USAID
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Consultation workshop

Study on international best practice for developing cross-border electricity transmission infrastructure

Contents

- **Prevailing models of CB infrastructure across the globe**
- **Key case studies**
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Prevailing models of CB infrastructure across the globe

Typical business models for CBET interconnections

Public/Govt. ownership	Owned by Government or a Government owned/controlled entity	Across the globe
Independent Power Transmission / Concessions	Line developed by a private entity under a Build-Own-Operate-Transfer (BOOT) or similar model of concession arrangement. Sometimes, the entity may also be a JV with some amount of Govt. ownership also.	Across the globe
Merchant Power Transmission	Line developed without any long-term revenue assurance through long term contracts – Relies on short term markets and anchor customers for revenue generation.	USA, Australia etc. Example – Basslink in Australia
Financial ownership	While line will be developed, constructed and operated by a state-owned transmission/system operator, a private entity to have partial ownership stake, and resulting dividend/share on profits.	Europe, Africa etc. Example – Denmark Germany interconnection
Dedicated transmission line	Dedicated line for evacuation from a power plant, typically operated by entity owning the plant also. Cost towards transmission is typically bundled within the Power Purchase Agreement (PPA) price.	Across the globe

The CBET line ownership also have a geographic element to it – Whether there is separate legal entity and ownership for infrastructure in each of the countries through which the line passes, or whether there is a single entity that has ownership of the entire infrastructure.

Regional practices on business and ownership models for CB interconnections

	Predominant Models	Exceptions
South-East Asia	Govt./public ownership model and Dedicated Transmission	IPTC – 115 kV HVAC Cambodia Thailand Interconnection
Central Asia	Govt./public ownership model and Dedicated Transmission	
Middle East	Combination of Govt./public ownership model and IPTC model, which is a Joint Stock Company of the countries (GCC Interconnection)	
Africa	Govt./public ownership model	IPTC model (220 kV HVAC Zambia - DRC interconnector line and the Mozambique Transmission Company); Dedicated transmission - 533 kV HVDC Cahora Bassa Interconnector
Europe	All models are present	
North America	Govt./public ownership model and Merchant interconnections	Dedicated transmission – Twin Rivers Paper Company
Central and South America	Govt./public ownership model and JV based IPTC model	Dedicated transmission – Itaipu Binacional

Examples relating to the above are covered under the detailed case studies

Key case studies

Case studies covered

Summary of models of cross border lines under case studies

Transmission Line	Type	Underlying arrangement	Investment entity structuring	Geographical nature	Any special features
Cambodia Thailand interconnection	HVAC	PPA	IPTC	Single Entity	ADB's first x-border private sector investment in Asia
Garabi interconnector (Argentina – Brazil)	HVDC	PPA	IPTC	Single Entity with country specific subsidiaries	
MOTRACO	HVAC	Wheeling Agreements and PPA	JV of Govt. utilities as IPTC	Single Entity	Mozal Aluminium as anchor customer
SIEPAC	HVAC	PPA and market	JV of Govt. utilities and private utilities as IPTC	Single Entity	Separate system operator and regulator
GCC interconnection project	HVAC	Multilateral Agreement	JV of Govt. utilities as IPTC	Single Entity (JV)	
NEMO LINK	HVDC	Auctions	JV of Govt. utilities as IPTC	Single Entity (JV)	Cap-and-Floor tariff regime + Auctions
Basslink Interconnector	HVDC	Market-based	Merchant	Single Entity	
Montana Alberta Tie Line (MATL)	HVAC	Market-Based	Merchant	Single Entity	
Ethiopia- Kenya Power interconnection	HVDC	Wheeling Agreements and PPA	Govt.	Govt. ownership within each border	

IPTC Models

Cambodia Thailand interconnection

Garabi interconnector (Argentina – Brazil)

ASEAN/GMS: Cambodia Thailand interconnection (1/3)

Developed for import of power from Thailand, to border provinces and industrial areas in Cambodia.

Location : Cambodia Thailand interconnection (connecting Thailand's Aranyaprathet and Bantey Meanchay, Siem Reap and Battambang

Countries: Thailand Cambodia

PHYSICAL CHARACTERISTICS

Line Voltage: s/c 115 kV transmission line.
Transmission capacity : 80 MW

LENGTH OF LINE

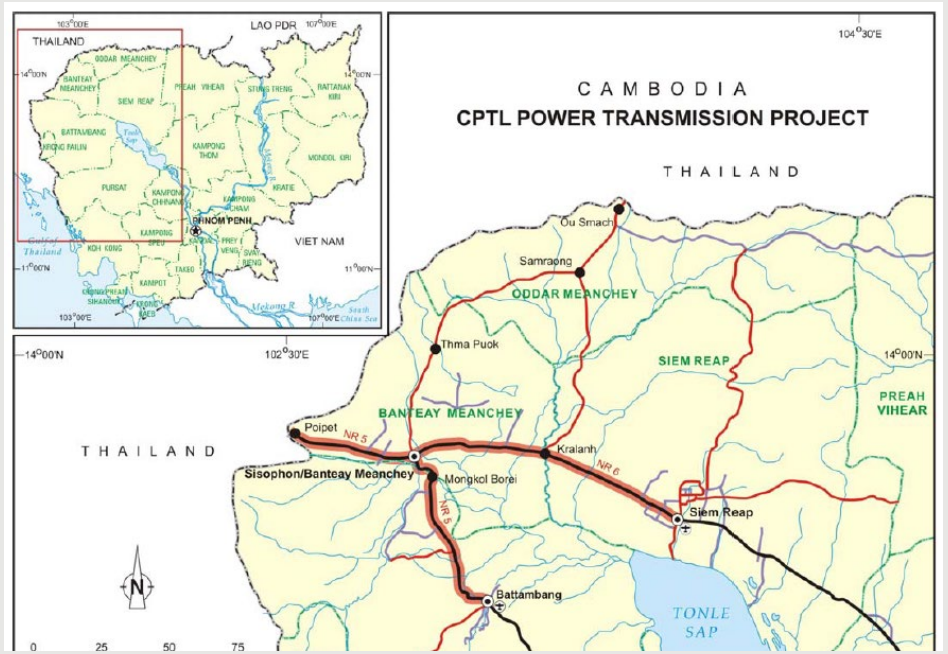
203 km

PROJECT COST

$33.5 million

Commissioned: 2007

Map of Transmission Line



30-year Build–Operate–Transfer PublicPrivate Partnership (PPP) awarded to (Cambodia) Power Transmission Lines (CPTL), through negotiation.

After tenure, assets in Cambodia side to be transferred to Electricité Du Cambodge (EDC)

ASEAN/GMS: Cambodia Thailand interconnection (2/3)

Entities driving decision for this project

The Ministry of Industry, Mines and Energy (MIME), Cambodia and EDC

EGAT, Thailand

Business Model

Ministry of Industry, Mines and Energy (MIME)

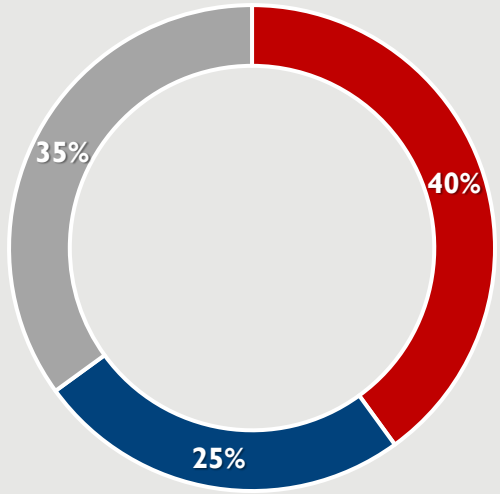
CPTL

Electricite du Cambodge (EDC)

30 Year BOT Power Transmission Agreement

PPA between Govt. of Thailand and Cambodia
Average for 2007 was Bt 2.82/kWh (approx. $0.08/kWh)

