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EASTERN AFRICA POWER POOL REGIONAL TRADE CONFERENCE

Private sector participation in national & regional transmission network development.

Panel discussion on “International experience from
Public – Private – Participation (PPP) in
Transmission – What works, what doesn’t?”

Summary of the panel discussion

Mombasa, December 9–11, 2024

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Introduction.

Welcome to this session on “Private sector participation in transmission network development”, with a focus on transmission investments of regional impact.

My name is Ignacio Pérez-Arriaga, and I have been until a few months ago the Interim Director of the African School of Regulation, ASR – now I am an advisor to the School. I am an electrical engineer, university professor at 3 universities: the Florence School of Regulation in Italy, Comillas University in Madrid and MIT for 14 years until recently. I have been a regulator twice, in Spain and in Ireland.

Prior to this panel discussion I have presented a brief review of the principles and some experiences of private sector participation in power transmission. You can find the slides corresponding to this presentation in a separate document.

Our three invited experts will bring diverse and complementary experiences. They are:

- *Tilana de Meillon, Senior Operations Officer, at the International Finance Corporation,*
- *Subhro Paul, Director of the Central Electricity Authority (CEA) in India, and*
- *John Mativo, Managing Director & CEO of KETRACO, the Kenyan transmission company.*

And these are their brief bios:

Tilana de Meillon, is a Senior Operations Officer at the International Finance Corporation (IFC), where she leads transmission and distribution initiatives across Africa. She is based in Nairobi, Kenya and brings over 20 years of expertise in energy sector development, consulting engineering, and project management. Tilana has played a pivotal role in advancing private sector participation in energy infrastructure, with a focus on regional interconnectors and grid projects. She has had leadership roles at Eskom, EON, and Xaris Energy,

where she managed major power projects across Africa. An Industrial Engineer, Tilana holds Master's degrees in Computer Engineering and Engineering Management.

Subhro Paul is the Director at the Central Electricity Authority (CEA) of India, *an organisation providing technical expertise and planning at national level, different from the Central Electricity regulatory Commission CERC, which is in charge of ensuring market regulation and compliance.* CEA plays a critical role in shaping India's energy infrastructure policies and projects. Mr. Paul leads efforts to evaluate and optimize the financial viability of transmission projects, ensuring alignment with India's ambitious power sector goals. He has been a pivotal contributor to the integration of renewable energy into the grid and enhancing the transmission network's efficiency.

John Mativo, is the Managing Director and CEO of the Kenya Electricity Transmission Company (KETRACO). Dr. Mativo holds a Ph.D. in Civil Engineering from Tokyo Metropolitan University, a Master's in Structural Engineering from Tongji University, and a Bachelor's in Civil Engineering from the University of Nairobi. With over 25 years of experience in both public and private sectors, he has been instrumental in planning, designing, and supervising major infrastructure projects, including high-voltage transmission lines and substations. Since joining KETRACO in 2010, Dr. Mativo has played a pivotal role in advancing Kenya's electricity transmission network.

Panel discussion

Our three guest experts can provide complementary perspectives on private participation in the activity of electricity transmission. From the extensive and mostly successful experience in India, where many transmission lines have been built with the participation of private capital, to the ongoing process in Kenya aiming to deploy the first transmission lines in Africa under the Independent Transmission Power model, and the broad perspective of the IFC on the use of PPPs to bring private investment into electricity transmission in developing and emerging economies. Let me introduce our panellists briefly.

I shall start the debate by asking basically the same question to the three panellists – Subhro, Tilana and John, initially in this order –, knowing that each one will answer it from a different perspective.

First question:

Let's start with Paul Subhro. What motivated the Indian government to open up transmission to private investment and do you think it was the right decision or not?

Let me start with sharing some numbers from the Indian grid to form the perspective. The installed capacity is 450 000 MW, with around 200 000 MW of renewable capacity. The transmission capacity at 220 kV and above levels is around 500 000 circuit kilometres and 1.3 million MVA. In the summer of 2024 the peak demand met was 250 000 MW.

