

# “Greek Export Capabilities in the Energy Sector”

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INSTITUTE OF ENERGY  
FOR SOUTH EAST EUROPE



## Some Key Energy Facts on Greece

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- ❑ The Greek energy sector now corresponds to **approx. 6% of GDP**, compared to tourism's contribution of 18.5% to the country's GDP in 2016.
- ❑ **In Greece's energy sector, approx. 150,000 people are employed directly and indirectly:** in oil refining, oil marketing and bunkering, electricity production and distribution, electrical equipment manufacturing, natural gas marketing and installation, RES, etc.
- ❑ An oil-dominated energy sector with **144 thousand barrels per day oil consumption in 2017, according to Hellenic Statistical Authority. Total oil consumption (including refining) amounted to 314 thousand barrels per day in 2017, according to BP Statistical Review 2018.**
- ❑ **Indigenous oil production stands at approx. 5,000 barrels per day in 2017.**
- ❑ **Greece imports almost all its crude oil with Arab countries playing a major role.**

## Investment Opportunities in Greece's Energy Sector

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- As Greece is slowly coming out from the worst recession in its history, the **energy sector is playing a key role in supporting a return to economic growth.**
- Apart from **providing much needed infrastructure for the use of different forms of energy** (i.e. oil, gas, RES, electricity, energy efficiency and CHP), the energy sector can **attract much needed investment for new projects**, but also for **marketing activities** following electricity and gas market deregulation and rising competition.
- Furthermore, Greece is pursuing efforts to **exploit its considerable hydrocarbon resources.**

# Investing in Greece's Energy Sector (I)

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- **Hydrocarbons**
  - Upstream, midstream, downstream
  
- **Natural Gas**
  - Gas trading (LNG, imports)
  - Gas transmission
  - Distribution and marketing
  - Small LNG (bunkering, regional markets)
  
- **Electricity**
  - Power generation
  - Electricity transmission and distribution
  - Retail market

## Investing in Greece's Energy Sector (II)

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### ☐ **Renewables**

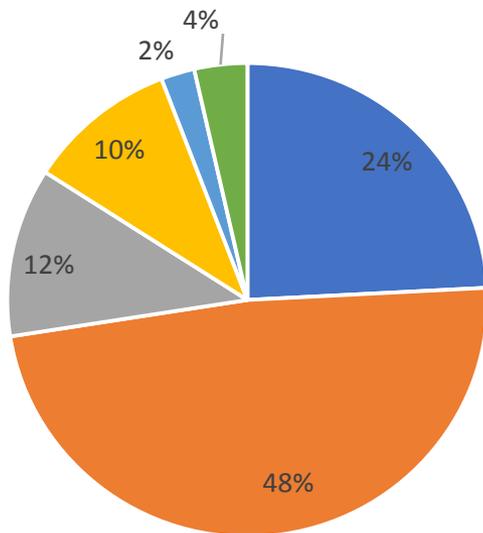
- Solar thermal and PV, wind, biomass, geothermal, small hydro

### ☐ **Energy Efficiency**

- Energy performance of buildings
- Solar passive heating and cooling of buildings
- Solar water heaters
- Energy saving devices and automation
- Energy audits for buildings and businesses

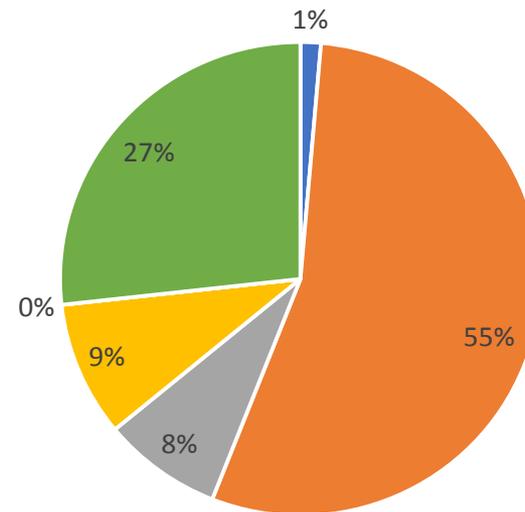
# Greece's Total Primary Energy Supply and Total Final Consumption (2015)

