



Conference Series

INTERNATIONAL ONLINE CONFERENCE

# PRIVATE INVESTMENT IN ELECTRICITY TRANSMISSION IN AFRICA



11TH, 12TH AND 13TH, MARCH 2024



3:00pm - 5:00pm CAT | 2:00pm - 4:00pm CET

WITH THE COLLABORATION OF AFDB & AFUR



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**INTERNATIONAL ONLINE CONFERENCE  
PRIVATE INVESTMENT IN TRANSMISSION IN AFRICA**

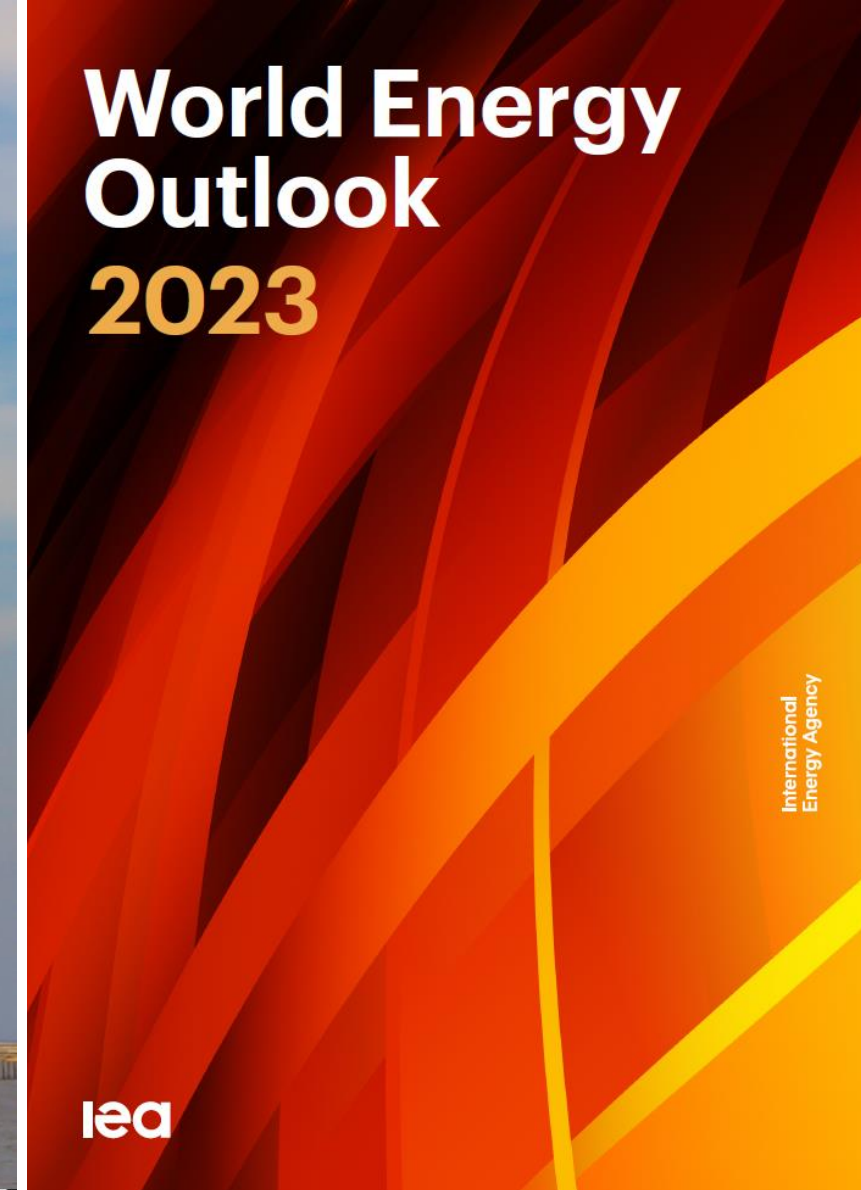
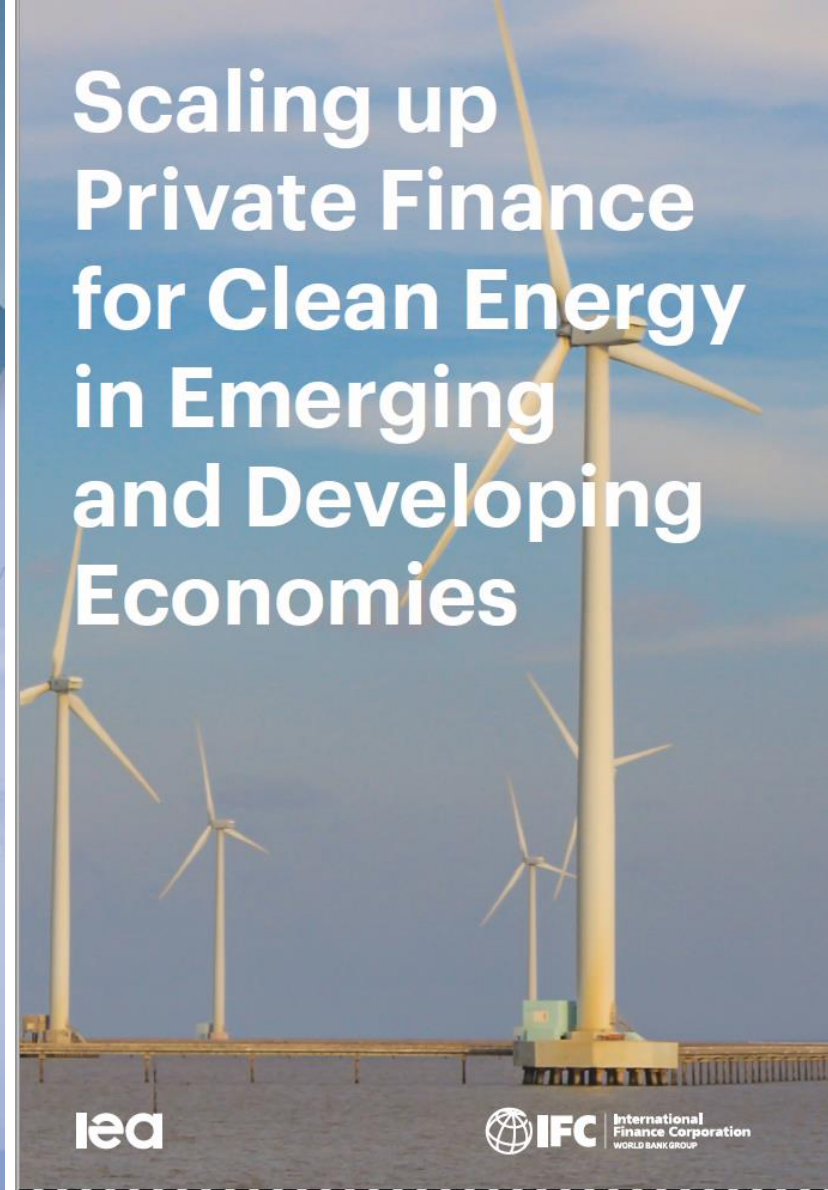
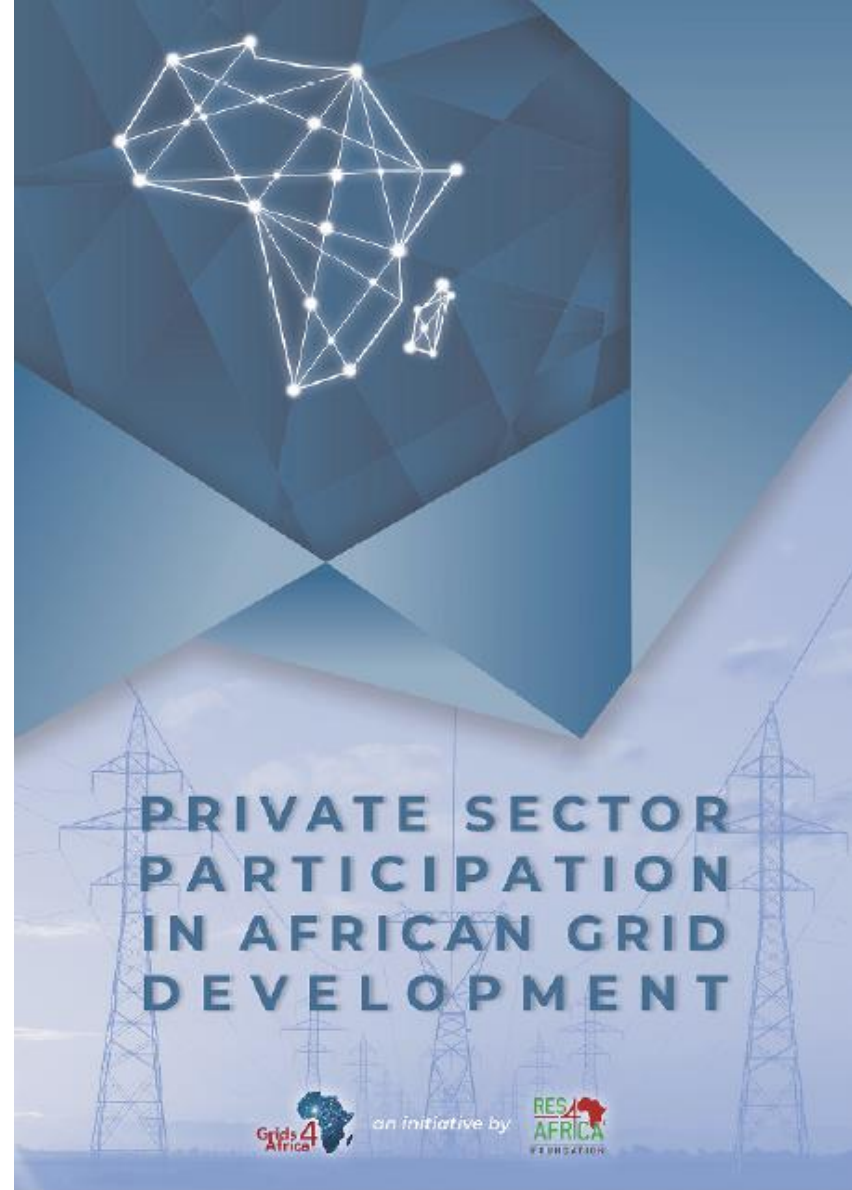
**March 11, 12 & 13, 2024**