Ownership Structure

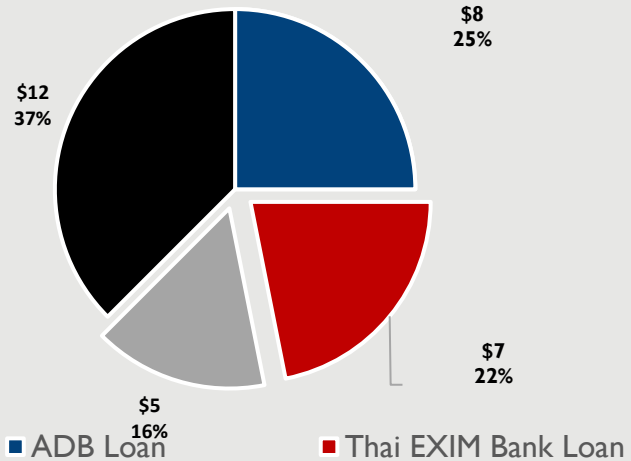


SKL ASK Private investment

- *Negotiated Transaction, not competitive bidding*

Private investment – By individuals

Source of Funding (in million$)



Some key characteristics of the transmission line:

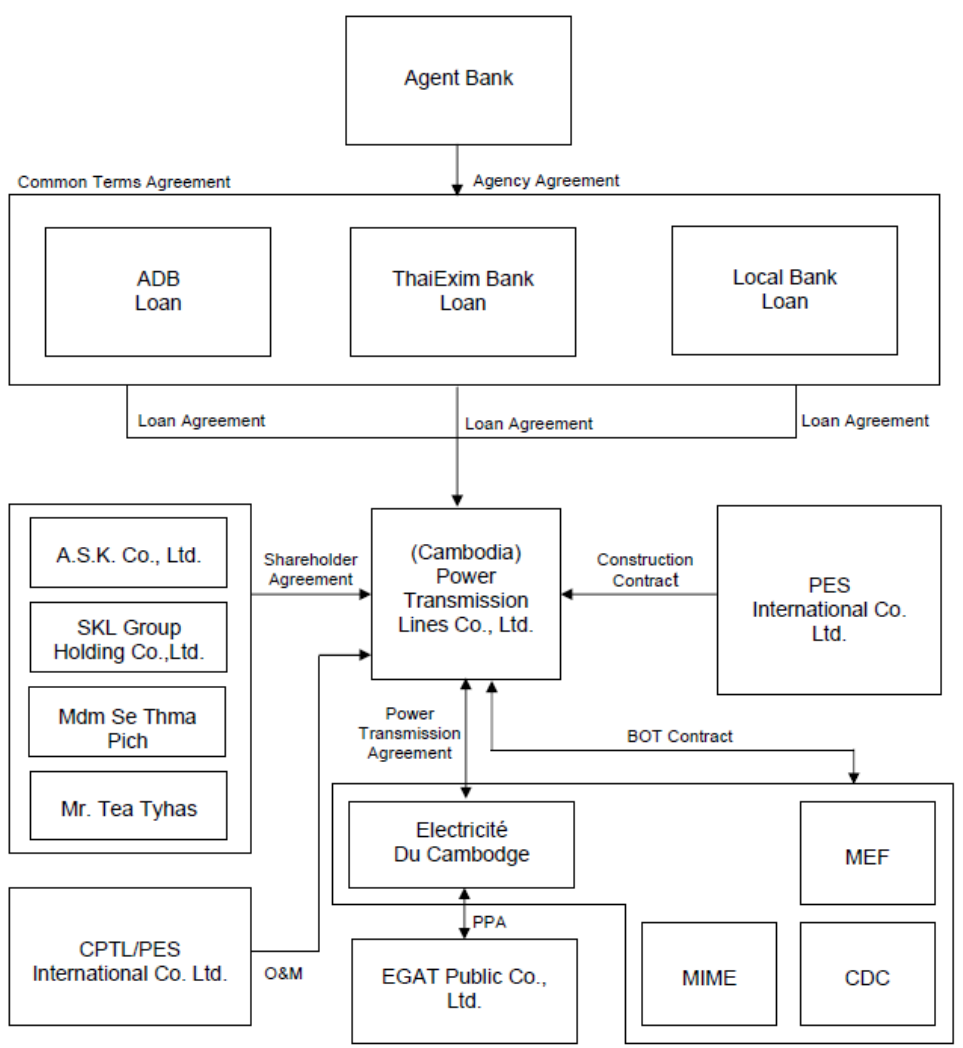
First privately owned high-voltage line in the GMS

ADB's first private sector investment in Cambodia

Transmission Service Fee – Formula specified in PTA

Source: ESMAP/ADB/OECD

ASEAN/GMS: Cambodia Thailand interconnection (3/3)



ADB = Asian Development Bank; BOT = build-operate-transfer; CDC = Council for the Development of Cambodia; CPTL = (Cambodia) Power Transmission Lines Co., Ltd; O&M = operation and maintenance; PPA = power purchase agreement; PTA = power transmission agreement; MEF = Ministry of Economy and Finance; MIME = Ministry of Industry, Mining and Energy; ThaiExim Bank = Export-Import Bank of Thailand.

Source: ADB

- A power purchase agreement (PPA) was signed in 2002 between the governments of Cambodia and Thailand. The PPA allowed Cambodia to import power from Thailand and to deliver it over a high-voltage transmission line to Cambodia's Siem Reap, Battambang, and Banteay Meanchey provinces.
- A wheeling agreement was signed between EDC and CPTL, under which EDC provides wheeling service-related payments to CPTL.
- There was also a BOT Concession Agreement between EDC and CPTL.
- **Tariff** - EDC pays a tariff to CPTL for the energy wheeled by it. Negotiated in the agreement – no regulatory mechanism.

South America: Garabi Interconnector (Brazil-Argentina) [1/2]

Originally planned for export from Argentina. Now being used for export from Brazil.

Location : The transmission line begins from Rincón de Santa Maria in northern Argentina and terminates on Itá in southern Brazil

Countries:

Brazil

Argentina

PHYSICAL CHARACTERISTICS

Two sets of parallel 500 kV HVAC transmission lines with two 1,100 MW HVDC Back-to-Back stations.

LENGTH OF LINE

Line running a span of 490 km.

In Brazil: 355 km in Brazil.

In Argentina: 135 km in Argentina.

PROJECT COST

US$700 million

Commissioned: 2002

Map of Transmission Line

TENURE OF CONTRACT

The project was designed and financed around a 20-year contract made between the Brazilian Government, the Argentine Government, and special-purpose company in Brazil

South America: Garabi Interconnector (Brazil-Argentina) [2/2]

Entities driving decision for this project

The governments of Argentina and Brazil signed an agreement to facilitate cross-border energy trading between the two countries.

- A 20-year contract was signed by the Brazilian Government, the Argentine Government, and a SPV in Brazil - Companhia de Interconexão Energética (CIEN).
- CIEN was developed by a Spanish-based electricity company (ENDESA).
- Originally planned for export from Argentina. Now being used for export from Brazil.

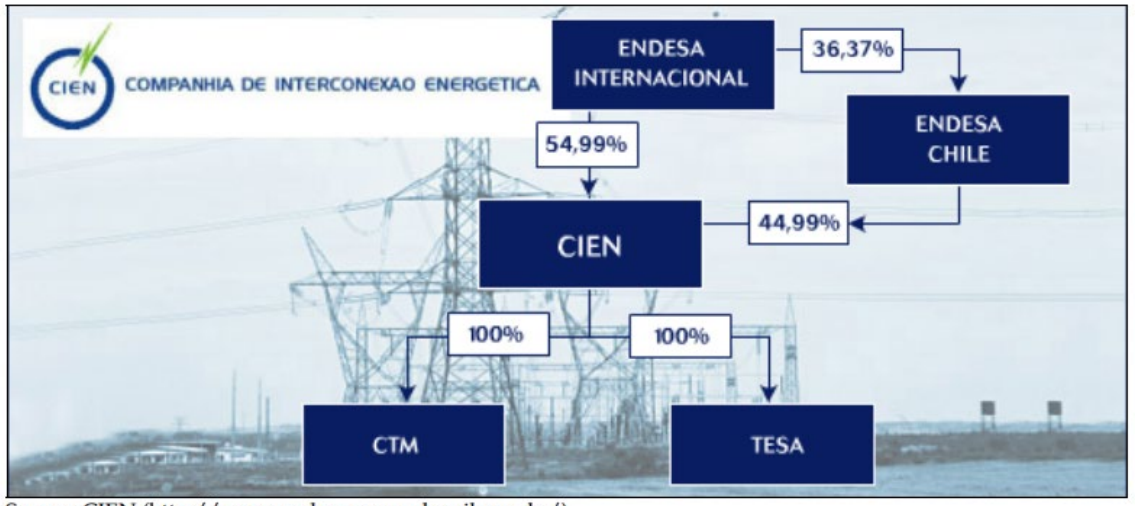
Business Model

The contract prices for energy trade and wheeling via the Garabi system are negotiated by the parties.