TPES=23.2 Mtoe



■ Lignite ■ Oil ■ Gas ■ RES ■ Hydro ■ Electricity

TFC=16.4 Mtoe



■ Lignite ■ Oil ■ Gas ■ RES ■ Hydro ■ Electricity

Source: IEA

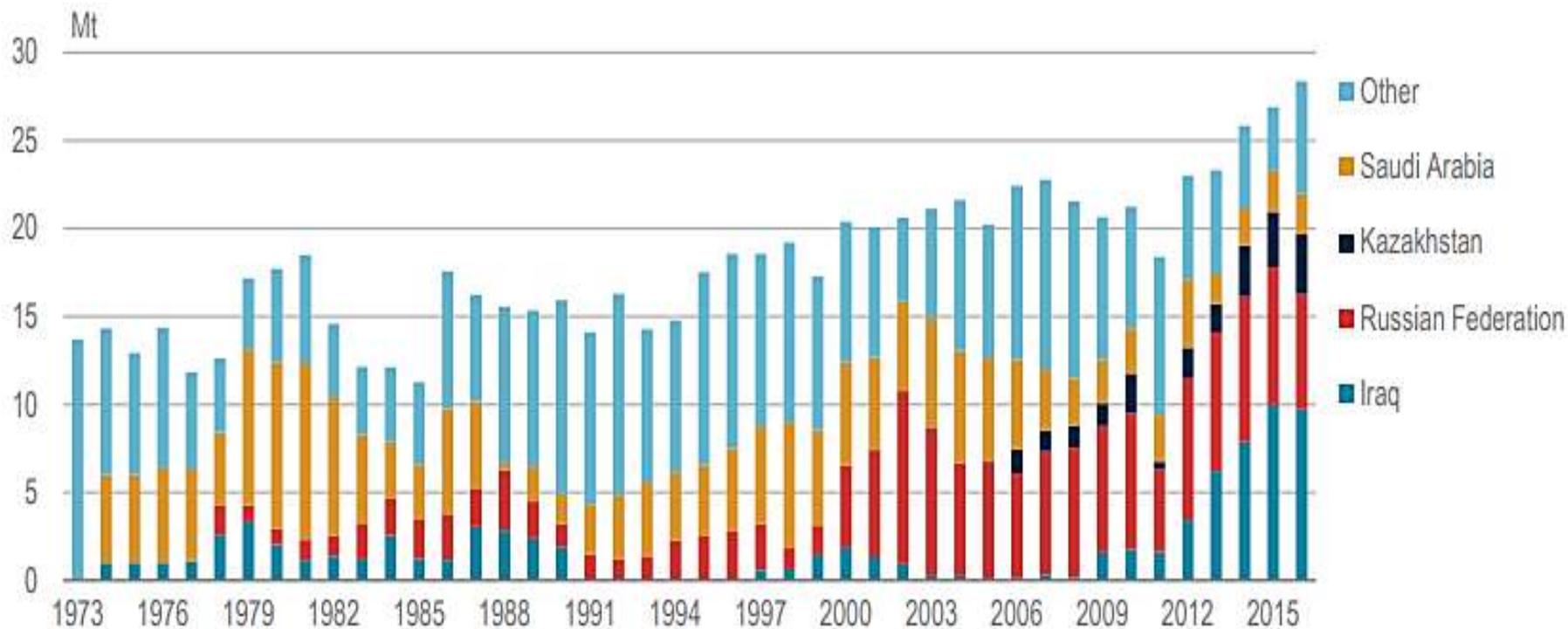
## Greece's Energy Balance (2017)