Electricity is a basic infrastructure. However, the per capita annual consumption of the country was around 250 kWh in the 1980's and installed capacity was around 40 000 MW. It was realized that the growth of electricity is essential to ensure better living conditions for the people. Therefore, substantial generation addition plans were made and executed. Private sector participation in generation was allowed in 1991. Generation being mostly thermal and hydro was geographically concentrated near coal bearing areas or hydro resource areas. Consequently, transmission was planned and linked with generation. Transmission was owned by the generating company. However, transmission planning linked with generation was sub optimal planning. It was realized that seamless power access to the States was not possible in this way. In order to strengthen the National grid and to ensure adequate drawal points in States, the National Power Transmission Company, which is the precursor of Powergrid, was formed in 1989. The development of transmission continued in the public sector. The inter-regional transmission capacity in 2002 was around 5000 MW. Although a lot of infrastructure in transmission was constructed through public sector investment much more investment was needed.

The Electricity Act 2003 and the Tariff Policy 2006 paved the way for competition and private sector participation in transmission which could benefit the consumers through facilitating supply from lowest cost generation. Transmission needed to come out of the shadows of generation and take its own place in the electricity infrastructure. It was further realized that private participation could accelerate the development of transmission infrastructure. To facilitate this, assets whose tariffs were discovered through tariff based competitive bidding were to be adopted by the regulatory commissions rather than determined through detailed analysis. In order to guide the process, the Guidelines and Standard Bid Documents were also issued. The first tariff based competitive bidding in transmission was done in 2009.

The private participation has been extremely successful. The inter state transmission capacity could be increased from around 20,000 MW in 2009 to around 1,18,000 MW now. The total transmission line length (220kV and above) increased from around 200,000 circuit km in 2007 to around 490, 000 circuit km, a growth of nearly 2.5 times. The total transformation capacity (220 kV and above) increased from around 257,000 MVA in 2007 to around 1.3 million MVA,

a growth of nearly 5 times. Total 58 number of TBCB projects costing around Rs 80,000 Crores have been completed and 61 projects are under construction costing around Rs. 106, 000 Crores.

As we look forward to integrate higher renewable generation in line with our national commitments, the private sector is poised to play a pivotal role in transmission development. It is estimated that the total amount required for transmission planned for development from 2022 to 2032 would be of the order of 916,142 Crores including inter-state and intra-state system.

Buoyed by the success of the TBCB process, many Indian States such as Rajasthan, Madhya Pradesh, Uttar Pradesh and Maharashtra have also adopted this process.

For Tilana I shall reformulate the question in a slightly different way. Do you think that the Independent Transmission Project (ITP) is the right model for private sector participation in transmission for Africa and East Africa in particular? Is the IFC promoting this model with preference to other approaches?

Africa's transmission investment needs are estimated at over \$45 billion over the next eight years. This underinvestment in transmission has put Africa behind other regions.

The 38 countries in sub-Saharan Africa have less than 150,000 kilometers of combined transmission lines – one of the lowest per capita rates of any region globally. Scarce public finance sources are not enough to close this gap and private sector provide part of the solution.

Private sector investment in T&D is critical for both improving energy access and integrating renewable energy projects including distributed generation. A key example is South Africa where the shortage in Transmission infrastructure is significantly hampering the electricity sector.

But what is the right model for Africa, ITP? Yes! Why? 1) It is not privatisation, 2) It is “like” IPP project finance structures that Africa is familiar with, but with distinct differences, e.g. PPA change into TSA. And 3) It has a lot of flexibility to design the structure based on country specific regulatory frameworks and preferences, e.g. BOOT, BTO, BOOT with buy back, BOO, etc.

And finally for John, what was the rationale to decide to do PPP in transmission in Kenya? Were there any feasible alternatives?