**Could common sense & sound regulation  
enable private investment in power  
transmission in Africa?**

**Ignacio Pérez-Arriaga**

Interim Director of African School of Regulation & Florence School of Regulation, EUI  
Institute for Research in Technology (IIT), Comillas University  
Sloan School of Management, MITEI & CEEPR, MIT

**The evidence is overwhelming,  
that there is no private investment in transmission in Africa  
(although some recent initiatives might start to change this)**



<https://www.res4africa.org/calendar-news/79po1jnb8nbasjvf3s8x8bnogbhff4>

<https://www.iea.org/reports/scaling-up-private-finance-for-clean-energy-in-emerging-and-developing-economies>

<https://www.iea.org/reports/world-energy-outlook-2023>





Sustainable  
Markets  
Initiative

## Global Grids, Money and Models

Unblocking Investment and  
Unlocking Africa's Renewable Energy Future

# Financing Clean Energy Transitions in Emerging and Developing Economies

International  
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## Understanding the Landscape

# 2021

In collaboration with



octopusenergy



# Africa Energy Outlook 2022

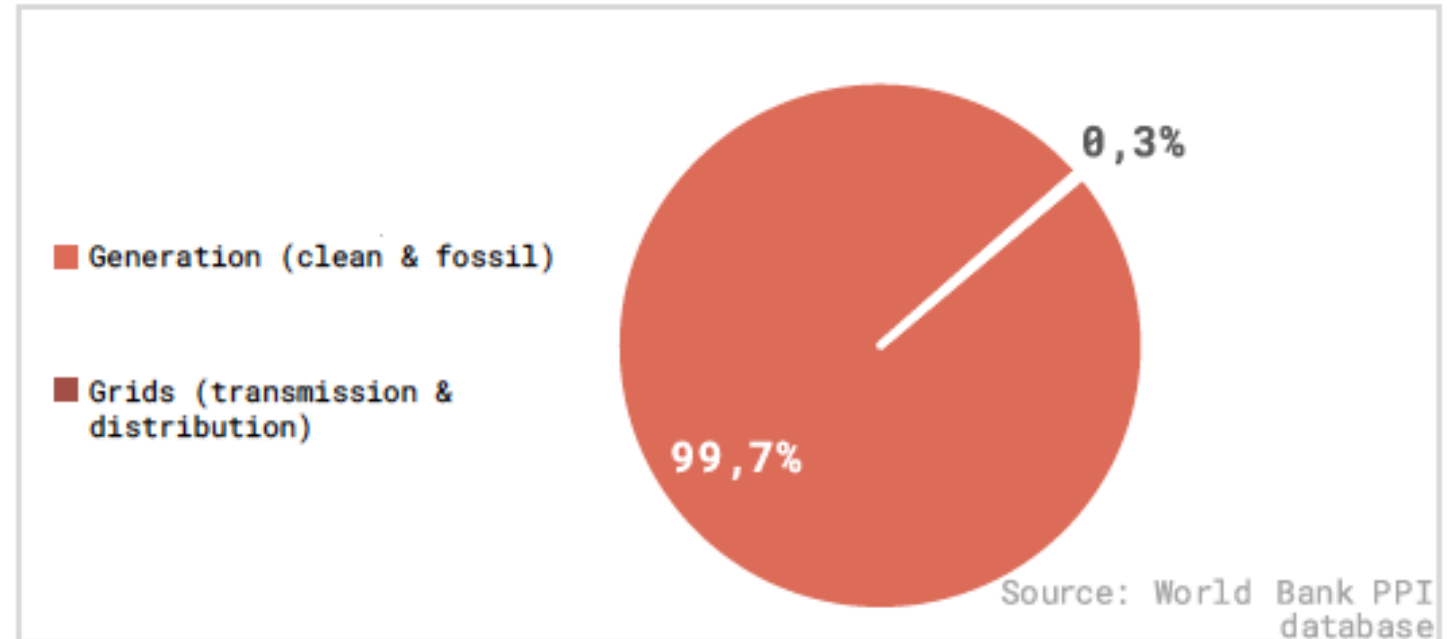
International  
Energy Agency

iea

World Energy Outlook Special Report

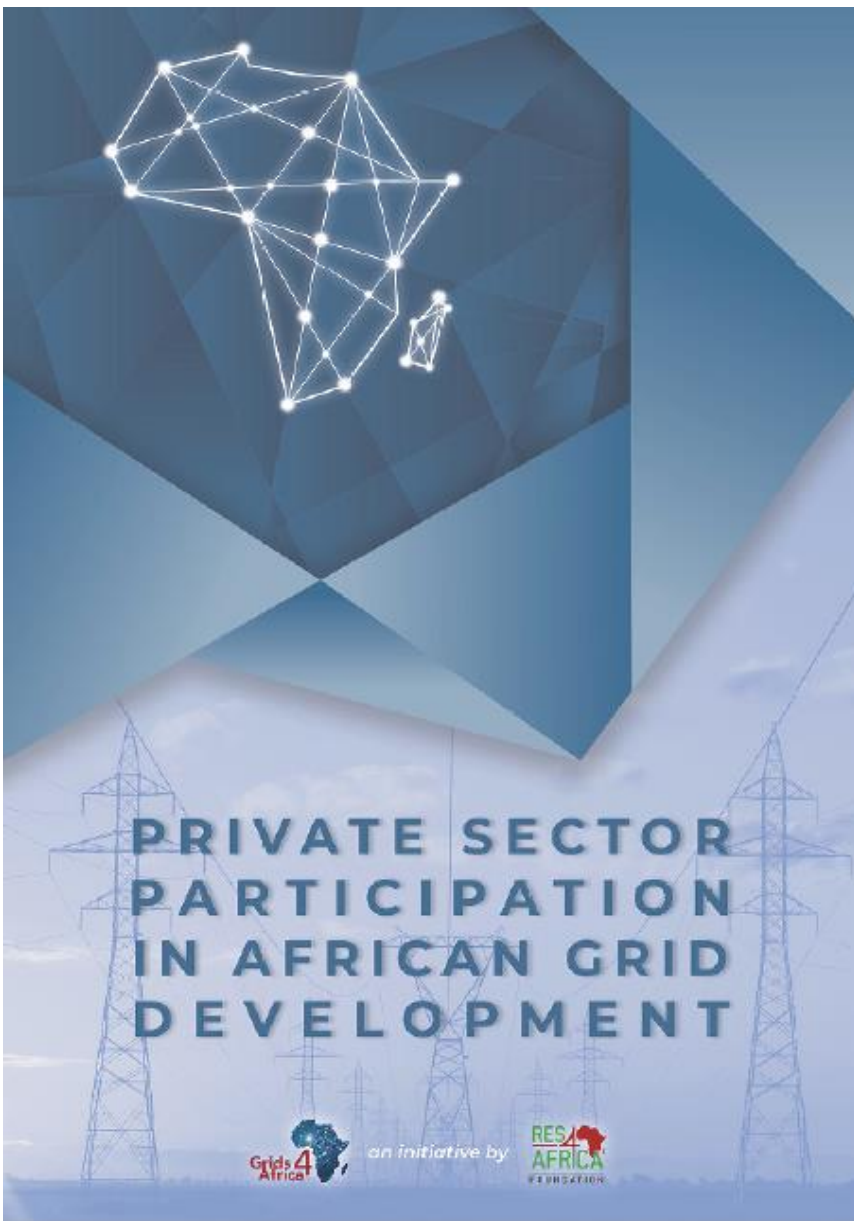
World Energy Investment 2021 Special Report  
in collaboration with the World Bank and the World Economic Forum

## The percentage of private investment in African electricity networks is negligible



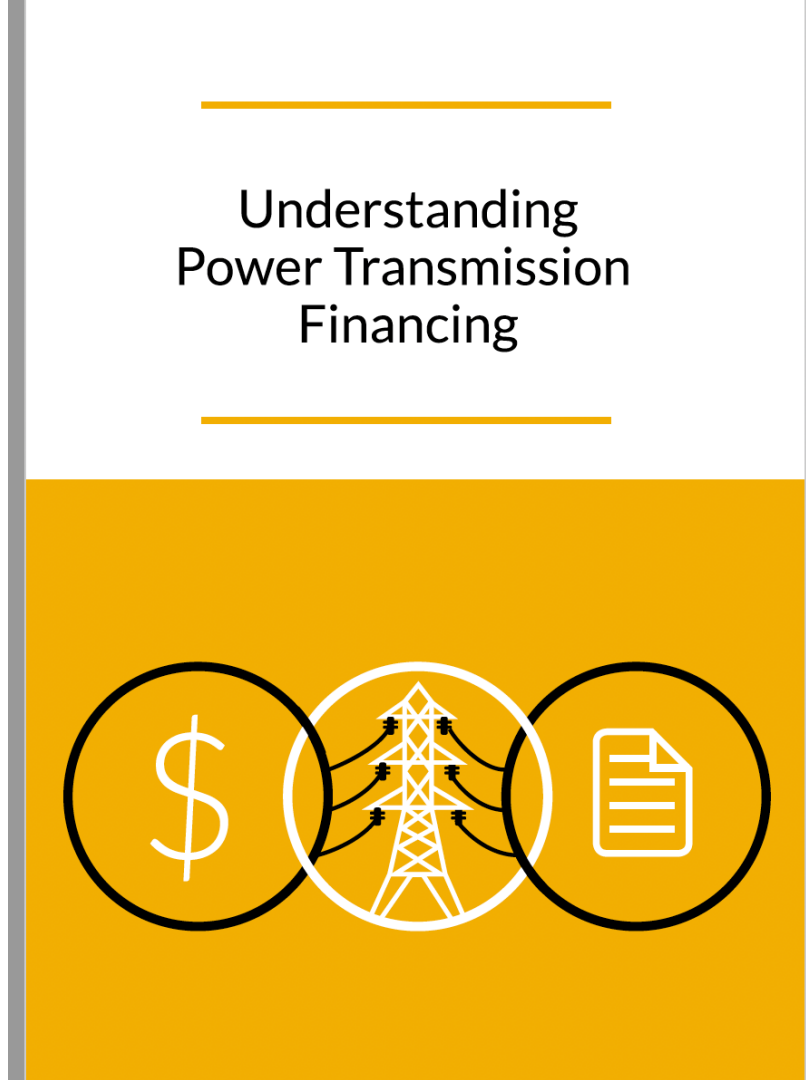
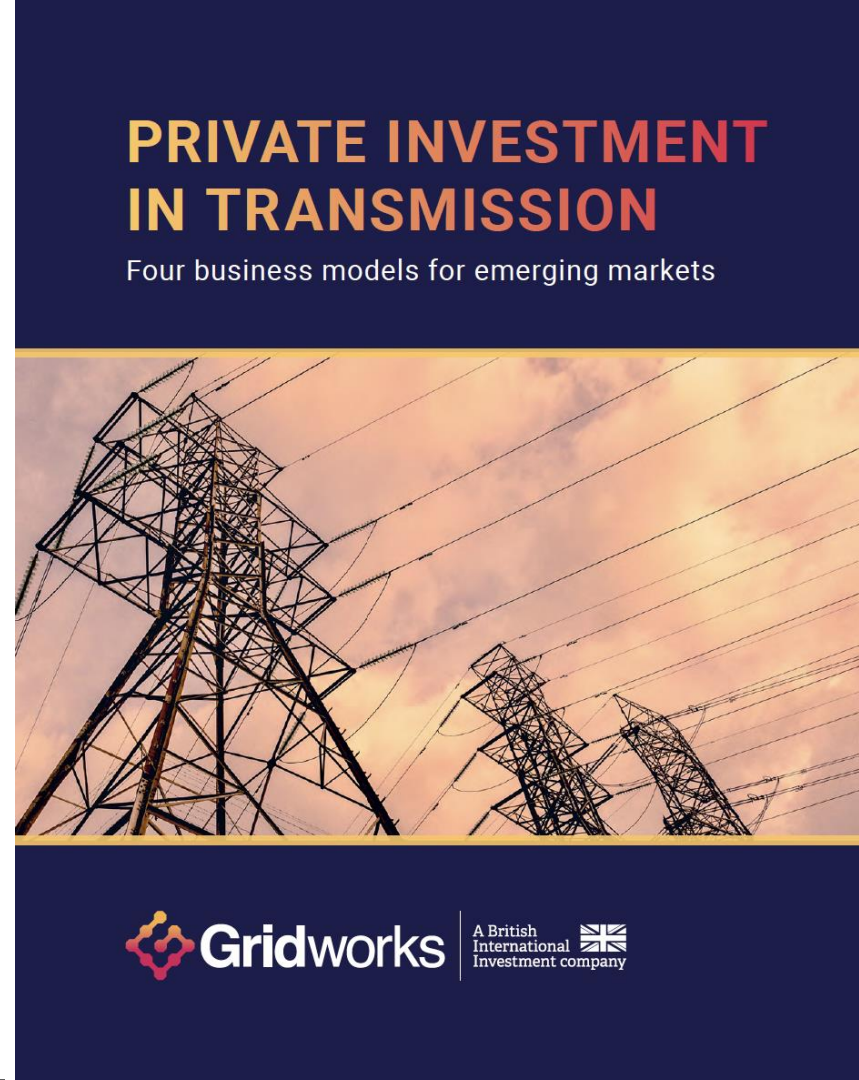
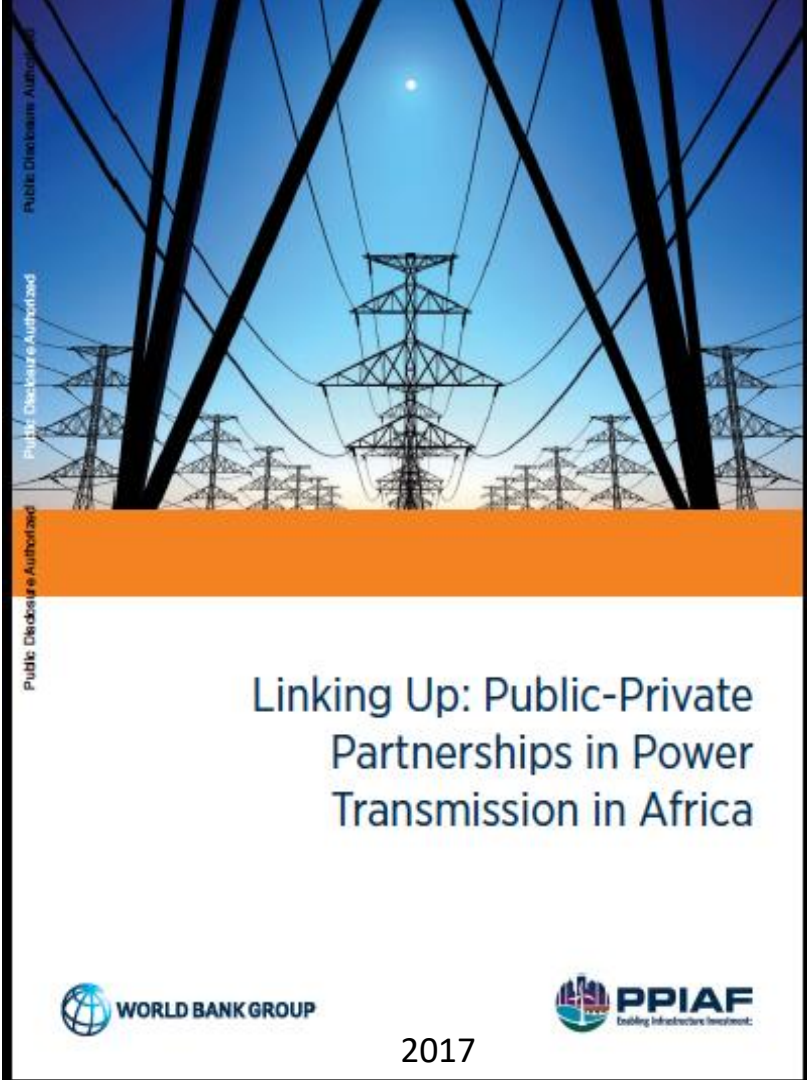
Private investments in the electricity sector over 2010-20 (% share of total) for a sample of 10 African countries: Algeria, Ethiopia, Ghana, Kenya, Morocco, Senegal, South Africa, Tanzania, Uganda, Zambia