<b>FUEL</b>	<b>NET IMPORTS*</b>	<b>IMPORT/EXPORT COUNTRY</b>
Crude Oil (import dependency: 98.9%)	26.8 Mt	Iraq (37%) Russian Federation (29.2%)
Oil Products	-11.6 Mt	Saudi Arabia (14.9%) Egypt (12.4%)
Natural gas (import dependency: 99.9%)	3.2 bcm	Russian Federation (61.6%) Turkey (19.4%)
Coal (import dependency: -3.8%)	0.3 Mt	Russia (64.2%) Ukraine (18.7%)
<b>ELECTRICITY</b>		
Imports	11.1 TWh	Bulgaria (32%)
Exports	1.5 TWh	Albania (54.7%)

\*negative numbers mean net exports

Source: IEA World Energy Balances 2017

# Crude Oil Imports by Country, 1973-2016



Note: Crude oil including natural gas liquids and feedstock. Data are provisional for 2016.

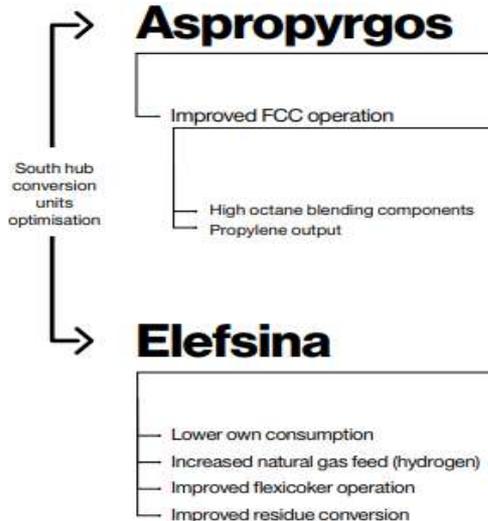
## Oil Refining and Storage



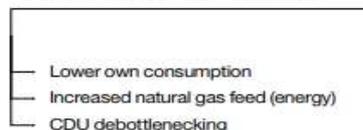
- A total of €4.0 billion of investments in refinery upgrade and expansion were implemented between 2010 and 2014
- A further €1.0 billion to be invested in downstream activities by 2025
- Greece imports some 14.5 mt/y for refining, destined for local consumption and exports, of which approximately 60% comes from Arab countries

# HELPE's Oil Refineries

## 2017 HELPE Refining System Performance Improvements



## Thessaloniki



### Leveraging Investments to Improve Results & Safety

- Operational optimization and full realisation of synergies in the South Refining Hub (Aspropyrgos and Elefsina).
- Optimization of the new refining model, maximizing the full potential of all three refineries, as well as the synergies between them.
- Supply Chain Optimization through broadening the supply of assessed crudes as well as increasing sourcing directly from producers, thereby optimizing crude supply.
- Further development of international trading activities in the Mediterranean and the Balkans.
- Implementation of a Holistic Safety Programme, with the aim of matching health and safety standards of the best companies worldwide.

Significant progress has been achieved regarding the optimization of operations at the Elefsina refinery and the implementation of a series of synergies between the three refineries, which has had a substantial effect on the Group's financials, with exports accounting for approximately 52% of total refining sales.

# Motor Oil's Oil Refinery

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## Leveraging Investments to Improve Results & Safety

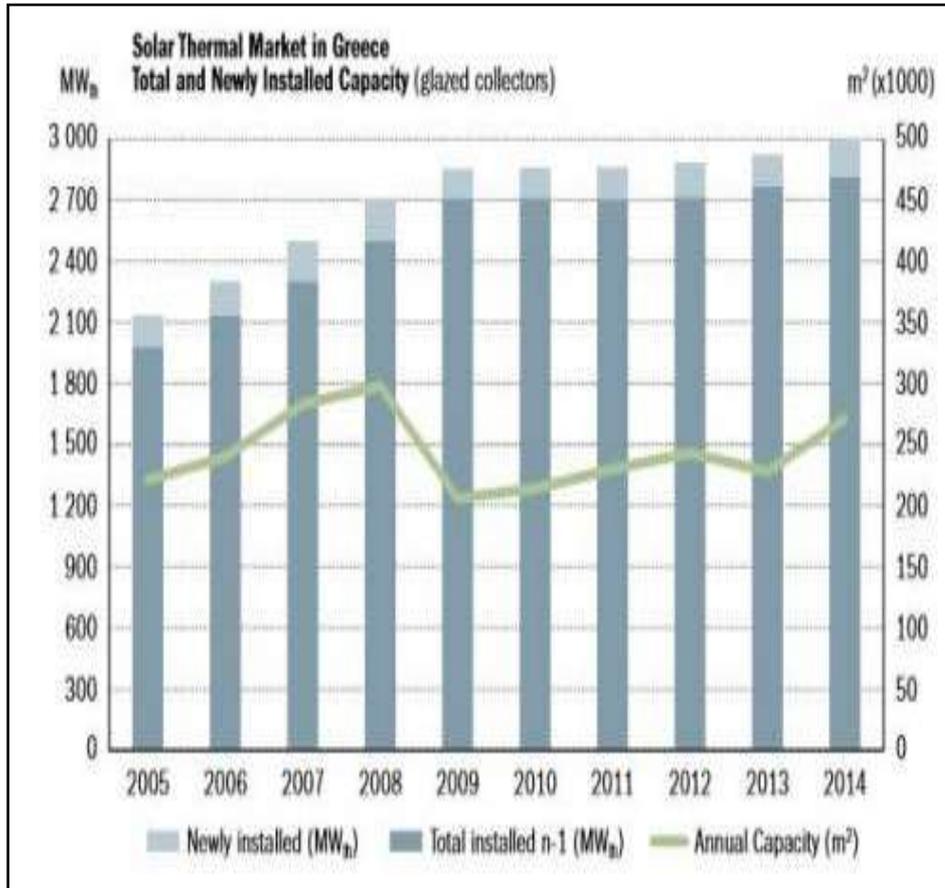
In fiscal 2017, the investments of the Company totaled €68 million. This amount includes the €15 million amount spent for the acquisition of the storage installations of REVOIL S.A. located in Northern Greece. **Consequently, the year 2017 capital expenditure of the Company reached €53 million and concerned the Motor Oil Refinery as follows:**

**(a) An amount of €24 million** was spent on regular maintenance at the existing Refinery units and on a series of miscellaneous small scale projects relating to the improvement of health and safety conditions of the Refinery, the improvement of its environmental terms as well as the attainment of high level of operability and flexibility of production.

**(b) The balance of €28 million** was spent on the so-called major investment projects; the most notable ones being:

- the processing capacity increase of the Lubricants Complex (€6.5 million capex in 2017),
- the Jet production increase from the Hydrocracker (€2.5 million capex in 2017),
- the construction of new storage tanks at the area freed as a result of placing the overhead Independent Power Transmission Operator (ADMIE) high voltage lines underground (€6.2 million capex in 2017), and
- the enhancement of energy efficiency of the Refinery (i.e. Power Plant upgrade and GT-3 major field inspection, €3 million capex in 2017).