Ownership Structure

CTM – Owner in Brazil side

On the Argentinean side, assets of the Project owned by Transportadora de Electricidad, S.A. ("TESA") an Argentinean subsidiary of CIEN.



Source: CIEN (http://www.endesageracaobrasil.com.br/)

JV Models

(Govt. owned and those with private sector involvement)

MOTRACO

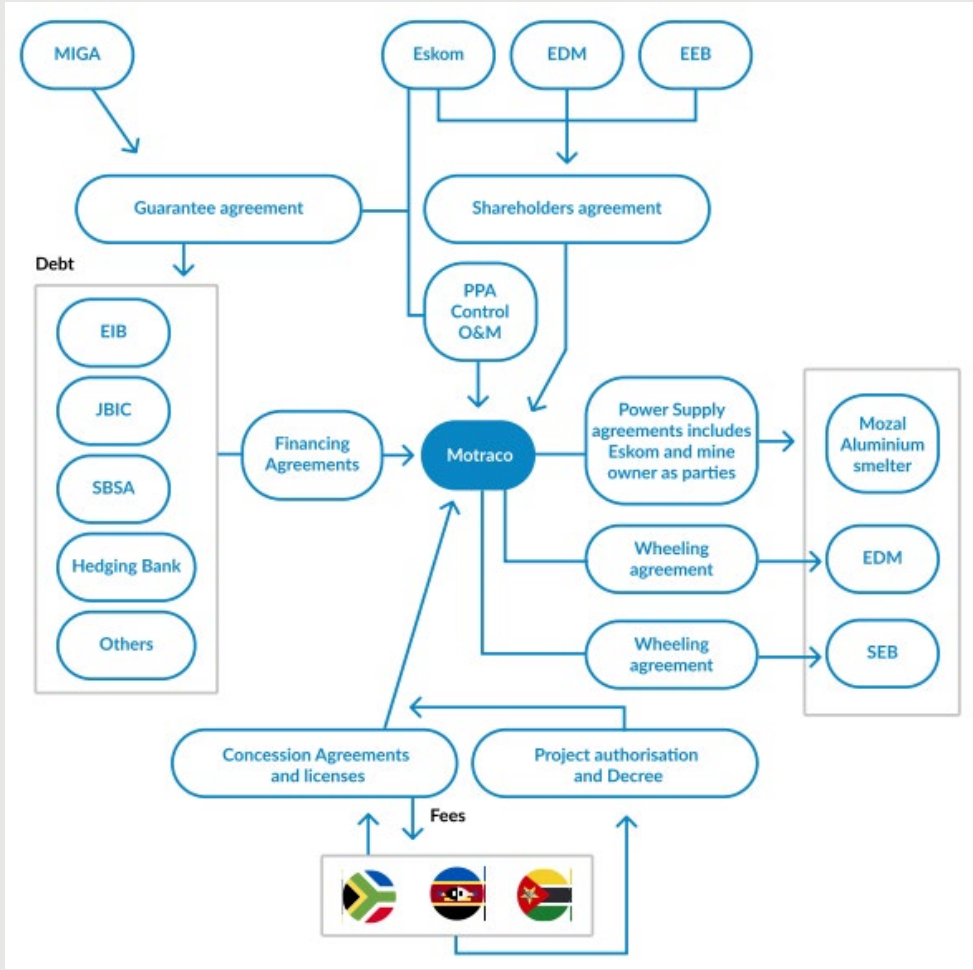
SIEPAC

GCC interconnection project

NEMO LINK

MOTRACO (MOZAMBIQUE TRANSMISSION COMPANY) INTERCONNECTION

- Mozambique Transmission Company (MOTRACO) established in 1998 as a joint venture between the three electricity companies of Mozambique (Electricidade de Moçambique - EDM), South Africa (ESKOM) and Swaziland (Swaziland Electricity Company – SEC, currently Eswatini Electricity Company - EEC).
- JV operates a 400 kV interconnection with a length of 565 KM, which connects South Africa (exporter), and Mozambique (importer) via Swaziland (now called Eswatini).
- *Mozambique had bauxite for aluminium production, but not enough electricity supply to power up an aluminium plant. South Africa had excess electricity.*
- MOTRACO primarily facilitates purchase of energy from Eskom of South Africa, for sale to the Mozal aluminum smelter in Mozambique. MOTRACO also transports electricity from Eskom for EDM and EEC.
- Commissioned in 2000-2001.
- Tariff - Fixed and variable charge for wheeling, variable charge for emergency wheeling, surcharge and reactive power rates. Wheeling charges linked with US inflation.



SIEPAC Interconnector (1/3)

Created for developing a regional electricity market, based on an intergovernmental treaty.

Location : Interconnector passes through 6 Central American nations - Panama, Costa Rica, Honduras, Nicaragua, El Salvador, and Guatemala

Countries:

Panama, Costa Rica, Honduras, Nicaragua, El Salvador, and Guatemala.

PHYSICAL CHARACTERISTICS

Line voltage : 230 kV , Capacity: 300 MW

LENGTH OF LINE

1800 kms

PROJECT COST

US$ 450 million

Map of Transmission Line

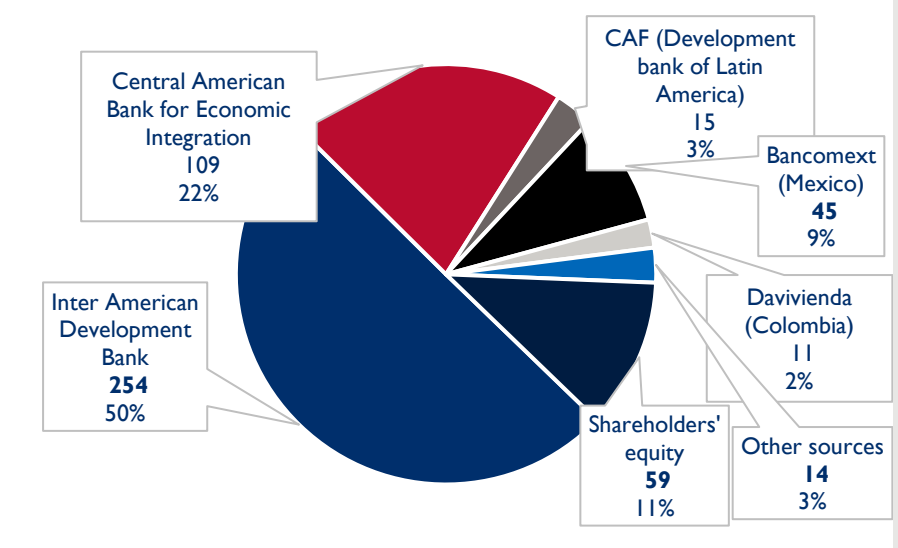
CONTRACT

The Marco Treaty requires each of governments to grant a 30-year concession across its territory to the transmission line company (EPR)

Conducting Feasibility Studies 1987 → **Loan approval from IADB 1997** → **Establishing Regional electricity Market regulator 2002** → **Signing of CAFTA 2004** → **Construction of SIEPAC line 2006** → **SIEPAC completed in 2014**

SIEPAC Interconnector (2/3)

Financing



Shareholding

Entity name	Country	Equity share capital
INDE	Guatemala	11.11%
CEL	El Salvador	11.06%
ETESAL	El Salvador	0.05%
ENEE	Honduras	11.11%
ENATREL	Nicaragua	11.11%
ICE	Costa Rica	10.36%
CNFL	Costa Rica	0.75%
ETESA	Panamá	11.11%
ENDESA	**España**	**11.11%**
ISA	*Colombia*	*11.11%*
CFE	*México*	*11.11%*
Total		100%

Entities driving decision for this project

Project initiated by the Central American Electrification Council and formulated under Marco Treaty

SPV is public-private partnership, La Empresa Propietaria de la Red (EPR)

Endesa Spain's role crucial in obtaining financing. Colombia and Mexico also became equity owners, though line does not pass through them, as they will also be benefitted from the line, and there are future expansion plans to these countries.

SIEPAC Interconnector (3/3)

Tariff

- Users of the line pay regional transmission rates, which consist of Variable Transmission Charge (CVT), the Toll and the Supplementary Charge, which are determined by the regulator CRIE.
  - *The CVT is paid implicitly in the Market of Regional Opportunity or explicitly in the Regional Contract Market (the revenue from Transmission Right auctions).*
  - *The Toll is calculated based on actual flows on the lines, and its relationship with overall flows, and national contribution for the regional transactions etc.*
  - *Rest of the unrecovered charge is recovered through the Complementary Charge, levied on all the market participants.*
- Revenue is received by EPR as an annuity determined by CRIE. The regulation ensures an annuity provided to the company, that ensures income for: Administration, Operation and Maintenance – Debt Service – Taxes – Profitability on equity (11% RoI) – VEI quality regime.

EPR Approved Revenue, 2023

Category	Amount [USD million]
Annual O&M	16.9
Debt Service	32.1
Return on equity	8.2
Taxes (paid in respective countries for income generated)	6.3

GCC Interconnection (1/2)

Initially envisaged for avoiding duplication of costly generation reserves / marginal plants

Location : The Interconnection passes through Kuwait, Saudi Arabia, Bahrain, Qatar, United Arab Emirates (UAE) and Oman

Countries:

PHYSICAL CHARACTERISTICS

Line Voltage : 400 kV

Line Capacity : 1200 MW for Kuwait, Qatar and Saudi Arabia, 600 MW for Bahrain

LENGTH OF LINE

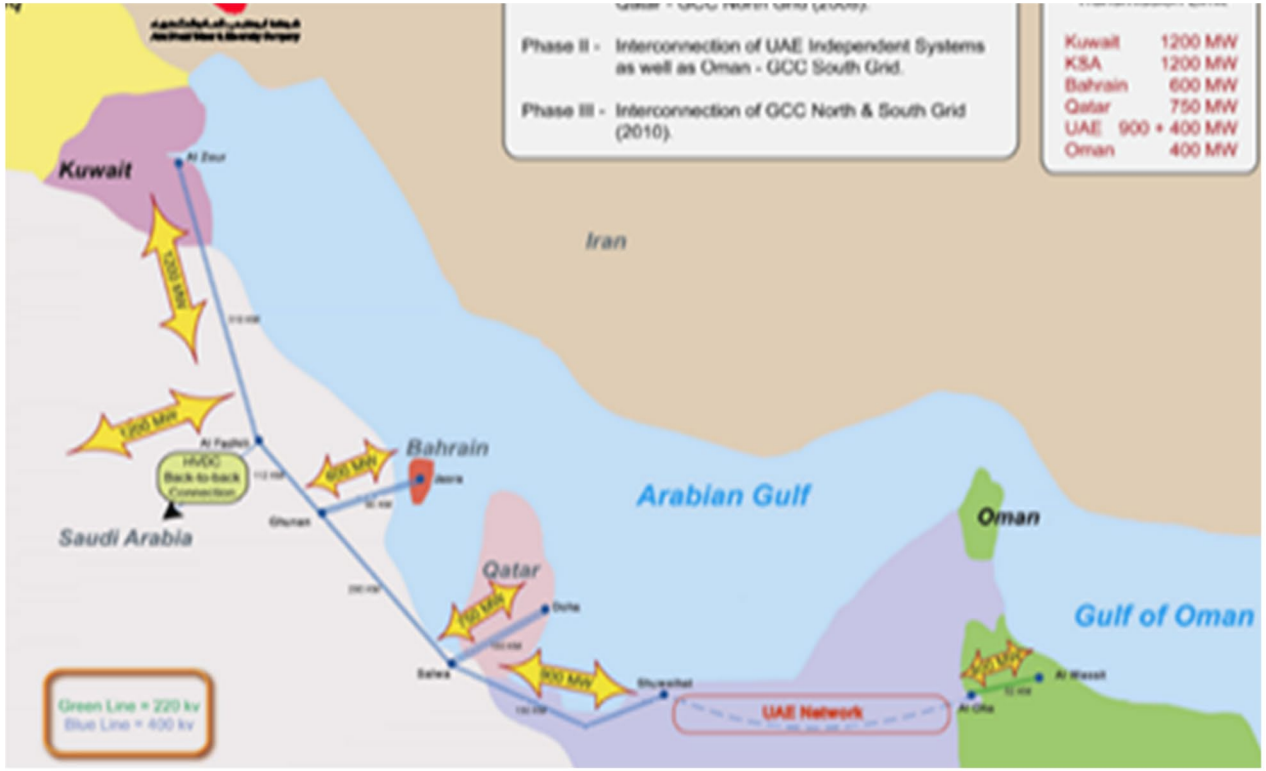
900 km.

PROJECT COST

The total project cost is Phase I - $1.1 billion, Phase 2 - $ 300 million, Phase3- $137 million

Commissioned: 2009-10

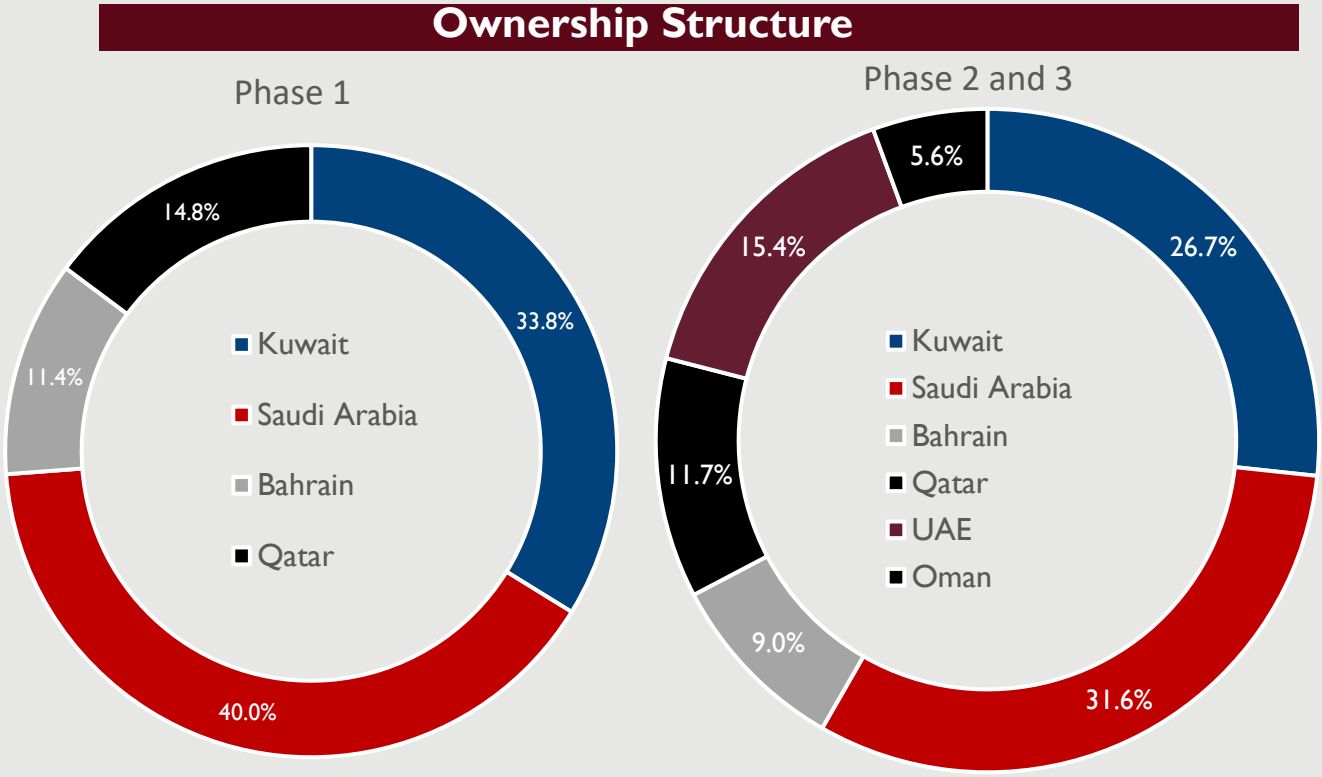
Map of Transmission Line



GCC Interconnection (2/2)

Entities driving decision for this project

The Gulf Cooperation Council Interconnection Authority (GCCIA) is a joint stock company subscribed by the six Gulf States, whose Articles of Association and By-Laws were approved by Royal Decree in 2001. GCC countries agreed to establish the GCCIA for the purpose of interlinking the power systems of its countries



All three phases completed now.

NEMO Link (1/2)

To facilitate the transfer of power in either direction between the two countries, and to connect UK with different parts of Europe.