In 1997, Kenya unbundled Generation from Transmission & Distribution in order to solve the then recurring national outages. The Kenya Electricity Generation was formed and the unbundling also allowed Independent Power Producers to come on board. However, by 2006, the Government and Development Partners

recognised that although generation was increasing, the national grid had numerous constraints and capacity challenges. A decision was made to form the Kenya Electricity Transmission Company (KETRACO) to focus on increasing and improving the high voltage national grid which stood at 3,408 circuit km.

Since incorporation of KETRACO in December 2008, KETRACO has added more than 5,600 circuit km of transmission lines and associated substation. Although the grid has exponentially grown, Kenya still requires more and more transmission infrastructure to meet the targets. Since inception, KETRACO has relied on the Government borrowing loans from development partners and on-granting to KETRACO.

However to accelerate the implementation of additional transmission infrastructure, the funding model is not sustainable due to borrowing challenges by the National Treasury. In order for the country to implement adequate transmission infrastructure, it is now imperative for the Government and Private Sector to partner in future projects.

Second question:

Again for Subhro first. Could you describe the process, as implemented in India, which has been able to bring private capital to transmission under the Tariff-Based Competitive Bidding (TBCB) scheme, which can be considered as one of the possible versions of the ITP approach?

I would like to point out that the ITP approach, also called the Tariff Based Competitive bidding (TBCB) process in India, ticks all the boxes for the facilitative conditions for private participation as brought out in professor Arriaga's presentation.

The process starts with planning for transmission. The Central Electricity Authority (CEA) is tasked to draw up short term plan every year on rolling basis for upto next five years and perspective plan every alternate year on rolling basis for next ten years. The Central Transmission Utility (CTU) draws the plan for inter-state transmission system for upto next five years on rolling basis every year identifying the specific transmission projects. Projects upto Rs 100 Crores are approved by the CTU while the projects upto Rs 500 Crores are approved by the National Committee on Transmission (NCT) headed by Chairperson, CEA. For projects of higher value, the NCT recommends to the the Ministry of Power which is the approving authority. Views of States are also considered. The NCT meets frequently, as frequently as a month, in order to ensure that there are no delays in projects.

The bidding takes place based on the standard bid documents issued by the Ministry of Power. These documents have been prepared in detailed

consultations with all stakeholders and provide a balanced risk sharing mechanism. The bidding takes place through secure e bidding platforms and e-reverse bidding process is followed to get the best prices. The selected bidder also called the Transmission Service Provider (TSP). The bidding is carried out by identified public sector undertaking companies also called the Bid Process Coordinators (BPC). Before bidding, the BPC floats a special purpose vehicle (SPV) company and applies for preliminary approvals such as approval for construction of overhead lines under Section 68 of the Electricity Act, 2003, forest clearance, etc in the name of SPV. The BPC also carries out a detailed survey of the line route and provides it with the bid documents. The bidders however are allowed to optimize the route. This SPV is transferred through a share purchase agreement to the selected bidder.

The TSP is responsible for owning, financing developing, designing, engineering, procurement, construction commissioning, operation, maintenance of the project. The project is transferred to the CTU at the end of the concession period of 35 years. As long as the transmission system is kept available the transmission developer is assured to recover the price that was quoted in the bid irrespective of the quantum of power flow in the line.

In order to encourage competition, the bidders are allowed to show experience from infrastructure sector rather than limiting the pool of bidders with transmission experience only. Consortium are allowed to meet the financial requirements. Experience as a developer of infrastructure and also as a contractor is allowed.

Payment collection is de-risked as the payment counter party for all the TSPs is the CTU. The CTU collects the transmission charges from all designated interstate customers in a pool. The payment to TSP's is made by CTU based on the Sharing Regulations issued by the Central Electricity Regulatory Commission.

