



PROGRAMME FUNDED BY THE EU



TPA in the electricity networks of Armenia
the AM-GE interconnector
Yerevan, 15.12.2015

BUILDING PARTNERSHIPS FOR ENERGY SECURITY

www.inogate.org

Contents (and structure) of the Presentation



- **Review of the situation in Armenia & identification of gaps**
- The AM – GE interconnector
 - Regulatory Options
 - EU practice
 - Our understanding for the AM-GE interconnector
 - Proposed Regulatory Model

www.inogate.org



The EU regulatory regime on transmission - TPA



- Each Member State must ensure the implementation of a system of TPA to the electricity transmission and distribution systems
 - based on **published tariffs**,
 - applicable to all **potential users** and
 - applied objectively and **without discrimination** between system users

www.inogate.org



Transmission system ownership & operation – the concept of **unbundling**



- Traditionally: owned by the integrated electricity company
- Under the competitive environment: **unbundling** requirements
- 3 well-known unbundling regimes (in order of increasing degree of unbundling):
 - **Accounting** unbundling
 - **Legal** unbundling
 - **Ownership** unbundling
- Very strict unbundling requirements under the newly established 3rd EU Energy Legislation Package; Requires unbundling of
 - Regulated from liberalized activities
 - Regulated activities with conflicts of interest, etc.