<https://www.res4africa.org/calendar-news/79po1jnb8nbasjvf3s8x8bnogbhff4>



**Resorting to private investment is inevitable**





<https://www.worldbank.org/en/topic/energy/publication/linking-up-public-private-partnerships-in-power-transmission-in-africa>

<https://gridworkspartners.com/wp-content/uploads/2023/05/Investment-in-Transmission-Gridworks.pdf>

[https://cldp.doc.gov/sites/default/files/2021-10/Understanding\\_Transmission\\_Financing.pdf](https://cldp.doc.gov/sites/default/files/2021-10/Understanding_Transmission_Financing.pdf)



The **critical nature of transmission infrastructure** to the overall function of the power system cannot be overstated. Transmission is a linchpin for decarbonisation.

Africa has fewer **kilometres of transmission lines per person** than any other region in the world.

Historically, **grid projects in sub-Saharan Africa have been made by state-owned utilities**, mostly funded by governments through DFIs, and underwritten with **sovereign guarantees**.

There is currently a **need for significant additional investment** in transmission on the African continent. This need is **unlikely to be met through the existing sources of funding** for the sector.

**Transmission contributes a relatively small part** of the overall cost of the sector value chain, but needs to move in tandem with additions to generation capacity

**Private investment may adopt several business models, some of which may be difficult to implement in most African countries**

## **Business models to facilitate private investment in transmission**

- **Whole-of-network concessions.**
- **Independent transmission projects (ITPs)**
- **Privatisations** ( a sell of shares by a government in a state-owned utility or transmission company) &
- **Merchant lines**

These are archetype-like models, which can be adapted & implemented across a large variety of circumstances.



# Models for private investment in transmission

1. **Indefinite privatizations** provide ownership of the transmission network to a private company, usually through a trade sale or public flotation of a government-owned transmission business. The private owner has the *exclusive right (and obligation) to develop new transmission in its area of operation*.
2. **Whole-of-grid concessions** provide *similar rights and responsibilities to privatizations, but for a shorter period*. In most cases, the government implements this business model with a *competitive tender of the concession* and enters a concession contract with the winning bidder.

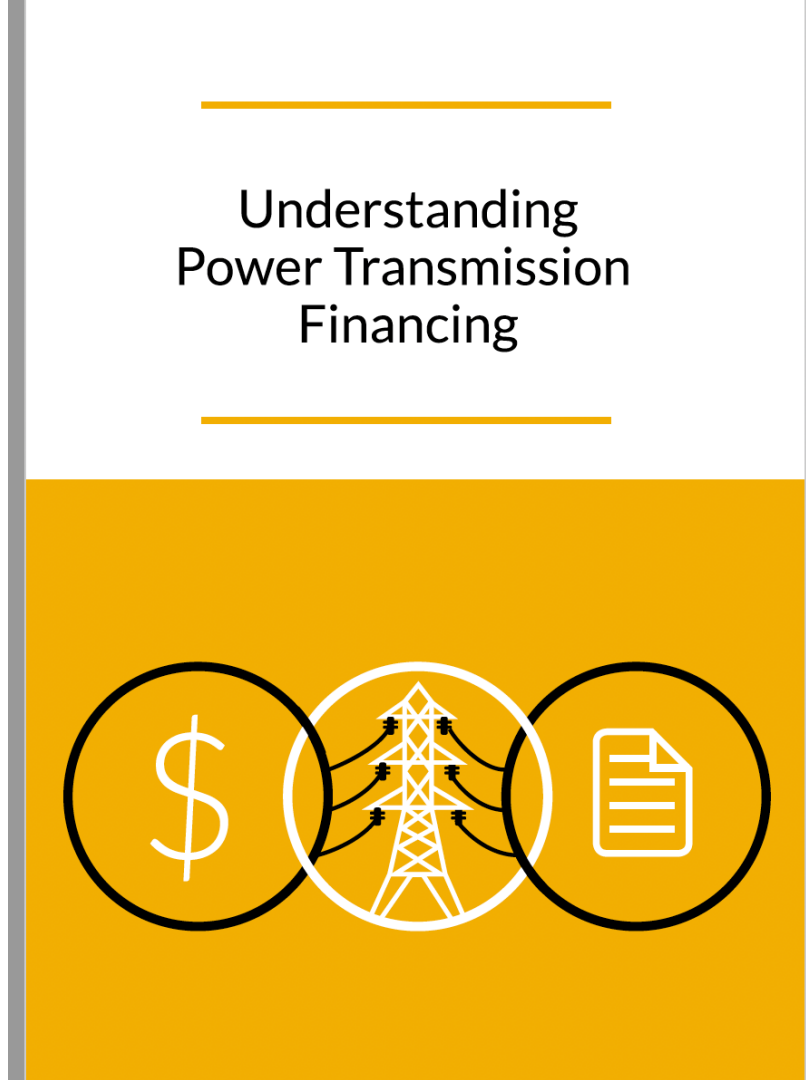
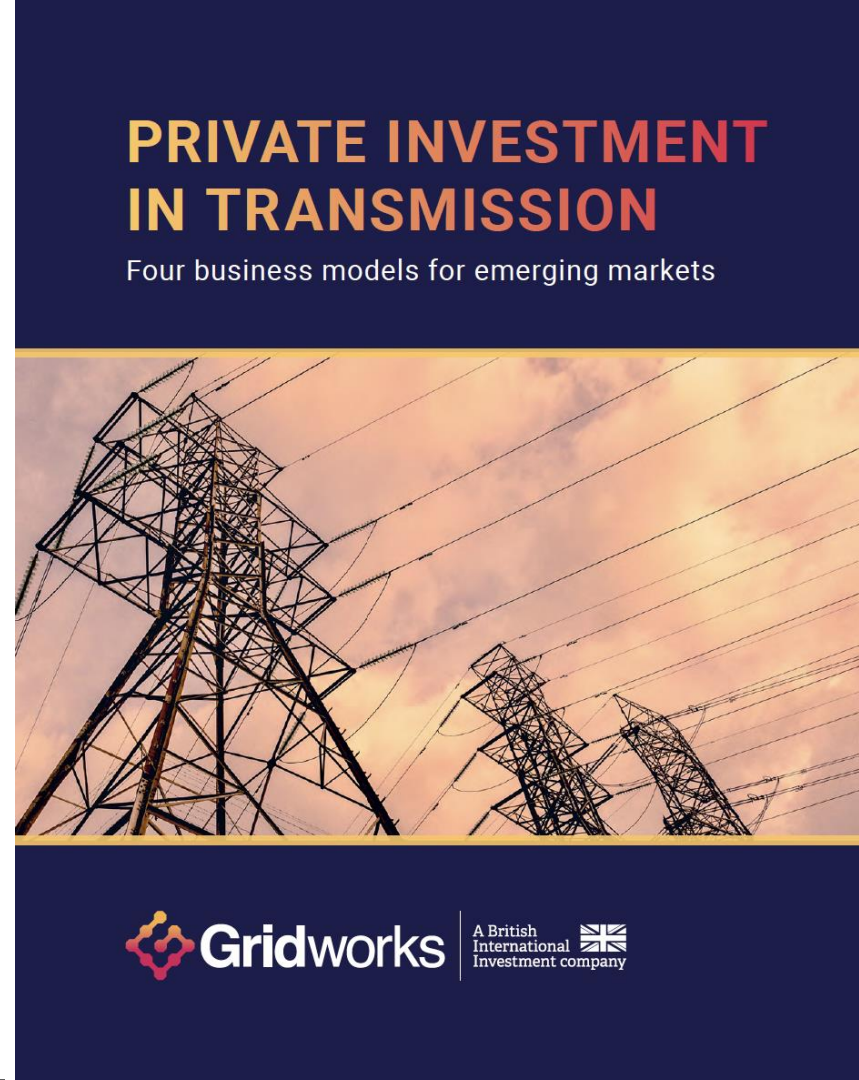
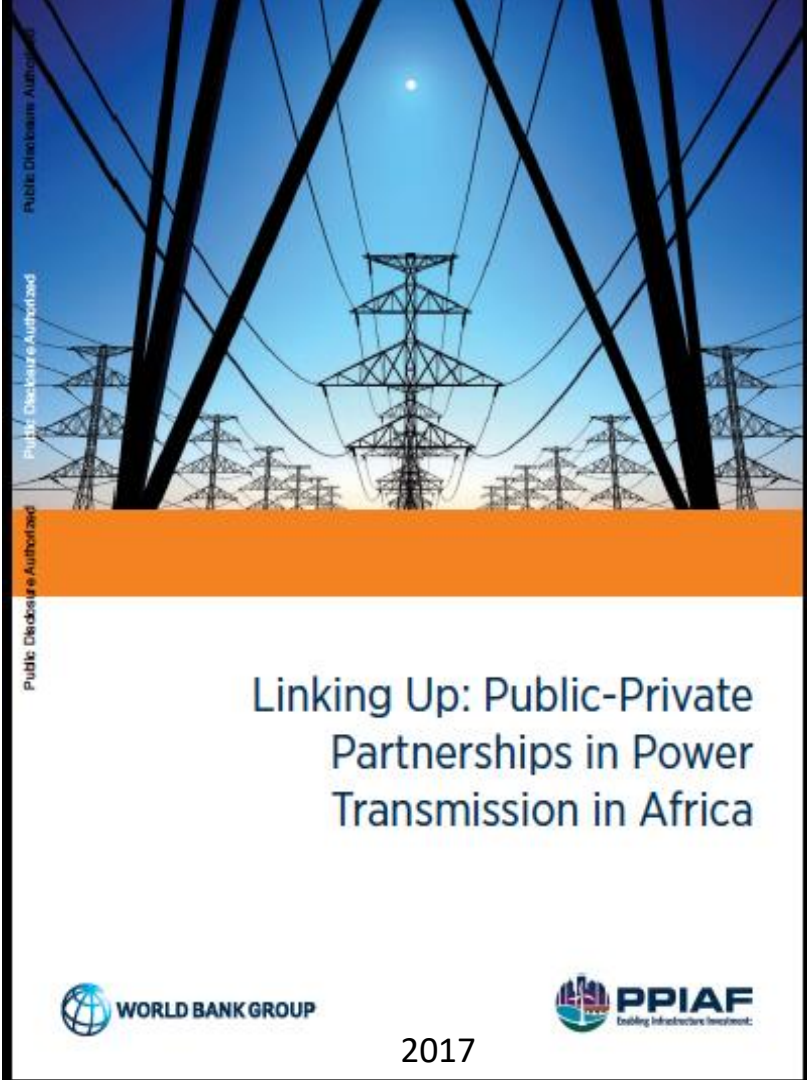
# Models for private investment in transmission

3. **Independent Transmission Projects (ITPs)** provide the rights and obligations associated with *a single transmission line, or a package of a few lines*. In most cases the government implements this business model by *tendering a long-term contract*, with payment dependent on the availability of the line.

4. **Merchant investors** *build and operate a single transmission line* (“merchant line”), typically a High Voltage Direct Current (HVDC) line. The merchant investor benefits from moving power from low-price regions to high-price regions. Merchant lines are a *private initiative* and are not initiated by the government. There are very few of them, for good reason.

**The main proposal to be discussed in this conference is  
NOT to privatise or concession the entire national  
networks, but to attract private investment to key  
transmission projects & to reinforce the networks  
piecemeal**





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## The Independent Transmission Project (ITP) model

- The **ITP** involves the construction and maintenance of a **single transmission line or a package** of transmission lines **under a long-term contract**, generally between the state-owned utility that is responsible for transmission and the (private) project company that is established to undertake the project.



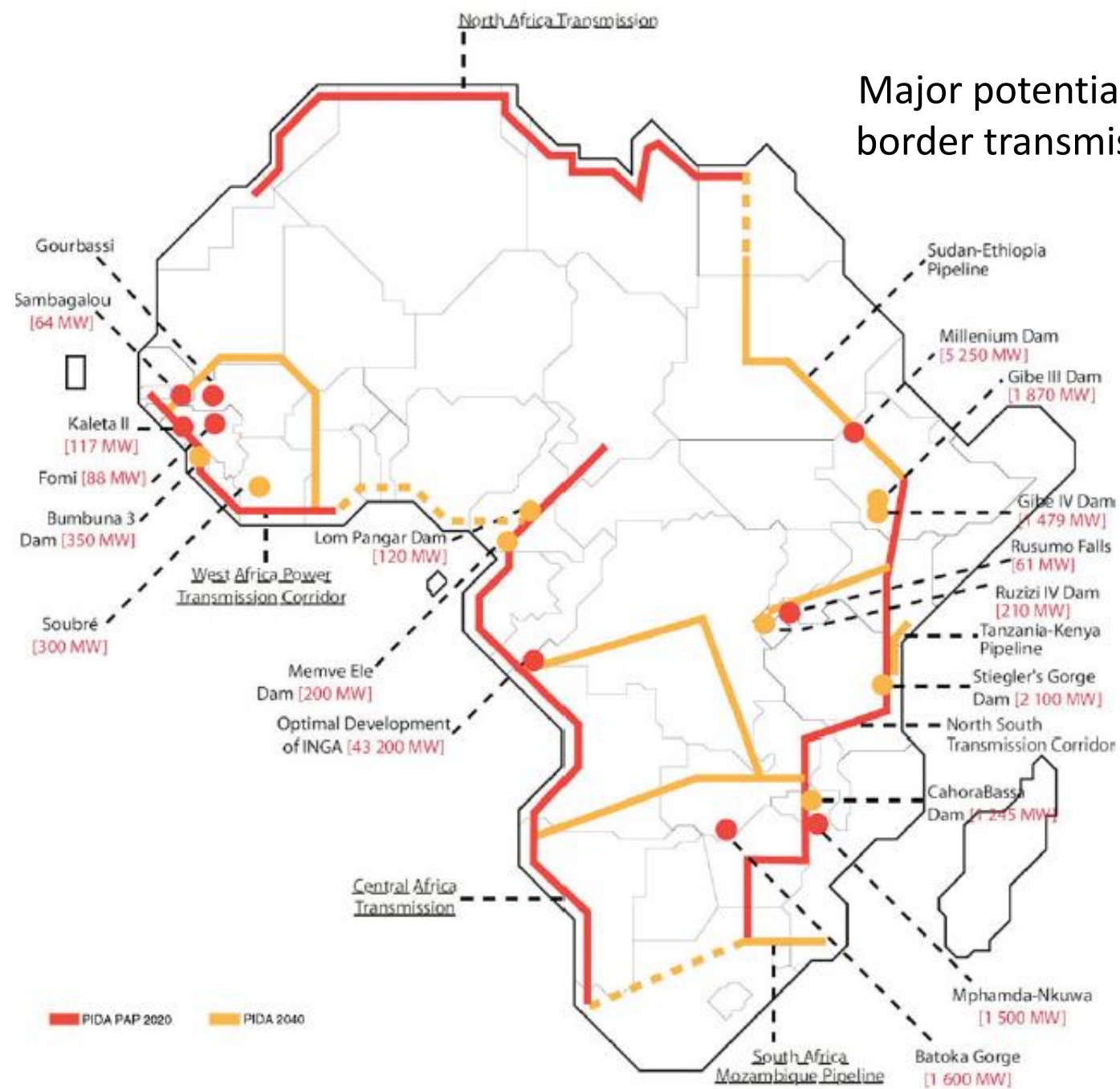
## The African Continental Master Plan (CMP)

<https://nepad.org/continental-master-plan>

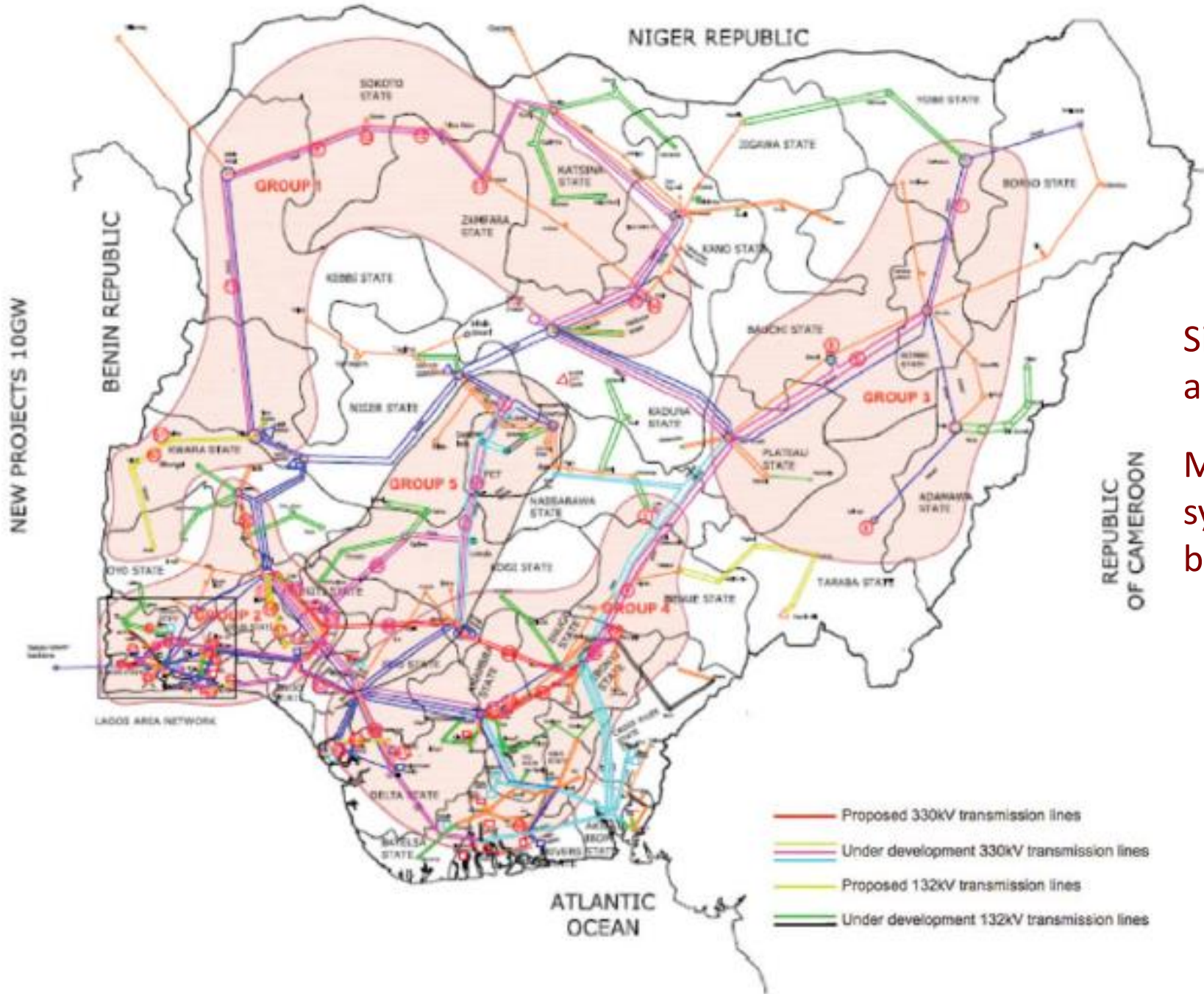
The CMP will provide a roadmap for the eventual integration of the continent through the establishment of a sustainable integrated continental power transmission network, in the context of the African Union's Agenda 2063.



# Major potential generation and cross-border transmission projects in Africa



Source: Figures sourced from African Development Bank (2013), Annex 1.

