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Monitoring the Cross-Border Capacity Market In South East Europe

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POTOMAC ECONOMICS

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Introduction

I. The Energy Community Treaty
II. Overview of Market Monitoring
    A. Overview of Market Monitoring
    B. Overview of SEE Market Monitoring
    C. Example of SEE Monitoring "Indicator"
    D. Thresholds and "Reference Levels";
III. SEE Market Monitoring Indicators
IV. SEEAMMS

Energy Community

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Energy Community

- Energy Community of South East Europe extends the European Union's (EU) internal energy market to South East Europe (SEE).
- Signatory parties agreed to implement the EU *acquis communautaire* on electricity, gas, environment, competition and renewables
- The **Parties** to the Treaty are the European Union, on the one hand, and nine **Contracting Parties**, namely, Albania, Bosnia & Herzegovina, Croatia, former Yugoslav Republic of Macedonia, **Moldova**, Montenegro, Serbia, **Ukraine**, and UNMIK.
- The market monitoring project is designed to help ensure the transition to competitive markets.

Market Monitoring

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Rationale for Market Monitoring

- What is ***Market Monitoring***?
- ***Market Monitoring*** is to ensure competition in liberalized markets.
  - ✓ Competition itself may not be enough to endure efficient outcomes
  - ✓ Vertical Market Power (control of transmission)
  - ✓ Horizontal Market Power (control of generation)
- The role of ***market monitoring*** has been to advise and inform the regulator.
  - ✓ The structure of the market (concentration, vertical integration);
  - ✓ Compliance with market rules;
  - ✓ Behavior of individual market participants and the market as a whole;

Rationale for Market Monitoring

- ***Market Monitoring*** provides a focused observation of market activities, conduct, and outcome;
  - ✓ Experience in other regions has indicated that market monitoring should be in place before market opening;
  - ✓ Development of the monitoring approach should proceed in parallel coordination with the development of the market design;
- ***Market monitoring*** is conducted using screens and analyses that rely on both public data and data from market participants;

Rationale for Market Monitoring

- ***Market Monitoring*** seeks to identify solutions to market structure flaws;
  - ✓ solutions should lead to improved market outcomes;
- ***Market Monitoring*** seeks to identify potential anticompetitive conduct
  - ✓ often detecting activities is sufficient to cause change in conduct;
  - ✓ The mere presence of a monitoring system can deter anticompetitive conduct;
- ***Market Monitoring*** provides a path toward greater transparency, a goal that has been recognized as contributing toward development of efficient markets;

Rationale for Market Monitoring
Non-RTO Markets

- ***Market Monitoring*** is most noticed in centralized spot markets (RTOs, Midwest ISO, PJM ISO, New York ISO)
  - ✓ These markets have multi-lateral exchanges;
  - ✓ ***Market monitoring*** is also conducted in non-RTO markets.
  - ✓ This is particularly important for market monitoring in South East Europe because South East Europe in a non-RTO market.
- In non-RTO markets, bilateral trading systems rely on open-access transmission tariffs to ensure non-discriminatory access to transmission service.
  - ✓ ***Market monitoring*** in these market focuses on the operation of the transmission network and the adherence to open-access policies.

Market Monitoring in South East Europe

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Market Monitoring Indicators

- Market Monitoring in SEE is focused on individual ***Indicators***
- An indicator is focused on a market or operating variable (e.g., load level)
- The Indicator shows whether a certain variable is outside an ***established range***.
- If an Indicator is outside a range, then regulatory intervention is recommended.

Market Monitoring Indicators

Three-Step Monitoring Process

- Calculate Indicator
  - ✓ Based on some theory of market performance or outcome (e.g., TRM value)
- Establish Threshold Range
  - ✓ Based on an expected competitive value of the indicator (What to expect under competitive conditions)
- Regulatory Follow-up if Necessary
  - ✓ Regulator will attempt to "Mitigate" when Indicator exceeds threshold

SEE Monitoring

- Market Monitoring in SEE is focused on access to cross-border transmission capacity;
- Transmission capacity is established using Net Transfer Capacity (NTC) estimates;
- A key part of the market monitoring is monitoring assumptions of the Capacity Assessment;
  - ✓ Capacity Assessment is the process used to estimate the level of cross-border transmission capacity that can be used to transfer electricity between control areas.