Location : NEMO link HVDC Interconnection between nations of Belgium and United Kingdom

Countries:

Belgium

United Kingdom

PHYSICAL CHARACTERISTICS

Line Voltage: ± 400kV HVDC

Capacity: 1000 MW

LENGTH OF LINE

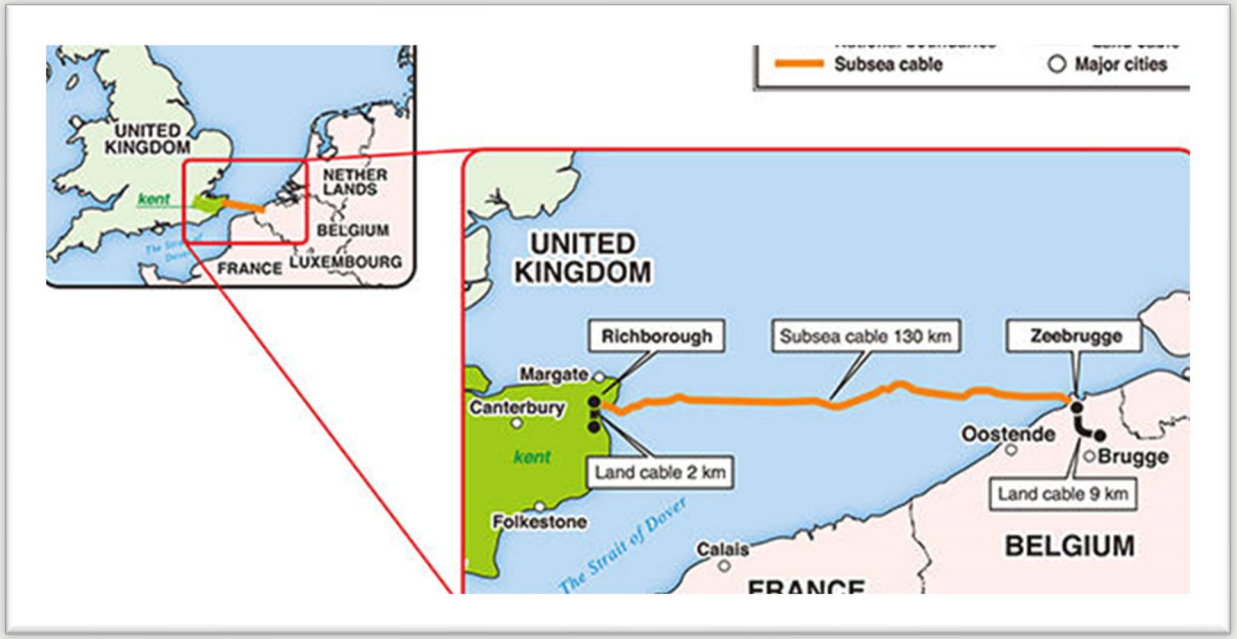
140 km

PROJECT COST

The total project cost is €598 million

Commissioned: 2019

Map of Transmission Line

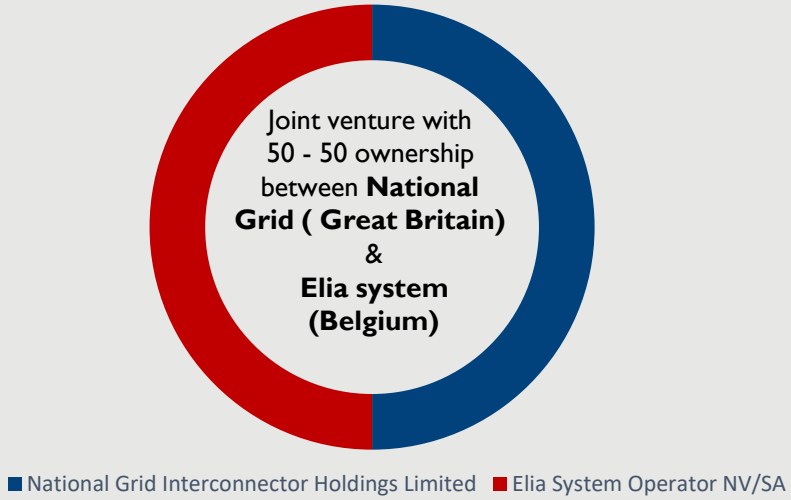


CONTRACT

Designed operational life of 40 years.

NEMO Link (2/2)

Ownership Structure



Tariff Mechanism

- The cap and floor regime is the regulated route for interconnector development in Great Britain. It sets a minimum and maximum return that interconnector developers can earn from the interconnector.
- The cap and floor regulatory model for Nemo Link was developed jointly with the Belgian regulator. The assessment has done in three stages Initial project assessment, Final project assessment and Post construction review.
- The discovered Cap and floor rate for the transmission line to be £ 76.2m and £42.8m (subject to indexations under cap and floor regime)

Merchant Models

Basslink Interconnector
Montana Alberta Tie Line (MATL)

Basslink Interconnector

To enable Tasmania's participation in Australia's National Electricity Market

Countries:

Victoria (Aus)

Tasmania (Aus)

PHYSICAL CHARACTERISTICS

Line voltage : 500kV system in Victoria and stepped down to 220kV and rectified to HVAC in Tasmania.

Transmission capacity : 500 MW.

LENGTH OF LINE

HVDC undersea &,Overhead transmission line.

Length: 375 km includes 295km submarine cable, 8 km underground cable & 66 km of DC transmission line .

PROJECT COST

$877million

Commissioned: 2016

Map of Transmission Line

TENURE OF CONTRACT

The Basslink Operating Agreement (BOA) is the contractual mechanism between the State of Tasmania and the operators of Basslink, the primary focus of which is ensuring that an interconnector is available to the State for a period of 40 years.

Montana Alberta Tie line Interconnector

Utilize energy price arbitrage between US and Canadian electricity markets – Transmission capacity auctioned out.

Location : The interconnector originates from Alberta Grid near Alberta Canada and terminates near Great Falls, Montana, US

Countries:

United States of America Canada

PHYSICAL CHARACTERISTICS

Line voltage :230 kV (HVAC)