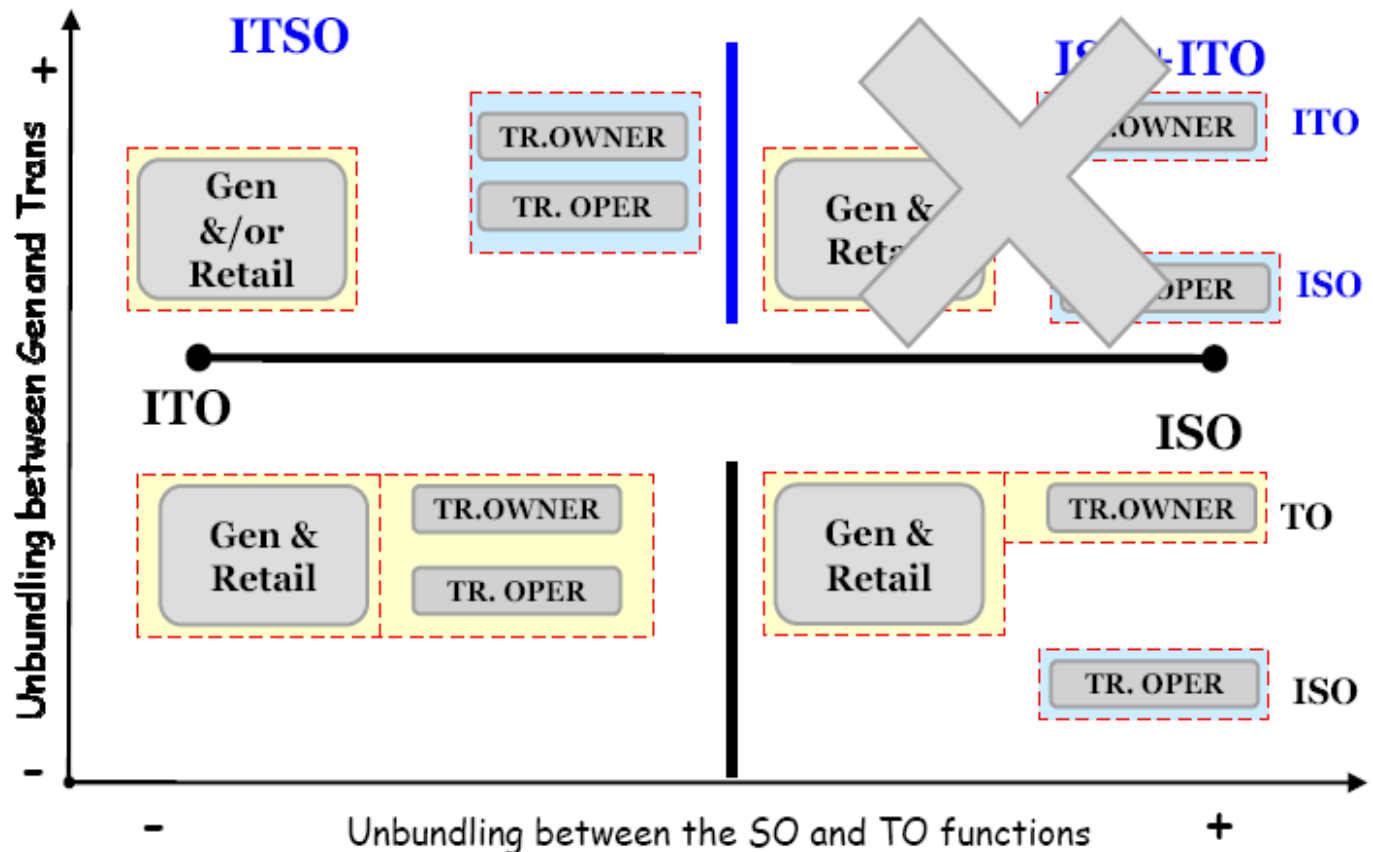
www.inogate.org



3rd EU Legislative package on energy



Three TSO arrangements in the 3rd Directive



Contents (and structure) of the Presentation



- **Review of the situation in Armenia & identification of gaps**
- The AM – GE interconnector
 - Regulatory Options
 - EU practice
 - Our understanding for the AM-GE interconnector
 - Proposed Regulatory Model

www.inogate.org



General issues + 3rd party access

- The Armenian energy market has not opened yet.
- There is no provision for a separate Transmission System Operator and Distribution System Operator in the sense of the EU 3rd Energy Package.
- No accounting, functional and or managerial disaggregation is provided or applied (Except Transmission)
- Although law provides for access to transmission and distribution networks, according to the market rules, however due to vertical integration (i.e. distribution company is a monopoly), it seems that only electricity exporters can enjoy access to transmission and distribution networks.
- Generation, transmission and distribution as well export tariffs are provided.



www.inogate.org



X-BORDER TRADE: General



www.inogate.org

- Electricity export is conducted by an export Licensee, who has concluded a number of contracts provided in the applicable legislation.
- The performance of transit as well is based in a number of contracts
- Basically, import / export is based on contracts, deviating from the market approach.
- No use of the terms “supplier” or “trader” in the law.



X-BORDER TRADE: specific



- There are no provisions that could promote full exploitation of capacity on cross border interconnections.
- Such approach may include:
 - introduction of provisions on **explicit auctions** (market approach)
 - or quota or First-Come-First-Served (non-market approach),
 - and Use-It-Or-Sell-It arrangements (UIOSI).

Contents (and structure) of the Presentation



- Review of the situation in Armenia & identification of gaps
- **The AM – GE interconnector**
 - Regulatory Options
 - EU practice
 - Our understanding for the AM-GE interconnector
 - Proposed Regulatory Model

www.inogate.org



The AM – GE interconnector

some key info



- **Capacity:** Stages: I (350 MW), II (700 MW), III (1050 MW)
- **Ownership:** HVEN (100% state owned)
- **Access:** preferential access to HRAZDAN CCGT (up to 440 MW) for the plant's lifetime (year 2043)
- **Funding:** through loan to HVEN
- **LEC** (from Feasibility study): 0.56/0.47/0.45 c/kWh
 - Assume 70% Load Factor (loading of interconnector)
- **Sources of income / cost recovery:**
 - Tariffs (PSRC decision)
 - Hrazdan CCGT (according to specific Agreement ?)
 - Other users of the interconnector (for the remainder 260 MW @ Stage II)

www.inogate.org



Impact on tariffs (in terms of Req. Revenue) of the AM-GE interconnector (in MEuro)



