An Outlook to Turkish Electricity Market in terms of Regulatory Framework

Power Projects and Investment Opportunities in Turkey and Middle East
## High Scenario - Figures

<table>
<thead>
<tr>
<th>Year</th>
<th>Installed Capacity (MW)</th>
<th>Increase in Installed Capacity (MW)</th>
<th>Available Capacity (MW)</th>
<th>Peak Power Demand (MW)</th>
<th>Deficiency in meeting Peak Power Demand (MW)</th>
<th>Increase in Peak Power Demand (%)</th>
<th>Reserve Power Capacity (%)</th>
<th>Energy Demand (GWh)</th>
<th>Increase in Energy Demand (GWh)</th>
<th>Increase in Energy Demand (%)</th>
<th>Investment Needed (USD/Year)</th>
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<tbody>
<tr>
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<td>46.041.600(*)</td>
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</table>

(*) 1 MW Investment = 2.2 Billion USD
Power Projects and Investment Opportunities in Turkey and Middle East

High Scenario – Projections

Supply-Demand Balance of Turkey

Installed Capacity (MW)
Available Capacity (MW)
Peak Power Demand (MW)
### Power Projects and Investment Opportunities in Turkey and Middle East

#### Supply-Demand Balance of Turkey

#### High Scenario – Power Demands

<table>
<thead>
<tr>
<th>Year</th>
<th>Low Scenario MW</th>
<th>High Scenario MW</th>
<th>Low Scenario Growth (%)</th>
<th>High Scenario Growth (%)</th>
</tr>
</thead>
<tbody>
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<td>36.122</td>
<td>7.80</td>
<td>7.80</td>
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<tr>
<td>2012</td>
<td>38.000</td>
<td>38.000</td>
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<td>2013</td>
<td>40.128</td>
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<td>2018</td>
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<tr>
<td>2019</td>
<td>56.976</td>
<td>60.226</td>
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<td>6.80</td>
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<tr>
<td>2020</td>
<td>60.451</td>
<td>64.321</td>
<td>6.10</td>
<td>6.80</td>
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</table>

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Diagram: Supply-Demand Balance of Turkey

- Düşük Sen. MW
- Yüksek Sen....
### High Scenario – Energy Demands

<table>
<thead>
<tr>
<th>Year</th>
<th>Low Sen. MW</th>
<th>High Sen. MW</th>
<th>Low Sen. Growth (%)</th>
<th>High Sen. Growth (%)</th>
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<td>229.344,00</td>
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<td>2014</td>
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<td>282.527,00</td>
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<td>2016</td>
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<td>6,50</td>
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<td>350.983,00</td>
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<tr>
<td>2018</td>
<td>356.738,00</td>
<td>376.955,00</td>
<td>6,50</td>
<td>7,40</td>
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<tr>
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<td>404.850,00</td>
<td>6,50</td>
<td>7,40</td>
</tr>
</tbody>
</table>
| 2020 | 404.621,00  | 434.809,00   | 6,50                | 7,40                 

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**Supply-Demand Balance of Turkey**

![Graph showing supply-demand balance]
Opinions - Conclusions

- Annual demand growth rate is still too high, i.e. 7.5% and does not seem to fall,

- This demand growth rate seems to lead most likely to a serious supply-demand deficiency in 2015 (w.r.t. High Scenario) or in 2017 (w.r.t. Low Scenario),

- Total investment needed for the generation sector, by the end of 2020 is about 46 billion USD, with no obvious solution for funding,

- Investment needed in each year is about $46 / 8 = 5.75$ billion USD, which is too high and seems to be unrealizable unless private sector is invited and encouraged to participate the projects,
Opinions - Conclusions

- Within the next 8 years, \(74.2 - 55.6 = 18.6 \times 10^3\) MW generation capacity needs to be installed, implying that; \(2.32 \times 10^3\) MW is to be installed in each year, which seems to be unreasonable,

- Nuclear power seems to be one of the most significant alternatives for restoring the supply-demand balance,

- But the first unit of Akkuyu that will be put in service in 2020, seems to be too late for helping to restore the supply demand gap, furthermore the social reaction to nuclear power projects is growing,

- In any case, Nuclear power projects will have an increasing importance everywhere, contrary to social reactions,
Opinions - Conclusions

- Energy prices seem to be continually rising, due to both financial burden arising from the financial bottleneck in Europe and continually rising fuel prices in the Middle East,

- Financial resources for energy projects will no longer be easily available, as was so in the past, hence more severe conditions will be imposed on feasibility studies,

- The rise in energy prices will definitely lead the society to more stringent measures for energy efficiency,

- Energy efficiency measures that were regarded to be unfeasible in the past, will turn out to be feasible and attractive,
Opinions - Conclusions

- A wide field of commercial opportunities will be available for the experts on energy efficiency, both in the domestic and in industrial levels,

- The efforts for discovering cheaper alternative technologies for energy production will most likely be unpromising, thus the fuel prices, in particular gas prices seem to continue rising,

- Coal prices will closely follow gas prices, tending to increase in the same proportion,
Opinions - Conclusions

- New energy technologies will most likely be developed on the demand side, for improving energy efficiency both in the domestic and in industrial levels,

- Increasing energy prices will most likely increase the attention to coal resources and to improve clean generation technologies,

- Uninterested behavior of USA, China and India in not respecting the Environmental Protocols will eventually lead the societies to a stage that the environmental concerns in energy generation will no longer be of their primary concern.
The most basic condition for investment is the establishment of a suitable investment climate.

Basic Conditions for suitable investment climate:

- Realizing vertical unbundling in all levels; i.e. in functional, organizational, physical and ownership levels,
- Establishment of an Independent Regulatory Authority,
- Realizing third-party access,
- Realizing cost-based prices in wholesale market
Basic Conditions for Investment

- In most countries the regulatory authorities are subject to severe influence of political authorities, thus, weakening their independence,

- The most essential function the regulatory authority is to be able to liberate the electricity prices in the wholesale markets, in terms of competitive market conditions, with no influence of political authority,

- The political authorities in those countries on the other hand, generally tend to intervene the wholesale prices in the direction of their own political objectives, i.e. to lower the prices, in order to gain the sympathy of the society, and to fund the energy tariffs and projects from public resources at the expense of losing large public financial resources,
Basic Conditions for Investment

- This type of intervention however, eventually leads to an unsuitable environment and eventually to a financial breakdown, where investors find themselves with no possibility of making investment, as their projects turn out to be unfeasible, in terms of those prices, hence they cancel their investment programs,

- This intervention eventually leads to a condition that the government owned public wholesale companies become the largest entities in the market, governing and funding the wholesale prices, thus inhibiting the market liberalization completely,

- This happy period continues until the supply-demand balance turns out to be disturbed and new investments are urgently needed, and public resources are neither sufficient, nor available, while the prices are still kept at low level,
Basic Conditions for Investment

- Then the governments in those countries find themselves in a situation that no solution exists, except inviting foreign investments,

- Inviting foreign investment on the other hand requires the satisfaction of one of the following conditions,

- To agree to make TOP (Take or Pay) Agreements in case of insisting on continuing cheap electricity prices,

- or to liberate the wholesale prices, thus leading to a completely liberalized market structure.
Fully - Subsidized Wholesale Electricity Market

Market prices do not rise, since they are subsidized by the Government

Is Cost Based Price < Wholesale Market Price ?
- Yes: Enter market
- No: Avoid entering market (Do not make any investment)

Private owned Generation Companies

Government owned Wholesale Company
- Energy sold at subsidized price to all wholesale dealers (eligible customers)
- Energy sold at Subsidized Price

Government owned Generation Company
- Energy sold at Cost Based Prices

Ministry
- Ministry plays a social role

Treasury
- Public Subsidy made to all customers

Subsidized Wholesale Market

Ministry for Energy

Loop

Deficiency in supply-demand balance

Please note that, this condition is usually not satisfied, hence private generation companies with no TOP agreements can not enter the market, unless their prices are less than the subsidized wholesale market price, thus, eventually leading to supply deficiency.
Wholesale Electricity Market with TOP (Take or Pay) Agreements

- **Government owned Generation Company**
  - Make investment in generation portfolio, regardless of the cost based prices
  - Energy sold at Cost Based Price

- **Private owned Generation Companies with TOP Agreements**
  - TOP (Take or Pay) Purchasing Agreement
  - Energy sold at Cost Based Price

- **Private owned Generation Companies without TOP Agreements**
  - Is Cost Based Price < Wholesale Market Price?
    - Yes: Enter market
    - No: Avoid entering market (Do not make any investment)

- **Ministry**
  - Ministry plays a social role

- **Treasury**
  - Public subsidy made to all customers
  - Cost Based Prices

- **Subsidized Wholesale Market**
  - Energy sold at subsidized price to all wholesale dealers (eligible customers)

**Please note that, this condition is usually not satisfied, hence private generation companies without any TOP agreements can not enter the market, unless their prices comes out to be less than the subsidized wholesale market price, thus, eventually leading to supply deficiency**
Power Projects and Investment Opportunities in Turkey and Middle East

Competitive Wholesale Electricity Market

- **Private Owned Generation Companies**
  - Energy sold at Cost Based Prices
  - Is Cost Based Price < Wholesale Market Price?
    - Yes: Make investment in generation portfolio
    - No: Avoid entering market (Do not make investment)

- **Cost Based Wholesale Market**
  - Energy sold at Cost Based Prices
  - Market prices rise
    - Loop
    - Deficiency in supply-demand balance
      - Ministry plays a social role
        - Ministry
          - Treasury
            - Direct subsidy (made only to retail customers with low income)

- **Retail Companies**
  - Energy sold at Cost Based Prices
  - Energy sold at Subsidized Prices
    - Retail Customers
      - (Customers who do not need direct subsidy)
    - Retail Customers with Low Income
      - (Customers who need direct subsidy)