

**PROJECT INFORMATION DOCUMENT (PID)  
APPRAISAL STAGE**

Report No.: 50380

<b>Project Name</b>	Technical/Engineering Education Quality Improvement Project II
<b>Region</b>	SOUTH ASIA
<b>Sector</b>	Tertiary education (90%); General industry and trade sector (5%); General public administration sector (5%)
<b>Project ID</b>	P102549
<b>Borrower(s)</b>	GOVERNMENT OF INDIA
	Government of India Department of Economic Affairs North Block India 110001
<b>Implementing Agency</b>	
	Department of Higher Education, Ministry of Human Resources Development, Government of India Shastri Bhavan India 110001
<b>Environment Category</b>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> FI <input type="checkbox"/> TBD (to be determined)
<b>Date PID Prepared</b>	September 3, 2009
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<b>Date of Board Approval</b>	November 13, 2009

**1. Country and Sector Background**

*A country with many poor but not a poor country.* In the past decade, India has accelerated economic growth, made progress on most MDGs, and maintained a vibrant democracy. India's GDP grew at more than 9% per annum over the past four years, although growth is now slowing to between 5-7% per annum. Nevertheless, there remain an estimated 421 million poor people living under \$1.25 a day. Further, inequality within households and between states is rising. To reduce inequality and ensure that growth benefits more people, improved delivery of public services, such as education, health, sanitation and electrification, is required. The challenges of sustainable, inclusive growth and improved service delivery are at the center of India's development. Improvements in education remain absolutely central to this agenda.

*India has made progress on its daunting education agenda but has a long way to go.* Nearly 44% of India's labor force is illiterate. The gross enrolment rates at the higher secondary are 40%, and enrolment rates in higher education are just 11%. These figures compare unfavorably with, for example, China's, where access to secondary education is almost universal and enrollment in higher education exceeds 20%. However, progress in primary education through the *Sarva Shiksha Abhiyan* (SSA) program is encouraging. Primary net enrolment increased from 80% in 2000 to 92% in 2007. At the secondary level, a planned government program offers an opportunity to dramatically expand access, invest in quality and improve equity. India is also renewing its efforts to strengthen higher and technical education.

*The renewed emphasis on higher education, and in particular the technical stream of higher education, seeks to directly address skill shortages in the economy.* Rapid economic expansion has boosted demand for engineers. The shortage is most severe in the IT, infrastructure, power and water sectors. For example, the exporting IT sector reported lack of skills as the most important obstacle for growth, and salaries rose 15% annually from 2003-06. The fact that India's best talent chooses the engineering discipline is a unique and tremendous factor for competitiveness that continues to drive India's exports in the IT and business-service sectors. A well-functioning technical education system and a reduction in the skill shortage would therefore be critical factors to sustain rapid growth in the medium term.

*Employers criticize the skill set of newly educated engineers.* A widely quoted study by NASSCOM and McKinsey from 2005 found that multinational firms in India consider only 25% of engineering graduates suitable for employment, compared to 35% in Malaysia and 50% in Eastern Europe. Private sector associations report that graduates have obsolete or poor technical knowledge and lack essential skills (communication skills, critical thinking, ability to apply learning to real life problems, and entrepreneurship). Another indicator of low quality is the huge training programs run by the IT companies for newly hired graduates. Improving quality and learning outcomes would require tackling the following persistent sector issues in technical education:

