CONTENTS

• INTRODUCTION

• REGULATORY REVIEW OF THE PLANS

• REGIONAL PLANNING: PECI/PMI SELECTION PROCESS 2020
NETWORK DEVELOPMENT

- LOAD GROWTH
- NEW USERS
- MARKET COMPETITION
- SECURITY OF SUPPLY
- AGEING
- RELIABILITY/RESILIENCE/FLEXIBILITY
- DECARBONISATION/SUSTAINABILITY/INOVATIONS

TSOs ARE OBLIGED FOR NETWORK PLANNING AND DEVELOPMENT IN ORDER TO MAINTAIN HIGH LEVEL OF SYSTEM SECURITY AND RELIABILITY

The Energy Community Secretariat | Regulatory school: Training on Network Development and System Adequacy
PLANNING CRITERIA

- DETERMINISTIC
  - N-1
  - N-1-1
  - N-k

- PROBABILISTIC
  - ENS
  - LOLE ...

- TECHNICAL
  - security
  - stability
  - power quality...

- ECONOMIC
  - NPV > 0
  - B / C > 1 ...

COMPUTER SIMULATIONS

- NETWORK SIMULATIONS
  - LOAD FLOW
  - SHORT CIRCUIT
  - STABILITY
  - RELIABILITY ASSESSMENT

- MARKET SIMULATIONS
FUTURE SCENARIOS AND UNCERTAINTIES

• AVERAGE TIME TO CONSTRUCT NEW TRANSMISSION LINE: 3 – 15 YEARS

• DECENTRALIZED PRODUCTION

• INTERMITTENT POWER SOURCES

• MARKET TRANSACTIONS

• EMERGING TECHNOLOGIES

• TRADITIONAL UNCERTAINTIES:
  • demand
  • hydrology
  • production costs …
REGULATORY REVIEW OF THE PLANS
GENERAL OVERVIEW

• TSOs PREPARE NETWORK DEVELOPMENT PLANS (1Y, 3Y, 5Y, 10Y)

• REGULATORY AGENCIES APPROVE THESE PLANS

• INVESTMENT COSTS TO BE INCLUDED INTO TRANSMISSION FEES

• PROJECTS OF REGIONAL AND/OR NATIONAL SIGNIFICANCE
REGULATORY REVIEW

• TRANSPARENCY / STANDARDIZED FORMAT
  • Contents
  • Procedures / deadlines
  • Methodology / review criteria
  • Financial impact / source of financing
  • Monitoring / reporting …

• REVIEW AGAINST PREDEFINED METHODOLOGY/Criteria
  • Project rationale / explanation
  • Calculation results (to prove that a project is the best option to solve specific issue)
  • Technical and economic planning criteria (n-1, n-1-1, NPV>0 ….)

EXAMPLES OF GOOD PRACTICE

➢ KOSOVO*, MONTENEGRO

➢ SLOVENIA, ITALY
The Energy Community Secretariat

Review Criteria

Preparation and Maturity → Compliance with Other Development Plans → Fulfillment of Technical Criteria → Fulfillment of Economic Criteria

Transmission Fee Impact

Regulatory Approval
REVIEW CRITERIA (example of project’s maturity evaluation)

PREPARATION AND MATURITY

- In construction
- Permits issued
- Permits ongoing
  - Short-term initiation
  - Mid-term initiation
- Collection permit process hasn’t initiated
  - Obligatory
  - Nonobligatory

APPROVAL
(if regulatory approval exists and CAPEX not changed)

- Additional Expl.
  (if CAPEX was changed)

REVIEW ACCORDING TO OTHER CRITERIA

- Regulatory approval exists
- Regulatory approval does not exist
REVIEW CRITERIA (cont.)

COMPLIANCE WITH OTHER DEVELOPMENT PLANS

Strategic documents
TSO previous development plan
DSO development plan
ENTSO-E TYNDP …

REVIEW ACCORDING TO OTHER CRITERIA

APPROVAL (PCI / PECI / PMI depending on the financing)

DISAPPROVAL
**FULFILLMENT OF TECHNICAL CRITERIA**

New users connection including necessary network reinforcements

Security of operation and supply (n-1, n-1-1, stability, short-circuit…)

Voltage control & other AS / power quality

Cross-border reinforcements

Modernisation / revitalisation

...
Fulfillment of Economic Criteria

- Projects with CAPEX above certain threshold
- CBA analysis
- NPV > 0
- B/C ratio > 1
- IRR > d
- Sensitivity analysis / risk management

Approval
- Economic criteria met
- Low level of risk
- Mid to high level of risk, risk management measures well defined

Disapproval
- Economic criteria not met
- High level of risk, no risk management measures
REVIEW CRITERIA (cont.)