Merchant electricity

Completely owned by Berkshire Hathaway Energy

LENGTH OF LINE

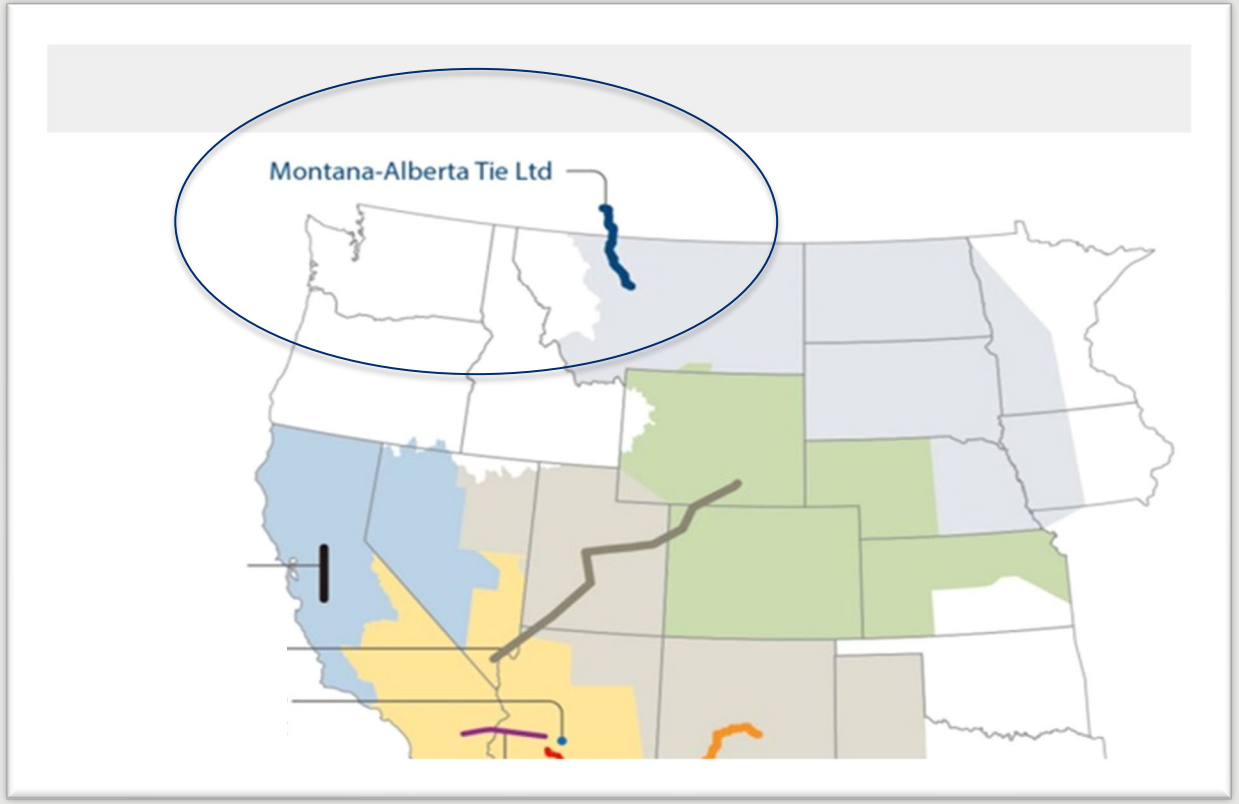
345 kms

PROJECT COST

US$300 million

Commissioned: 2013

Map of Transmission Line



At end of contract, Montana Alberta Tie Line (MATL) will remove the infrastructure including any materials associated with the sub-station. Holes would be filled with clean fill and the Right-of-Way and sub-station site would be allowed to return to their preconstruction condition

Owned by Berkshire Hathaway BHE Canada and BHE U.S Transmission at either sides of the border.

Government owned models

Ethiopia- Kenya Power interconnection

Ethiopia- Kenya Power interconnection

Electricity supply deficit in Kenya to be reduced through import from Ethiopia.

Location : Interconnection between Ethiopia and Kenya which originates from Welayta Sodo in Ethiopia and terminate at Suswa in Kenya

Countries:

Ethiopia

Kenya

PHYSICAL CHARACTERISTICS

Line voltage: 500kV

Transmission capacity: 2000MW

LENGTH OF LINE

Total: 1045 km

433 km in Ethiopia and 612 km in Kenya.

PROJECT COST

$ 1262.50 Million

Commissioned: 2022

Map of Transmission Line

CONTRACT

Ethiopia and Kenya will initially trade 400 MW of firm energy with a load factor of 85 percent for a period of 25 years. The PPA also mandates that Ethiopia shall ensure a minimum export capacity of 300 MW. The price of the electricity traded up to 400 MW has been fixed at 7 US cents/kWh for the whole duration of the contract with no indexation.

Ethiopia- Kenya Power interconnection (2/2)

Entities driving decision for this project

Government ministries in both sides, EEPCo, KETRACO

~ 10% project cost as equity by Governments. Rest provided by multilaterals

Part of EAPP Master Plan

Joint Steering Committee, Joint Ministerial Committee and Joint Project Coordination Unit

Business Model

EEPCo

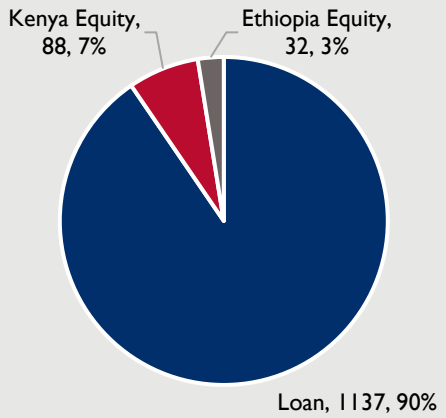
Power Purchase agreement
Average for consisting of US$0.07 per kWh

KETRACO

Wheeling agreement

Construction, Operation and Maintenance Agreement

Financing structure



Ownership Structure

Ethiopia Portion owned by EEPCO

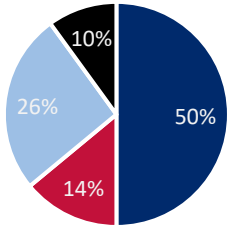
Kenya portion owned by KETRACO

Development of CB lines in South Asia

Except in case of 400 kV Dhalkebar-Muzaffarpur line, and dedicated transmission line of Godda thermal power plant, the conventional Government owned model has been tried out for CB lines.

Nepal side

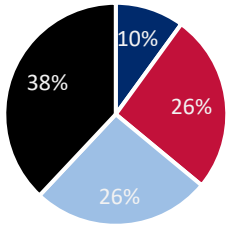
Ownership Structure of
Power Transmission Company Nepal Limited (PTCNL)



- Nepal Electricity Authority
- Hydroelectric Investment and Development Company (HIDC)
- Power Grid Corporation of India
- IL&FS Energy of India

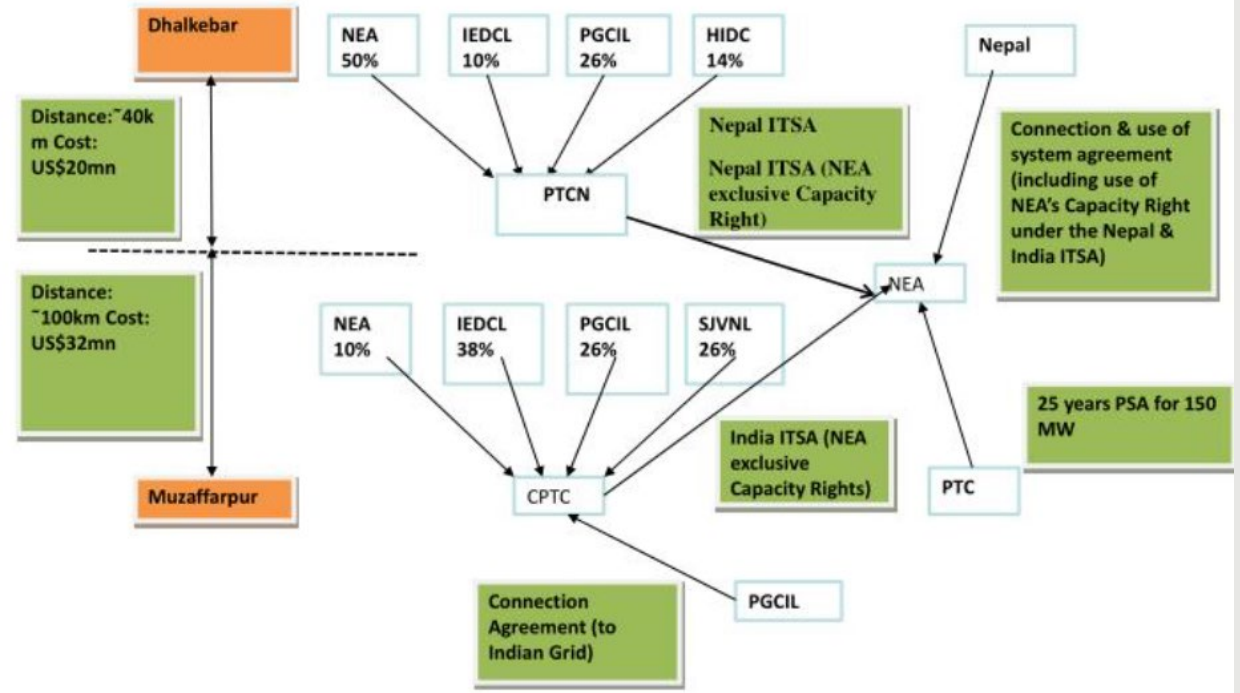
India side

Ownership Structure of
Cross Border Power Transmission Company Limited (CBPTCL)



- Nepal Electricity Authority
- SJVN Ltd. (formerly Satluj Jal Vidyut Nigam Ltd.)
- Power Grid Corporation of India
- IL&FS Energy Development Company of India Limited

Overall contractual arrangements

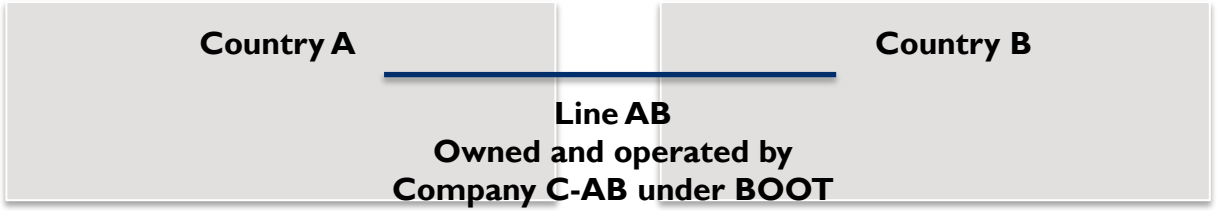


Draft recommendations for South Asia

1. Structuring of line ownership across borders:

There are models that can be adopted beyond the existing border-based approach

Proposed Solution



- Company C-AB can be JV of transmission utilities of A and B; or an entirely private third party.
- If legal provisions prevent foreign incorporated entities from operating, Company C-AB can set up fully owned subsidiaries in Country A and Country B, which then look after the respective line segments.
- Easier to package the single project for awarding a BOOT based contract – Attractive for investors.
- Line can have stand-alone tariff mechanism, de-linked with domestic transmission tariff regime.

Examples

- Nemo Link Limited (UK-Belgium) : 50:50 JV of National Grid (Great Britain) and Elia (Belgium)
- Cambodia Thailand Power Transmission Limited (CPTL)
- MOTRACO (South Africa-Eswatini-Mozabique)
- Argentina-Brazil Garabi Interconnector (CIEN - CTM, TESA)
- Transmission lines of Itaipu Binacional Ltd.

2. Business Model:

More PPP based business models can be introduced in the region

Proposed Solution

BOOT based PPP options will provide an option for Governments to utilize their capital and resources elsewhere.

If the limitations in legal or policy framework preclude the possibility of 100% private ownership, JV models can be explored, which has already been implemented in the case of 400 kV Dhalkebar-Muzaffarpur.

Examples

- Cambodia-Thailand Power Transmission
- Garabi interconnector (Agentina-Brazil)
- Central American Interconnection (SIEPAC)

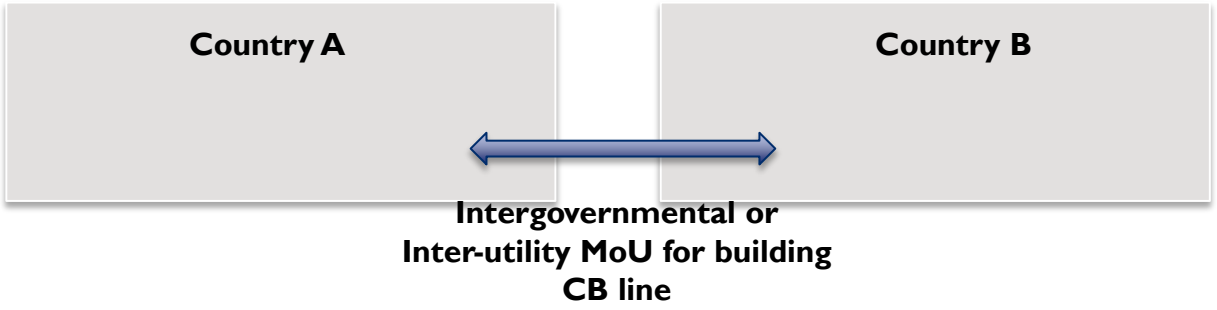
3. Decision on building CB lines:

Inter-governmental and Inter-utility MoUs will be relevant for countries who want to interconnect with countries other than India

Proposed Solution

In the long-term context, South Asian countries may also be exploring interconnections that does not involve India, such as Bangladesh-Myanmar. In such cases, the countries could consider entering into an Intergovernmental MoU/treaty or Inter utility MoU for the development of such lines.

For lines interconnecting with India, existing mechanisms of JWG, JSC and Designated Authority approvals may continue.



Examples

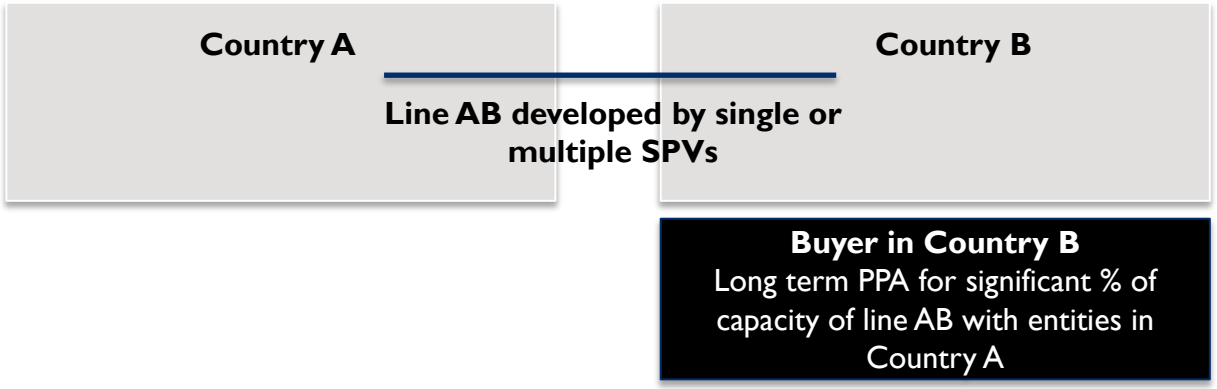
- Central American Interconnection (IG treaty)
- MOTRACO (IG-MOU)
- Kenya-Tanzania interconnection (Inter utility MoU)

4. Investment decision:

In the absence of firm PPAs for full capacity between Governments, and Inter-governmental or Inter-utility MoUs, anchor customers can be identified who can commit to a major share of line usage

Proposed Solution

When countries or state-owned utilities are unable to arrive at a consensus in long term assurance on payment of transmission charges, it could be ventured to identify an anchor customer, who can be a large industrial consumers, or a group of such anchor customers, who can ensure blocking and utilization of a substantial portion of line capacity.



Relevant in Indian context, where large corporates are looking for clean power sources from outside India also, especially hydropower.

Examples

- MOTRACO interconnection, which facilitates purchase of energy from Eskom of South Africa, for sale to the Mozal aluminum smelter in Mozambique.
- The "anchor" customer was the **Mozal aluminium smelter plant.** The aluminium plant had significant electricity demand and was willing to pay MOTRACO a wheeling charge for the reliable energy it received. The aluminium plant also paid the cost of electricity purchased from ESKOM.

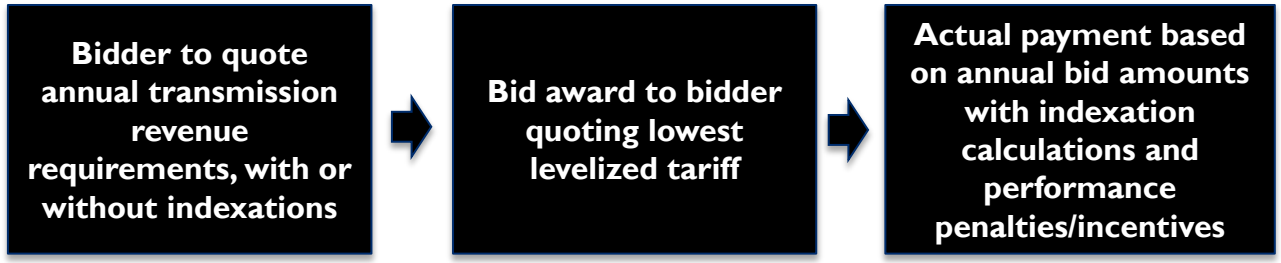
5. Transmission tariff models:

CB interconnections ultimately require assurance of an annuity payment, which could be collected in any forms. Most international examples follow a Regulated Tariff or bilaterally agreed tariff model.

Proposed Solution

The model is already in practice in the case of Indian portion of Dhalkebar-Muzaffarpur line, where annual transmission payment calculation methodology is specified in the Implementation and Transmission Service Agreement (ITSA).

There is potential for extending Tariff Based Competitive Bidding (TBCB) regime to cross border lines also.



Examples

- Central American Interconnection (SIEPAC) – Annuity Payment determined by regulator CRIE
- GCC Interconnection – Tariff determined by Advisory and Regulatory Committee
- NEMO link – Tariff determined by UK Regulatory OFGEM under a cap and floor pricing regime
- Cambodia-Thailand Interconnection – Tariff specific in commercial agreement

6. Cost and revenue sharing:

In case of JV formed by Govt owned utilities, there are uniform, infrastructure-based and benefit-based cost and profit sharing options.

Proposed Solution

Uniform sharing	**Equal ownership share of each of the countries**
Infrastructure-based	**Shared in ratio of CB infrastructure planned in each of the countries**
Benefit based	**Shared in ratio of estimated benefits from CB interconnections**

In case of a single private entity owning the entire cross border line, this point becomes moot anyway, as capital expenditure of respective state-owned utilities are avoided.