- *Insufficient faculty qualifications and large faculty shortage.* Government of India (GoI) estimates that the massive expansion of institutions—1,400 out of the 2,400 engineering schools have been established since 2001—has resulted in a faculty shortage exceeding 30,000 PhD and 24,000 Master degree-level faculty members. There is an estimated 140,000 faculty members. For example, India's production of PhDs is estimated at just 1,000 per year, for a student population of 1.7 million. This compares to a PhD production of 9,000 in the US and 12,000 in China. Unlike the gap in undergraduate education, this gap is not being filled by private institutions. At the same time, few faculty members conduct research or take part in faculty development. The consequence is teachers with bachelor degrees teaching bachelor students, and teaching methods which emphasize theoretical rote-learning. The challenges to improve faculty qualifications are: (i) upgrade the academic qualifications and increase professional development of the existing faculty, and (ii) increase the production of adequately prepared faculty members for the future through scaled-up post-graduate programs.
- *Nascent industry-academia collaboration.* Industry-academia collaboration occurs in various ways, such as industry input to curriculum development, internships for students, and joint research. The collaboration yields real-life skills demanded in the labor market and generates revenue for education institutions. Increasing industry-academia collaboration requires: (i) overcoming the distrust between the two partners; (ii) identification of win-win partnerships in terms of technical knowledge; (iii) incentives to institutions and teachers for collaboration; and (iv) a minimum level of institutional decision-making authority over course development and examination.
- *Outdated learning infrastructure prevents the development of hands-on skills in industry-relevant technologies.* Many public institutions have not upgraded their equipment, labs, and learning resources for more than a decade. Consequently, engineering education has been reduced to a theoretical study. Investments are needed to support curriculum revisions which focus on practical training and provide a minimum infrastructure for research and development along with policies to increase sustainability of such investments
- *An over-regulated, but under-governed higher education system.* Less than 4% of institutions are academically autonomous, and only 5% are accredited. The other institutions are affiliated to universities that design curriculum and exams, thus inhibiting innovations in the teaching-learning process and tailoring education to local industry demand. Further, public institutions are under detailed input control from the state or central government with limited discretion and incentives for efficiencies. At the same time, little reliable performance information is available. Accreditation is based on inputs into education, not actual learning outcomes. Therefore, both policymakers and

students (consumers) face difficulties identifying poor performing institutions, thus lowering quality of service delivery. This takes place within a risk-averse civil servant cadre with little experience in decentralization and cases of poorly managed institutions. One way forward would be to: (i) decentralize decision powers to the capable and responsible institutions, (ii) raise availability of reliable performance information, (iii) improve capacity of governments to govern based on outcomes, and (iv) increase the share of accredited institutions and reshape accreditation to focus on outcomes.

- *Stagnating research.* Increasing research is not only necessary for educational quality (because it continuously updates teachers' domain knowledge and course content), but also to cater to emergent industry and societal demand for technological solutions. A growing number of Indian firms are looking to collaborate with academia to enhance competitiveness. Further, sustainable development in India requires suitably adopted technologies; for instance to reduce the impact of climate change and increase energy efficiency.

*Besides low quality of education, inequitable access to technical education is an issue.* Major inequalities exist in enrolment between rich and poor, rural and urban areas, men and women, disadvantaged groups and the general population, and between states. Most gaps have diminished in the last decade, with the exception of the gap between rich and poor. In 2004, a young person from the top expenditure quintile was 14.5 times more likely to enroll in tertiary education than a young person from the bottom quintile. The inequalities seem to be a result of the following factors: (i) poor completion rates of secondary education and low learning outcomes (particularly for SC, ST, and OBC students, preventing them from taking advantage of the reserved seats in public institutions); and (ii) rising costs of tertiary education rendering higher education unaffordable for many. Recommended policy responses are to improve graduation rates of secondary education, expand the student loan program, and provide remedial education to weaker students.

*The first phase of TEQIP started a reform process and made headway on the above sector issues, but needs to be sustained and scaled-up.* The first phase of TEQIP supported 109 engineering education institutions in 13 states and 18 central institutions. Around a fifth of the institutions were private. Initially, only six states accepted the TEQIP reform criteria, but the reforms are now a key part of the 11th Five-year Plan of the GoI. The project initiated a reform process promoting autonomy and accountability that led to over 25 TEQIP-institutions becoming academically autonomous. For instance, 17 Regional Engineering Colleges became National Institutes of Technology with university status. Seven of the nine quantitative development targets were achieved or within 10% of achievements. In the TEQIP-institutions, the salaries of graduates increased by 90% in nominal terms over the baseline, and the employment rate increased by 42%. About 83% of the existing education programs have been revised and about 91% of eligible programs are either accredited or are under assessment for accreditation. Publications and patents from TEQIP-supported institutions more than doubled. However, due to shortage of faculty only 70 out of the proposed 164 new courses could be started. For the reforms to function optimally and spread, continued support is needed. There is considerable momentum to move forward and all state governments have expressed interest in the proposed project, and are supportive of the proposed reforms.

