Turkey

Key Figures 2
OVERVIEW 3
1. Energy Outlook 4
2. Oil 5
   2.1 Market Features and Key Issues 5
   2.2 Oil Supply Infrastructure 7
   2.3 Decision-making Structure for Oil Emergencies 9
   2.4 Stocks 10
3. Other Measure 12
   3.1 Demand Restraint 12
   3.2 Fuel Switching 13
   3.3 Others 13
4. Natural Gas 14
   4.1 Market Features and Key Issues 14
   4.2 Natural gas supply infrastructure 16
   4.3 Emergency Policy for Natural Gas 18

List of Figures
Total Primary Energy Supply 4
Electricity Generation, by Fuel Source 4
Oil Consumption, by Product 5
Oil Demand (kb/d) 5
Crude Oil Imports, by Source 6
Refinery Output vs. Demand 7
Oil Infrastructure Map 9
Oil Consumption, by Sector 12
Natural Gas Consumption, by Sector 14
Natural Gas Infrastructure Map 17
Turkey

Key Oil Data

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>Production (kb/d)</td>
<td>40.6</td>
<td>72.5</td>
<td>67.7</td>
<td>52.8</td>
<td>43.5</td>
<td>48.3</td>
<td>45.6</td>
<td>44.9</td>
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<td>Demand (kb/d)</td>
<td>359.5</td>
<td>477.0</td>
<td>608.3</td>
<td>662.8</td>
<td>647.5</td>
<td>649.8</td>
<td>655.9</td>
<td>670.3</td>
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<td>Motor gasoline</td>
<td>44.4</td>
<td>74.0</td>
<td>100.2</td>
<td>83.6</td>
<td>61.9</td>
<td>47.3</td>
<td>44.7</td>
<td>41.2</td>
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<td>Gas/diesel oil</td>
<td>114.2</td>
<td>153.7</td>
<td>180.0</td>
<td>184.8</td>
<td>216.8</td>
<td>300.1</td>
<td>310.6</td>
<td>327.6</td>
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<td>Residual fuel oil</td>
<td>121.3</td>
<td>119.8</td>
<td>144.4</td>
<td>141.5</td>
<td>117.8</td>
<td>20.2</td>
<td>18.7</td>
<td>19.8</td>
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<tr>
<td>Others</td>
<td>79.7</td>
<td>129.6</td>
<td>183.7</td>
<td>164.4</td>
<td>252.9</td>
<td>251.1</td>
<td>282.3</td>
<td>281.9</td>
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<td>Net imports (kb/d)</td>
<td>318.9</td>
<td>404.5</td>
<td>540.6</td>
<td>610.0</td>
<td>604.0</td>
<td>601.5</td>
<td>610.3</td>
<td>625.4</td>
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<td>Import dependency</td>
<td>88.7%</td>
<td>84.8%</td>
<td>86.9%</td>
<td>92.0%</td>
<td>93.3%</td>
<td>92.6%</td>
<td>93.0%</td>
<td>93.3%</td>
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<tr>
<td>Refining capacity (kb/d)</td>
<td>460</td>
<td>725</td>
<td>713</td>
<td>691</td>
<td>714</td>
<td>630</td>
<td>630</td>
<td>630</td>
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<tr>
<td>Oil in TPES</td>
<td>46.0%</td>
<td>44.3%</td>
<td>46.1%</td>
<td>40.0%</td>
<td>34.0%</td>
<td>28.6%</td>
<td>27.7%</td>
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End-Month Total Oil Stock Levels - Five Year Range

Key Natural Gas Data

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<tr>
<td>Production (mcm/y)</td>
<td>67</td>
<td>212</td>
<td>182</td>
<td>639</td>
<td>897</td>
<td>682</td>
<td>761</td>
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<tr>
<td>Demand (mcm/y)</td>
<td>67</td>
<td>3 468</td>
<td>7 029</td>
<td>14 835</td>
<td>27 375</td>
<td>38 127</td>
<td>44 686</td>
</tr>
<tr>
<td>Transformation</td>
<td>18</td>
<td>2 585</td>
<td>3 600</td>
<td>8 845</td>
<td>15 157</td>
<td>20 708</td>
<td>21 570</td>
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<tr>
<td>Industry</td>
<td>49</td>
<td>814</td>
<td>1 984</td>
<td>2 098</td>
<td>3 839</td>
<td>7 901</td>
<td>9 878</td>
</tr>
<tr>
<td>Residential</td>
<td>-</td>
<td>49</td>
<td>1 364</td>
<td>3 218</td>
<td>5 747</td>
<td>5 888</td>
<td>8 779</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>20</td>
<td>81</td>
<td>674</td>
<td>2 632</td>
<td>3 630</td>
<td>4 459</td>
</tr>
<tr>
<td>Net imports (mcm/y)</td>
<td>-</td>
<td>3 256</td>
<td>6 847</td>
<td>14 196</td>
<td>26 478</td>
<td>37 445</td>
<td>43 925</td>
</tr>
<tr>
<td>Import dependency</td>
<td>0.0%</td>
<td>93.9%</td>
<td>97.4%</td>
<td>95.7%</td>
<td>96.7%</td>
<td>98.2%</td>
<td>98.3%</td>
</tr>
<tr>
<td>Natural Gas in TPES</td>
<td>0.1%</td>
<td>5.4%</td>
<td>9.4%</td>
<td>16.6%</td>
<td>27.0%</td>
<td>29.6%</td>
<td>32.3%</td>
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</table>

End-Month Natural Gas Stock Levels - Five Year Range

1 - Primary oil stocks on national territory; these exclude utility stocks and including pipeline and entrepot stocks where known.
2 - Stock's held on national territory, as reported to the IEA in monthly data submissions.