Underlying Theory of SEE Market Monitoring Indicators

Network Model Base Case uses forecasts to estimate available cross-border capacity:

Base Case Assumptions

- Base Case Exchange (expected trades between control areas)
- Forecast Load
- Forecast Generation
- Transmission Topology

Error in Assumptions

→ Error in NTC

→ Restrict Cross-Border Trade

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SEE Market Monitoring Indicators

Base Case Assumptions

- BCE →
- Forecast Load →
- Forecast Generation →
- Transmission Topology →

Market Monitoring Indicators ask: Are these assumptions accurate?

Base Case Exchange Indicator

Base Case Exchange (BCE) Indicator

- Monitors the accuracy of cross-border transactions forecasts in Network Model;
- BCE values are a forecast of cross-border commercial schedules.
- Therefore, the BCE Indicator is simple
  - ✓ Compute the ***forecast error*** and
  - ✓ Establish a ***threshold range***.

Base Case Exchange Indicator

BCE Indicator

Forecast Error:

(Forecast – Actual) / Actual

(BCE – Commercial Schedules) / Commercial Schedules

- Indicator 1- Indicator 6 are all focused on testing some aspect of a forecast;
- Hence, all six indicators use the forecast error formula;

Base Case Exchange Indicator

BCE Indicator

Two Elements to the Indicator

(1) Compute Forecast Error

(2) Threshold Range:

Threshold Range

Indicator Violation when

Forecast Error > Threshold ⟶ **?**

(BCE – Commercial Schedules) / Commercial Schedules

Base Case Exchange Indicator

BCE Indicator

Threshold Range:

- The threshold ranges used for the BCE Indicator as well as the other Indicators is based on Reference Values;
- Reference Values are used in market monitoring to establish "competitive benchmarks"
  - ✓ Basic idea of the Reference Value is to estimate what a supplier would do under competitive conditions.
  - ✓ One approach is to use suppliers historical behavior during periods deemed competitive.
    - (e.g., in centralized RTO markets, historical bid/offers are used that occur in low-priced periods)

Base Case Exchange Indicator

BCE Indicator

Reference Levels

- The reference levels used in the MMG Indicators are based on historical values of the Indicator itself.
  - ✓We consider the range of forecast errors across all participants and all interconnections.
  - ✓We consider outliers in this collections of forecast errors to be "non-competitive" or modeling errors.
  - ✓Outliers are considered to be top 15% and bottom 15% of all observations.

Base Case Exchange Indicator

BCE Indicator

Reference Levels

Process:

1. For the prior four months, collect all forecast errors for the Indicator on all interconnections for all data providers;
2. The 15th percentile value and the 85th percentile values are identified. (roughly equal to the 90 percent confidence interval for a normal distribution)
3. Example.
4. The values at the 15th and 85th percentile are the threshold ranges.
   - ✓ Thresholds may be one- or two-sided;
   - ✓ BCE Indicator in one-sided: Forecast Error>Threshold
   - ✓ Load Forecast Indicator is two-sided:

Base Case Exchange Indicator

BCE Indicator

Reference Levels

Process:

4. The values at the 15th and 85th percentile are the threshold ranges.
   - ✓ Thresholds may be one- or two-sided:

     BCE Indicator is two-sided:

     $Threshold_L < Forecast\ Error < Threshold_H$
   - ✓ Other Indicators may be one-sided: Forecast Error < Threshold

