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Turkish Energy Activity and Policy—beyond hydrocarbons

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The Greek audience is focused on the part of Turkish energy policy that has to do with hydrocarbons and in particular [1] exploration in the Aegean and [2] oil and gas pipelines like Turkish Stream and interconnectors such as ITB and ITGI. In this area, it should be noted that Turkey is also switching to LNG, sending signals to Moscow, as Qatargas delivered largest single LNG cargo at Marmara Terminal in spring this year.

However, Turkey has a much more active and diverse energy policy and activity that are worth looking at. This will be the subject of our brief presentation today.

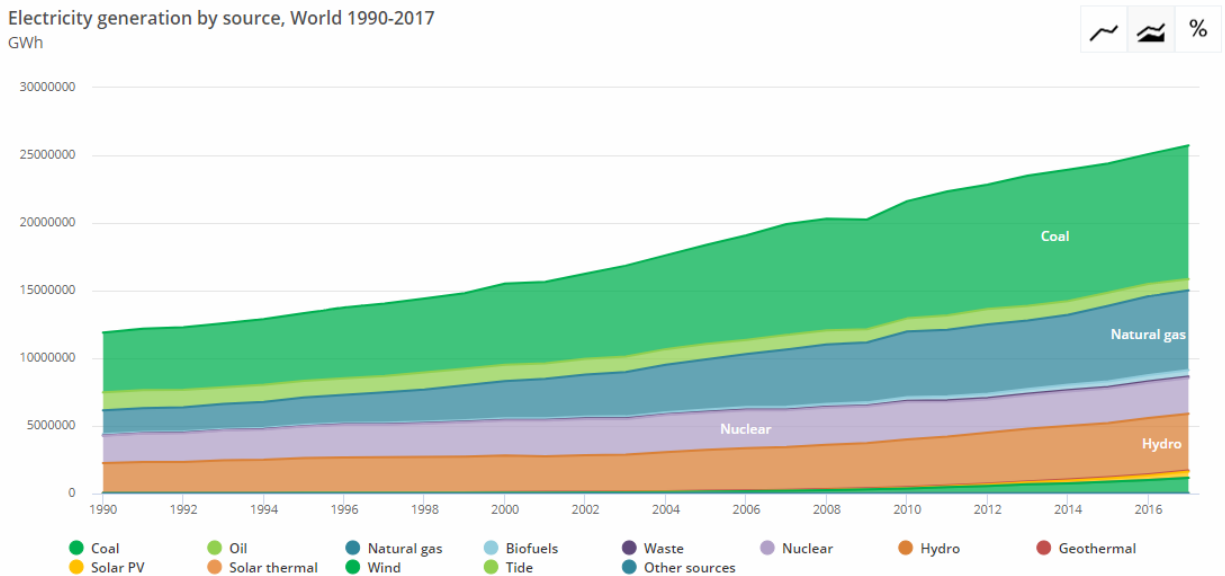
Key energy facts World Coal, 29 May 2019

- Turkey is the 18th largest energy consumer in the world.
- According to the IEA, the country's total primary energy supply (TPES) is 31% oil, 28.1% coal, 28.1% natural gas, 4.2% hydro, 6.3% geothermal, 2.3% biofuels and waste.
- Fossil fuels account for over 87% of the country's energy mix.

Electricity outlook

- Last year, Turkey's electricity generation by source was 36.8% coal, 29.8% natural gas and 32.9% renewables.

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Source: www.iea.org/statistics/

1. Coal

- **Coal was the largest single source for power generation.**

Coal capacity and forecasts

- Turkey is the biggest user of coal-fired power among countries in the Middle East, with the capacity of existing plants estimated to be 18.5 GW.
- Coal demand in Turkey is projected to rise at an average annual rate of 3.3% to 2023. Coal production is also projected to increase from 22 megatonnes of coal equivalent to 28 megatonnes of coal equivalent through to 2023.
- Turkey hit a record high with the production of local coal amounting to 101.5 million tonnes in 2018, Energy and Natural Resources Minister, Fatih Donmez announced Jan 17 '19.

