Short Term Gas Demand Forecasting

Case study by Egypt

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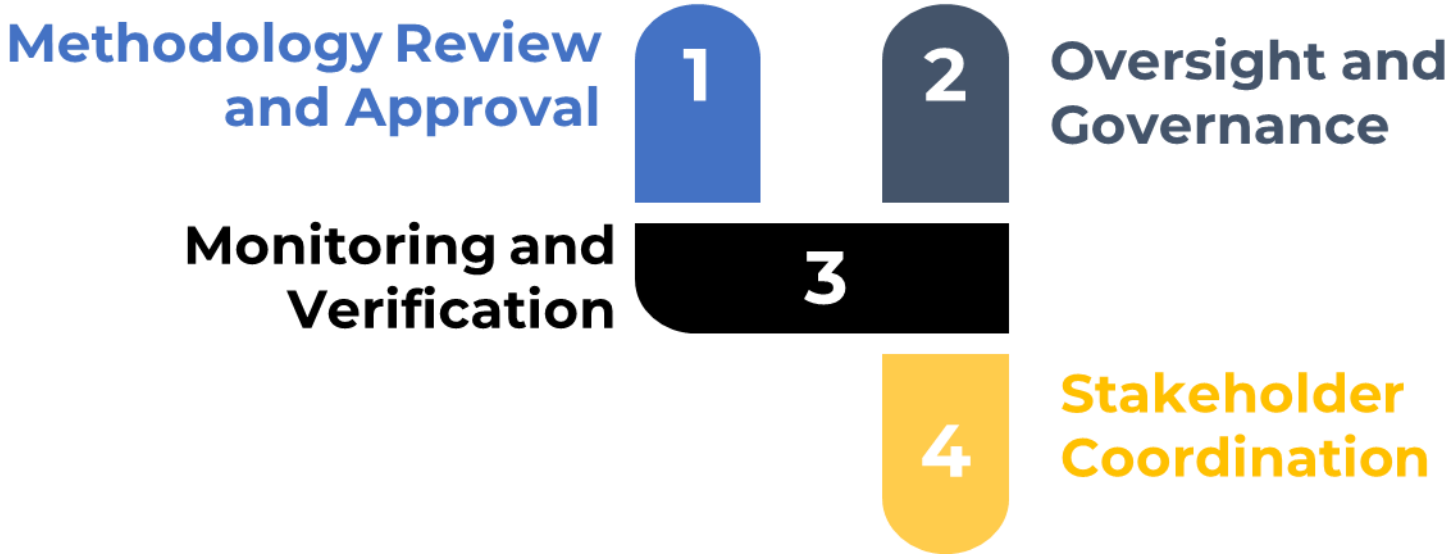
Topic description
as per 2024-2026 workplan

This case study shall focus on the methodology for setting short-term gas demand forecasts, particularly for the annual and winter periods. The discussion will cover the data used by the Transmission System Operator (TSO) to forecast gas demand for different users, including Distribution System Operators (DSOs), industrial high-pressure users, and power plants. Participants should delve into the methodology and specific gas forecast calculation formulas for volume and flow applicable to each type of transmission system user.

Regulator Role in Gas Forecasting

In Egypt, the regulator acts as a supervisor and approver of the gas demand forecasting process. By ensuring that TSOs/DSOs conduct forecasts and accurately, GasReg safeguards the stability and efficiency of the gas market while supporting national energy goals.



Purpose and Objectives of the Gas Demand Forecasting

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Segmented Gas Demand Forecasting

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Residential and Commercial Users	▪ Gas use is for cooking and water heating ▪ Consumption is generally stable year-round, with minor fluctuations influenced by household expansion and urbanization.
Industrial Users	▪ fertilizer, and steel producers, are among the largest gas consumers in Egypt. ▪ Demand is linked to production cycles, economic activity, and export market performance.
Electricity Sector	▪ it is the largest gas consumer in Egypt, as natural gas is the primary fuel for electricity generation. ▪ the demand is influenced by electricity peak loads, particularly in summer due to air conditioning, and by operational schedules of combined-cycle and steam power plants.
Export	▪ Egypt used to be exporter of LNG and gas, with export demand driven by global market conditions. ▪ The export ability is related to balance domestic needs as a priority.
Distribution System Operators (DSOs)	▪ DSOs manage the supply for smaller users, including residential, commercial, and small industrial customers. ▪ Demand patterns depend on the expansion of distribution networks and customer connections.

Inputs When Forecasting the Gas Demand

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- Historical Consumption Data
- Weather Forecasts
- Gas Cost Forecasts
- Connection Data

- Contracts and Market Agreements
- Energy Policy and Macroeconomic Factors
- Other Supply-Side Inputs
- Power Generation Needs

Mathematical Models for Forecasting

- The forecasting methodologies in the Egyptian gas market are not static but evolve to align with market development and emerging priorities.
- Methodologies considered may include Regression-Based Models ,Time-Series Analysis , Simulation and Scenario Analysis
- Dynamic methodologies offer flexibility to adapt to market changes, accuracy by tailoring models to sector-specific characteristics, and preparedness to address diverse market scenarios effectively.

Challenges and Best Practices in Gas Demand Forecasting

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Challenges	Best Practices
▪ **Data Quality and Availability** Leads to unreliable forecasts, especially for newly connected users or expanding industrial zones. ▪ **Unpredictability of Weather** Sudden deviations from forecasts during periods of extreme heat (affecting cooling load) or lately cold weather. ▪ **Industrial and Power Sector Variability** Difficult to predict industrial and power sector demand with precision. ▪ **Global LNG Market Dynamics** Impacts the balance between domestic supply and export obligations. ▪ **Lack of Standardized Methodologies:** Reduces confidence in aggregated forecasts for planning and policy-making.	▪ Invest in more advanced high-quality data collection systems, such as smart meters, and real-time monitoring tools. ▪ Foster collaboration between TSOs, DSOs, industrial users, and regulators to share data, assumptions, and methodologies. ▪ Develop multiple demand scenarios, including base case, high-demand, and low-demand scenarios. ▪ Continuously update models to reflect changing market conditions, such as growing residential connections, increased LNG trade, or renewable energy integration.

THANK YOU
FOR YOUR ATTENTION!

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