), whereby ownership of existing facilities are transferred to the concessionaire in return for an upfront concession fee/ payment and the government then makes ongoing availability payments back to the concessionaire who is committed to expanding and rehabilitating the facilities.
- The status of the project needs to be clarified. It is reported that a Chinese bank is interested in investing plus possibility of donor finance from ADB (who are looking at the reform of water and waste water in UB).

Table F4: West-East Railway

Name	Cost	Sector
East-West Rail Project	US\$2.1 billion	Transport
Summary		
<ul style="list-style-type: none"> Resolution 32 “State policy on railway transportation” provides for a new freight rail route over land from South Gobi mines east and north towards Russia including four stages: (i) Dalanzadgad-Tavan Tolgoi-Tsagaansuvarga-Zuunbayan-Sainshand (400km), (ii) Sainshand-Baruun Urt (350km), (iii) Baruun Urt-Khuut (140km), and (iv) Khuut-Choibalsan (150km). 		
Phase 1 assessment		
<ul style="list-style-type: none"> Project identified as a priority by MRTCUD, and currently under preparation. Clear revenues from Tavan Tolgoi and other mines, long term environment seemingly conducive for contracting. The project represents a strategic investment to transport coal from TT, but it is not the most efficient approach. Exporting through Russia would cost five times more than exporting from China. Should coal, or other resources be transported through China at the Zamyn-Uud border, further investment is likely to be needed because the railway connecting Sainshand to the border is already congested. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	17, or 62.0%	<p>Project scores low on <u>Structure Complexity</u>, since the planned structure is not clear and potentially unworkable, i.e. an infrastructure PPP company would have to rely on the operational performance of UBTZ. Availability payment approach may be more sensible but have complexity drawbacks in terms of incentives and contract specification. Another approach is for integrated infrastructure and train operating PPP. Currently unclear.</p> <p><u>Planning Horizons</u> may be stable due to possibility of long-term contracting with mines, but again depends on structure. In terms of <u>Enabling Environment</u>, there are no specific issues against PPP in railway framework and experience of existing joint-venture in rail. The regulatory and tariff setting structure must be clarified (e.g. average cost or monopoly tariffs).</p> <p>The large <u>Project Size</u> is sufficient to absorb procurement costs, while <u>Public Acceptability</u> is likely to be high given political sponsorship from GOM.</p>
Socio-economic impacts	20, or 72.0%	<p>The project would seek to mobilise a significant amount of <u>Private Investment</u>, so the project scores high on this. However, compared to counterfactual of alternative route to market for mining output, the high economic cost of the rail project would require a large financial commitment from the government (or alternatively lower potential net fiscal revenues from the mines). Therefore, the project scores low on <u>Fiscal Impact</u>.</p> <p>There is potentially a significant indirect impact on <u>Economic Growth</u> arising from the project. Contribution to exports, processing at industrial park, and creation of potential transport and growth corridors with additional economic activity.</p> <p>The <u>Number of People</u> who populate the route of the railway is more than 300,000, although the <u>Distributional Impact</u> is likely to be benign. The <u>Environmental Impact</u> is positive compared with rail transport (pollution/safety); however, if counterfactual is short rail route to market rather than a longer route via Russia, less favorable environmental impact.</p>