Revenue is de-risked through provisions of deemed Commercial Operation if the transmission system of the TSP could not be charged due to delay in the upstream/downstream transmission/generation system. Force Majeure events are not considered breach of contract events and the concession period is extended in such cases. Change in law provisions during construction and during operation stage and their financial remedies are spelt out clearly. In case of delay on behalf of the TSP, clearly laid out liquidated damages provisions kick in. Therefore the risk of the developer is known a priori.

The CTU is also adequately protected through provisions of project monitoring, termination due to non performance, misrepresentation and penalties for non commissioning of critical elements identified in the bid documents.

The lower risk perception and higher certainty leads to ease of project finance.

For Tilana: Could you tell us about specific cases where the IFC has been involved in ITP projects, the role played by IFC and how did things evolve?

IFC, a member of the World Bank Group, advances economic development and improves the lives of people by encouraging the growth of the private sector in developing countries.

IFC has a Long Track Record in T&D >68 projects and with a total commitment value US\$2.7 billion, including in Brazil, Peru, Colombia, India and Africa. The current outstanding portfolio is about US\$820 million.

The IFC pipeline indicates significant activity in Latin America (Brazil, Colombia), India & Africa in Transmission.

IFC historically has provided financial products tailored to client needs, but most recently also provide early development support in the form of collaboration and co-development with developers.

IFC has also been involved in transactions on asset monetization, including in India (InVIT).

IFC is actively involved in supporting development of ITPs in Africa, and have been collaborating on projects as well as having a recent mandate signed to provide funding for a Zambia DRC interconnector.

The transmission agenda seems to have become a focus and things are evolving fast, with South Africa, Uganda, Kenya, Mozambique, etc. each in the process to make space for private sector.

For John: Please, describe KETRACO journey so far in implementing PPP. How is the situation now?

Kenya enacted the Energy Act 2019 and PPP Act 2021, opening up a framework to on-board private sector funding in the transmission infrastructure space. With the support of development partners and the PPP Directorate, KETRACO staff have undergone intensive capacity building to ensure there was corporate readiness of the organisation.

So far eleven transmission infrastructure projects are being considered for development through privately initiated proposals (PIP). Three private firms have expressed interest to develop transmission lines through PIP. Two PIPs have progressed to negotiations whereas one is at the proposal stage. One recently terminated. Five projects had been identified as candidates for solicited (competitive) Public Private Partnership (PPP) projects to be subjected to

screening. Transmission Master Plan 2023-2042 has 90 planned projects and expect between 15- 20% of them to be implemented through PPP.

Third question:

For Subhro: What lessons can India share with African countries?

I would like to respond to the issues pointed out by Tilana with respect to asset recycling. In India we have also introduced the Infrastructure Investment Trust (InvIT) model and Acquire Operate Maintain Transfer (AOMT) model. InvIT and AOMT are eminently suited for private participation in brownfield transmission assets. There are two operational InvIT one by PGIInvIT and another by Indigrid.

A clear cut separation of responsibilities in planning, ownership, operation and Trading is essential. For example in India, the CEA and CTU are the planners, the TSP is the owner and maintains the transmission, GridIndia is the system operator and traders are separate parties. The trader based on the available margins can execute any trade without approaching the owner of the transmission line. The transmission access has no relation with any power sale purchase contract. However, it was a long journey from the days when transmission was developed as a part of generation evacuation. In 1989 the transmission assets of state owned NTPC, NHPC, BBMB and other companies was carved out into a separate company called the National Power Transmission Company. Initially, the transmission charges were based on wheeling, thereafter it was based on regional postage stamp method. However, it was realized that the linking of transmission development with power sale contracts was inappropriate and a hindrance in the growth of transmission which is a prerequisite for efficient energy delivery. With this, significant changes were introduced by the Sharing Regulations in 2010 and more recently the General Network Access in 2022. These regulations have de-linked transmission from the contracts and transmission is being built based on scientific studies and analysis. There are no wheeling charges in inter state transmission in India.

I would like to point out that it is essential to have a set of laws, rules, etc. so that the participants are well aware of the intent of the government. The Electricity Act, 2003, Tariff Policy, 2016 lay down the intent of the government. It is also important to have well drafted documents prepared in consultation with the stakeholders to ensure appropriate risk sharing mechanisms. There should be a continuing engagement process to get feedback on the working of the entire process.

It is also important to have strong institutions such as planners, regulators, etc. A good planning system will ensure cost effective transmission development as once built the TSP is assured of revenue based on availability. In spite of well

drafted documents, events such as in case of Force Majeures and Change in Law are open to interpretation and there is a need to adjudicate such issues by regulators. A sound regulatory institutional set up has a profound role to play in such cases. I was referring earlier that the CTU is the counter party for all inter state TSPs. The collection and disbursement of payments by the CTU are governed by clearly laid out Sharing Regulations issued by the Central Electricity Regulatory Commission. All institutions such as the Ministry, the regulators, the planners and the system operators need to work in close coordination to ensure a healthy PPP model.

Continuous engagement is key. In India we have engaged with the stakeholders in continuous basis and made appropriate changes in the process as and when it was felt necessary. For example in 2021 the revised standard bid documents were issued in which important changes were made. For example before the 2021 standard bidding documents the counter party to the Transmission Service Agreement (TSA) were utilities which had agreed to the scheme in regional forums and the TSA was required to be signed by multiple such parties. In the 2021 document this requirement was modified to make CTU as the single counter party. Appreciating the essence of time, the 2021 documents reduced the time frame for completion of the bid process from 145 days to 91 days. Different issues raised by stakeholders are under consideration as I speak.

I would also say that the intra state system and the distribution system need to be developed in tandem with the inter state system. Dr Dalal had pointed it out in an earlier session. The development of intra state system and distribution system would address the issue of latent demand and ensure that the power reaches to the end consumers.

For Tilana: What are the lessons learned from the involvement of IFC in ITP-like experiences?

Lessons learnt:

- Cheap Funding - There is limited experience in private sector participation in transmission projects in Africa. There is a reluctance from governments and utilities to be the first movers in Africa, and private funded projects are considered expensive, therefore, any cheap sources of funding will be needed to help develop success cases that can be replicated, given the large need.
- Regulatory Reforms - Regulatory and policy environments in Africa are often unpredictable and not transparent. Collaboration with the broader WB towards required reforms to achieve clear processes and cost reflective tariffs to enable private sector participation is necessary.

- Leadership - Leveraging the influence of leaders within the stakeholder ecosystem to push the T&D ecosystem in both the public and private sector. Active dialogue with government stakeholders to advocate for stable and transparent regulatory frameworks is necessary.

How can DFI's help:

- Guarantees and bankability support mechanisms - In addition, and considering the state of Africa utilities, guarantees and bankability support mechanisms will be required to mitigate payment and termination risks.
- Cheap Funding - There is limited experience in private sector participation in transmission projects in Africa. There is a reluctance from governments and utilities to be the first movers in Africa, and private funded projects are considered expensive, therefore, any cheap sources of funding will be needed to help develop success cases that can be replicated, given the large need.

Mission 300 will unlock funding for transmission. See:

<https://www.worldbank.org/en/news/feature/2024/09/19/five-ways-the-world-bank-will-achieve-mission-300>)

- Capacity building - Rarely will governments or utilities have sufficient capacity to engage in complex PPP transactions. Hence, capacity enhancement must be ensured within the relevant institutions by (a) training and retaining staff internally on transacting and (b) by retaining the services of capable external advisors.

For John: What lessons can KETRACO share with other African Countries?

- Ensure you have the necessary Legislation Framework.
- Enact all the requisite regulations and easy to use practical guidelines & templates.
- Ensure that staff undergo adequate and intense capacity building.
- Ensure engagement of stakeholders and improve your communication protocols.
- Have a tariff payment support mechanism.

Please give the panellists a round of applause for their brilliant contributions to the theme of this session. Thank you.