Other Monitoring Indicators

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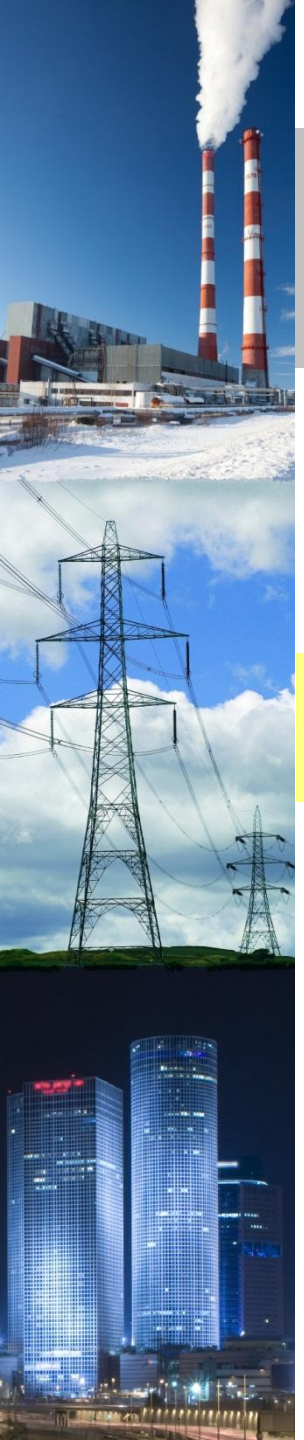
Market Monitoring Indicators

- **Indicator 1**: Base Case Exchange (BCE) Indicator –Monitors the accuracy of cross-border transactions forecasts in Network Model;
- **Indicator 2**: Already Allocated Capacity Indicator – Monitors the usage of cross-border reservation to detect any withholding (Hoarding);
- **Indicator 3**: Critical Facilities Indicator – Monitors the accuracy of Network Model outcomes on cross-border limiting facilities;
- **Indicator 4**: Load Forecast Indicator – Monitors the accuracy of load forecasts in Network Model;
- **Indicator 5**: Generation Output Indicator – Monitors the accuracy of generation forecasts in Network Model;
- **Indicator 6**: TRM Indicator – Monitors TRM calculations;
- **Auction Data Indicators** – Indicators the results of cross-border capacity auctions;

AAC Indicator

Description: Compare AAC to monthly peak schedules

- ✓ AAC v. peak Commercial Schedules
- ✓ Forecast Error formula: (f-a)/a
- ✓ Thresholds based on 85th percentile



Market Monitoring Indicators

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Critical Facilities Indicator

Description:

(1) Identify constrained facility in Network Model;

(2) Report model flow in network model;

(3) Report actual flow on facilities;

Discussion:

- ✓ Constrained Facilities;
- ✓ Forecast Error formula: (f-a)/a
- ✓ Thresholds (85th percentile)

Market Monitoring Indicators

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Load Forecast Indicator

Discussion:

- ✓ Forecast Error formula: (f-a)/a
- ✓ Thresholds (85th and 15th percentile)

Market Monitoring Indicators

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- **Auction Data Indicators** – Indicators the results of cross-border capacity auctions;

Generator Forecast Indicator

Discussion:

- ✓ Top ten generators
- ✓ Use forecast error
- ✓ Threshold based on 85th percentile

Market Monitoring Indicators

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- **Auction Data Indicators** – Indicators the results of cross-border capacity auctions;

TRM Indicator

Description:

- Based on ENSTO-E TRM approach;
  - ✓ The ENTSO-E approach bases TRM on standard deviation of Area Control Error (ACE). ACE is the hourly difference between control area load and total supply (generation plus net imports).
- Indicator uses an estimate of TRM based on historical control area imbalances and compares to posted TRM value.

Market Monitoring Indicators

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- **Indicator 5**: Generation Output Indicator – Monitors the accuracy of generation forecasts in Network Model;
- **Indicator 6**: TRM Indicator – Monitors TRM calculations;
- **Auction Data**– Analyzes the results of cross-border capacity auctions;

Auction Indicator

Description:

1. Collect and analyze results of auctions for cross-border capacity;
2. Monitor annual monthly, daily auctions;
3. Calculate share and concentration of capacity for each interconnection;

South East Europe Automated Market Monitoring System (SEEAMMS)

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SEEAMMS

South East Europe Automated Market Monitoring System

SEEAMMS automates:

- ✓ Data Collection/upload
- ✓ Data Storage
- ✓ Indicator Calculation (forecast error)
- ✓ Threshold Calculations
- ✓ Indicator “Variances”
- ✓ Reporting and downloads;