*Government of India has designed an ambitious strategy for higher education in the 11th Five Year Plan with many initiatives.* The main target for the 11th Five Year Plan for higher education (technical and general) is to increase gross enrolment from 11% to 15%. The goal for technical education is an annual growth rate of enrolment of 15%. An equitable expansion is aimed by the establishing 80 new Centrally-funded high-quality institutions, over 800 new polytechnics, and 370 new Colleges in under-served regions. Equity is further supported through financing to student loan and grant programs, in combination with increased cost-recovery to 20% of the costs. The proposed project is specifically mentioned the 11<sup>th</sup> Five Year Plan for technical education as a key component for improving the quality of education in

existing institutions. Further measures to improve quality include increased focus on accreditation and increased autonomy and accountability in the system, besides investing in ICT for education. Within the institutions, the GoI seeks to improve teacher competence and motivation, and provide for a more flexible and frequently updated curriculum and assessment to improve the skill set of graduates. In addition, the UPA government that took power in June 2009 has through MHRD signaled strong intentions to overhaul the federal regulatory framework of higher education. The few details available on this overhaul follow the strategy outlined by the 11<sup>th</sup> Five Year Plan from the Planning Commission and the recommendations of the National Knowledge Commission. These recommendations suggest the creation of a single regulatory body of all streams of higher education, a separation of the accreditation agencies from the government sphere, and a strong emphasis on competitive funding with increased availability of performance information and increased autonomy of institutions.

## 2. Program Objectives

*The project is a second phase of an envisioned 15-year phased program initiated with the first phase of TEQIP from 2002 to 2009.* The program aims to improve quality of technical/engineering education.

*Progress towards the improvement in the quality of engineering education is measured through improvements in the learning and employability outcomes of the graduates of the supported institutions.* Learning outcomes and employability will be tracked through the following proxies:

- Increase in the satisfaction index of employers with graduates
- Campus Placement Rate for graduates and Annual Average Salary offered employment

*The second phase builds upon progress achieved under the first phase and addresses a new large need for producing qualified faculty.* The first phase achieved significant impact on quality of education by implementing institutional and policy reforms in a large number of participating institutions, focusing on improved academic excellence in each supported institution; and established a competitive fund process implemented in partnerships with state governments. An extensive set of lessons has been drawn from phase I as part of the preparations for phase II. This second phase of the program equally seeks to contribute to a nation-wide improvement in quality of technical education. It will strengthen the core-concept from phase I, which proved highly relevant and effective; notably the competitive fund mechanism, the autonomy and accountability reform, and the bottom-up approach. Lessons emphasize the need to focus more on capacity building to implement the reforms, increase availability of pedagogical training, stronger focus on project implementation, and further enhance the monitoring and evaluation. Further, the second phase will respond to two new sector issues: (i) Preparing more post-graduate students to reduce shortage of qualified faculty, and (ii) produce more R&D in collaboration with industry.

## 3. Rationale for Bank Involvement

*The Bank can add value with extra capacity building, focus on results, experience from Phase I, sharing of international experiences, and financing.* First, it can assist with capacity building to design the project and jointly review implementation. This is desirable given the important and novel aspect of incentivizing and facilitating the implementation of reforms in a bottom-up approach. Additionally, Bank assistance is helpful to GoI to increase the capacity involved in for implementation of the high number of initiatives in the 11th Five-Year Plan for technical education. Second, Bank assistance with monitoring and evaluation is requested by GoI to ensure a focus on results. With a strong focus on results, there is also a better opportunity to demonstrate the impact of the project, which could influence the design of financing scheme to other streams of higher education. Third, the Bank has global experience in supporting higher education through transparent and objective competitive funds. Fourth, the Bank would bring additional financing to improve quality of education. Furthermore, the Bank's value addition was demonstrated in Phase I, through which the Bank gained valuable lessons that would benefit the proposed Phase II.

## II. Proposed project development objective(s)

The second phase of the Technical/Engineering Education Quality Improvement Project seeks to strengthen selected institutions to produce more employable and higher quality engineers and prepare more post-graduate students to reduce faculty shortage.

*Achievements towards the objective will be measured as follows:*

Primary Project Development Objective	Key Performance Indicator (KPI)
<i>Institutions are strengthened to produce more employable and higher quality engineers</i>	<ul style="list-style-type: none"> <li>• Share of supported programs that are officially accredited</li> <li>• Percentage of institutions with academic autonomy</li> <li>• Percentage of Faculty with a Master or a PhD-degree</li> </ul>
<i>Prepare more post-graduate students</i>	<ul style="list-style-type: none"> <li>• No. of master and PhD students enrolled</li> </ul>

Note: Indicators will be collected for the selected institutions on a continuous basis, while the indicators will be collected at baseline and end of project for a comparator group. Baseline and targets have been established. These will be updated by March 2010 when the selection of first 100 institutions has taken place.