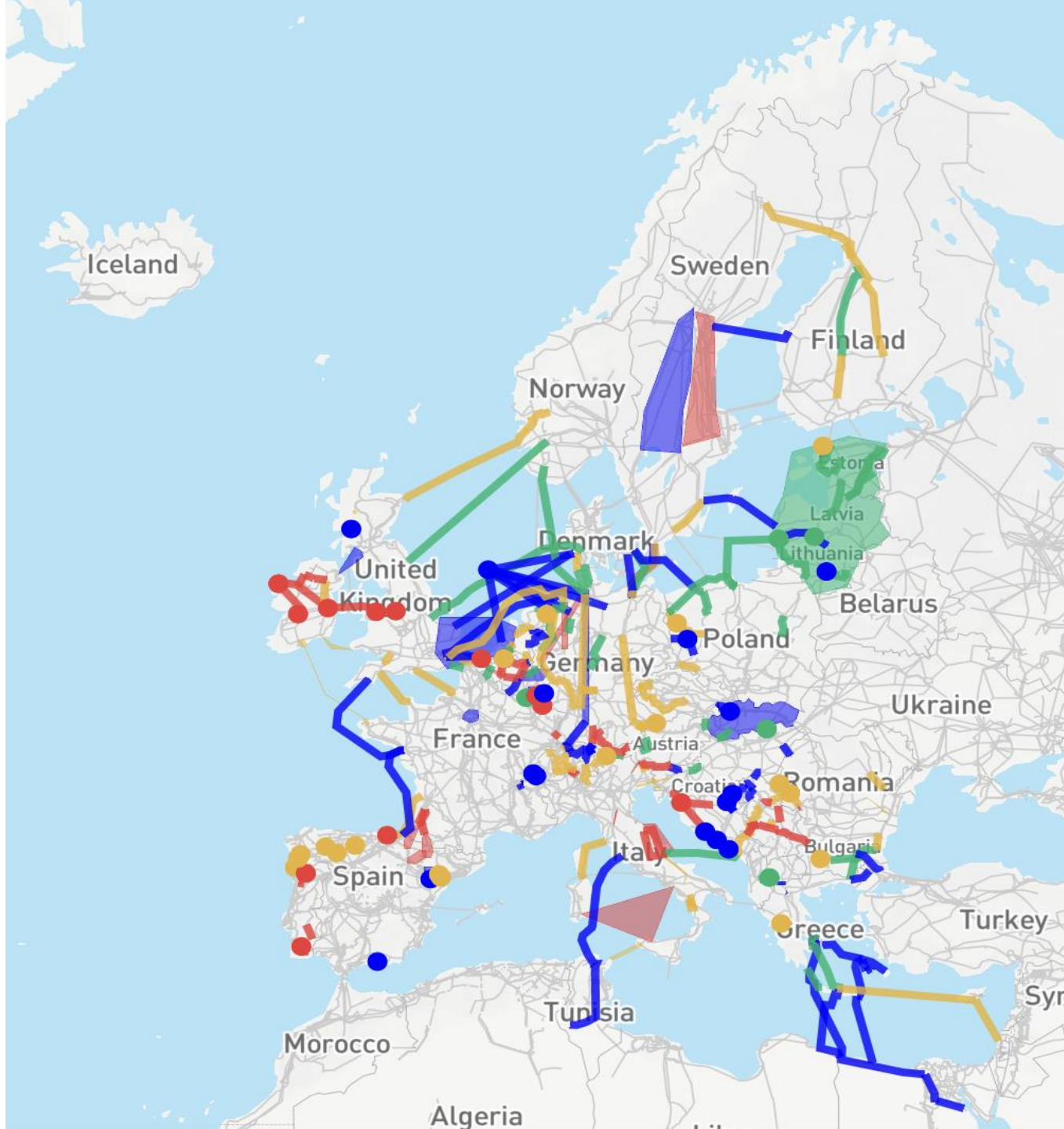


Significant transmission investments are also necessary at national level.

Map of Nigeria's transmission system, showing transmission lines being developed and proposed.

Source: Transmission Company of Nigeria, "Appraisal of Transmission Projects," (2014), (pers. comm. with Patricia Mong, November 17, 2016).





**The EU association of System Operators ENTSO-E Ten Year Network Development Plan (TYNDP) is developed every other year.**

**TYNDP 2022 identified 141 transmission projects and 23 storage projects.**

**These projects receive priority administrative treatment and subsidies of different kinds.**

**How to make transmission attractive to private investment?**

The **primary constraint on private investment** is not the lack of the availability of capital.

The **key constraint** is, rather, the ability to access that funding through market **regulations and project structures that provide the predictable operating conditions and revenue** that are fundamental to any commercial investment.

It is difficult to prioritise and justify transmission projects when **transmission costs are not clear and transparently allocated** within the sector.

And **this is exactly what is happening in Africa**, which is not learning from the successful experiences around the world, including in developing countries.



**How can regulation help?**

# The challenge of power sector regulation

- The challenge (& the beauty) of power sector regulation resides in the necessary contribution of several activities with very different regulatory characterization & treatment
  - Centralised generation
  - **Transmission**
  - Distribution
  - Retail or commercialization
  - Distributed energy resources
  - System Operation
  - Market Operator (Power exchange)

# Characterisation of the transmission activity

- The activity of transmission of electricity is an **infrastructure activity**
  - Deploy pylons, wires, insulators, breakers, transformers, substations, communications and protections.
  - Maintain & keep these assets in good operating condition most of the time, during their economic lifetime.
- And **nothing else**
  - **Secure and centralised operation of the power system is the responsibility of the System Operator**, not of the network owners.
  - There is **no reason to impede having multiple owners of transmission assets** in the same national transmission system.

# Characterisation of the transmission activity

- The activity of transmission of electricity is a **natural monopoly**
  - Large economies of scale
  - Rights of way make very difficult to have multiple providers
  - Very large market power
  - Locational electricity prices are inadequate to cover the costs of transmission
- Therefore, **the transmission activity must be regulated as a natural monopoly, with remuneration based on the cost of service** (*or the outcome of an auction deciding who will build a new line or substation*)
  - Uniform annuities covering CAPEX & OPEX for the economic lifetime of the assets. Thus, a low risk, booring activity, adequate to create an assets class, meant for patient, risk-averse investors like pension funds.

**Is the current regulation of transmission helping?**



## Current transmission regulation creates unnecessary risks in transmission remuneration

- Regulation must try to **avoid unnecessary financial risks** (*which have negative consequences on the cost of capital*) to a natural monopoly activity like transmission, subject to regulation
  - The next slide offers a list of actions – mostly with origin in **flawed regulation** – that create unnecessary risk (*therefore perfectly avoidable*) in the remuneration of the distribution activity

# Flawed regulation creates investment risks

These are frequent **unnecessary regulatory risks** in the remuneration method

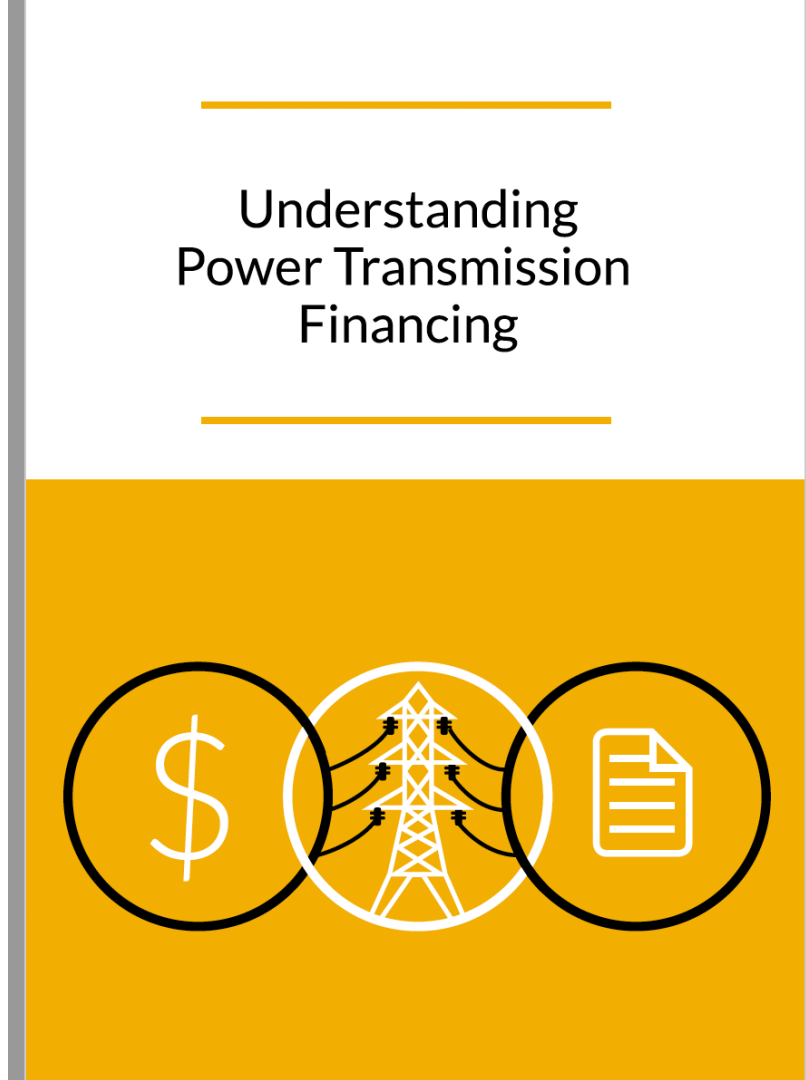
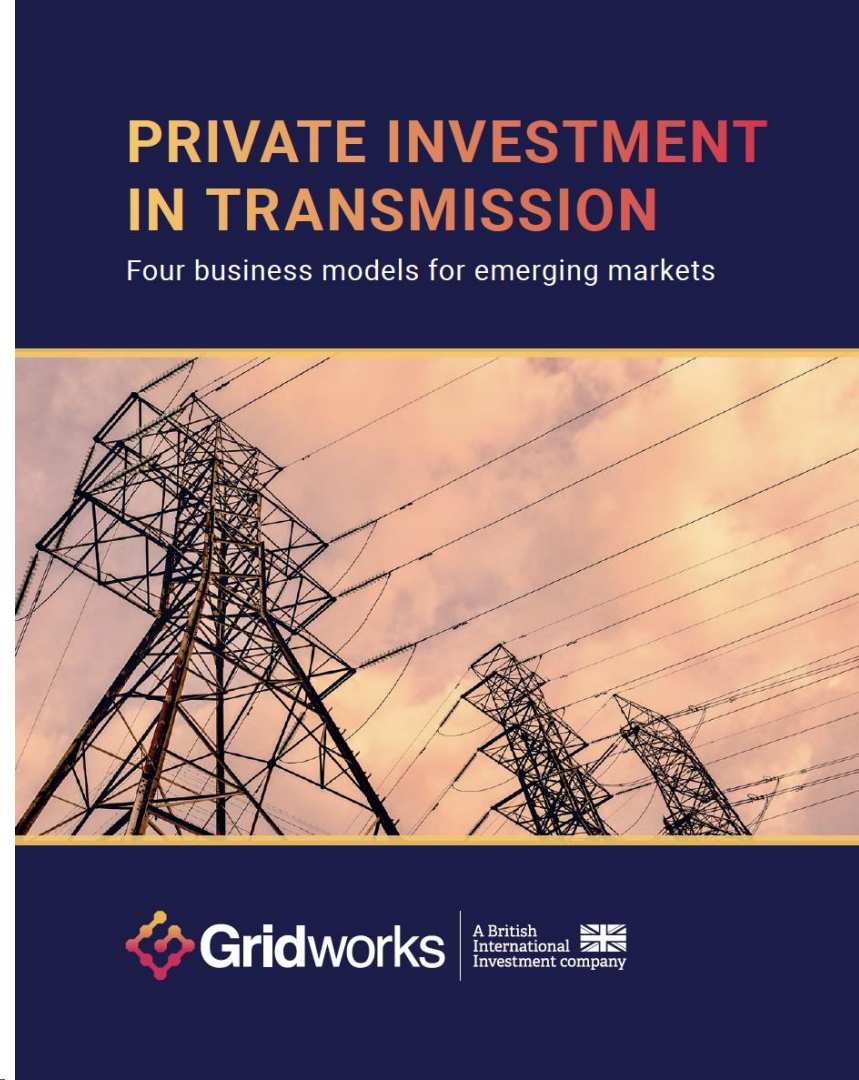
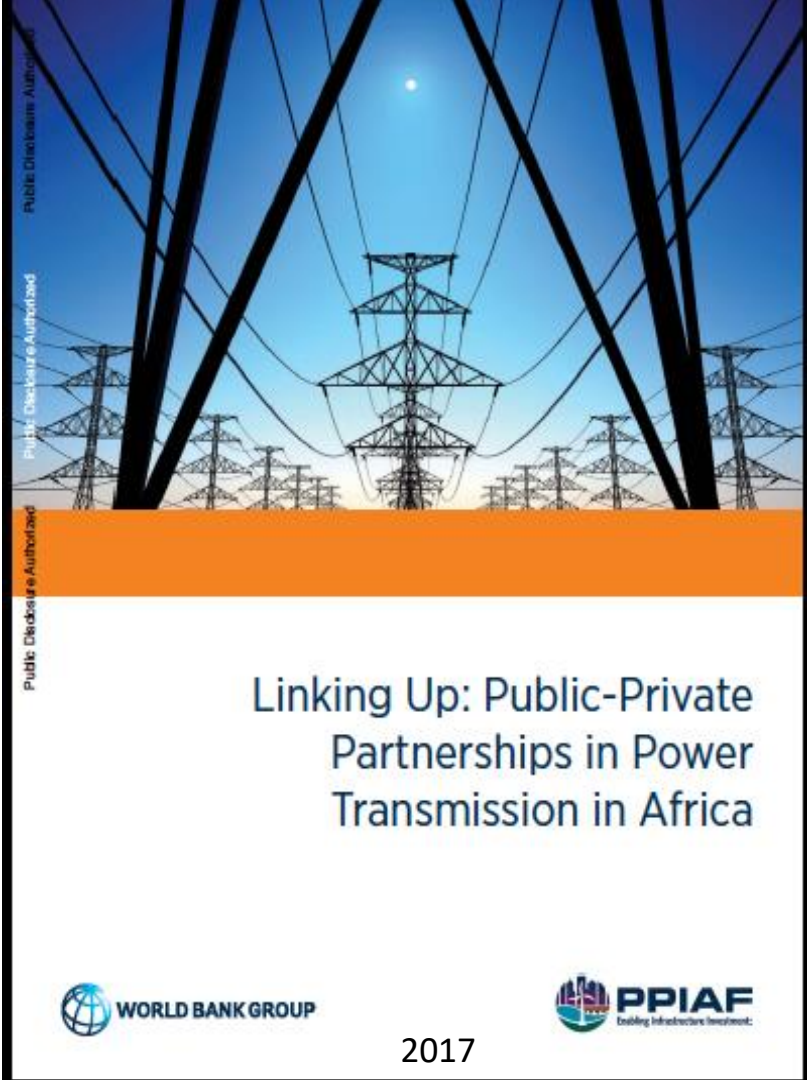
- **Revenues that depend on transactions or volume of utilization**, instead of the actually incurred costs, or standards, or results of an auction
- **Regulatory updates of the historical rate base**, based on “replacement costs”, “market value”, or other creative methods
- **Failure in ring fencing the transmission revenue requirement** in the revenues obtained from the end customer tariffs
- **Flawed cost allocation methods** that lead to opposition to pay charges that are considered unfair
- **Frequent re-calculation of transmission charges** or changes in methodology
- Performance-based **incentives that go beyond the equipment failure**
- Uncertainty in remuneration **beyond the economic life** of the transmission asset

# How to make transmission attractive to private investment?

## Summary

- **Transmission must be treated as a regulated monopoly**, avoiding to introduce unnecessary risk for investors
- Do not make transmission remuneration depend on the volume of flows or of wheeling charges, **just use cost-of-service**
  - Cost-of-service could be competitively determined by an auction
  - Reduce other risks (e.g., rights-of-way acquisition) a priori by the government
  - Add availability incentives, but not others that are for the system operator
- The transmission cost is essentially a fixed cost. **Ring-fence the annuity & recover it from the regulated end customer tariffs**
  - Transmission owner must refinance the decoupling in time of debt service & regulated revenue requirement
- Establish **clear & stable transmission cost allocation rules**
  - This is particularly relevant for cross-border trade in regional markets

# References



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