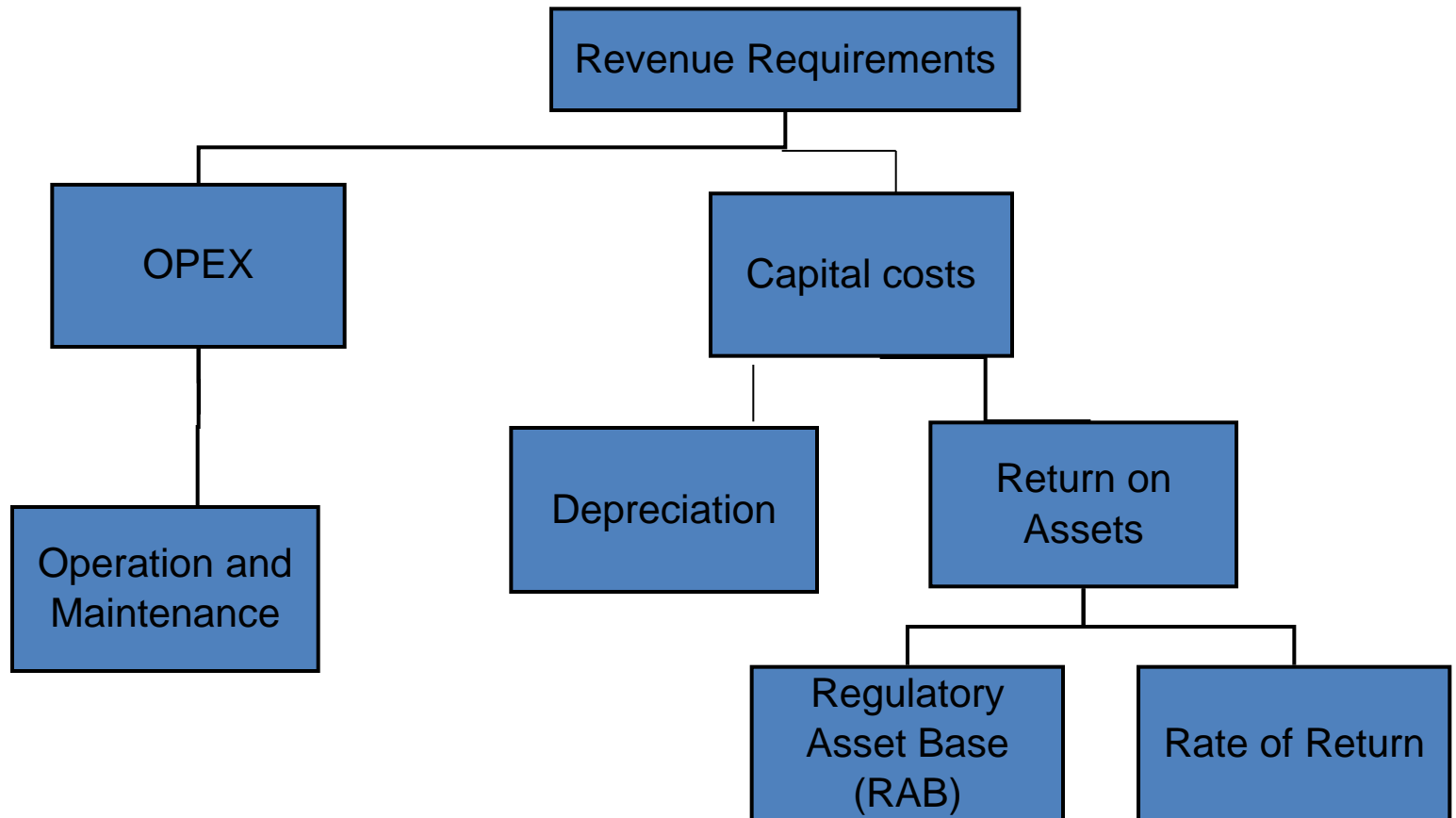
Electricity Tariffs in Armenia

Component	Tariff
Average generation	EUR 27.9/MWh
Transmission	EUR 2.0/MWh
System operations & settlement	EUR 0.4/MWh
Distribution	EUR 17.3/MWh
Losses/internal consumption	EUR 5.0/MWh
Total	EUR 52.2/MWh