Examples

- **Uniform Sharing**
  - Central American Interconnection (SIEPAC)
- **Infrastructure-based**
  - Kenya-Ethiopia Interconnection
  - Kenya-Tanzania Interconnection
- **Benefit based**
  - GCC Interconnection

7. Regional markets:

Liberal access to regional power markets can facilitate faster development of CB lines, as concerns on small quantum of untied capacities can mitigated through market options.

Proposed Solution

The availability of regional markets for energy trade has been a key enabler in various regional interconnections such as Central American Interconnection, NEMO link etc. Adequate access to a regional electricity market reduces the need for entire line capacity to be tied up under 100% long term PPAs (though a substantial portion of capacity still have to be under long term PPAs in South Asian context).

South Asia is also moving towards improved regional electricity market, and therefore this aspect is already being addressed by the countries.

In longer term, even transmission line capacity of CB lines can be auctioned out, through market platforms.

Examples

- Central American Interconnection – Use of market platform for trading
- NEMO link – Auction of line capacity through market platforms

8. Regional financing of CB transmission infrastructure:

There is a potential for countries in the region to come together to financially support regional lines whose benefits extend beyond two countries

Proposed Solution

Some of the cross-border transmission lines have benefits that extend beyond the countries at the two endpoints of such lines. There could be additionalities that could benefit the region as a whole, in the form of improved reliability, or improved evacuation of renewable energy etc.

In the medium to long-term, South Asian countries may also explore such options, which provide some form of viability gap support or concessional loans or grants to cross border lines that have regional benefits, spanning beyond the beneficiary countries.

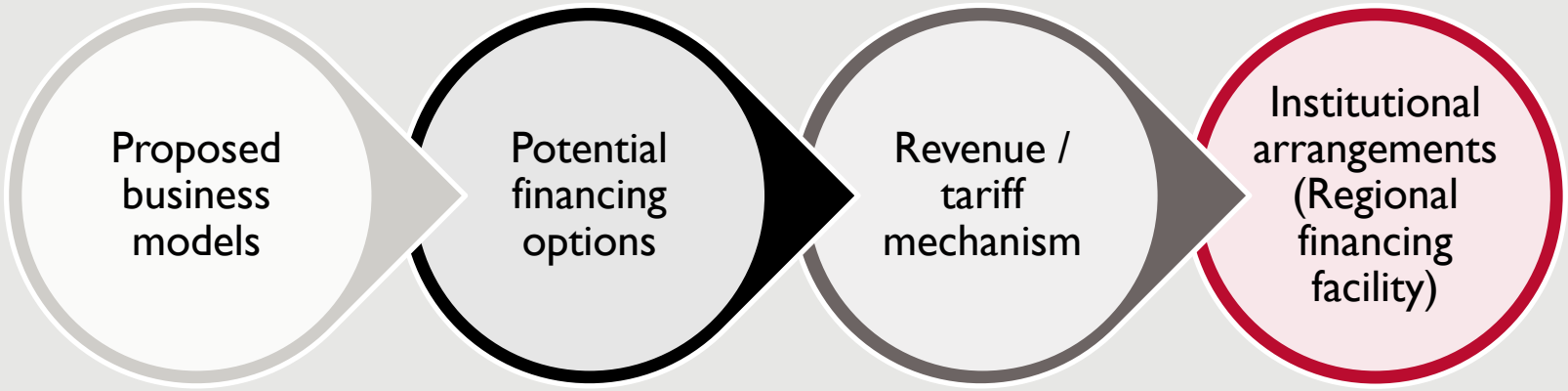
[Potential for linkages with SAREP's ongoing support related to South Asia Forum for Energy Investment]

Examples

Regional Transmission Infrastructure Financing Facility

- **European Union – Projects of Common Interest (PCI)**
  - Grants from Connecting Europe Fund (CEF) with over €5 billion budget
  - PCI eligibility determined by European Commission, assisted by ACER
  - Eligibility requirement: increase market integration, OR help the EU's energy security OR contribute to the EU's climate and energy goals by increasing renewables integration.
- **South African Power Pool - Regional Transmission Infrastructure Financing Facility (Under development)**

Key points for discussion



Annexures

Scope of work (C1)

1. Carry out a comprehensive and in-depth review and analysis of the different cross-border transmission infrastructure development ecosystems covering the following: -
    i. Business and Financing model adopted
    ii. Investment entities structuring
    iii. Ownership, Financing mechanism
    iv. Risk management and Risk allocation principles and mechanism
    v. Source of funding including funding through regional financing instruments/funds/grant mechanism/ viability gap funding, blended financing etc. if any.
    vi. Cost sharing and cost recovery methods
    vii. Contractual design and arrangements
    viii. Role of regional markets in cross-border electricity transmission infrastructure project development and actual realization
    ix. Associated strategic, policy, regulatory, legal, technical, commercial, operational framework, and institutional environment in which a particular cross-border electricity transmission infrastructure project was realized to be reviewed, analyzed and contextualized. The above analysis will also cover the following
        a) Role of Governments in the development of Cross Border Transmission Interconnection and governance arrangement in case of involvement of more than two countries.
        b) Planning Procedure and implementation approval steps of the interconnection
        c) Economic analysis including socio economic benefits/carbon emission reduction assessment undertaken for the feasibility of Cross Border Transmission Interconnection.
        d) Payment Security Mechanism
        e) Dispute Resolution Mechanism

Scope of work (C2-C3)

2. It may be noted that in C.1., all types of cross-border electricity transmission infrastructure projects will be considered in the review and analysis irrespective of their ownership structure such as public, private, and public-private partnership-based projects. The review and analysis should also cover:
   i. How the different key aspects (as applicable in a particular project context), such as transmission pricing, capacity auctioning system (if any), physical rights, financial rights, transmission losses, identification of transmission capabilities, and mechanism for open access, wheeling methodology, deviation settlement, and congestion management, etc., were dealt in the overall context of the cross-border electricity transmission infrastructure development (techno-commercial design) and its implementation.
   ii. Similarities/commonalities and differences amongst the models of cross border transmission infrastructure to be assessed for classification/categorization of different models.
   iii. Details of the benefits due to the cross-border electricity transmission infrastructure development under different models and how these are shared amongst the different participating countries.

3. Review and analysis of all cross-border electricity transmission infrastructure projects (in C.1. and C.2.) across the globe in the form of detailed case studies from inception of the project till execution and operation should be covered, covering the following regions: -

   Africa, ASEAN /Southeast Asia, European Union ,South America, North America, Central Asia, Gulf, and Arab Region, South Asia (existing cross-country interconnections), Australia (Inter regional connections)

Scope of work (C4-C9)

4. The study (in C.1., C.2. and C.3.) to cover not only the bilateral, trilateral transmission lines i.e., lines between two or more countries but also to cover the cross-border transmission infrastructure projects that get structured and financed through regional energy market set up such as in Europe. The activity from C.1 to C.4. is not only to be done through just desk research but also through conducting virtual meetings/interaction with all the relevant institutions /entities concerning cross-border electricity transmission infrastructure projects to gather critical inputs/insights and practical understanding in a comprehensive manner on all matters (as elaborated in C.1 and C.2.) related to cross-border electricity transmission infrastructure projects. The consultant shall prepare minutes of meeting for each consultation
5. Based on the comprehensive review, and analysis conducted from C.1. to C.4. prepare the draft interim report on international best practices on business and financial models for developing cross-border electricity transmission infrastructure projects including the gap analysis vis-à-vis the existing practices in South Asia and recommendations thereof.
6. Conduct a stakeholder workshop with key stakeholders from all the regions studied as a part of this assignments and present the key findings and seek comments and suggestions. (Cost related to organizing the workshop shall be borne by SAREP. Actual travel related cost shall be reimbursed by SAREP)
7. Prepare the summary proceedings of the stakeholder workshop and incorporate the comments and suggestions of stakeholders that emerged in the stakeholder consultation workshop and prepare the draft report on international best practices on business and financial models for developing cross-border electricity transmission infrastructure projects.
8. Prepare the final report on international best practices on financial models for developing cross-border electricity transmission infrastructure projects including the key lessons learned and concrete recommendations along with suggested options for South Asia. The suggestions shall cover all parameters being studied in this scope.
9. Based on the final report, prepare a summary for policymaker.

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