TEQIP-II will pursue these primary objectives in a manner where institutions in economically-backwards areas are strengthened, and where institutions also scale-up demand-driven research, development, and innovation. The set of intermediate outcome indicators therefore include:

Secondary Objective	Intermediate Outcome Indicators
<i>Institutions in economically-backwards areas are strengthened</i>	<ul style="list-style-type: none"> <li>• Difference in the above KPIs between institutions in economically-backwards areas and institutions in others</li> </ul>
<i>Scaling-up demand-driven R &amp; D &amp; I</i>	<ul style="list-style-type: none"> <li>• Percentage of externally funded R&amp;D and consultancies in total revenue</li> <li>• Increase in the number of publications in refereed journals</li> </ul>

*The project development objective stresses “strengthening of institutions” as the project objective to reach the longer-term program objective of producing more employable and higher quality engineers, since improving quality (learning outcomes) and employability of graduates are medium-term outcomes. Project activities will take between 2 to 6 years to substantially impact learning and employability in the class-rooms and labs. Therefore, the last graduating class before project closure (in 2013) will only have benefitted modestly from the project’s interventions. Institutional strengthening is therefore, the project’s development objective, not learning and employment outcomes. Nevertheless, the project will track employability and seek to measure learning outcomes when possible.*

### 4. Project Description

The second phase of the Technical/Engineering Education Quality Improvement Project is composed of the following components and sub-components:

#### **Component 1: Improving Quality of Education in Selected Institutions – US\$ 453 million (90% of total) -- IDA US\$ 280 million**

*This component will support around 200 competitively selected Engineering Education institutions through two funding windows to improve Learning Outcomes and Employability and Scale up Research,*

Development and Innovation. The faculty of these institutions will be offered pedagogical training through a separately funded faculty development program.

*The same selection process will be used for the two windows in the competitive fund.* The main steps are:

1. Eligibility of States
2. Selection of Preliminary Proposals from Institutions
3. Selection of Complete Proposals from Institutions
4. Improvement of Complete Proposals
5. Institutional Project allocation and Signing of MoUs

*The selection of the 200 institutions will take place in two rounds.* The first round of an estimated 100 institutions will start in July/August 2009 and be completed in January 2010. The second round would also be completed in 2010. The two rounds will phase the intensive evaluation and implementation start-up phase over 18 months. Further, the two rounds will give time to institutions and states to improve the quality and potential impact of proposals. In each round, the technical evaluation, scoring and feedback of the institutional proposals will be undertaken by experts in technical education to ensure a merit-based, transparent, and objective evaluation.

*A set of eligibility criteria for States will be enforced to achieve a high and sustained impact of the TEQIP investments.* The criteria seek to enhance reforms in the system and give TEQIP institutions an enabling policy framework, with adequate decision power and incentives, which will enable and encourage them to deliver quality education and research in an effective and efficient manner. A primary focus is to shift the role of Government away from the traditional role of input-control towards a role of leading change, focusing on outcomes, and incentivizing improvements in technical education. Importantly, appropriate accountability mechanisms need to be in place to ensure value for public money and an institutional development aligned to State policy objectives. These reforms are formulated by Government of India.

#### **Component 1.1 Competitive Window: Strengthening Institutions to Improve Learning and Employability of Graduates – US\$ 250 million (50%)**

*This Window will seek to strengthen around 140 institutions to improve the competencies of undergraduates through the implementation of a set of reforms and investments.* The window is an enhanced version of the window in phase I. The Institution's progress will primarily be measured in terms of accreditation, academic autonomy, faculty qualifications, increase in the overall satisfaction index of faculty and students on quality of education, and the transition rate of students from first year to second year by social group. The last two intermediate outcome indicators seek to measure quality of the teaching learning-process and the attention to weaker students. Each institution would have to meet a set of 2-year performance benchmarks to continue receiving funding under the project. To reach these benchmarks and targets, the window will support an institution-specific package consisting of measures to: (i) improve learning facilities; (ii) develop and continually improve curricula to enhance their relevance to the labor market, in collaboration with industry; (iii) increase faculty development, (iv) implement institutional reforms aimed at improving and incentivizing effective teaching, promoting academic excellence, and enhancing efficiency of project institutions, (v) build management capacity, and (vi) obtain accreditation. Although the institutions will design their own institutional project, there will be a limited number of financial parameters to respect, such as investing a maximum of 5% in civil works and 50% in equipment and learning resources of the maximum INR. 10 crores grant (US\$ 2 million). At least 10% should be invested in faculty development and other intangible investments. It is expected that around 20 percent of institutions will be private.