TRANSMISSION FEE IMPACT

Simulation of the transmission fee with approved investments included

No significant impact
Increase of the transmission fee
Decrease of the transmission fee

FINAL APPROVAL

ADDITIONAL CORRECTIONS
REGIONAL PLANNING:

PECI/PMI SELECTION PROCESS 2020
BACKGROUND

- **REGULATION 714/2009** on conditions for access to the network for cross-border exchanges in electricity (ENTSO-E TYNDP)

- **REGULATION 347/2013** on guidelines for trans-European energy infrastructure
  
  - PCI PROJECTS
  
  - PECI / PMI PROJECTS ADAPTED IN EnC
  
  - PROMOTION OF PROJECTS OF EUROPEAN / REGIONAL SIGNIFICANCE
    
    - Electricity, gas, oil infrastructure
    
    - Smart grid
    
    - Storage
    
    - Electricity highways, carbon dioxide networks…
### R347 Implementation

<table>
<thead>
<tr>
<th>National Competent Authority</th>
<th>Manual of procedures</th>
<th>Methodology and the criteria used to evaluate investment with the higher risks</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>WF</td>
<td>0.4</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>AL</td>
<td>70%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>BA</td>
<td>30%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>KS*</td>
<td>70%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>MD</td>
<td>30%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>ME</td>
<td>30%</td>
<td>10%</td>
<td>100%</td>
</tr>
<tr>
<td>MK</td>
<td>30%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>RS</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>UA</td>
<td>30%</td>
<td>0%</td>
<td>30%</td>
</tr>
<tr>
<td>GE</td>
<td>0%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

30% draft decision, law, by-law  
70% adapted and designated  
100% operational  
70% first general draft  
70% final draft/national specifics  
100% published  
30% first general draft  
70% final draft/national specifics  
100% published
PROCESS

• PECI/PMI SELECTION 2020
  • JANUARY 2020 – JUNE 2020
  • PROMOTORS SENT CANDIDATE PROJECTS
  • SELECTION BASED ON SOCIO-ECONOMIC ANALYSIS AND MULTI-CRITERIA ASSESSMENT
    • cross-border impact
    • potential benefits shall outweigh its costs

<table>
<thead>
<tr>
<th>Number of projects</th>
<th>Electricity transmission</th>
<th>Electricity storage</th>
<th>Gas transmission</th>
<th>Gas storage</th>
<th>LNG</th>
<th>Smart grid</th>
<th>Oil</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0</td>
<td>19</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Submitted investment cost (million €)</th>
<th>Electricity transmission</th>
<th>Electricity storage</th>
<th>Gas transmission</th>
<th>Gas storage</th>
<th>LNG</th>
<th>Smart grid</th>
<th>Oil</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2879</td>
<td>-</td>
<td>-</td>
<td>7980</td>
<td>75</td>
<td>-</td>
<td>-</td>
<td>431</td>
<td>11 365</td>
</tr>
</tbody>
</table>
METHODOLOGY

• DATA COLLECTION

• ELIGIBILITY CHECK/VERIFICATION

• CBA ANALYSIS
  ➢ Market modelling (2 scenarios)
  ➢ Market simulations
  ➢ Other benefits (losses & ENS)

• MULTI-CRITERIA ASSESSMENT

Source: REKK, DNV GL
<table>
<thead>
<tr>
<th>Project code</th>
<th>Country</th>
<th>Welfare change, m€</th>
<th>Investment cost, m€</th>
<th>OM cost, m€</th>
<th>Transmission loss reduction benefit, m€</th>
<th>ENS benefit, m€</th>
<th>NPV, m€</th>
<th>B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL_01</td>
<td>BA-ME-RS</td>
<td>1674</td>
<td>-849</td>
<td>307</td>
<td>X</td>
<td>-21.6</td>
<td>15.5</td>
<td>0.7</td>
</tr>
<tr>
<td>EL_03</td>
<td>BA-HR</td>
<td>337</td>
<td>-229</td>
<td>31</td>
<td>X</td>
<td>-4.7</td>
<td>2.2</td>
<td>0.0</td>
</tr>
<tr>
<td>EL_07</td>
<td>UA_W-SK</td>
<td>245</td>
<td>-16</td>
<td>180</td>
<td>X</td>
<td>-0.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>EL_09</td>
<td>UA_E-RO</td>
<td>1627</td>
<td>-915</td>
<td>1831</td>
<td>X</td>
<td>-4.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>EL_12</td>
<td>RS-RO</td>
<td>28</td>
<td>18</td>
<td>6</td>
<td>X</td>
<td>-6.4</td>
<td>-2.0</td>
<td>0.6</td>
</tr>
<tr>
<td>EL_13</td>
<td>GE-RO</td>
<td>2697</td>
<td>-2591</td>
<td>1924</td>
<td>X</td>
<td>-426</td>
<td>-194.2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: REKK, DNV GL
# RESULTS (example: Electricity)