○ Future plans

Table 1: Under Construction and Planned Coal Plants in SEE Countries (MW)*, as of July 2019

Country	Announced New Plants	Pre-permit	Permitted	Announced + Pre-permit + Permitted	Under Construction	Shelved	Operating	Cancelled (2010-2019)
Turkey	14,450	12,975	6,420	33,845	336	17,964	19,337	51,911
Bosnia and Herzegovina	2,380	600	1,100	4,080	0	0	2,073	1,020
Serbia	1,000	750	350	2,100	0	0	4,405	1,070
Romania	0	600	0	600	0	0	5,305	5,105
Kosovo	0	0	450	450	0	0	1,290	330
Greece	0	450	0	450	660	0	4,000	800
North Macedonia	0	130	0	130	0	300	800	300
Montenegro	0	0	0	0	0	0	225	1,410
Bulgaria	0	0	0	0	0	0	4,829	2,660
Slovenia	0	0	0	0	0	0	1,069	0
Croatia	0	0	0	0	0	0	210	1,300
Albania	0	0	0	0	0	0	0	800

*Note: Includes units 30 MW and larger|

2. Hydroelectric

- Large capacity, public as well as private. Production 4 162 266 GWh in 2016

3. Geothermal

- Installed capacity 2018 was 14.9 GWe. Top five countries: USA, Philippines, Indonesia, Turkey [no4] and New Zealand.
- Turkey Global Leader in New Geothermal Capacity in 2018. Croatia was sixth worldwide, with 17.5 MW. Turkey completed several geothermal power projects in 2018, raising its installed capacity by 21% or 219 MW, to 1.3 GW, June 28 '19

4. Nuclear

- Akkuyu nuclear plant under construction Turkey -- Russia's atomic connection April '18
- Rosatom wins license to build 2nd nuclear reactor in Turkey Sept 5 '19

5. Shale oil and gas

- Production of shale oil started, Erdogan announces in the beginning of Oct '19...
- ...could proceed to shale gas in East Thrace where new fields were found 3 billion m³

6. Renewables RES

- Launching 1 GW solar PV tender in December 2018
- Turkey Set to Boost Renewables Capacity to 63 GW by 2024, Rank 5th in Europe November 7, 2019
- ...but Turkish Banks Agree to Restructure \$10 Billion of Energy Sector Loans Oct '19
- New Deadline in Tender for Building 5 Solar Parks in Turkey
Five EU-backed solar projects, a hydropower plant (HPP), water pumps and electric buses, has been extended by a week. All projects will receive financial support under the EU's Instrument for Pre-accession Assistance (IPA II).

7. Batteries, Storage

- Turkey to introduce provisions for storage Sept 27, 2019: The new guidelines are aimed at the sub-1 MW projects which make up the backbone of Turkish solar.
- Toyota, Panasonic may produce electric vehicle batteries in Turkey May 31 '19
- As part of a larger effort Zorlu Enerji announced in March 2018 a 25 GW battery manufacturing plant with Chinese partners

8. Raw materials for RES

- Also in 2018, Zorlu Enerji informed it was doing preliminary R&D on extracting lithium from geothermal fluids.
- AMR Mineral Metal Inc. focused on advancing its Rare Earths & Minor Metals deposits in Turkey in 2014

9. Machinery for RES

- Siemens Gamesa to soon start nacelle production in Turkish factory Nov 8
- Turkey to launch production at first YEKA wind turbine plant in İzmir; \$100-million factory, established after the first wind power Renewable Energy Resource Areas (YEKA) tender was won by Siemens-Türkerler-Kalyon consortium in 2017 requirement of locality rate Nov 8

Outside Turkey

- Turkey's Zorlu Enerji to Build 1.8-MW Solar Farm in West Bank Sept 2 '19
- EBRD Provides Loan to 32.4MW Kitka Windfarm in Kosovo, Developed by Turkish energy group Guris the EU has offered technical cooperation support June 2019

Conclusions

1. Turkish exploration drillings for hydrocarbons indeed have an important geopolitical dimension but they also reflect the country's pressing need to achieve an energy balance [and thus improve their balance of payments, external debt and inflation] and get away from the recession that plagues it from 2018 – for the first time after many years of continuous growth.
2. Turkey has a vast internal market...
3. Their array of initiatives is proactive, and includes manufacturing of renewables equipment and batteries-- and can thus be really called **development** – rather than just 'damage control'
4. Their energy sources for electricity are very diverse and complementary to each other: coal, natural gas, hydro, oil, solar, wind, geothermal, biofuels, nuclear, waste, shale etc
5. The country is taking advantage of being outside the EU: profits from carbon leakage...
6. ...and is free from EU norms and policies [€, Climate policy, anti-nuclear, anti-shale or other] or national psychoses [eg against geothermal energy]
7. Turkey also has large international ambitions...
8. ...and achieves many of the above targets with **EU financing**. For example by benefiting from EIB/EBRD financing -- despite the EU's announcement of sanctions over Cyprus, and by participating in H2020 programs including 'Green Islands' for Πρωκκηπονήσια!