* Based on monthly data submissions to the IEA.
OVERVIEW

Oil has been one of the main energy sources in Turkey, accounting for some 28% of the country’s total primary energy supply (TPES) in 2011. Turkey’s oil demand slightly increased from 637 kb/d in 2003 to 670 kb/d in 2012, although it dropped down from 678 kb/d in 2009 to 650 kb/d in 2010. The transport sector accounted for half of total oil consumption in 2010. Domestic oil production is in decline in Turkey, amounting to 45 kb/d or about 6.7% of total consumption in 2012.

In 2012, Turkey imported 712 kb/d, consisting of about 392 kb/d of crude oil and some 320 kb/d refined products. Around 39% of total crude oil imports came from Iran. Crude oil and petroleum products are mainly undertaken by tankers and two major international pipelines running through the country with a total annual handling capacity of 2.8 mb/d. In the country, there are four operational refineries with a total crude distillation capacity of around 610 kb/d.

Turkey meets its 90-day stockholding obligation to the IEA by placing a minimum stockholding obligation on industry. Under the relevant acts, refineries and fuel distribution companies are obliged to hold at least 20 days of product stocks based on the average daily sales of previous year, while eligible consumers that use more than 20,000 tonnes annually are required to hold 15 days’ consumption of each type of liquid fuel.

Turkey held some 61 million barrels of oil stocks at the end of January 2013, equating to 99 days of 2011 net-imports. Around 55% of total oil stocks are held in the form of crude oil. The use of emergency oil stocks is central to Turkey’s emergency response policy, which can be complemented by demand restraint measures.

The share of natural gas in the country’s TPES significantly increased at 32% in 2011. Turkey’s gas demand significantly increased from 0.7 billion cubic meters (2 mcm/d) in 1987 to 45.3 bcm (124 mcm/d) in 2012, while indigenous natural gas production totalled some 0.63 bcm in the same year. The transformation sector was the largest consumer of natural gas in 2011, representing about 48% of the country’s total gas consumption.

Russia was the largest supplier, representing 58% of total imports in 2011. Turkey has four international gas pipelines in operation with a total import capacity of some 46.6 bcm, and it has planned to diversify natural gas import pathways through constructing new major cross border pipelines and LNG terminals.

Key elements of Turkey’s overall gas security policy are diversifying long-term supply contract portfolio, forming an energy hub from Central Europe and the Middle East to Europe, increasing natural gas storage facilities, cutting back contractual supplies, and fuel switching to alternative fuels in power generations. Gas importers are obliged to hold gas storage capacity corresponding to 10% of their annual gas import. The country has also planed to oblige all power plants with fuel switching capacity to hold sufficient amount of secondary fuel such as diesels.

The transmission system operator, BOTAŞ, would take the lead in time of crisis under the supervision of the Energy Market Regulatory Authority. In case of a gas supply disruption in which responsible gas suppliers are not identified, the TSO will endeavour to curb gas consumption by reducing the contractual capacities of interruptible contracts and gas fired power plants which can switch to alternative fuels.
1. Energy Outlook

Turkey’s TPES has risen considerably from 24.4 million tonnes of oil equivalent (Mtoe) in 1973 to 114.1 Mtoe in 2011 at a compound annual growth rate of 4%. TPES is most likely considered to continue to grow at a compound annual growth rate of around 4.5% from 2015 to 2030, rising to over 237 Mtoe in 2030.

Oil has been one of the main energy sources in Turkey, accounting for some 28% of the country’s total primary energy supply (TPES) in 2011. The share of natural gas in the country’s TPES significantly increased from 5% in 1990 to 32% in 2011. Coal is also a large energy source in Turkey, whose share in the country’s TPES increased to 30% in the same year. Renewable energy including hydro energy provided 10% of TPES. The Administration aims to increase the share of renewables to 30% of its electricity generation by 2023, installing 20 GW of wind capacity as well as 600 MW of geothermal capacity. The country plans to introduce two nuclear power plants in order to make nuclear energy responsible at least for 5% of its electricity generation by 2023.
2. Oil

2.1 Market Features and Key Issues

Turkey produced 45 kb/d of crude oil in 2012, which was equivalent to 6.7% of total consumption. Around 50 upstream companies were granted exploration and production licences in 2012. About 75% of exploration areas are covered by Turkish Petroleum Company (TPAO). The industry estimates that crude oil production will reduce to 0.6 Mt (12.1 kb/d) by 2030, unless new abundant oil fields are discovered.