#### **Component 1.2 Competitive Window to Scale-up Post-graduate Education and Research, Development and Innovation – US\$ 194 million (38%)**

*This Window of the Competitive Fund seeks to significantly increase enrolment in post-graduate education, and produce engineering research and development and innovation in collaboration with the*

*private sector.* The estimated 60 institutions are expected to be more advanced than in window A, and will be asked to meet a stringent set of eligibility criteria to demonstrate an existing R&D base and management capacity that can be expanded. The key target will be increased enrollment of students in post-graduate education programs, in particular the PhD programs to address the faculty shortage. A secondary target would be increased industry collaboration within R&D to produce technological solutions with firms and increase R&D outputs to produce knowledge for development and raise the quality of research-based education. The main type of grants will be a scaling-up grant in the size of INR. 12 crores (US\$ 2-2.5 million) for institutions to scale-up several existing Master and PhD programs with concomitant research programs. Preference would be given to proposals that incorporate national and international partners. The grants will finance scholarships, research equipment, lab refurbishment, faculty development, costs associated with industry collaboration, patenting and other IPR related costs, and networking activities with national and international partners. Further, there will be an additional grant available to around half of the selected institutions to open a Center-of-Excellence within an interdisciplinary, cross-departmental and problem-focused area. This additional grant will be allocated based upon success in the implementation of the initial grant and quality and relevance of the additional proposal. Companies (and other external partners, such as government agencies) will mandatorily co-finance a limited share of the center-of-excellence costs. It is expected that around 15 percent of institutions will be private.

**Component 1.3 Faculty Development for Effective Teaching– Pedagogical Training – US\$ 9 million (2%)**

*The pedagogical training seeks to improve the learning outcomes of Engineering students in the 200 selected institutions.* The target number of trained faculty members is 15,000 in around 500-750 batches of 25 faculty members each, conducted in the TEQIP institutions. Given the expected large number of fairly standardized training workshops and the limited existing supply, pedagogical training is deemed best organized through a separate sub-component than through the above institutional grants. A basic and an advanced level of pedagogical training will be offered each of one week’s duration. Based upon input from an expert group, broad guidelines for the training will developed. After floating of a public tendering, an estimated 20-30 training providers will be selected. Each TEQIP institution would choose among the qualified providers, and a pre-determined fixed fee per successful workshop will be financed. The training providers will be required to implement an assessment technique to evaluate the effectiveness of the training given. Further, the student surveys will include a specific question propping the pedagogical abilities of their teachers, and the faculty surveys will enquire about the quality and frequency of faculty development programs.

**Component 2: Improving System Management – US\$ 38 million (8%)**

**Component 2.1 Building Capacity to Strengthen Management of Technical Education – US\$ 17 million (3%)**

This sub-component seeks to build capacity of technical education policy planners, administrators and implementers at the central, state, and institutional levels. These capacity building programs are cross-institutional initiatives, not financed under the institutional grants in Component 1. In particular, capacity building is intended to support the effective implementation of reforms required in the competitive funds and sharing of good practice. In particular, the sub-component will support innovative management initiatives in States and Affiliating Universities, and knowledge sharing workshops between TEQIP States and Institutions. Further, this sub-component will finance professional development and conferences for Technical Education/TEQIP administrators and organized by NPIU.