The revenue requirements



$$\text{Revenue Requirements} = \text{OPEX} + \text{Depr.} + (\text{RAB} \times \text{Rate_of_Return})$$



Impact on tariffs (in terms of Req. Revenue) of the AM-GE interconnector (in MEuro)



www.inogate.org



Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing Transmission Network													
RR (mil AMD)	3246	3246	2731	2436	3608	3608	3324	3324	3324	3324	3324	3324	3324
RR (mil. Euro)	6.30	6.30	5.30	4.73	7.01	7.01	6.45	6.45	6.45	6.45	6.45	6.45	6.45
New AM-GE Interconnector													
CAPEX	100	100	100	100	100	100	100	100	100	100	100	100	100
OPEX	2	2	2	2	2	2	2	2	2	2	2	2	2
Total Annual Cost	102	102	102	102	102	102	102	102	102	102	102	102	102
Annual Depreciation	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Cumulative Depreciation	2.50	5.00	7.50	10.00	12.50	15.00	17.50	20.00	22.50	25.00	27.50	30.00	32.50
RAB	97.50	95.00	92.50	90.00	87.50	85.00	82.50	80.00	77.50	75.00	72.50	70.00	67.50
Rate of Return	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Return on Capital	7.80	7.60	7.40	7.20	7.00	6.80	6.60	6.40	6.20	6.00	5.80	5.60	5.40
Required Revenue for AM-GE	12.30	12.10	11.90	11.70	11.50	11.30	11.10	10.90	10.70	10.50	10.30	10.10	9.90

the AM-GE interconnector is expected to almost triple the RR for transmission which, in turn, may affect end-user tariffs by an increment of the order of 10%.