Turkey’s oil demand slightly increased from 637 kb/d in 2003 to 670 kb/d in 2012, although it dropped down from 678 kb/d in 2009 to 650 kb/d in 2010. The transport sector accounted for half of total oil consumption in 2010. Domestic oil production is in decline in Turkey, amounting to 45 kb/d or about 6.7% of total consumption in 2011.

In 2010, around 50% of Turkish total oil demand was consumed in the transport sector, while the industry sector and the commercial/agriculture/other sector accounted for 24% and 14% respectively. Relatively high oil demand in the industry sector derives from construction sector (around 33% of industry share) and chemical sector (31%). In terms of oil demand by product, demand for diesel almost doubled from 2003 to 2012 while demand for gasoline decreased by 34%. Demand for heating oil/other gasoil also increased during the same period. Demand for residual fuels significantly dropped by 86%. Turkish Petroleum Industry Association (PETDER) forecasts that consumption of gas oil will significantly increase from 2010 to 2020 at a compound annual growth rate of around 3.7%.
Imports/exports and import dependency

Turkey’s oil imports in 2012 were some 712 kb/d, consisting of about 392 kb/d of crude oil and some 320 kb/d refined products. Concerning crude import sources, Iran was the biggest supply source of crude oil with 39% of the 2012 total, followed by Iraq (19%), Saudi Arabia (15%) and Russia (11%). In 2012, refined product imports came from Russia (28%), Italy (18%), India (13%), Greece (12%), and Algeria (11%).

![Crude Oil Imports, by Source](chart)

Source: Monthly Oil Statistics, IEA

Oil Company Operations

TPAO, a state-owned company, is the country’s main domestic crude oil producer covering about 75% of total domestic production in 2011. TPAO also actively conducts production and exploration projects abroad: Azerbaijan, Kazakhstan, Iraq and Libya. In 2012, 50 companies are licensed to conduct exploration and production activities. Half of them are foreign-capitalised companies.

TÜPRAŞ is the country’s biggest industrial company and it operates four refineries, while two other refineries are being constructed by Star Refining and Eastern Mediterranean (Doğu Akdeniz) Refinery.

The Turkish Oil industry Association, PETDER, represents the 15 major companies operating on the Turkish retail and wholesale oil market. These companies collectively represent over 75% of oil sales on the Turkish market. In 2011, 49 distributors operate 12,441 filling stations in the country. There are also 70 LPG distributing companies running 9,663 LPG autogas stations.

Taxes and maximum price mechanism

Wholesale and retail prices are mainly influenced by the relevant quotation prices and exchange rates, which are driven by the global market fundamentals and expectations. Government interference is mainly limited to determining the level of the excise tax and VAT under normal conditions, although the Petroleum Market Law obliges refineries and distributors to notify the Authority of ceiling prices by taking into account the global market prices at the closest accessible point. The Administration is also authorised to determine base and/or ceiling prices in case that competitive environment is hindered and/or oil supply is disrupted in the market. As of 2Q2012, while the share of all tax components in the retail price is some 49% for unleaded gasoline, the share of all tax components is some 39% for automotive diesel (for non-commercial purposes).
2.2 Oil Supply Infrastructure

Refining

There are four refineries in operation with a total crude distillation capacity of around 610 kb/d. All of them are owned by TÜPRAŞ. The refineries also process feedstocks which directly go through in secondary units. Those refineries have a vacuum distillation capacity of around 210 kb/d, which can process vacuum residue or vacuum gasoil. Three refineries in Izmit, Izmir and Kirkkale are medium complex refineries, while the Batman Refinery is a simple refinery with atmospheric and vacuum crude units, which is located close to crude oil production area in southeastern Turkey.

In 2011, TÜPRAŞ processed 13 types of crude oil from nine countries, whose gravities ranged between 23 API and 45 API with sulphur contents between 0.6% and 4.1%. Almost 65% of crude oil processed in the county was medium and heavy sour crude in 2011, followed by heavy/sour (28%) and light/sweet (7%). The industry, however, stated during the review that the refineries’ complexity is developed enough to process other, similar or lighter crude oils.

Furthermore, two refineries are under construction/plan: one refinery is expected to be operationalised by 2015 in Izmir by Star Refining, while Eastern Mediterranean (Doğu Akdeniz) Refinery carries out a feasibility study of another refinery in Adana. When construction of those refineries is completed, the country’s total crude distillation capacity will rise to 1.1 mb/d with a new distillation capacity of around 510 kb/d.

In 2011, the total crude throughputs averaged 413 kb/d. Total utilization rate of four refineries is around 75%: Izmit (82%), Izmir (73%), Kirkkale (59%) and Batman (86%). In 2012, the refined product output totalled 486 kb/d. The main product of those refineries is gas/diesel oil (33%), which is followed by gasoline (21%), kerosene (15%), residual fuel oil (6%) and LPG (5%).

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<tr>
<th>Product</th>
<th>Refinery Output</th>
<th>Demand</th>
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<tr>
<td>LPG and Ethane</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Naphtha</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Gasolines</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Jet and Kerosene</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Gas/Diesel Oil</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Residual Fuels</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Other Products</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Monthly Oil Statistics, IEA

With the exception of gasoline, jet and kerosene and residual fuels, domestic refinery production is insufficient for meeting demand in the country. In 2012 domestic production of gas/diesel oil was able to meet 52% of domestic oil use, while LPG and Ethane amounted to some 21% of domestic demand. Those products require imports to meet the remaining share, although domestic refinery gross output of both products increased from 23.5 kb/d for LPG and 144 kb/d for gas/diesel in 2011 to 24.6 kb/d and 160 kb/d in 2012 respectively.