**Component 2.2 Project Monitoring, Evaluation and Management – US\$ 21 million (5%)**

This sub-component aims to provide reasonable timely, sufficient, precise, and reliable information to improve and assess the performance of the selected institutions. Thereby, the sub-component seeks to

provide the information to institutions, state directorates and the MHRD/NPIU to carry out evidence-based policymaking. Five activities are planned:

1. Web-based Management Information System (MIS). An interactive web-based MIS will be connecting all the 200+ project institutions, the State Governments and the MHRD/NPIU. The development of the MIS will be outsourced. States interested in the MIS will be supported with project resources to extend the MIS to non-TEQIP engineering institutions in their state.
2. Stakeholder Surveys to provide information to institutions for their internal and external quality assurance. Two surveys will be conducted: (i) Employer Satisfaction Survey to receive feedback from employers on the skills of graduates, and (ii) Student and Faculty Satisfaction Surveys to receive feedback on their educational experience.
3. Technical Audits in the institutions to assist and assess technical and objective aspects of implementation, including fiduciary aspects.
4. Project Support and Review Mechanisms, such as academic mentors and auditors to aid and evaluate institutions implementing the academic aspects of the institutional projects.
5. Project Management, which will cover expenses related to project implementation at the central and state level.

In addition, there will be US\$ 9 million of unallocated funds to invest in the sub-components that are having the best results or are most needed, and/or to overcome unforeseen challenges to reach the project objective.

## 5. Financing

Source:	(\$m.)
BORROWER/RECIPIENT	200
International Development Association (IDA)	300
Total	500

## 6. Implementation

*The implementation arrangements for the second phase will to a large extent build upon the well-functioning implementation arrangements for the first phase, with appropriate improvements.* The existing arrangements would be adapted to the GoI's concept for Centrally Sponsored Schemes (CSS). This is expected to require only one important change in institutional set-up, which is flow of funds from MHRD through the State Treasuries to the institutions. The central government will finance 75% of the costs and the State government the remaining 25%, unless the state is a lagging state in which case it finances 90% of the costs.

*Overall responsibility will lie with the Department of Higher Education of the Ministry of Human Resource Development (MHRD).* MHRD will constitute a National Steering Committee assisted by a small National Project Directorate headed by the National Project Director (Secretary or Joint Secretary in charge of higher/technical education). MHRD will delegate the day-to-day implementation to the National Project Implementation Unit. MHRD will enter into a Memorandum of Understanding (MoU) with each state government.

*State Governments will oversee and facilitate implementation in the institutions in their state through the State Project Facilitation Unit (SPFU) under the department responsible for technical education.* The Secretary in charge of technical education is the overall responsible for project implementation in that state assisted by the Director of Technical Education and the team in the SPFUs. Each State will enter into a MoU with each participating institution.

*At the institutional level, the Board of Governors is the body responsible for sub-project design, reform and project implementation.* The day-to-day implementation is coordinated by a TEQIP unit headed by the institutional director and assisted by a senior faculty member as the TEQIP nodal officer. Besides the

expected 180 participating institutions sponsored by State governments, the project is expected to include around 20 Centrally-Funded Institutions (CFIs). These will be financed exclusively by the central government and will enter into a MoU directly with MHRD under the supervision and facilitation of the NPIU.

*A private sector advisory group will be constituted by MHRD to ensure that the private sector has a voice in project design and implementation. This group will consist of HR managers and directors from firms hiring engineers, professional engineers and industry associations.*

*Phase I revealed several challenges related to the implementation arrangements: ensure sufficient and clear fiduciary capacity and oversight at all levels; reduce red tape, while still ensuring appropriate oversight; promote stability in staffing, and empower the entities and officials involved in implementation. The potential institutional overhaul at the central level is not expected to affect the implementation arrangements of the project. Compared to phase I, the implementation arrangements have been enhanced by strengthening the NPIU significantly, acquiring of two Management Information Systems for education information and for procurement information, clarified roles and responsibilities of state government and NPIU in supervision of fiduciary compliance at the institutional level, increased up-front material and training for project implementation, and increased involvement of stakeholders.*

## 7. Sustainability

*Implementation of the governance reforms, such as increased institutional autonomy, is fundamental changes that are highly likely to be sustainable beyond the lifetime of the project. These reforms empower institutions to overcome barriers in innovative and individual ways that the system in many cases cannot overcome for political reasons or lack of inertia. In addition, experiences from phase-I show that strong state ownership has resulted in positive spillovers to non-project institutions and further innovations.*

*The human capital invested in current and future faculty members and physical capital invested in equipment and learning resources are sustainable in the medium term and will continue to benefit student learning for decades. However, continuous upgrades in faculty qualification, curriculum and equipment require continued investments. These investments will depend upon the Institution's authority to retain its own generated revenue and manage funds across financial years (both a requirement for participation in the project), and its ability to generate revenue from R&D and knowledge services (which will be strengthened and measured in the project). Nevertheless, long term sustainability also depends upon the willingness of GoI's and State governments to continuously invest in engineering education.*

*The management capacity built in State governments and Institutions are expected to remain within the technical education system. As such this capacity will continue to make institutions responsive to the changing market-demand for high-quality engineers and engineering R&D.*

*Sustainability of the competitive fund allocation and implementation mechanism is likely, but not ensured. For the moment, the Government of India has opted not to fully integrate the day-to-day administration of the project within the Central governmental structure for technical education. Nevertheless, all other aspects of implementation is integrated into the existing Central, state and institutional administrative structure. Further, past experience with competitive funds, from Chile, Mexico, and Vietnam suggests that Institutions value this mechanism and that higher education authorities and ministries of finance alike tend to retain the allocation principle beyond Bank supported projects. The support from the States and institutions for the second phase is indicative of this sustainability.*

## 8. Lessons Learned from Past Operations in the Country/Sector

*GoI and the Bank have thoroughly evaluated the impact, implementation and design of phase I yielding a rich set of lessons that have been incorporated into the design of phase II. The main lessons from phase I are:*

- (i) The key features of phase I was appropriately designed and implemented leading to a satisfactory outcome.

- (ii) Institutions, faculty, and students are responding to additional funding for research and post-graduate study.
- (iii) Implementation of effective reforms takes time and requires capacity building and involvement of all partners.
- (iv) There is a need to establish a more consistent, verifiable and efficient results framework.
- (v) Incentives for states, institutions, faculty, and students must be realigned with project objectives.
- (vi) Lessons within fiduciary aspects focus on the need to increase training, better dissemination of guidelines and information, as well as building oversight and assistance into the project.

The Bank has a large number of experience from competitive funding projects in tertiary education, the main lessons reflected in project design are:

- (i) The competitive fund mechanism is a highly effective vehicle to obtain results in tertiary education, with or without external funding.
- (ii) Competitive funds unleash faculty's creativity and innovative skills.
- (iii) Competitive fund in countries where a large proportion of students are enrolled in private institutions are meaningful only if they include such institutions.

## 9. Safeguard Policies (including public consultation)

<b>Safeguard Policies Triggered by the Project</b>	Yes	No
<a href="#">Environmental Assessment (OP/BP 4.01)</a>	[ X ]	[ ]
Natural Habitats ( <a href="#">OP/BP 4.04</a> )	[ ]	[ X ]
Pest Management ( <a href="#">OP 4.09</a> )	[ ]	[ X ]
Physical Cultural Resources ( <a href="#">OP/BP 4.11</a> )	[ ]	[ X ]
Involuntary Resettlement ( <a href="#">OP/BP 4.12</a> )	[ ]	[ X ]
Indigenous Peoples ( <a href="#">OP/BP 4.10</a> )	[ X ]	[ ]
Forests ( <a href="#">OP/BP 4.36</a> )	[ ]	[ X ]
Safety of Dams ( <a href="#">OP/BP 4.37</a> )	[ ]	[ X ]
Projects in Disputed Areas ( <a href="#">OP/BP 7.60</a> )*	[ ]	[ X ]
Projects on International Waterways ( <a href="#">OP/BP 7.50</a> )	[ ]	[ X ]

## 10. List of Factual Technical Documents

1. Government of India Annual Report, Department of School Education & Literacy, Department of Higher Education, Ministry of Human Resource Development, 2006-07
2. Financing Higher Education and Technical Education, Report of the Cabe Committee
3. A Report, Social, Economic and Educational Status of the Muslim Community of India, Prime Minister's Higher Level Committee, Cabinet Secretariat, Government of India, November 2006
4. Engineering Education in India, Draft Final Report, Energy Systems Engineering, IIT Bombay, Powai, Mumbai – 400076, Rangan Banerjee, Vinayak P. Muley, September 14, 2007

\* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas

5. Getting the Numbers Right: International Engineering Education in the United States, China and India, *Journal of Engineering Education*, Gary Gereffi, Vivek Wadhwa, Ben Rissing, Rayan Ong, January 2008
6. Report of High Power Committee for Faculty Development in Technical Institutions

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