The AM – GE interconnector the issues

- Access
- Sources of income / cost recovery



www.inogate.org



PROGRAMME FUNDED BY THE EU

2 business models for interconnectors in the EU

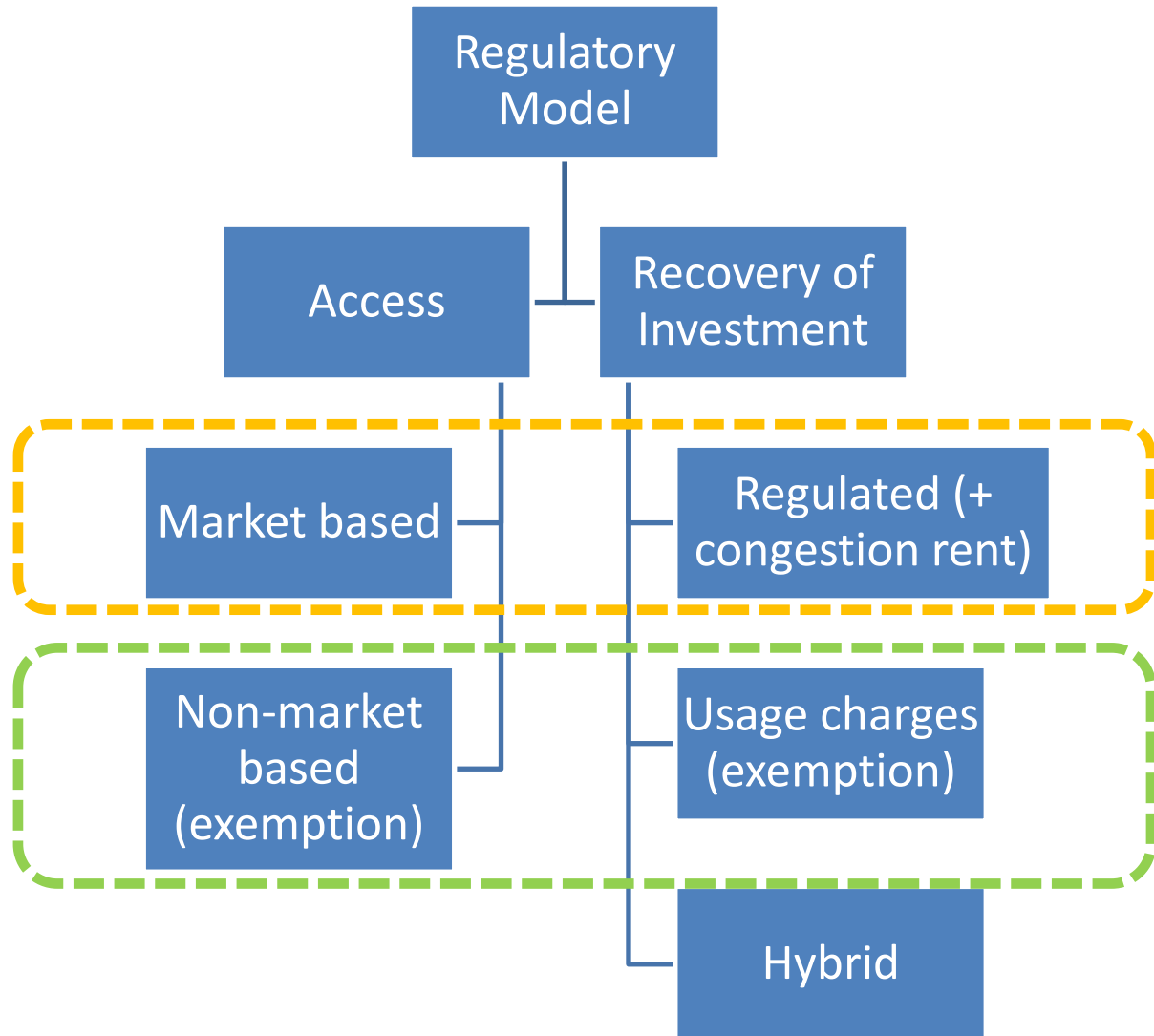


www.inogate.org



	<u>Regulated Investment Scheme</u>	vs.	<u>Merchant Investment Scheme</u>
<i>Owner:</i>	TSO		Legally separate from TSO
<i>Regulatory Status:</i>	Conforms fully to Regulation 714/2009 & Directive 2009/72		Exemption from regulated third party access and/or restrictions on use of capacity allocation revenues
<i>Benefits to Investors:</i>	Revenue losses recoverable from national transmission charges		Increased control over capacity allocation and use of revenues, which may shorten loan payback period

Regulatory Decisions/Options for the interconnection



The AM – GE interconnector

some uncertainties



- Detailed terms of the preferential access to interconnection are not known
 - What happens if Hrazdan cannot make use of the reserved capacity (fallback option?)
- If Stage I & II are not implemented concurrently, 100% of the available interconnection capacity is reserved up to 2021 by Hrazdan
- working assumptions for the derivation of LEC – exported volumes need to come in prices lower to those offered by RU to GE
- No markets at both sides of the interconnector imply no congestion. Our part of recommendations regarding the use of the congestion rent (see next slide) maybe inactive for quite some time !

Regulatory Options



Option A: Light- TPA (current regime)

- Allocation: Hrazdan 5 priority (+ **possibly** First-Come-Fist-Served (for future exporters)
- Recovery: **Socialised** (through the transmission tariff)

Option B: Hybrid-TPA

- Allocation: Hrazdan 5 priority + First-Come-Fist-Served (now)/**capacity auction** (future)
- Recovery: **RR reduced** by:
 - Hrazdan V usage (now) and
 - any licensed supplier/traders usage (future)

The AM – GE interconnector

the ‘hybrid’ approach (TPA + exemption)



The EXEMPTION part

- the HRAZDAN V CCGT plant accesses the interconnector as per the specific Agreement clauses (+ pays any remuneration agreed)