Pipelines and Ports

Imports of crude oil and petroleum products are mainly undertaken by pipelines and tankers. While Izmit refinery and Izmir refinery import crude oil by tankers, crude oil is delivered to the Kirkkale Refinery and the Batman Refinery by pipelines.
Two major international pipelines run through the country: Kirkuk-Ceyhan Pipeline and Baku-Tbilisi-Ceyhan Pipeline. There are also three domestic pipelines: Ceyhan-Kirkkale Crude Oil Pipeline, Batman-Dörtyol Crude Oil Pipeline and Şelmo-Batman Crude Oil Pipeline. BOTAS is responsible for operation of those oil pipelines. Total length of crude oil pipelines in the country reaches to 3,374km and its annual handling capacity is 2.8 mb/d (140.2 Mt per year) in 2012.

Kirkuk-Ceyhan Crude Oil Pipeline runs from Kirkuk, Iraq, to the Ceyhan Oil Terminal on the Mediterranean since 1976. A second pipeline parallel to the first one was commissioned in 1987, which brings total maximum annual capacity to 1.4 mb/d (70.9 Mt per year). In September 2012, Iraq and Turkey agreed to extend Iraqi crude oil import through the pipeline by 15 years. In 2011, this pipeline brought 163.3 mb of crude oil from Iraq to Turkey (447 kb/d in average).

Baku-Tbilisi-Ceyhan Crude Oil Pipeline has been into operation since 2006. This pipeline allows the Caspian region’s crude oil transportation from Baku to Ceyhan via Georgia. It has a total length of 1,760 km. The original capacity of the pipeline was 1 mb/d (50 Mt per year), but 1.2 mb/d could be transported with drag-reducing agents at present. Also, there is a plan to expand the capacity to 1.6 mb/d. In 2011, this pipeline brought 257.2 mb of crude oil from the Caspian Sea to the country (704 kb/d in average).

As for domestic pipelines, Ceyhan-Kirkkale Crude Oil Pipeline has a maximum capacity of 135 kb/d, running from Ceyhan to Kirkkale Refinery. In 2011, around 20.2 mb of crude oil were brought through this pipeline (55.2 kb/d in average). Batman-Dörtyol Crude Oil Pipeline, with a capacity of 86.4 kb/d, aims to transport crude oil produced in South-eastern Anatolia region to the Dörtyol Marine Terminal. Around 10.1 mb of crude oil was brought through this pipeline in 2011. Şelmo-Batman Crude Oil Pipeline has a capacity of 16 kb/d to transport crude oils produced in the Şelmo area to the Batman Terminal, but this pipeline has not been in operation since 2008.

Furthermore, Turkey has a plan to construct a pipeline from Samsun on the Black Sea to Ceyhan with a capacity of some 1.1 mb/d (55 Mt per year), which could be expanded to 1.5 mb/d (75 Mt per year). It aims to reduce increasing tanker traffic in Turkish Straits.¹ The project has been still in negotiations with Russia which could export crude oil through the pipeline, although the countries signed a Memorandum of Understanding to support the realisation of the project in May 2010.

The country has a dozen of important oil ports: Antalya, Mersin-Ataş, Trabzon, Hopa, Izmir/Aliağa, Gemlik, Tekirdağ, İzmit, Iskenderun, Zonguldak, and Istanbul. In 2011, the country’s handling capacity at ports totalled 243.2 Mt or 5.9 mb/d: 144.8 Mt for loading and 98.5 Mt for unloading. Those ports are oriented towards oil products, especially diesel oil. However, several key ports including Samsun, Mersin-Ataş, Izmir/Aliağa, İzmit and Istanbul can also unload other petroleum products such as jet fuel and gasoline. Ports in Izmir/Aliağa and İzmit have a capacity of unloading crude oil, as they need to carry crude oil to the refineries close to the terminals.

¹ The Turkish Straits are 698 meter wide at their narrowest point, forming one of the busiest chokepoints for international oil transit. Between 120 and 140 Mt (from 2.4 to 2.6 mb/d) of crude oil and oil products were annually transported through Istanbul Strait (Bosphorus Strait) from 2010 to 2012 and between 140 and 150 Mt (from 2.8 to 3.0 mb/d) through Çanakkale Strait (Dardanelles Strait).
Storage Capacity

Total storage capacity in Turkey is estimated at some 79 mb (12.5 million cubic meters). Most of storage capacities are located in the Marmara region, the Aegean region and the Central Anatolia region, where the refineries are located, as well as in the Mediterranean region which includes Ceyhan Oil Terminal. At the end of 2011, around 44% of total storage capacity is owned by TÜPRAŞ, followed by fuel distributors (37%), BOTAŞ (18%) and TPAO (1%). The number of tanks at refineries of TÜPRAŞ amounts to 448 tanks as of June 2012: 125 tanks in Izmit, 171 in Izmir, 95 in Kırıkkale, and 57 in Batman.