Private-sector appetite	5, or 44.0%	<p><u>Economic Viability</u> is unclear and subject to structuring and involvement of the railway operatorship and link to the mining sourced revenue as opposed to the building and maintenance of the infrastructure only.</p> <p>Transport through this railway will imply costs three times higher than transport cost through a railway which connects to the Gashuun Sunhay border. Further transshipping costs will make it five times more expensive for companies to use this railway. This implies that should mining companies have an alternative and cheaper route, they will be reluctant to use the railway. That would affect the revenue generated by freight traffic and overall viability. The project would require significant budgetary commitments from government to ensure viability.</p> <p>An additional consideration is that there is unlikely to be sufficient additional mining freight traffic for sections (ii) to (iv) to justify the cost.</p> <p><u>Investor Appetite</u> in large rail projects likely to be significant from funds, developers and construction firms (including parastatals backed by export credits) in Russia, China, South Korea, etc.</p>
Overall score	56.0%	
Further considerations		
<ul style="list-style-type: none"> • The key issues for the rail project are around the structure of the PPP company, the willingness of the government to support the project with long-term commitments, the short-medium-long term prospects for mining traffic, and the ability to sell output via sea routes from Russia. • Government expects to tender project as BT or BTO whereby the PPP company finances, constructs operates and maintains the bulk infrastructure, while train operating services are undertaken by UBTZ 50:50 JV between Russia and Mongolia; owner and operator of Trans Mongolia railway. This would only be feasible under an availability payment structure (a PPP company would not want to rely on operational performance of UBTZ). A PPP including train operations may offer better value for money if mines can be contracted over a long period. The overall suitability for PPP is questionable since preparatory work may have already begun and press reports in November suggest Russian Railways would construct and finance operation. 		

Table F5: Gashuun Sukhait Port

Name	Cost	Sector
Gashuun Sukhait Port	US\$30 million	Logistics
Summary		
<ul style="list-style-type: none"> Project involves the rehabilitation and expansion, including installation of innovate equipment, for border crossing facilities including infrastructure, road, customs and storage structures. 		
Phase 1 assessment		
<ul style="list-style-type: none"> Border crossing project for shipment of minerals to China. Identifiable revenue from mining activities and relatively simple PPP structure in terms of rehabilitate, finance and operate. 		
Phase 2 assessment		
Evaluation criteria	Score	Notes
Implementation and structuring	17, or 70.0%	<p>The project scores high in terms of <u>Structure Complexity</u>, since it is possible to design in a similar fashion to a port project (without the larger capital requirements and complexities of public and private components). Maybe concerns over proposed RTO model.</p> <p><u>Planning Horizon</u> likely to be favorable given mining traffic, although there may be some uncertainty around the exact volumes given construction of railway. The <u>Enabling Environment</u> is less certain, since there is an unknown legal and regulatory framework or process in border-crossing/ port sector.</p> <p><u>Public Acceptability</u> for a strategic project is likely to be high, with strong government sponsorship. As a medium sized project, it lacks economies of scale in procurement cost but may be grouped with similar projects.</p>
Socio-economic impacts	14, or 48.0%	<p>The project scores low for <u>Private Investment</u> since the size of the project is limited (although this might be higher if grouped). The project scores high for <u>Fiscal Impact</u> since there is likely to be significant risk transfer possible (including a possible concession fee). The project scores high for <u>Economic Growth</u>, since it can facilitate improved trade and movement of goods.</p> <p>The <u>Number of People</u> likely to be affected is likely to be small, such that the project scores low. The Environmental Impact is likely to be benign, with some possible efficiencies.</p>
Private-sector appetite	9, or 96.0%	<p>The projects score high in terms of <u>Economic Viability</u> since there is a clear and credible revenue stream and the projects are likely to have an advantage over conventional port projects that the capital requirements are lower.</p> <p>Likely to be regional <u>Investor Appetite</u> for the projects (indeed, there is already some interest).</p>
Overall score	76.4%	
Further considerations		
<ul style="list-style-type: none"> The key issue with the project will be managing the traffic risk through the border crossing and the potential for guarantees from government. In addition, the structure should be clarified, since a RTO model would pay the concessionaire for works and ongoing O&M and so has limited risk transfer. The status of these projects must be clarified, since there are reports that construction has been started and developers single sourced. 		