The TPA part

- End-consumers pay for the interconnector through the domestic transmission tariffs
 - This involves similar calculations as for the TSO’s assets, in order to produce the Required Revenue (RR) on a yearly basis
 - **Reduce the RR by any amount received from the HRAZDAN V plant**
- Allocate the remaining capacity -after HRAZDAN CCGT nomination- (up to 260 MW) to potential users (traders, exporters, importers)
 - Use a market (explicit auctions) or non-market approach (quota or First-Come-First -Served)
 - Charge according to auction’s results or using a fixed tariff
 - Again, reduce the RR by any amount received from users other than the HRAZDAN V plant

Methodologies for CB capacity allocation



Regulation (EC) 714/2009 in principle allows for different capacity allocation methodologies as long as non-discriminatory and **market based**.

Methodology	Description	Implications
First-Come First-Served	Network users are served in the order of contracting or requesting capacity. The auction stops when all capacity is allocated.	<ul style="list-style-type: none"> • Easy to implement • Economically not efficient • Not market based ·
Pro-rata allocation	the proportion of capacity requested by a certain network user in relation to the total requests corresponds to the proportion of the available capacity which is allocated to this network user	<ul style="list-style-type: none"> • Easy to implement • Not market based · • Does not provide economic signals • Transparent · • Does not necessarily meet demand given pro rata cap
Explicit auctions (NTC based)	TSO offers capacity after performing a security analysis and accepts bids from potential buyers in an auction	<ul style="list-style-type: none"> • Provides economic signals · • Market based • Transparent
Implicit auctions (NTC based)	The TSO determines ex ante ATC considering security analysis and accepts energy bids from potential buyers	<ul style="list-style-type: none"> • Provides economic signals • Transparent · • Usually requires a Power Exchange

Impact on tariffs (in terms of Req. Revenue) of the AM-GE interconnector (in MEuro)

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing Transmission Network													
RR (mil AMD)	3246	3246	2731	2436	3608	3608	3324	3324	3324	3324	3324	3324	3324
RR (mil. Euro)	6.30	6.30	5.30	4.73	7.01	7.01	6.45	6.45	6.45	6.45	6.45	6.45	6.45
New AM-GE Interconnector													
CAPEX	100	100	100	100	100	100	100	100	100	100	100	100	100
OPEX	2	2	2	2	2	2	2	2	2	2	2	2	2
Total Annual Cost	102	102	102	102	102	102	102	102	102	102	102	102	102
Annual Depreciation	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Cumulative Depreciation	2.50	5.00	7.50	10.00	12.50	15.00	17.50	20.00	22.50	25.00	27.50	30.00	32.50
RAB	97.50	95.00	92.50	90.00	87.50	85.00	82.50	80.00	77.50	75.00	72.50	70.00	67.50
Rate of Return	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Return on Capital	7.80	7.60	7.40	7.20	7.00	6.80	6.60	6.40	6.20	6.00	5.80	5.60	5.40
Required Revenue for AM-GE	12.30	12.10	11.90	11.70	11.50	11.30	11.10	10.90	10.70	10.50	10.30	10.10	9.90
Hybrid Case A: (contribution by Hrazdan V)	4.61	4.54	4.46	4.39	4.31	4.24	4.16	4.09	4.01	3.94	3.86	3.79	3.71
Hybrid Case B: (contribution by Hrazdan V)	5.68	5.68	5.68	5.68	5.68	5.68	5.68	5.68	5.68	5.68	5.68	5.68	5.68

the AM-GE interconnector is expected to almost triple the RR for transmission which, in turn, may affect end-user tariffs by an increment of the order of 10%.



www.inogate.org



PROGRAMME FUNDED BY THE EU

Спасибо!
Thank you!



Nick Turlis
Electricity Markets Convergence Expert
INOGATE Technical Secretariat
ntourlis@ldk.gr



www.inogate.org



INOGATE Technical Secretariat and Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives