UKRAINE: UKRZALIZNYTSIA (UZ) MODERNIZATION STRATEGY

Policy Note 3: Selected Cargo Business Issues

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Preface

This Policy Note is one of a series of individual papers originating in a request from Ukraine’s Ministry of Infrastructure (MoI) and JSC Ukrzaliznytsia (UZ) to the World Bank to address specific topics concerning Ukraine’s railway sector. The Policy Notes address the following topics.

1. **Railway market opening for cargo services**: progress in the meeting rail commitments in the EU-Ukraine Association Agreement, reorganization of UZ, Ukraine’s readiness for and implications of market opening, pre-requisites to avoid leaving UZ in an unfavorable situation.

2. **Loss-making long-distance passenger services**: service costing, institutional and financial options for providing sustainable transport passenger services for long distance travel.

3. **Selected Freight Business Issues**: specific matters on which Bank advice has been sought including cargo tariffs, customer service and perceptions, and operating efficiency.

4. **Debt management**: options for UZ to restructure its debt and reach a financially stable situation.

5. **Infrastructure asset management and prioritization of investment**: Asset management strategy and life-cycle costing in the renewal and reconstruction of UZ’s railway infrastructure network.

This Policy Note no. 3 addresses selected cargo business issues presented in the document JSC “Ukrainian Railways” development strategy for 2019-2023 covering:

- **The current situation in cargo services**: operational assessment of current situation.

- **Elements of market opening for cargo services**: progress in the reorganization of UZ, readiness for and implications of market opening, pre-requisites to avoid leaving UZ in an unfavorable situation.

- **Maximizing opportunities in cargo services**: making use of, rationalizing, and expanding the current asset base.

- **Addressing threats in cargo services**: using the infrastructure assets to streamline train operations

- **Addressing operational readiness for market opening**: using the current rollingstock fleet as a point of strength in a competitive market

- **Improvements to quality perception**: strategies to address quality perceptions

- **Management of tariffs**

The Note is aimed at supporting JSC Ukrzaliznytsia in preparing for competition to its cargo business that would follow from market opening.
Glossary of terms and acronyms

**CURRENCY EQUIVALENTS**

*Exchange Rate (Feb 2019)*

*Currency Unit: Ukrainian Hryvnia (UAH)*

**USD 1 = UAH 26.9**

**ACRONYMS**

- **AMS** Asset Management System
- **AMCU** Antimonopoly Committee of Ukraine
- **CoM** Cabinet of Ministers
- **CSM** Common Safety Methods
- **ERA** European Rail Agency
- **EU** European Union
- **GoU** Government of Ukraine
- **IM** Railway Infrastructure Manager
- **MAIC** Multi-annual Infrastructure Contract
- **MoF** Ministry of Finance
- **MoI** Ministry of Infrastructure
- **NCRT** National Commission for Regulation of Transport
- **PSO** Public Service Obligation
- **SAR** State Agency for Railways (to be established)
- **SMS** Safety Management System
- **TAC** Track access charges (charges levied for use of railway infrastructure)
- **TOC** Train operating company (‘Carrier’ in Ukrainian Law)
- **TSI** Technical standards for interoperability
- **USD** United States Dollar
- **UZ** Joint Stock Company, JSC Ukrzaliznytsia (registered October 2015)
Summary of Findings

Background

1. The draft Law on Railway Transport of Ukraine (the ‘new Railway Law’) is currently awaiting sign-off from other ministries and the approval of the Cabinet of Ministers. The Law, among other aims, is intended to align with commitments contained the EU-Ukraine Association Agreement 2014.

2. The Agreement commits the parties to cooperate and seek to harmonize policy, legislation and regulation across a broad range of areas. In its railway sector, Ukraine undertakes to approximate its legislation to specified EU legislation (the ‘rail acquis’) within stipulated timeframes, generally by 2022.

3. The ‘market opening’ provisions of the new Railway Law will include arrangements allowing properly licensed cargo train operating companies, whether public or private, to provide transport services on Ukraine’s rail network on a fair and equal (competitively neutral) basis.

4. JSC Ukrzaliznytsia has already begun a wide-ranging reform program with its “development strategy for 2019-2023” that includes a comprehensive strategy dealing with its vision and values, market analysis, objectives, reorganization into business segments, and actions that are commensurate with best practice observed by the World Bank. The strategy should result in a sustainable and expanding railway to meet the country’s needs.

5. The focus of this Policy Note is on selected cargo business issues involved in JSC Ukrzaliznytsia (UZ) preparations for competing in the provision of rail cargo transport services.

The current situation

6. UZ’s operations are not efficient. The former organisation structure involving six different railways has left behind unnecessary practices in the context of the new integrated organisation, soon to be subject to competition.

7. Old equipment and incompatible electrified areas have also generated inefficiencies.

8. Wagon utilisation is low due in part to aged equipment and also because of the extent of mixed train operation, insufficient attention to asset utilisation and sub-optimal customer terminal arrangements that lead to wagons being stationary for long periods leading to gross under-utilisation. Wagons are also stationary and loaded for large periods, tying up consignments.

9. Many cost drivers are time-based such as depreciation and capital opportunity costs as well as some maintenance tasks, but revenue is almost entirely load and kilometre based. This has led to an imbalance where there is little regard by customers or staff for the non-productive time of railway resources.

10. The current tariff arrangements create distortions in the market because any price increase from year to year via indexation is equally applied across all traffics. Although relativities are maintained, the industries being served are subject to other forces such as world trade and supply and demand and applying the same price index is unresponsive to those other forces.
Elements of Market Opening with cargo operations

10. Separation of infrastructure and train operations will have far reaching effects on the way UZ conducts its operations.

11. Train operators will be subject to entirely new disciplines about when and how to operate their trains. They will not have unfettered track access and therefore will need to operate to a strict schedule of train pathing.

12. Priority for access will be based on an agreement the infrastructure company has with all operators. This agreement will be universally applied on an impartial basis.

13. The only infrastructure that train operators will have full control over will be small sidings and depots necessary for their own maintenance activities.