Construction of new refineries led by Star Refining and Eastern Mediterranean (Doğu Akdeniz) Refinery will add 18.9 mb (3 mcm) of storage capacity, while Samsun-Ceyhan oil pipeline project needs 14 oil tanks which amount to 13.2 mb (2.1 mcm). Total storage capacity of the country will be expanded to over 110 mb (17.5 mcm) with completion of those new infrastructure projects.

2.3 Decision-making Structure for Oil Emergencies

The National Oil Stock Commission (NOSC) is responsible for energy security in supply disruption. The Commission is chaired by the Undersecretary of the Ministry of Energy and Natural Resources (MENR), and it is composed of the Undersecretary of Treasury and representatives from the Ministry of National Defence, the Ministry of Foreign Affairs, the Ministry of Finance, the Ministry of Interior Affairs, the Energy Market Regulatory Authority (EMRA), and the General Directorate of Petroleum Affairs (GDPA). The MENR and the GDPA coordinate as secretariat and form the core of the Turkish National Emergency Strategic Organisation (NESO). The Petroleum Market Law provides the legal basis for establishing the NESO.

During an emergency, the Chairman of the NOSC will convene a meeting with the Commission members to make a decision to release compulsory industry stocks, which is estimated to be
taken within two days. Decisions of the NOSC will be implemented by the GDPA in close cooperation with the industry.

2.4 Stocks

Stockholding Structure

Turkey meets its stockholding obligation to the IEA by placing a minimum stockholding obligation on industry. According to the Petroleum Market Law, the country should hold oil stocks equivalent to at least 90 days of its net imports.

Refineries and fuel distribution licensees are obliged to hold at least 20 days of product stocks based on the average daily sales of previous year. These stocks must be held at their own storage or licensed storage facilities. New entrants in the distribution market are obliged to hold 3.3 Kt of stocks at minimum.

Eligible consumers that use more than 20 Kt on an annual basis are also obliged to hold 15 days’ consumption of each type of liquid fuel in their consumption inventory.

In addition, refineries are asked to hold, on behalf of the Administration, complementary stocks which correspond to the remaining balance of 90 days of net oil imports. However, the complementary stocks have not been put in place yet, although refineries eventually hold commercial oil stocks more than asked as complementary stocks. The draft Law on Complementary Oil Stocks is expected to ensure that the complementary stocks shall be held in an appropriate manner.

While the NOSC determines the base number of days, the type, quantity and place of emergency oil stocks, the EMRA is given the legal authority to conduct regular inspections and to order a company to provide any information necessary for its stockholding obligations.

Crude or Products

Turkey held some 61 mb of oil stocks at the end of January 2013, equating to 99 days of 2011 net-imports. Around 55% of total oil stocks are held in the form of crude oil, as refineries are allowed to hold crude oils in place of gasoline and diesel on the condition that they shall report the amount and the type of substitution. Middle distillates accounts for 21% of the country’s total stocks, followed by motor gasoline (5%). Compulsory stocks are comingled with commercial and operational stocks in storages.

Turkish emergency oil stocks are mainly held by TÜPRAŞ which owns all refineries in operation (about 66% of total emergency stocks as of December 2011), followed by fuel distributors (28%), LPG distributors (4%) and eligible consumers (2%).

Location and Availability

Since Turkish legislation does not allow emergency oil reserves held abroad, Turkey does not have either bilateral agreements or ticket arrangements with other countries. Therefore, all emergency oil stocks are held in the country.
Emergency oil stocks are considered to be held on top of the minimum operating requirements (MOR) in the industry. Refineries need more than 20 days of stocks as the MOR and distributors require around 10 days of stocks.

**Monitoring and Non-compliance**

Since April 2007, Turkey has become marginally compliant with the IEA 90 days obligation, with two dips below this level in December 2007 and in October 2009. In October 2009, Turkey held 88 days of oil stocks due to shipping delay. Minimum stock levels necessary to cover the 90 days of net imports required by the I.E.P. Agreement range between 50 to 62.6 mb, depending on the mix of crude and product stocks held.

The EMRA conducts regular on-site audits on randomly selected facilities twice a year to monitor physical availability and quality of compulsory stocks in cooperation with the Ministry of Science, Industry and Technology. Technical requirements are also tested on site by individual experts.

In cases there is a failure to comply with stock obligations in terms of quality, quantity and location of oil products, companies can be sentenced to fines. The license of the company may be cancelled in case of a serious infringement. Only four small companies have been fined due to lack of storage facilities.

**Stock Drawdown and Timeframe**

The Petroleum Market Law requires a decision by the NOSC to drawdown compulsory industry stocks during an oil supply disruption. Based on the decision taken by the NOSC, the GDPA will request obligated industry to release necessary oil stocks in close cooperation with the EMRA. Stock release will be most likely made by refineries. The Government’s decision could be made in two days and stock release is estimated to be made in about three days.

The country has never released emergency oil stocks for domestic purposes, but it participated in the IEA’s collective actions by releasing oil stocks held by TÜPRAŞ in 2005 and in 2011.

**Financing and Stockholding Costs**

The Turkish government does not provide financial support for building compulsory industry stocks. All refineries, distributors and eligible consumers must self-fund the operational costs of meeting emergency requirements. These costs are implicitly passed on to final consumers in market prices. There is no official figure for emergency oil stocks but it is estimated to be around 12-15 US dollars per tons.

The cost of complementary stocks held by refineries on behalf of the government is levied on consumers. The level of the levy is determined by the Energy Market Regulatory Board at a maximum of 10 US dollars per ton. However, the collected levies remain unused, amounting to around 500 million US dollars as of end 2012, as complementary stocks have not been put in place yet.
3. Other Measure

3.1 Demand Restraint

As in other IEA countries, the transport sector makes up the single largest share of oil consumption in Turkey. In 2010, the transport sector represented 50% of total oil use in the country. However, this is lower than in most IEA countries (the IEA average is around 60% for the transport sector). Following the transport sector, the industry sector represented 24% of total oil use (compared to an IEA average of 21%). Relatively high oil demand in the industry sector derives from construction sector (around 33% of total industry share) and chemical sector (31%). The remainder of oil consumed in Turkey in 2010 was in the commercial/agriculture/other sector (14%) and the transformation/energy sector (7%).

![Oil Consumption, by Sector](source: Oil Information, IEA)

Demand restraint is considered as a secondary emergency response measure that could complement an oil stock release in Turkey.

Turkey's demand restraint measures would range from light-handed measures (e.g. information and energy-saving campaigns) on a recommendation basis, to heavy-handed measures (e.g. mandatory speed limits, a ban on weekend driving and short distance driving, temporary restrictions on heating for houses and public buildings under 15 degrees Celsius, restriction on lighting of shop windows, prohibition of motor sports, introduction of delivery quotas of gasoline, tax increase and rationing) which will be deployed only in case that light-handed measure are not enough to reduce oil consumption. The Administration also regularly promotes general energy efficiency measures by organising an intensive energy and natural resources saving campaign in the first week of January every year.

Decisions to implement demand restraint measures will be taken by the Coordination Board, established under the Law on Organisation and Duties of Headship of Disaster and Emergency Management in 2009. The Coordination Board will be advised by the NOSC. An approval by the parliament will be required for implementation of tax increase and rationing/allocation measures. The local governors are asked to implement demand restraint measures which the Coordination Board decides according to a crisis. Demand restraint measures will be monitored by monthly statistical reports from the oil industry, and the Administration will conduct ad hoc reviews if necessary.

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2 Total Consumption (including refinery consumption), does not include international marine bunkers.
3.2 Fuel Switching

Short-term fuel switching from oil to other fuels is not regarded as an emergency response measure in Turkey, as the share of oil in power generation sector was estimated to be only 1.5% in 2011, amounting to 3.4 TWh. There is little potential to switch away from oil to other energy sources in this sector.

3.3 Others

According to the Petroleum Law, the Administration can ask producing companies to increase oil production. Domestic production surge is estimated to be a 5-10% increase of production for 10 days in the time of a crisis. It is too little to cover domestic oil demand since the country’s annual crude oil production was around 45 kb/d in 2012.
4. Natural Gas

4.1 Market Features and Key Issues

Gas production

In 2012, indigenous natural gas production totalled some 0.63 billion cubic metres (bcm). Gas production is projected to be depleted.

Gas demand

Turkey’s demand for natural gas significantly increased from some 0.7 bcm (2 mcm/d) in 1987 to around 45.3 bcm (124 mcm/d) in 2012.

<table>
<thead>
<tr>
<th>Natural Gas Consumption, by Sector</th>
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<tbody>
<tr>
<td>Energy</td>
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<tr>
<td>Transport</td>
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<tr>
<td>Dist. losses</td>
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<td>Commercial/other</td>
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<td>Residential</td>
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<tr>
<td>Industry</td>
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<tr>
<td>Transformation</td>
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</table>

In 2011, the transformation sector was the largest consumer of natural gas in Turkey, representing about 48% of the country’s total gas consumption, while the industry and the residential sector represented 22% and 20%, respectively. Gas demand in Turkey peaks in winter when gas consumption significantly increases for electricity, combined heat and power (CHP) and heat plants. The Turkish monthly peak gas demand stood at some 5.2 bcm per month in January 2012. Daily peak demand was recorded in the same month, amounting to around 186 mcm/d.

Given that electricity demand is estimated to increase by 7.5% annually until 2020, gas demand may rise at a significant rate despite efforts to promote non-fossil fuels in the electricity. In 2011, natural gas accounted for some 45% of total electricity generation, while coal and hydro represent 28% and 23%, respectively.

Gas import dependency

Due to limited amount of indigenous natural gas production, Turkish gas demand is mostly supplied by imports through pipelines or in the form of LNG. The country’s total natural gas imports in 2011 amounted to some 44 bcm (120.5 mcm/d), corresponding to 98% of its total gas demand.
In 2011, Russia was the largest supplier, representing 58% of total imports in 2011. Iran (19%), Algeria (9.5%) and Azerbaijan (8.7%) are other key gas supply sources for Turkey. Most of natural gas comes through international pipelines from Russia, Iran and Azerbaijan. Natural gas from Algeria and Nigeria are imported in the form of LNG. Natural gas imports are dependent on long term contracts. The LNG supply contract with Algeria was extended for 10 years in January 2013, as a result of the country’s efforts to diversify its gas supply sources.

**Gas Companies**

The gas market was liberalised in May 2001, with the Natural Gas Market Law N° 4646 which obliges state-owned BOTAŞ to reduce its market share in import, wholesale and distribution. However, BOTAŞ still remains a dominant gas market player.

As for gas imports, BOTAŞ is obliged to gradually transfer its import contracts until its market share decreases to 20% of annual consumption. As such, 4 bcm of annual natural gas import from Russia was transferred to four private companies: Enerco Enerji (2.5 bcm), Bosphorus Gaz (0.75 bcm), Avrasya Gaz (0.5 bcm), Shell Enerji (0.25 bcm). In April 2012, the Administration conducted tender process for another 6 bcm of natural gas import from Russia via the border with Bulgaria. As a result of the tendering, four companies acquired right to import natural gas from Russia: Akfel (2.25 mcm), Bosphorus Gas (1.75 mcm), Kibar Enerj (1 mcm), and Batı Hattı (1 mcm).

As for LNG trade, about 86% of total LNG imports were led by BOTAŞ in 2011, while the remaining part was imported by Ege Gas.

Together with natural gas imports through pipelines, some 39 bcm of natural gas was imported by BOTAŞ in 2011, while about 5-6 bcm was imported by private gas importers. Gas imported by BOTAŞ was 43.1 bcm in 2012.

There are 42 wholesaling companies in the country. Wholesalers are not allowed to engage in transmission and distribution. Sales amount of a wholesale company is also limited to be less than 20% of projected national gas consumption. They are obliged to hold storage capacity to respond to their customers’ peak gas demand.

Concerning the retail market, 63 distribution companies are licensed in 2012. They are obliged to purchase natural gas from two different sources at least. According to the Administration, there were some 9.1 million contracts at the end of 2011 when residential gas consumption has reached to 11.3 bcm.

On the upstream side, TPAO is the largest natural gas producing company, which operates natural gas fields in the Thrace Basin and in the West Black Sea offshore. Natural gas produced in the Thrace Basin has been sold directly to local consumers, as there is no access to the national transmission network.
4.2 Natural gas supply infrastructure

Pipelines and Ports/LNG terminal

BOTAŞ Transmission division is the operator of the national transmission system in the country. The transmission system has approximately 9,555 km of pipeline within Turkey. With the distribution grid included, the total length of the gas grid is around 12,290 km. The country has nine entry points: 4 points through international pipelines, 2 LNG terminals, 2 domestic production areas and one storage facility.

The system comprises 7 gas compressor stations with a compressor capacity of 250 MW in total, and over 200 pressure reducing and metering stations. As the country faces a difficulty to transfer gas imported from east to northwest with the current compression capacity, two new compressor stations with a capacity of 98 MW are expected to be integrated to the transmission system in 2013. Turkey has 290 primary exit points: 53 points are operated by BOTAŞ Transmission division while 237 entry points are operated by distribution companies.

There are four international gas pipelines in operation with a total import capacity of some 46.6 bcm (around 127.6 mcm/d or 5.3 mcm/h): Russia-Turkey West Gas Pipeline with a capacity of 16 bcm via Kofcaz on the border with Bulgaria; Russia-Turkey Blue Stream with 14 bcm via Samsun on the Black Sea; Iran-Turkey Pipeline with 10 bcm via Dogubayazi close to the border with Iran; and Baku-Tbilisi-Erzurum Pipeline with 6.6 bcm through Georgia via Ardahan. The country also exports natural gas to Greece through a pipeline with a maximum capacity of 2.4 mcm/d.

Turkey participates in Nabucco Gas Pipeline project in which gas would be delivered from Azerbaijan to Europe with a maximum capacity of 31 bcm. The project support agreement (PSA) was signed between Nabucco Companies and the responsible ministries of five transit countries in June 2011. On the other hand, it is also engaged in Trans Anatolian natural Gas Pipeline (TANAP) project to transport such Shah Deniz phase-two gas to Europe through Turkey with a capacity of 16 bcm, among that 6 bcm is expected to be imported for Turkish domestic gas demand with the remaining 10 bcm for Europe. This project is considered to start construction in 2014 and be completed in 2018, once a final decision is taken.

As an important transit country, Turkey also participates in other various international pipeline projects: Arab National Gas Pipeline project with which Egyptian gas would come to Turkey and Europe through Jordan, Lebanon and Syria; Turkmenistan-Turkey-Europe Natural Gas Pipeline project aiming at transporting 30 bcm of Turkmen gas to Turkey (16 bcm) and Europe (14 bcm); and Iraq-Turkey Natural Gas Pipeline project which is planned to be constructed in parallel to the existing Kirkuk-Ceyhan Crude Oil Pipeline.