Table F6: Shiveen Hureen Port

Name		Cost	Sector
Shivee Hureen Port		US\$30 million	Logistics
Summary			
<ul style="list-style-type: none"> Project involves the rehabilitation and expansion, including installation of innovate equipment, for border crossing facilities including infrastructure, road, customs and storage structures. 			
Phase 1 assessment			
<ul style="list-style-type: none"> Border crossing project for shipment of minerals to China. Identifiable revenue from mining activities and relatively simple PPP structure in terms of rehabilitate, finance and operate. 			
Phase 2 assessment			
Evaluation criteria	Score	Notes	
Implementation and structuring	17, or 70.0%	<p>The project scores high in terms of <u>Structure Complexity</u>, since it is possible to design in a similar fashion to a port project (without the larger capital requirements and complexities of public and private components). Maybe concerns over proposed RTO model.</p> <p><u>Planning Horizon</u> likely to be favorable given mining traffic, although there may be some uncertainty around the exact volumes given construction of railway. The <u>Enabling Environment</u> is less certain, since there is an unknown legal and regulatory framework or process in border-crossing/ port sector.</p> <p><u>Public Acceptability</u> for a strategic project is likely to be high, with strong government sponsorship. As a medium sized project, it lacks economies of scale in procurement cost but may be grouped with similar projects.</p>	
Socio-economic impacts	14, or 48.0%	<p>The project scores low for <u>Private Investment</u> since the size of the project is limited (although this might be higher if grouped). The project scores high for <u>Fiscal Impact</u> since there is likely to be significant risk transfer possible (including a possible concession fee). The project scores high for <u>Economic Growth</u>, since it can facilitate improved trade and movement of goods (particularly exploitation of the Oyu Tolgoi mine).</p> <p>The <u>Number of People</u> likely to be affected is likely to be small, such that the project scores low. The Environmental Impact is likely to be benign, with some possible efficiencies.</p>	
Private-sector appetite	9, or 96.0%	<p>The projects score high in terms of <u>Economic Viability</u> since there is a clear and credible revenue stream and the projects are likely to have an advantage over conventional port projects that the capital requirements are lower.</p> <p>Likely to be regional <u>Investor Appetite</u> for the projects (indeed, there is already some interest).</p>	
Overall score	76.4%		
Further considerations			

- The key issue with the project will be managing the traffic risk through the border crossing and the potential for guarantees from government. In addition, the structure should be clarified, since a RTO model would pay the concessionaire for works and ongoing O&M and so has limited risk transfer.
- The status of these projects must be clarified, since there are reports that construction has been started and developers single sourced.

Annex F: PPP structuring and viability issues on additional projects

Feedback on the draft final report revealed that some projects were no longer being considered for pilot PPPs. This Annex presents the previous draft analysis on these projects.

Dornod power plant

For the power plant in Dornod province, which is an extension and rehabilitation of an existing facility, there is the added complication in PPP structuring of ownership of the existing assets. On the one hand, a private company could be contracted under a lease arrangement whereby they receive tariff payments from the power utility but also pay a lease payment to the government for use of the existing asset. Alternatively, it might be more appropriate to allow a Rehabilitate, Operate, Transfer/ Own (ROO/ ROT), whereby ownership of existing facilities are transferred to the concessionaire in return for a commitment to expand and rehabilitate the facilities and an upfront concession fee/ payment. The IPP still receives the PPA tariff for power output from the power utility. This provides greater operational risk transfer for the government.

The project would require substantial investment in transmission and distribution networks in order to sell power to new areas and to potentially connect the plant with the rest of the grid.

The project is at a very early stage and very little analysis has been done to date. The key assessments for a feasibility study include latent demand from users in the province, potential industrial sources of demand, and the necessary network upgrades to distribute generated capacity. It may be that the project is not considered a priority until new mineral deposits are found in the region, or will become more viable should the rail project go ahead.

The power plant may have both mining and domestic off-take. Given this and the unknowns, a benchmark for the cost of capital the broader range of 8.8-12.1% was used. If it is assumed that the plant has technical characteristics similar to Tavan Tolgoi, a doubling of the coal price to reflect possible transport costs would require the wholesale tariff to be seven cents higher in order to ensure an unleveraged project IRR of at least 10.8%.

Ulaanbaatar wastewater rehabilitation

PPP structuring

Greenfield wastewater treatment facilities can be structured with availability payments as a DBFO to prevent exposure to collection fee risk and politicisation of setting user tariffs. In contrast, expansion urban water projects in the 1990s were often structured as leases, such that the concessionaire was responsible for collecting user fees and paid a lease payment to the government for use of the existing asset. This meant that private operators were exposed to market risks and needed to charge users cost recovery tariffs.

In this case, it might be more appropriate to allow a ROT, whereby ownership of existing facilities are transferred to the concessionaire in return for a commitment to expand and rehabilitate the facilities and an upfront concession fee/ payment. The concessionaire receives a specified tariff (with fixed and variable components) on a take-or-pay basis for the treatment of wastewater. If the government wished to retain ownership of the assets, a Rehabilitate, Finance, Operate (RFO) structure based on an availability payment would have a similar allocation of risks as a ROT.

Risk allocation

The core service of the project is the treatment of urban sewerage – end users need to be connected to the sewerage system and billed for use, which is likely to be the role of the municipal authority. Should the concessionaire be subject to the risks of collection, their risk adjusted cost of capital is likely to be high.

A ROT/ RFO approach with a take or pay tariff or availability will allow operational risk transfer (construction and financing risks, and operations and maintenance according to KPIs), but does not expose the concessionaire to market risks (collection and affordability). If the government wished to maintain a low user tariff, it must fund the difference between this and the tariff/ fee it pays to the concessionaire.

Government obligation

In the suggested structure (ROT/ RFO) the key role of the government, through the municipal authority, will be to specify the outputs (wastewater capacity and volume) it requires including KPIs. The municipal authority will also be responsible for connecting new users to the wastewater system and collecting payments from users, i.e. managing end user demand.

Key impediments

The project has several potential impediments. The PPP structure is potentially complicated by the need to rehabilitate existing infrastructure and so needs detailed consideration. There has been significant international experience with wastewater PPP and with expanding and renovation urban water systems in general which should be a useful input into this decision.

In addition, the status of the project needs to be clarified. It is reported that a Chinese bank is interested in investing, plus there is the possibility of donor finance from ADB (who are looking at the reform of water and waste water in Ulaanbaatar). It should be explored how these measures might improve bankability and affordability.

Economic viability

Feasibility analysis is required to firstly determine the potential technical options and costs involved under different output specifications and options. The municipal authority then needs to determine what volume of water treatment services it wishes to procure (as a PPP) in line with its own master planning. The viability of the wastewater project depends on the willingness and ability of the municipal authority to meet tariff obligations or availability payments vis-à-vis its ability to connect new users and effectively bill customers.

East-West Railway

The PPP structures for rail projects can be complex given the need to invest in, maintain and operate track on the one and trains on the other.

PPP structuring

The PPP structuring issues with the railway project are complex. For new rail infrastructure, the key functions for track and signalling are financing, construction (design and build), and operations and maintenance; while for train operations, there is a need to finance rolling stock and operate train services. This taxonomy applied to the East-West Railway project is shown in Figure 5.7.

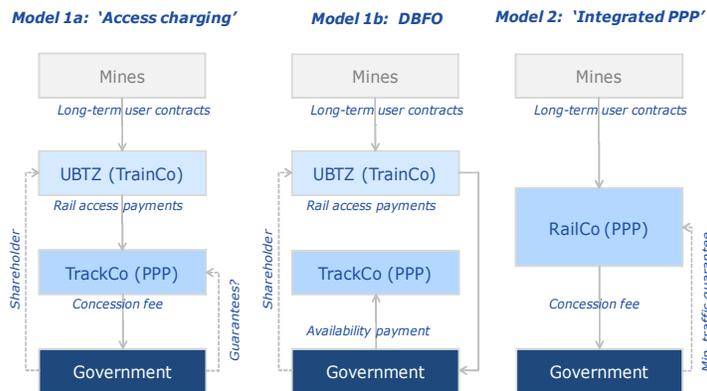
Figure 5.7: Taxonomy of rail PPP

	Track			Trains	
Function	Financing	Design/ Build	O&M	Finance	Operate
Model 1	PPP COMPANY			UBTZ	
Model 2	Financing Co.	PPP COMPANY			

The current plans for the project might be described as an infrastructure ‘build and operate’ concession. The incumbent State rail services operator, UBTZ, is expected to finance the purchase of new rolling stock and operate freight rail services. A PPP contract would seek a private sector partner to finance, build and maintain the bulk rail infrastructure. This would mean that there would be a large financing burden on the PPP company, or ‘TrackCo’ (since track infrastructure is the most capital intensive component of rail transport). This represents a source of risk and the ability of the TrackCo to raise the necessary finance needs to be examined.

Currently, the revenue model for this BTO is not clear. On the one hand, the PPP company could seek to recover fees directly through long-term contracts with mining firms (paying UBTZ a unit fee) who would provide the anchor offtake for the mine. However, this means that the TrackCo is reliant on the operating efficiency of UBTZ as well as the offtake arrangements with mines. A variant on Model 1 is to structure the project as a DBFO whereby the TrackCo is paid an availability payment for building, financing and operating the track. The revenue models are shown in Figure 5.8.

Figure 5.8: Revenue models for rail PPP



An alternative approach would be for full operational risk transfer, i.e. for an integrated PPP company to undertake all track and train activities. This integrated approach allows the company to directly contract with mines and manage its own operational performance. Since there may still be concerns about the ability of the company to raise substantial investment in the track infrastructure (and, even if they did, the financing costs might make user fees unviable). Therefore, an approach currently being explored in Jordan for a similar project (large scale Greenfield rail investments linked to mining output) is for a public infrastructure financing company to be established separate from the PPP including public and private finance to reduce the financing burden, risk and cost.

Risk transfer

The different PPP options have different risk allocation implications. The BTO model based on payments from mines and/ or UBTZ exposed transfers financing, construction and ongoing O&M risk to the private sector, as well as market risks and, to some extent, the operational performance risk of UBTZ (which it cannot manage). In a DBFO, as per the other sectors, the TrackCo is still subject to construction, financing and operational risks but it not subject to market risks.

In an integrated rail project, all risks are transferred to the private company, who will have full incentives to manage track and rail operations efficiently and fully utilize the bulk infrastructure. If an infrastructure financing entity were created to ease the financial burden on the PPP company, most of the same incentives would still apply.

Government obligation

The central obligation for the government is to ensure that mining output uses the railway either through managing the cost of rail freight or by compelling the mines to do so (both involve a cost for the government).

The specific role of the government will depend on the PPP arrangements. In the build and operate model, the government should specify the scope of works and the regulatory arrangements for track access. They should also determine how revenue is allocated from the mining companies to the concessionaire or UBTZ, and the arrangements for charges between the two. The government may have to offer guarantees in this structure.

Given the complications of these arrangements and risks involved for the private sector, it may offer better value for money to allocate public budget (potentially from mining revenues) to fund availability payments to the private party. This means that the risks arising from the operating performance of UBTZ, payment of access charges and roles of mines is undertaken by the government.

For an integrated track and train company, the government will have to determine how to finance the bulk infrastructure if not part of the PPP. If a public entity is established as a holding company, its governance arrangements (e.g. independence from government) and sources of capital will need to be structured. Importantly, the level of government guarantee (explicit or implicit) on its debt will need to be determined (and will affect the interest paid). Given the financing costs of the public entity, the private sector will need to bid on the lease payment it will offer the government to recapture some of these costs. With an integrated company, the government needs to have less of a role in issues of mining payments and access charging.

Key impediments

There are numerous potential impediments to the rail project, including its size, cost and the complicated PPP structure. The primary issue to be resolved is whether and how mines will be obliged to sell their output via the east-west rail route rather than south to China. Given there is a higher economic cost involved in selling north, the government must compel use of the rail and so reduce its own revenue from the mines (an indirect subsidy to the rail project). Alternatively, it could meet the financing burden for the rail infrastructure and keep freight fares low this way.

The status of the project and the roles of Russian Railways and UBTZ must be clarified. Preparatory work may have already begun and press reports in November suggest Russian Railways will invest US\$1.5 billion in the project as a developer-operator.

Economic viability

The key issue with the rail project is the PPP structure and how the different financing and operations will be separated. It should be clarified that the assumptions for the analysis, taken from the Land Transport Report, are highly preliminary and may underestimate operating and maintenance costs. The focus is only on the first 400km stretch of the railway. Estimates of volumes were based on traffic from Tavan Tolgoi, Oyo Tolgoi and Tsagaan mines and a small amount of 'additional' traffic. It is understood that there is an expectation

that volumes will increase in the future as new mineral deposits are discovered and economic activity in general increases.

The estimated cost of 400km of rail way at US\$1.8 million per kilometre is US\$720 million (which is equivalent to US\$85 million per year on an annual basis at a 10% discount rate). Since aspects such as variable O&M and train operating costs will be determined by freight volumes, costs are examined on a per net tonne per kilometre basis. Table 5.3 shows a simple levelized cost analysis, whereby the total rail freight cost at a 12% discount rate is 4.8 cents. A rail freight cost of five cents per tonne per kilometre means that the transport cost for coal from Tavan Tolgoi to Sainshand is around US\$20 per tonne of coal.

Table 5.3: Levelized cost analysis (USD/ tonne-kilometre)

Expense	Cost (USD per kWh output)		
	8.0%	10.0%	12.0%
Discount rate	8.0%	10.0%	12.0%
Infrastructure capital cost	0.0135	0.0155	0.0177
Fixed O&M	0.0003		
Variable O&M	0.0200		
Break-even infrastructure charge	0.0337	0.0358	0.0380
Train capital cost	0.0016	0.0019	0.0022
Variable O&M	0.0080		
Break-even infrastructure charge	0.0096	0.0099	0.0102
TOTAL BREAK-EVEN	0.0434	0.0457	0.0481

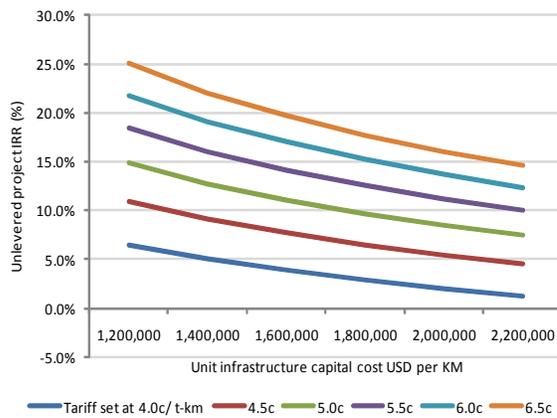
Since it is not possible to determine whether mining companies are willing to pay a freight charge of US\$20 per tonne of coal, it has been assumed that they are compelled to use the railway and there is a commensurate reduction in the government's share of mining revenues.

As discussed with reference to the road project, traffic risk increases the cost of capital involved with a project. The adjusted benchmark with full traffic risk is 13-16%. This can be mitigated to a large extent with an integrated rail company through longer term contracts with mining companies. Also, the government may decide to underwrite these contracts or provide other forms of guarantee. Therefore, the focus is on the lower end of this range for the cost of capital at around 13-14%. However, a PPP structure involving the risks identified above, i.e. that a build and operate concessionaire would be exposed to risks it cannot control, would mean that the cost of capital would be higher, at around 14-16% for example.

The cash-flow analysis is highly tentative. If the implications of a 5.7 cents freight charge and a Capex cost of US\$1,800 are examined, the post-tax unleveraged IRR is 13.6%. The cost of transporting coal 400km would be almost US\$23. Since infrastructure costs are around 78-79% of the total unit cost (on a levelized basis), the impact of infrastructure construction costs on overall costs in the cash-flow analysis are examined.

Figure 5.9 shows the impact on project returns of different freight fees and capital costs. If capital costs were to increase by US\$400,000 per km, the tariff would have to increase by half a cent to maintain a similar return.

Figure 5.9: Unleveraged post-tax project IRR at different capital cost and freight charge



If the scope of the railway is increased to 1,100 km, while maintaining the same volume of traffic – increasing the capital cost for rail construction of the entire 1,100km is almost US\$2 billion – then the unit freight cost increases significantly. A charge of around 10 cents would be required to ensure a return above 13%, such that the cost of transporting a tonne of coal 1,100km would be almost US\$110, making the coal uncompetitive. This probably underestimates the increased need for rolling stock.

On an availability payment basis, the cost of capital is likely to be much less, in the range 8.4-12.4%. If the government wanted to cover the capital cost of the infrastructure investment alone, it would need to pay more than US\$239 million each year (at a 10.4% discount rate, i.e. the mid-point in 8.4-12.4%).

The result of this financial analysis is that the scope, scale and cost of the project is huge, and there might only be clear sources of freight traffic for one component of the rail. There would need to be dramatic increases in potential rail freight to justify the full 1,100km of the railway.

Border crossings

PPP structuring

Port projects often have similar characteristics to industrial projects in that there is a bulk land preparation and infrastructure aspect (harbor clearing, docking piers, etc.) which can be separated from processing, storing, forwarding and logistical aspects. However, both border crossing projects considered for Phase 2 are land crossings and involve the expansion of an existing facility. Road and rail connections are not part of the projects (although there may be some separate upgrades to the connecting rail line). Therefore, the project can be structured relatively simply as a BOO/ BOT concession in which a private operator pays an upfront concession fee to the government to develop efficient border crossing facilities (to a

set of specifications) and recovers these cost from a charge on the movement of freight traffic.

In this approach, the concessionaire is subject to traffic risk. If this risk pushed up their cost of capital such that unit charges were high, it might be more appropriate to have a DBFO structure where the government paid the private sector an availability payment. However, it is understood that there will be a large and consistent mine related flow of traffic through the border crossing. There may be scope for government to ensure value for money through profit/ revenue sharing and ongoing concession fee arrangements.

Risk allocation

In the model outlined above there is full transfer of construction, financing, operational and traffic risk to the private party. Depending on the outcome of economic feasibility studies, it may be appropriate for the government to mitigate some traffic risk by providing minimum revenue/ traffic guarantees in return for revenue/ profit sharing mechanisms.

Government obligations

The government will need to state the scope of the facilities being developed, i.e. the daily traffic, warehousing, etc., as well as any relevant performance indicators. In addition, the appropriate risk mitigation measures such as revenue guarantees should be recognised for the fiscal liabilities they generate.

Key impediments

There are few obvious impediments to the implementation of the border crossing projects as PPPs. The current status must be clarified, since there are reports that construction has been started and developers single sourced.

Economic viability

The economic viability of the border crossing projects appears to be potentially high. There are established volumes and sufficient demand for minerals that should be able to cover the relatively limited capital and operating costs of the projects. However, these views are based more on theory and international experience rather than on preliminary assessment of project specific viability. Full technical and economic feasibility studies examining options for facilities, costs and potential volumes and charges should be undertaken, at which point the SPC and government can better assess the need for any guarantees.

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