<table>
<thead>
<tr>
<th>Project Code</th>
<th>Countries</th>
<th>Change in Indicator due to Project</th>
<th>Scores of Indicators [Scale 1 (min) to 10 (max)]</th>
<th>Weighted Scores of Indicators</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Benefit-Cost Ratio (B/C ratio)</td>
<td>System Adequacy Index (SAI)</td>
<td>Herfindahl-Hirschman-Index (HHI)</td>
<td>Implementation Progress Indicator (IPI)</td>
</tr>
<tr>
<td>EL_01</td>
<td>RS-BA</td>
<td>-3.97</td>
<td>1.22</td>
<td>-599.30</td>
<td>6</td>
</tr>
<tr>
<td>EL_03</td>
<td>BA-HR</td>
<td>0.19</td>
<td>0.43</td>
<td>-175.91</td>
<td>5</td>
</tr>
<tr>
<td>EL_07</td>
<td>UA-SK</td>
<td>7.68</td>
<td>0.15</td>
<td>-216.78</td>
<td>1</td>
</tr>
<tr>
<td>EL_09</td>
<td>UA-RO</td>
<td>5.77</td>
<td>0.15</td>
<td>-89.43</td>
<td>-9</td>
</tr>
<tr>
<td>EL_12</td>
<td>RS-RO</td>
<td>0.06</td>
<td>0.13</td>
<td>-317.66</td>
<td>1</td>
</tr>
<tr>
<td>EL_13</td>
<td>GE-RO</td>
<td>0.74</td>
<td>0.45</td>
<td>-137.82</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: REKK, DNV GL
PECI/PMI selection process: January 2020 – June 2020

- 6 electricity infrastructure, 20 gas, 3 oil, 0 smart grid candidate projects were evaluated

### List of PECI in Electricity

<table>
<thead>
<tr>
<th>EL_01</th>
<th>Transbalkan corridor</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>New 400 kV OHL SS Kragujevac 2 (RS) – SS Kraljevo 3 (RS), with voltage level upgrade in SS Kraljevo 3 (RS) to 400 kV voltage level</td>
</tr>
<tr>
<td>b</td>
<td>New double circuit 400 kV OHL SS Obrenovac (RS) – SS Bajina Basta (RS) with upgrade of SS Bajina Basta (RS) to 400 kV</td>
</tr>
<tr>
<td>c</td>
<td>New 400 kV interconnection between SS Bajina Basta (RS) - Visegrad (BA) - Pljevlja (ME)</td>
</tr>
</tbody>
</table>

### List of PMI in Electricity

| EL_07 | 400 kV Mukacheve (Ukraine) – V.Kapusany (Slovakia) OHL rehabilitation |
| EL_09 | 750 kV Pivdenoukrainska (Ukraine) – Isacea (Romania) OHL rehabilitation and modernization |
| a | Upgrade and extension of the internal line within Ukraine; Yuso Ukrainska-Prymorskaya |
| b | Upgrade and extension of the cross-border line between Ukraine and Romania; Prymorskaya – Issacea |
PECI - Gas

<table>
<thead>
<tr>
<th>#</th>
<th>Project Name</th>
<th>Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas_13</td>
<td>Albania-Kosovo* Gas Pipeline - ALKOGAP</td>
<td>Supplying Kosovo* competing projects’ cluster</td>
</tr>
<tr>
<td>Gas_26</td>
<td>North Macedonia-Kosovo* Interconnector</td>
<td>Supplying Kosovo* competing projects’ cluster</td>
</tr>
<tr>
<td>Gas_11</td>
<td>Interconnector Serbia-North Macedonia</td>
<td>Supplying North Macedonia competing projects’ cluster</td>
</tr>
<tr>
<td>Gas_09</td>
<td>Interconnector Bulgaria-Serbia (PCI) as a competing project with TurkStream expansion in Serbia (Gastrans project)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

PMI - Gas

<table>
<thead>
<tr>
<th>#</th>
<th>Project Name</th>
<th>Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas_29</td>
<td>SCP Georgian Offtake Expansion for EU LNG Swap</td>
<td>N/A</td>
</tr>
<tr>
<td>Gas_10</td>
<td>Gas Interconnector Serbia-Croatia (Phase I)</td>
<td>N/A</td>
</tr>
<tr>
<td>Gas_28</td>
<td>Trans-Anatolian Pipeline Expansion - TANAPX</td>
<td>Southern Gas Corridor Expansion-TANAPX-SCPFX-IAP</td>
</tr>
<tr>
<td>Gas_22</td>
<td>South Caucasus Pipeline Further Expansion - SCPFX</td>
<td>Southern Gas Corridor Expansion-TANAPX-SCPFX-IAP</td>
</tr>
<tr>
<td>Gas_16</td>
<td>Ionian Adriatic Pipeline - IAP</td>
<td>Southern Gas Corridor Expansion-TANAPX-SCPFX-IAP</td>
</tr>
<tr>
<td>Gas_4b</td>
<td>Interconnector Greece-North Macedonia</td>
<td>Supplying North Macedonia competing projects’ cluster</td>
</tr>
<tr>
<td>Gas_01</td>
<td>Interconnector Bosnia and Herzegovina - Croatia North</td>
<td>Supplying Bosnia and Herzegovina competing projects’ cluster</td>
</tr>
<tr>
<td>Gas_03</td>
<td>Interconnector Bosnia and Herzegovina - Croatia South</td>
<td>Supplying Bosnia and Herzegovina competing projects’ cluster</td>
</tr>
</tbody>
</table>
THANK YOU
FOR YOUR ATTENTION

davor.bajs@energy-community.org

GET IN TOUCH

- www.energy-community.org
- Ener_Community
- /company/energy-community
- /Ener.Community
- /EnergyCommunityTV