As noted above, Turkey has two LNG regasification terminals with a total maximum annual capacity of around 14 bcm. BOTAŞ owns the Marmara Ereğlisi LNG Terminal which has a maximum send-out capacity of some 22 mcm/d. Ege Gaz operates the Aliaga Terminal with a capacity of 16.4 mcm/d. A construction project of a new LNG terminal is under evaluation by the Administration, which is expected to be equipped with a capacity of 18 mcm/d. In 2011, around 6.5 bcm of natural gas was imported in the form of LNG.
The country has around 3 bcm of storage capacity in total, with a sending out capacity of some 58.5 mcm/d. As it is not sufficient enough to meet its increasing gas demand, the Strategic Plan of the MENR in 2008 sets a target to increase gas storage capacity to 4 bcm in 2014.

In 2012, Turkey has 2.66 bcm of underground storages at two depleted gas fields, close to Istanbul, in the Marmara region for seasonal balancing, peak shaving, and gas supply shortage. TPAO operates those storages with an injection capacity of 16 mcm/d and a withdrawal capacity of 20 mcm/d in total. Around 2.1 bcm of this storage capacity is used by BOTAŞ, while some 561 mcm are open for private companies. The storage capacity of the facility is expanded to reach 2.84 bcm with a withdrawal capacity of 25 mcm/d in the second phase by 2014, and then 4.3 bcm with a withdrawal capacity of 70 mcm/d in the revised phase III by 2017.

There are also 5 ongoing projects, one of which is Tuz Gölü (salt lake) natural gas storage project in the Central Anatolia region. The Salt Lake Natural Gas Underground Storage project aims at utilizing salt domes under the Salt Lake. The project seeks to provide supply-demand balance, shave the peak demand, optimize the operation of the natural gas pipeline network particularly in the Central Anatolia Region, as well as meeting gas supply deficit that is expected in years to come. Engineering studies of the Project with an annual storage capacity of 1 bcm was completed. The first phase, comprising of 6 domes is planned to be completed in 2015-2016 and the second phase in 2018-2019 with other 6 units. The facility will be operational after all units are fully completed.

Furthermore, BOTAŞ operates three LNG storage tanks totaling 255,000 cubic meters of LNG or 156.8 mcm of natural gas in Marmara Ereglisi, while Ege Gaz owns 280,000 cubic meters of LNG storage (or 172.2 mcm of natural gas) in Aliaga.

![Natural Gas Infrastructure Map](image-url)
4.3 Emergency Policy for Natural Gas

Key elements of Turkey’s overall gas security policy are diversifying long-term supply contract portfolio, forming an energy hub from Central Europe and the Middle East to Europe, increasing natural gas storage facilities, cutting back contractual supplies, and voluntary fuel switching to alternative fuels in power generations.

The Natural Gas Market Law N° 4646 (2001) sets the standard of gas supply security for suppliers. Gas importers (except spot LNG importers) are obliged to hold gas storage capacity corresponding to 10% of their annual gas import, although they are not necessarily asked to hold such amount of natural gas in the storages. In light of the law, the Transmission Network Operation Principles (Network Code) was approved by the EMRA to regulate operation of the transmission system operator (BOTAŞ Transmission division) and involved companies such as distributors and importers during natural gas supply shortage. The Code has been regularly reviewed by the EMRA since its entry into force in September 2004. According to the Code, BOTAŞ Transmission division would take the lead in time of supply disruption under the supervision of the EMRA.

In 2011, the Minister of Energy and Natural Resources approved an action plan on additional contingency measures. Under the action plan, the Commission for Enduring and Supervising Security of Natural Gas Supply, CESS-NGS, was established with participation of Undersecretary of the MENR (chairperson), the EMRA, the General Directorate of Energy Affairs of the MENR, Turkish Electricity Transmission Corporation (TEİAŞ), state-owned Electricity Generation Company (EÜAŞ), Turkish Electricity Trading and Contracting Company (TETAŞ) and BOTAŞ. The CESS-NGS plans to amend the National Gas Market Law in order to oblige all power plants with fuel switching capacity to hold sufficient amount of secondary fuel such as diesels. It is also planned that all periodic maintenances to be kept at minimum levels during winter time.

Emergency response measures

On electronic bulletin board, the TSO, BOTAŞ Transmission division, announces “Difficult Day” when heavy imbalances in the system occur due to excessive withdraws or insufficient gas entries. Suppliers are requested to implement disruption and interruption orders from the TSO within 8 hours.

When concerned gas importers could be identified, gas supplies can be curtailed in accordance with the end user priority list which is submitted by gas importers every year.

In case of gas supply disruption in which responsible gas suppliers are not identified, the TSO will first endeavour to curb gas consumption by implementing interruptible contracts. However, the share of such contracts with BOTAŞ is limited to around 1.4% of its total sales, because prices between normal contracts and interruptible ones don’t make any significant difference.

The TSO will also reduce the contractual capacities of gas fired power plants which can switch to alternative fuels, and then cut gas supplies to other power plants. Total amount of dual-fired power generations was around 3.5 GW (or some 8.4 mcm/d at net caloric value) as of July 2012, and most of them generate electricity for their own facilities.

When the above measures are not sufficient to mitigate the impact of a gas disruption, the TSO will reduce gas supplies to industry and eventually households.
The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 28 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency’s aims include the following objectives:

- Secure member countries’ access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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- Canada
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