14. Efficient train operations will largely consist of block trains. However, efficiency and price alone will not always retain a client and the method of train operation will need to be responsive to reasonable demands of the client. A close cooperation will be required to achieve both objectives where the client modifies their requirements to achieve better efficiency and timeliness in the railway. This is a logistics exercise.

15. As block train operation emerges as a more dominant method of train operation, the need for marshalling yard services will decline.

Maximizing opportunities in cargo services

16. UZ has an extensive customer relationship which can be used in the lead up to the open market by reinforcing good relations.

17. Between now and 2022, when market opening is expected to begin, UZ has the opportunity to make changes to exploit its intricate detailed knowledge of the network and rail market, by reinforcing its strengths and addressing its weaknesses.

18. Targeted investment in the container market could substantially improve market share by using the existing terminal strengths provided by “Liski”.

19. Lower demand for marshalling yard services will make large tracts of land surplus to operations requirements. This land can be redeveloped for logistics or any other land intensive industry such as housing.

Addressing threats in cargo services

20. UZ has time between now and 2022 to alter its practices in order to meet the threat from third party train operators.

21. Third party operators will target block train operation because it is the most efficient method of utilising railway assets. UZ can reorganise its activities so that block train operations are the preferred type. This will involve aggregating hitherto small consignments of wagons into larger blocks that have a single origin and destination. Customers will need to reorganise their activities.

22. Block train operation has been successful for grain because the grain industry has reorganised its loading patterns. This same model will eventuate with other traffics, either because other industries see the benefit or if UZ is proactive.
23. The key to reorganising clients and railway operation to accept block trains is the reorganisation and design of loading and unloading points; that is, the terminals. A focus and improvements to terminal operations, equipment at terminals and infrastructure at terminals, will result in service quality improvements by way of door-to-door time, transit time, consignment visibility and rollingstock utilisation.

**Addressing operational readiness for market opening**

24. Operational readiness is primarily concerned with understanding which activities are adding to financial sustainability and which activities are wasteful. This will require a change in culture for the employees and the clients of UZ.

25. An analysis of activities, identifying cost drivers and minimising those costs, identifying revenue sources and maximising revenue, will be required prior to market opening and beyond.

26. The incentives created by the competition permitted by the new Railway Law should provide the opportunity to make changes to operations and practices that can achieve cost minimisation and revenue maximisation.

**Improvements to quality perception**

27. Two elements drive the perception of quality. The actual performance itself and the myths and rumours that are circulated.

28. Perception can be altered by providing data in an open and transparent way even if it is “bad” data. Generating trust is a powerful way of improving perception.

29. Improving actual performance is best achieved by adopting targets and using data and communicating it to employees and clients to demonstrate performance. Targets of improvement should be openly shared and strategies to achieve those targets worked on by all parties.

**Management of tariffs**

30. For an interim period, prior to the new Railway Law and separation, UZ will be required to maintain sustainability without the tools to alter its cost drivers and practices. Adjustment to tariffs are logically addressed by applying an index based on the changes to its input costs. This is a Production Price Index (PPI). This index is a base upon which other factors may be applied.

31. Upon separation into an infrastructure company and cargo train operating company, and market opening, only the infrastructure company should be regulated and subject to state monopoly processes. Although state-owned, the UZ’s Cargo carrier will be subject to market forces and will need to make decisions based on commercial competition criteria in order to be sustainable. It should have the freedom to price as its sees fit but needs to understand the forces at work including road truck competition and third-party train operating companies.
1. **The current situation in cargo services**

1.1 **Asset utilisation**

UZ’s current train operation is one that uses any and all the infrastructure and rollingstock resources available, whether they are used efficiently or not. The more assets are available the more they are used, except they are not used most efficiently. If more wagons are available due to efforts by workshops or repair depots to make wagons available, then they are placed into service. But this does not assist utilisation efficiency. Indeed, higher availability of wagons alone fuels inefficiency by clients or railway staff.

1.2 **Wagons are idle**

While a shortage of rollingstock may be reported, the utilization of the current fleet is poor, with much rollingstock waiting for attention, either loading, unloading or in marshalling yards. Many wagons are idle. This idleness is a cost impost because the wagon continues to be maintained (on a time basis) and the capital opportunity cost is time based.

It would be better to mothball surplus wagons so that servicing is not required. It would also be better to have fewer wagons in a fleet that would be better used.

Much less rollingstock than currently used would be required by an efficient railway.

1.3 **New railway entrants**

New train operating company entrants will “cherrypick” traffic that displays the propensity for high rollingstock utilization. High utilization is characterised by minimum time loading, unloading and with no stopping in marshalling yards or changing locomotives. These are block trains.

UZ’s greatest operational and profitability threat will come from operators who are able to operate block trains giving high profitability, with UZ left to manage the unprofitable traffic on a piecemeal basis.

1.4 **Storage appears more the norm**

Many current UZ clients use the UZ rollingstock for storage purposes.

For example, approximately 200,000 tonnes of grain capacity is available in stationary wagons, half of which are loaded.

In another example, many containers remain on wagons while being opened and loaded and unloaded.
2. Elements of market opening with cargo operations

2.1 Market opening

Market opening on a competitively neutral basis requires far-reaching changes in the institutional structure of the rail sector in Ukraine, in the organisation of Joint Stock Company, JSC Ukrzaliznytsia (UZ) and in the market for railway services. They include the following changes.

2.2 Introduction of management independence

The corporatisation of UZ in October 2015 was a critical first step but UZ cannot yet be said to be managerialy independent because: (a) the government heavily regulates all UZ’s passenger tariffs and cargo rates; and (b) UZ management is required to internally cross-subsidize many activities.

2.3 Improvement of the financial situation of state railway enterprises

The above factors also contribute to the fact that the company’s financial situation is currently not sufficient to sustain its capital assets.

2.4 Separation between infrastructure management and transport operations

The current UZ ‘segmented verticals’ structure provides a positive (and arguably essential) stage for developing an effective ‘lines of business’ organisation but does not yet meet the essence of the rail acquis. Infrastructure management and transport operations are not yet independently managed and there is not yet a financial accounting separation between infrastructure and operations.

2.5 How separation will impact train operations

Separation of the infrastructure from the train operations will result in most infrastructure being under the control of an organisation that is different to the organisation that operates the trains.

2.6 Train scheduling

The infrastructure company will plan and permit the operation of trains over the network, including access to marshalling yards, on a competitively neutral basis overseen by an independent regulatory agency. There will be a contract between the infrastructure company and the train operating company. The infrastructure company cannot give preference to UZ trains. This access will need to be pre-planned by the train operator and the contract will determine how either party will behave, including financial incentives and penalties.

2.7 Priorities for access

Where two companies’ trains are attempting to access the same section of track, which would be an unplanned event, a protocol agreed by all train companies and the infrastructure
company and approved by the regulatory agency will determine the rules associated with priority.

2.8 Train operators’ infrastructure

A small amount of infrastructure is likely to be retained by the train operating company for the operator’s exclusive use, including certain terminals as well as maintenance depots. Each operator will require its own facilities or have agreements with other operators for use of the facilities.
3. **Maximizing opportunities in cargo services**

3.1 **UZ has extensive relationships**

UZ already has an extensive network of relationships with railway clients. These relationships are a valuable commodity and need to have on-going reinforcement before and after the structural separation and opening of the market.

3.2 **Access to terminals will be open**

UZ already has access to some terminals including container terminals (“Liski”). But with separation it is likely that unloading and loading terminals such as for grain, iron and coal will be on an “open access” basis. This means that all operators can seek and be granted access to these terminals.

Depending on the view of the regulatory agency, the “Liski” terminals are likely to remain exclusively available for UZ because they are an integral part and owned by the UZ JSC. However, there are only five operational container terminals for the entire Ukrainian task and Liski only transports approximately 10% of the total container traffic on UZ.

UZ must expand its Liski terminal asset base if it is to compete with new entrants, who will no doubt provide their own terminal facilities.

3.3 **Utilising current integration in the short term**

Until separation and before new entrants, the infrastructure and train operating sections of UZ can educate one another into methods to improve efficiency and reduce cost. This timeframe is not available to new entrants and is a strength for UZ to exploit.

Until separation, UZ must try to organise train operations so as to minimise use of marshalling yards as these locations are a large cost base. In addition, marshalling yards add time to transit time.

3.4 **Marshalling yard land is valuable**

After separation and market opening, many marshalling yards and their land will become surplus due to the need for more efficient block train operations in the face increasing competition from road. Some marshalling yards may be candidates for redevelopment since they contain large areas of land. Other consolidations of land and real estate may also present themselves.

Enabling legislations and procedures will assist in the realisation of benefits from land rationalisation.

In other countries these areas have been converted to industrial zones, cargo “villages” and housing. An example of one such redevelopment in shown in Annex H. Example:

Conversion of obsolete marshalling yards
3.5 Block train operations are essential

The widespread adoption of block train movements will lead to railway efficiency but also be prime targets for new entrants to target the most profitable traffic. This could be a threat and an opportunity for UZ. Niche pick-up and drop-off trains will also be required for specialised markets but will be in the minority.

The opportunity for UZ that results from a block train policy is that there will always be small clients who cannot fill a block train. Third party train operators will be reluctant to service those clients.

3.6 Personalised service

Personalized service for small clients will not be an immediate target of third-party train operators who will be looking for large scale block train movements from a single supplier or industry.

One of UZ’s opportunities is to provide a personalized service for the small client, optimizing the service and cost by working with the client, adjusting the railway offering and adjusting the client logistics, to result in a win-win for UZ and the client. This optimization requires a lot of effort but could result in good outcomes for UZ.

In personalizing the service, UZ will need to balance the efficiencies of potential block train operation with the smaller needs of the client. This may be by way of amalgamation such as servicing the client every second day with a larger consignment than every day with a small consignment. Specialized wagons may also be required.
4. **Addressing threats in cargo services**

4.1 **Maximising opportunities and minimising threats**

As MoI and UZ are aware, the challenge for Ukraine is to manage market opening in such a way as to maximize the opportunities and mitigate the threats.

With limited technical resources, a small team is working within MoI, reporting to the Cabinet of Ministers (CoM) on meeting the provisions of the Association Agreement. It has strengthened the new draft Railway Law and has drafted a methodology for infrastructure access charges. UZ has assembled plans for further separating infrastructure activities and accounts from transport operations and is progressing the costing of passenger services to assist in defining PSO services. The actions both entities are taking in their respective spheres are positive and headed in the right direction.

The threats to the UZ cargo service will come from broader economic factors in which UZ has no control as well as from competition from other transport modes and competition from other train operators.

4.2 **Clients want change**

The current environment has frustrated clients who now wish to exert as much control as possible. They are purchasing wagons in an effort to have more control. They wish to purchase locomotives and there is no doubt that they will wish to operate their own trains, either individually or through a third party, once market opening occurs.

4.3 **Period is available for change**

UZ has a period to prove it can provide a good service, from now to market opening. Even without Railway Law it can create a “shadow” organisation that follows the market opening regime, albeit constrained and operating only in theory. But this action will show clients what will be possible once Railway Law and market opening occurs. This will require a great deal of communication and exploit the current relationships.

4.4 **Block train operation**

Road transport provides a door to door service but is more costly than a rail option. Rail transit times are far in excess of road transport and that time is more valuable for the client who is willing to pay the premium for faster delivery. Rail can address this threat by lowering transit time. This will not be achieved by increasing speed on the mainline but by reducing time in terminals and marshalling yards. This is achieved with block train operation.

New train operators entering the market will only be interested in high utilization of their rollingstock and this is achieved with block trains. New entrants will not use marshalling yards and will not stop to change locomotives. They are most likely to use diesel locomotives so that they can operate from their terminal facility, straight through or past marshalling yards to their destination. The diesel locomotives will be able to shunt as well as operate on the mainline.
When not required to stop at marshalling yards, new efficient diesel engines have minimal effect on greenhouse gas emissions. Some diesel locomotives have two engines, one switched off during shunting.

In order to counter this threat UZ must address a range of processes that currently create a resource-heavy train operation, including electrification voltage changeovers, driver changeovers at Oblast borders, marshalling requirements, train assembly at origins and destinations, and train inspection procedures and frequency.

Block train operation is the most efficient method to utilise railway resources but it needs to be matched by sensible and responsible wagon load practices that take into account client needs. This balance of efficiency and service requires an in-depth understanding of the client needs, and discussions with the client with the aim of achieving a win-win where both the railway and the client modify their requirement and service respectively to achieve an efficient quality service.

### 4.5 Profitability analysis

UZ must also understand which traffics have the greatest profitability as these will be the target of the new operators and also understand the traffics of least profitability, and all in between.

The traffics with least profitability due to their storage and marshalling requirements must be restructured in their operation so that clients provide more timely cargos of an amalgamated basis. For example, a cargo every second day of twice the volume rather than a cargo every day.

Some cargos may be unable to be restructured and remain unprofitable so that clients will need to find other transport. This is a transitioning process.

### 4.6 Terminal operations

UZ may wish to facilitate efficient operations of a client by providing terminal facilities which will benefit both parties. This could be way of Lisky terminals, extensions to existing sidings or amalgamation with other closely sited clients.

The current definition of block train is minimum of 44 wagons. This has been adopted to maximise utilisation of locomotives. However, block train movements of as low as 20 wagons could provide a better solution to the current one where mixed trains are being delayed at marshalling yards. Indeed, two or three sub-sections of a longer train, each sub-section being 20 wagons, could prove beneficial.

Most effort must be directed at eliminating the need to enter a marshalling yard. Some smaller yards may be inevitable for smaller blocks.
5. **Addressing operational readiness for market opening**

5.1 **Culture change**

When 2022 arrives, it will be one thing for Ukraine to be able to ‘tick the boxes’ to demonstrate that legal and regulatory instruments are by then in place to ‘approximate’ to the various elements of the EU rail acquis. It will be a more substantial matter for the railway sector to have attained the institutional competences, cultural shifts and commercial focus to make it a success.

5.2 **Operationally ready**

To be operationally ready for market opening, UZ must try to do four things.

1. Identify and quantify the financial and operational performance of each traffic business segment;
2. Develop a deep understanding of the cost-drivers (reasons for cost) in each of its traffics, including reasons for expenditure in maintenance and operation;
3. Undertake an honest appraisal of its weaknesses and
4. Plans for addressing those weaknesses including operational changes, operating rule changes, bureaucratic changes, capital expenditure and labor resources.

5.3 **Commercial decision making**

Above all, the commercial focus for cargo of UZ will not permit non-commercial decision making. Services provided by UZ must be performed for a fee. Costs incurred by UZ must be minimised using contemporary and competitive practices.

On the other hand, UZ must be open to listen to any proposition where their services could be compensated if asked to perform non-commercial activities.

5.4 **Communication with customers and staff**

Communication of the performance well before market opening can benefit market opening for UZ, if performance can be improved before market opening.
6. Improvements to quality perception

6.1 Perception of quality

Perception is ‘reality’ in the minds of an audience regardless of the facts.

Communication is an important component of changing perceptions.

Open communication, where clients can trust information, is better than providing no information, even if the information is bad news.

6.2 Communication methods

Open communication can be exercise by UZ in the lead up to market opening in the following ways:

1. Share train control information in real time including by making available mimic panels
2. Provide statistics relating to:
   - On-time arrival (within 15 mins of schedule)
   - Transit time
   - Availability of wagons
   - Security incidents
3. Arrange for visits for clients to facilities
4. Provide operational data in an education setting
   - Wagon movements
   - Train speeds
   - Shunting frequency
   - Length of sidings
   - Length of mainline trains
5. Promote the use of the current wagon tracking system which is available by internet
6. Provide transparent and easy to read pricing system
7. Promote the twinning of employees, UZ and client

6.3 Improve the performance of the railway

Define “improvement” in the clients’ eyes. What does “improvement” mean for the client?

1. Jointly agree with the client which elements have priority, such as transit time, on-schedule performance, tariff transparency, regular communication etc.
2. Address those areas specifically and trumpet the success of the improvements

Advertise widely as to the benefits of UZ and recent case study improvements.
7. Management of tariffs

7.1 Financial separation

During the restructuring process it is likely UZ will become separated into at least three companies. An infrastructure company will be responsible for managing access to infrastructure; a passenger company will provide train services and other customer services for passengers and a cargo company will provide train services for cargo customers. These train companies will seek access from the infrastructure company. Other train companies, owned by other parties, will also seek access to the infrastructure.

Since the infrastructure company will be a monopoly, it will be regulated to ensure fair access to the train companies while also ensuring long term sustainability for the infrastructure company. Sustainability for the train operating companies will not be the concern of the regulator.

7.2 Structure and tariffs

The separation structure is common in EU and some other countries such as Australia. However, there are other important countries in the railway world that have maintained a vertically integrated structure. Among them are Russia, the United States, Canada, China, India and Japan. Most of the world’s rail passengers and freight are carried on systems where infrastructure and train operations are managed within one organisation, even if as separate functional divisions.

In the state-based railways the pricing structure and any adjustments to pricing are often driven by broader state goals and there may be no noticeable commercial logical pattern.

In the United States where private railroad cargo companies are vertically integrated, no automatic indexation applies as the prices are completely market driven. Railroad companies can set rates as they wish but there is an environment of competition from other railroads and the road trucking industry. There have been instances where customers have complained that railroad rates are too high and where it has been claimed that quasi-monopolization has led to gouging. Judgements have been made in the client’s favor to lower the rates.

In the EU and Australia, the pricing of the infrastructure access charge and the train services are separate exercises. Infrastructure is owned by the state and the state makes the rules for indexation or otherwise. Train companies are owned by private or semi-private companies and determine their own rates.

Use of the term “tariff” is usually applied in the case where the railway is vertically integrated. Railways that are separated have “charges” for infrastructure access and “prices” for the service delivered to the customer.

In contrast to the current arrangements where tariff adjustments through indexation are equally applied across all tariffs, market opening and separation of business units will require a tariff arrangement that is more responsive to individual customer and industry needs.

7.3 Infrastructure charges

In the main, since the infrastructure is regulated, indexation of access charges is the norm. The basis of the indexation on infrastructure access price, varies. Some countries use a Producer Price Index and
some use a Consumer Price Index and some also add or subtract a productivity factor that is expected by the users owing to capital investment and technological change which should provide improvement to productivity. If the factor is an addition it may be due to the planned capital improvements and be applied for a limited time, sometimes called a “levy”, and once completed, the subtraction of a productivity factor will recognize improved performance.

Sustainability of the railway infrastructure is an important component of the regulation of access charges. The use of automatic indexation could be justified on the basis of sustainability due to increases in input costs to the railway and this is a Production Price based index (PPI). But if the railway continued to index indefinitely it may price itself out of business, especially if road transport conditions improve.

### 7.4 Train operations prices

UZ’s train operating company will be competing with other train operating companies as well as with road trucks. These train operating companies must be mindful of their position in regard to attracting and retaining business as well as their financial sustainability.

Each train operating company must therefore decide for itself what price it wishes to charge. It is not bound by any convention. New entrants will not be regulated. The customers will choose which railway company to give their business or use road trucks.

In determining a price to charge a customer the train operating company must bear in mind that it will be charged for infrastructure access by the infrastructure company. It must then take into account the costs of its own operation, and then it must take into account the long-term costs such as depreciation and other capital charges.

### 7.5 Tariffs can drive reform

When the railway has to compete with road for the same traffic, continual indexation may not be in the best interests of the railway, as the prices continue to increase beyond the competitive rate. Indeed, some railways have used sustainability arguments in the context of competition to adjust rates at less than PPI and to effectively drive reform in the railway organization. Reform to become more competitive is required in the railway when road will undercut the railway’s pricing.

Being able to reform, by reconfiguring the organization, reduce costs and become more productive is essential in the competitive environment that will emerge with market opening.

### 7.6 Short term tariff arrangements

In the short term, until market opening UZ retains a monopoly of rail services but is still faced with need to adjust rates in order to maintain sustainability. Tariff adjustments should display the following attributes:

- The adjustments should be part of an overall agreement that includes base rates, conditions of carriage and service quality, and form part of the “package” of service including price arrangements.
- Adjustments should take into account the prevailing conditions of the general economy, client circumstances, railway financial circumstances and any other factor that may impact or be impacted by the adjustment.
• Use of a Production Price Index is a rational base to make the adjustments because it reflects input costs and if there are any other factors that should be taken into account, such as large capital expansion or productivity improvements, the PPI can be modified with the addition or subtraction of a factor.

• The adjustments should be applied either regularly or with as much notice as possible so that all stakeholders can make any commercial or operational changes in advance.

• With regular adjustments, the method of adjustment and the factors are conveyed to all parties for their comment and iteration, and the method of adjustment and the factors are applicable over a multi-year period. This makes the adjustments somewhat predictable within the bounds of the factors being used.

• The overall trend in railways around the world is to regularise the adjustments so that there are no severe shocks given to clients and to promote a stable operating environment that promotes investment.

Upon separation and market opening, UZ’s freight operations will become contestable and it will no longer have a monopoly of rail services. Market pricing should then become the norm, and indexation will remain applicable only agreement between an operator and a shipper as part of a multi-year contract to carry.
Annex A. Utilization of railway wagons in Ukraine

A1. Background

The costs associated with owning and operating cargo wagons is considerable and the utilization of them is an important parameter in assessing the relative efficiency with which the railway is working and points to the improvements available in efficiency.

The utilization of the wagon fleet can also be an indication of the efficiency of utilization of the locomotive fleet because when wagons are loading and unloading, or marshalling or waiting, the locomotives used to perform these functions are poorly utilized.

Since UZ operates approximately 170,000 freight wagons, this is a considerable asset base requiring capital funds and maintenance resources.

Most of a wagon’s cost is time based, being capital outlay costs, depreciation, opportunity cost of capital, interest, and some maintenance costs that are time based. Most of the revenue earned by freight wagons is distance based, so it is imperative that wagons are working by covering distance, as much as possible.

A commonly used benchmark for the most efficient wagon utilization is that the wagon should not be stationary, that is, not earning revenue, for any more than 30% of the total time\(^1\). On a yearly basis this means running for approximately 6000 hours at an average speed of 40 kmph, about 250,000 kms.

The analysis following here is an attempt to understand what utilization is currently occurring at UZ.

A2. Analysis

An analysis was performed of the utilization of wagons on the Ukrainian system sampling 20 randomly chosen wagons from each of 10 wagon types extracted from the UZ database for September 2018. In each wagon type, 10 wagons with “UZ” ownership and 10 wagons of “Not UZ” ownership were chosen.

Each wagon was tracked using the codes of activities in the database.

Two codes, ПРОС and ОТПІП describe “running through a station” and “departure from a station”, and these represent the periods when the wagon is actually earning most of its revenue. These activities are called “running” in this document. The remainder of the time the wagon may be loading, shunting, delivering locally, in repair, in storage or otherwise disengaged from earning revenue. In some instances a wagon will earn revenue while not moving like a demurrage charge. This is rare.

The analysis looked at the utilization of UZ owned wagons and wagons not owned by UZ to compare the relative working.

A3. Results

Wagon Operations

\(^1\) In this document “total time”, “their time” or “its time” means 24 hours a day, 7 days a week. In the database some wagons have not been recorded for the full time of September 2018, 24 hours for 30 days (720 hours) and the calculations have used only the recorded hours
The freight wagon fleet in Ukraine is running, that is, earning revenue, about 8% to 10% of its time. That is, for the remaining 90% the wagons are not earning revenue but are being marshalled, shunted, loaded, unloaded, in repair or otherwise engaged. With rare exceptions these activities do not earn revenue.

The best utilization is observed for Not UZ owned container wagons at 17% and the worst utilization from Not UZ Covered wagon fleet at 4% running or departing.

These results are shown in Figure A1.

*Figure A1: Running and Departing for Wagons*
The analysis also inspected the actual operations the wagons were performing. In Figure A2: UZ Owned Container wagons and in Figure A3, UZ Owned Minerals wagons.

**Figure A2: UZ Owned Container Wagon Activities**
Figure A3  UZ Owned Minerals Wagon Activities
**Wagon Loading**

The UZ database also records what net load the wagon has on it. When matched with the operations recorded, a picture of the way wagons are used emerges. In A4 the time spent by wagons in each of the 10 wagon classes, and each of UZ and Not UZ, is shown where the wagon is running (codes ПРОС and ОТПІР, “transit” and “departure”) or where the wagon is stationary (not running). When the wagon is “stationary” it may not be stationary in the absolute sense and may be shunting, loading, unloading, forming a train etc. But since revenue is not usually earned by these activities the wagon is “stationary” in the revenue sense.

**Figure A4 Loaded and Empty Wagon Running**

In Figure A4, for example, for Covered “Not UZ” ownership, wagons are 64% Empty and Stationary, 29% Loaded and Stationary, 3% Empty and Running and 4% Loaded and Running.

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2 “Transit” means that the train (and its wagons) has been logged passing through a station. “Departure” means the train (and its wagons) have been logged departing from a station. Stations include all wayside points including sidings, depots, yards, (un)loading points.
Indeed, generally, loaded wagons are stationary (not running) for approximately 30% of the time. Container wagons are loaded and stationary for approximately 75% of the time, more than half of that for loads of empty containers. Unless UZ earn revenue from storing empty containers on wagons, this time is lost.

The next Figures show further explanation.

In Figure A5 the percentage of total time spent in running and being loaded, operation codes ПРОС and ОТПР and load > 0, transit and departure, is shown for each UZ owned wagon class.

**Figure A5 Loaded and Running UZ Wagons Percentage of Time**

Container wagons enjoy the best utilisation as they are running and loaded for 16.5% of the time. Some of that running is with empty Container wagons which (should) attract revenue (perhaps as a return fee). The poorest utilisation is for Platform and Refrigeration wagons at approximately 2.5% of their total time.

In Figure A6 the percentage of total time spent being stationary and loaded, all operation codes other than ПРОС and ОТПР and load > 0, transit and departure, is shown for each UZ owned wagon class.
In Figure A6 Container wagons are loaded and stationary for approximately 75% of their time while Refrigeration wagons are loaded and stationary for 25% of their time.

Grains wagon show that for nearly 50% of their time they are loaded, presumably for unloading, marshalling, waiting for locomotive or suchlike. If each grain wagons holds 60 tonnes, for 27,000 grain wagons, about 500,000 (half a million tonnes) is “stored” in wagons at any one time.
A4. Conclusions

1. Ukraine’s wagon utilization, UZ owned and Not UZ owned, could be improved, and are currently earning revenue for approximately 10% of the total time.

2. Large parts of the wagons’ time is spent in “formation” or “unformation”, being marshalling. Other periods they are “coupling” or “uncoupling” and also “delivering”.

3. The operations of ПРОС and ОТПР describe the actual departure and running of wagons from station to station. Most of a wagon’s time is spent in marshalling yards or loading points.

4. A large proportion of wagons’ time is spent acting as a storage unit. For example, a grain wagon may store grain while it waits for other wagons to be loaded or for it to be marshalled into another train or wait for a locomotive. Some revenue may be earned from this activity, but in the main, no revenue is earned.

5. Wagons owned by Not UZ enjoy better utilization in Covered, Platform, Open, Tank and Dumpcar, perhaps indicating a more holistic approach to logistics from the business owners.

6. Wagons owned by UZ in Containers and Grains enjoy better utilization than Not UZ, perhaps indicating UZ larger fleet where block trains can be formed.
Annex B. The development of grain efficiencies at UZ

B1 Recent reforms

Ukraine’s grain industry is a significant contributor to its GDP, earning valuable export income and enabling value add agriculture.

Recent 2015-2018 initiatives in the grain industry to consolidate loading points and enjoy the economies of scale are welcomed by UZ, enabling block train operation from many sites. Rather than pick up one or two wagons from sidings loaded by individual farmers, UZ is now able to access large consolidated storage sites. Construction or enhancement of existing sites is still underway. 2018 was the first year where UZ ran a substantial number of grain trains as block trains.

The block trains are largely made up of UZ wagons or larger owner fleets who can assemble large numbers of wagons. A few smaller private wagon owners are still accessing mixed trains.

B2 Wagon utilisation

Grain wagons are being added to the total fleet by private owners and this is shown in the “availability” graph as Figure B1. Wagons become more available seasonally because in the winter months less loading occurs. But each successive year a great number of wagons have become available, with the number of UZ wagons, shown dotted, remaining the same.

Figure B1 Availability of grain wagons

Source: UZ Train Control statistics 2019 for all graphs
At the same time, because more wagons are available, and UZ’s locomotive fleet is a finite size, the turnover of wagons is getting longer. This is shown in Figure B2.

**Figure B2  Turnover period for grain wagons**

Wagons are experience longer times to load and unload, as shown in Figures B3 and Figure B4, and then they are held in storage until a locomotive is available for their next trip. The trip time should become shorter as the number of block trains increase because they should not have to stop at marshalling yards like mixed trains.

In Annexes G and H, examples are shown where marshalling yards “capture” wagons and make them unproductive and also where a marshalling yard has been converted to a light industrial area where the trains have become block trains and no longer require marshalling.
Figure B3  Grain wagon loading time

Figure B4  Grain wagon unloading time at the port
Assuming UZ can provide locomotives with the same reliability and availability in the future, grain wagon utilisation should increase as the number of grain block trains increase. Indeed, the number of required locomotives should decrease because they will not be waiting to form a train from disparate sources, such as single wagon sidings.

In terms of loading rate, the Ukrainian rate is very low. For a 44 wagon block train it takes more than 24 hours at a rate of 50 tonnes per hour per loading outlet. Some sites have up to 4 loading outlets, making 200 tonnes per hour. But this is still very low by international standards where 1000 tonnes per hour is common. At 200 tonnes per hour for a 3,500 tonne payload, the loading alone is 17.5 hours and then the shunting for the four sections of train makes up 24 hours. This means wagons are stationary for a long time and yet revenue is accrued only with distance travelled. Costs of wagon ownership are largely time-based being depreciation, opportunity cost of capital and some maintenance.

After the initiative of block trains, the next priorities for reform should be the elimination of the practice of locomotive changes which was a practice when six separate railways operated. Crew changes will continue to be required but these may also reduce as the “boundaries” formed by the six railways are eliminated.

B3 Railway asset utilisation

Although the initiative of block trains is a very welcome reform, the loading points (terminals) remain constrained in length, meaning the train has to be broken into a number of sections. In addition, loading cannot occur with the main line locomotive even if the siding was long enough because it is electric and the loading points would need great modification to accept an electric locomotive.

In Figure B5 is a loading point at Bobrovytsia where four loading positions can load simultaneously, 7 to 8 wagons at a time. On the left the photo shows the loading point. On the right the aerial view shows the constraints of the site, rail lines shown in black and the loading point indicated. Each wagon takes 50 minutes to load indicating a loading rate of approximately 75 tonnes per hour at each loading point, 300 tonnes per hour total. Together with shunting 30 wagons at a time from the nearby (5km away) marshalling yard and shunting at the loading point, the whole process of loading takes 24 hours. The limitation on train length is a constraining factor and this occurs because of the capacity of the shunt locomotive on pulling a loaded wagon rake as well as on the track length available at the siding.

Figure B5 Loading point at Bobrovytsia

In Figure B6 is a loading point at Boryspil where two loading positions can load 5 wagons simultaneously. Old storage sheds shown on the left, new silos on the right. The aerial view shows the constraints imposed by the suburban location but the new silos are not yet shown. The loading point is currently under construction to accept more grain and to increase the loading rate so that a full block train can be loaded in 12 hours, implying a loading rate of approximately 300 tonnes per hour. The marshalling yard is 200m away but with the shunting of 10 wagons for each loading sequence, the
entire process to make ready a block train for dispatch from the marshalling yard will be approximately 15 hours.

The consolidation of grain handling and loading onto trains at this site provides a distinct advantage for the UZ operation but it is hindered by the physical constraints on the site being located in a suburban area.

Figure B6  Loading point at Boryspil

In the short term therefore, as grain loading consolidation continues and construction or enhancement of grain storage is completed, block grain trains will only improve wagon utilisation marginally. Loading rates need to be improved and this will involve modifications to clients’ loading sidings and equipment as well as UZ’s availability of locomotives and change from the historical “six railways” structure where legacy practices slow transit. This is a long process that may extend over decades but needs to be done before substantial improvement in road infrastructure denies UZ of much traffic. This is the model for all of UZ’s custom, except for the monopoly commodities of iron and coal.

B4  Open Market

Clients of UZ in the grain industry have clearly sought to gain more control over their operations by buying grain wagons. It is highly probable that some larger grain customers will purchase locomotives when the rail market is opened in 2022. They may purchase diesel locomotives so that they can load their train and be free of the need to use overhead wire. They will have the ability to purchase train
paths from the infrastructure company which will lock them into a schedule and gain priority if other users are not running on time.

UZ clients may also believe they will be able to perform the task more cheaply than UZ. Although this is unlikely, clients will see that investment in their own assets is better than paying for a service from somebody else.

**B5 Tariffs**

In the short term UZ has constraints about the way tariff and tariff increases are applied. The New Railway Law will enable the UZ train operating company to be more focussed on particular industries and the infrastructure company will also have the ability to pitch its access charges for particular industries.

In the short term UZ is required to adjust cargo tariffs by the same percentage across all tariff classes. UZ has chosen to index tariffs by Producer Price Index of Manufacturing. This may approximate to its input costs but alternatives exist that could more closely align its costs to an index by adopting a specifically created index to mirror its costs more precisely. But this is only a short-term measure since the New Railway Law will be introduced before market opening and this could be as early as the latter half of 2019.

In Australia, train operations for cargo are deregulated indexation is not practiced. However for infrastructure companies, two of which are private companies and others public companies, indexation is applied to the component of track access charges where costs are incurred from maintenance. The capital cost components are regulated according to the prevailing conditions associated with the cost of capital. Examples of these mechanisms are shown in Annexes C, D and E.

In the EU, train operating companies are deregulated and mark-ups, which are increases over the cost of provision, can be applied to a level not beyond that can be borne by the market. Infrastructure access charges in the EU are not regulated except that there is an expectation that they provide for a sustainable infrastructure, unless there is specific provision by the state. Overall however, it is the general view that it is difficult to manage domestic or international tariffs in a structured and logical way consistently across all jurisdictions, because each jurisdiction has its own priorities and these are particularly associated with infrastructure charges. Above all else, the EU rules stipulate unbiased competition among train operating companies, and it is this mechanism that is relied upon for the health of the industry. An extract from a relevant documents are shown at Annex F.

In the United States, the cargo railways are privately owned and they are not directly regulated. Nevertheless, there is a close correlation between input costs and revenue because there is a very competitive market present.

In Figure the average rail revenue per ton-mile for grain is shown plotted against the Rail Cost Adjustment Factor which reflects rail input prices. In general, the revenue is lower than the Adjustment Factor. This is published so that the public, clients and legislature can see whether or not the rail companies are gouging the market. It is a type of self-regulation.

Particularly of note is that revenue varies for product and this can be attributed to the highly flexible market responding to volumes, geographic spread, loading rates and equipment needs.
Figure B7  Revenue vs Input Costs

Source: Association of American Railroads

B6  Conclusions

These observations lead to conclusions as follows:

1. Indexation is only one method of adjusting rail tariffs but there is a close correlation between commonly used economic indices such as Consumer Price Index (CPI) or Producer Price Index (PPI) and revenue because PPI or CPI represent cost inputs to the railway. Ongoing reform should result in less than a full pass-through.

2. When the opportunity arises, or whenever feasible, grain loading rates should be increased to the highest rate possible.

3. Changing locomotives and crews at historical boundaries should be withdrawn, unless the schedule indicates that drivers will be “out of hours” or locomotives will be incompatible for the next section of line.

4. When the opportunity arises, such as grain siding enhancement, or on new construction, the siding length should be sufficient to accommodate a full block train. This could entail a balloon loop.

5. New grain sites for loading trains should be designed to take maximum advantage of block train length and rapid loading rate.
Annex C. Example: Tariff escalation

This example is from Queensland Australia. The reference tariff applies to infrastructure access charge by the Queensland Government for state government-owned railway infrastructure.

3.3 Escalation of Reference Tariff inputs

(a) Each Reference Tariff input specified in clause 3.1(e), except the QCA Levy, will automatically escalate annually on each Escalation Date commencing on the First Escalation Date in accordance with the following formula:

\[ AT_n = AT_{n-1} \times \left( \frac{CPI_n}{CPI_{n-1}} \right) \]

where:

- \( AT_n \) means the value of the relevant Reference Tariff input to apply after escalation;
- \( AT_{n-1} \) means the escalated value of the relevant Reference Tariff input immediately prior to the relevant Escalation Date or, for the First Escalation Date, means the relevant Reference Tariff input referred to in clause 3.1(e);
- \( CPI_n \) means the CPI for the Quarter which commenced six months prior to the Escalation Date for which the variable \( AT_n \) is being determined; and
- \( CPI_{n-1} \) means the CPI for the Quarter which commenced 18 months prior to the Escalation Date for which the variable \( AT_n \) is being determined.

(b) Queensland Rail will publish the escalated Reference Tariff inputs on its website within five Business Days after each Escalation Date commencing with the First Escalation Date.

Source: Queensland Rail 2016 Access Undertaking
Annex D. Example: Maintenance cost escalation

This example is for a private company “Aurizon”, Queensland Australia

Note the use of “MCI”, maintenance cost index, which is a CPI for maintenance of infrastructure cost items.

Calculation of Adjusted Allowable Revenue

(c) The Adjusted Allowable Revenue for AT_{2.4} or the AT_{5} component of Access Charges in relation to a Reference Tariff is the sum of the following components of the applicable Allowable Revenue (as relevant to the applicable Allowable Revenue):

(i) the component relating to the recovery of Aurizon Network’s maintenance costs, adjusted to reflect the difference between:

(A) the actual MCI value for the relevant Year; and

(B) the forecast MCI value that was used for the purpose of determining the relevant Reference Tariff for the relevant Year;

(ii) the component relating to the recovery of Aurizon Network’s operating costs, excluding those costs referred to in clause 4.3(c)(i), adjusted to reflect the difference between:

(A) the actual CPI value for the relevant Year; and

(B) the forecast CPI value that was used for the purpose of determining the relevant Reference Tariff for the relevant Year;

(iii) the components relating to the recovery of Aurizon Network’s costs associated with the connection of Aurizon Network’s electrical traction system to an electricity transmission or distribution network, adjusted to reflect the difference between:

(A) the actual costs for the relevant Year; and

(B) the forecast costs used for the purpose of determining the relevant Reference Tariff for the relevant Year;

Source: Queensland Competition Authority Decision on 2017 Access Undertaking.
Annex E. Example: Infrastructure access charge escalation

This example is taken from the Australian Rail Track Corporation (ARTC), which is a Federal government-owned Railway Infrastructure Management Company, and applies to track access charges on Federally-owned network.

ARTC may annually vary the Indicative Access Charges for Indicative Services ("Review Date") by up to an amount determined in accordance with the following formula:

\[ AC_t = AC_{t-1} (1 + TV_t) \]

Where

- \( AC_t \) is the Indicative Access Charges for Indicative Services following the relevant Review Date;
- \( AC_{t-1} \) is the Indicative Access Charges for Indicative Services immediately preceding the relevant Review Date;
- \( TV_t \) is the maximum variation to Indicative Access Charges (measured as a percentage) that may be applied from 1 July 2008 and thereafter from each 1 July during the Term ("Determination Date") and is to be determined in accordance with the following formula,

\[ TV_t = \text{the greater of} \]

(A) \( \left( \frac{\text{CPI Index}_t}{\text{CPI Index}_{t-1}} \right) \frac{\text{CV}_{t-1} - 1}{\text{CV}_{t-1}} \times 100 \)

(B) Zero

Where

- \( \text{CPI Index}_t \) is the All groups Consumer Price Index, Weighted Average of Eight Capital Cities, Index Number for the March quarter preceding the relevant Determination Date.

Annex F. Exhibit: Some issues of EU track access pricing

- It is a concern of regulators to avoid discrimination. ABC does not appear to be more complex for regulators to work with than many other cost accounting systems. Nonetheless, regulation may require cost data to be provided in a particular form and to a particular aggregation level, e.g. 'regulatory accounts'.

- Under EU law the regulatory body is required to supervise negotiations on track access charges between the infrastructure manager and railway undertakings, where such negotiations are permitted under national law. In practice, it may be difficult for the regulator to put such supervision in place, especially in an environment of open competition involving a number of different market segments and operators. Clearly, effectiveness will also depend on the staff capacity of the regulators.

- Article 8 of Directive 2001/14/EC sets the costs of operating the train services as the rule, and mark-ups may only be levied if this market segment can bear it. This presupposes a definition of market segments and an understanding of how demand in a particular segment varies if mark-ups are levied. International freight transport may be defined as one or more market segments. In this respect, there is an urgent need for stronger cooperation between infrastructure managers and regulatory bodies across borders.

- Different cost accounting systems used by infrastructure managers and data confidentiality present obstacles to the effective regulation of international traffic. Regulatory bodies should reinforce cooperation in order to overcome these obstacles.

- A simple harmonisation of cost accounting systems of infrastructure managers may be a prerequisite for enforcing the existing pricing and charging rules for international traffic.

Source: RAILCALC Workshop on Infrastructure Charging* Brussels, 15 February 2008
Annex G. Exhibit: Marshalling yard “capturing” wagons and reducing utilization

Source: Google maps: Darnytsia, Ukraine
Annex H.  Example: Conversion of obsolete marshalling yards

Forrestfield is an example of a former marshalling yard in Western Australia converted to light industrial and freight village.

Source: Google maps, Forrestfield Western Australia (Perth)