# Solar Thermal



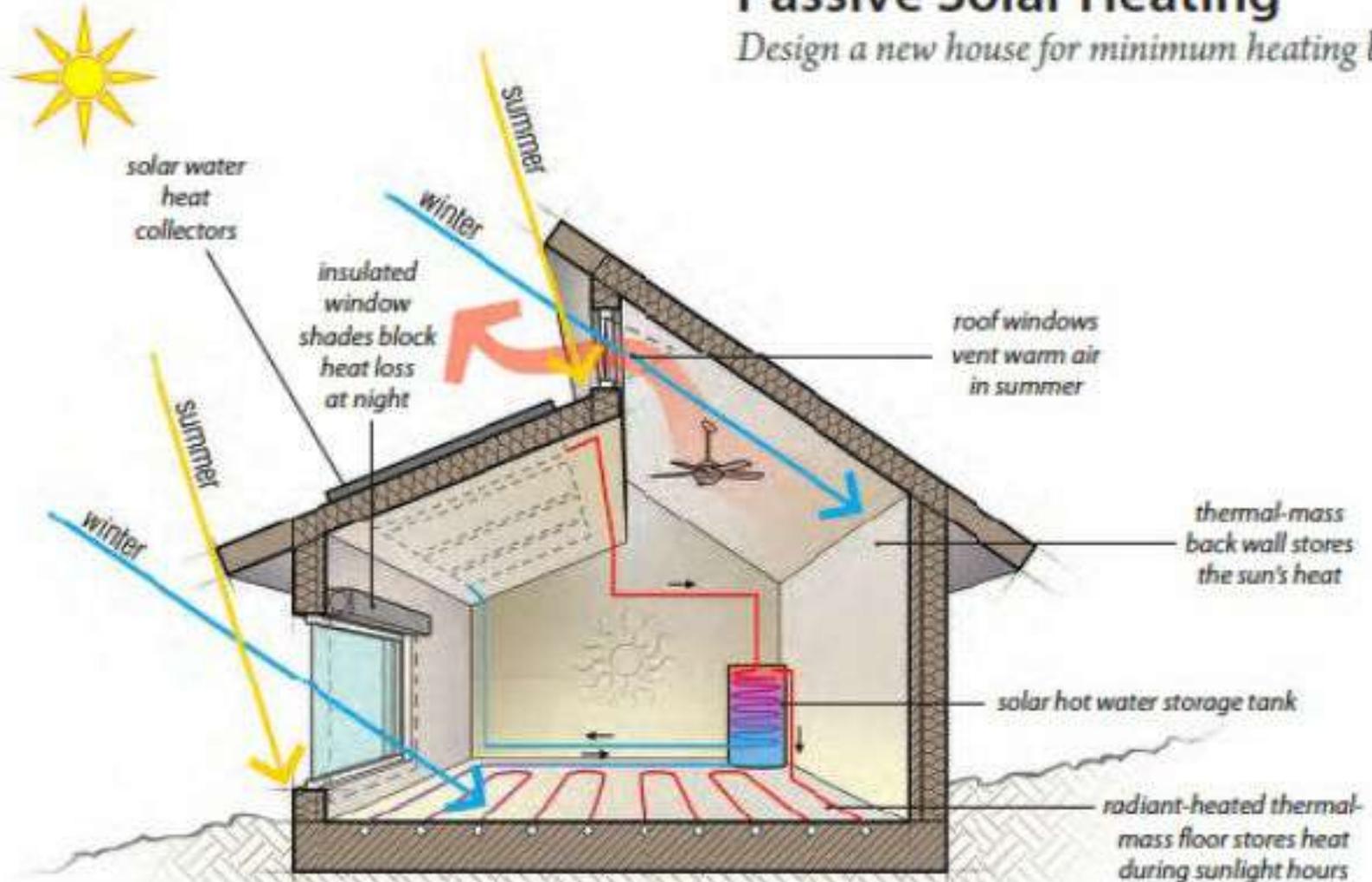
- Total installed capacity: 2.8 GW<sub>th</sub> (2014)
- Most systems are **solar water heaters** that prevent the emission of 2 million tons of CO<sub>2</sub> each year
- The industry has an **annual turnover of about €300 million** and provide **3,500 full-time jobs**
- Greece's solar water heater manufacturers were able to increase both **domestic (+19%) and export (+16%) sales in 2014**
- The industry provides a high level of vertical integration and exports 50% of its annual production volume



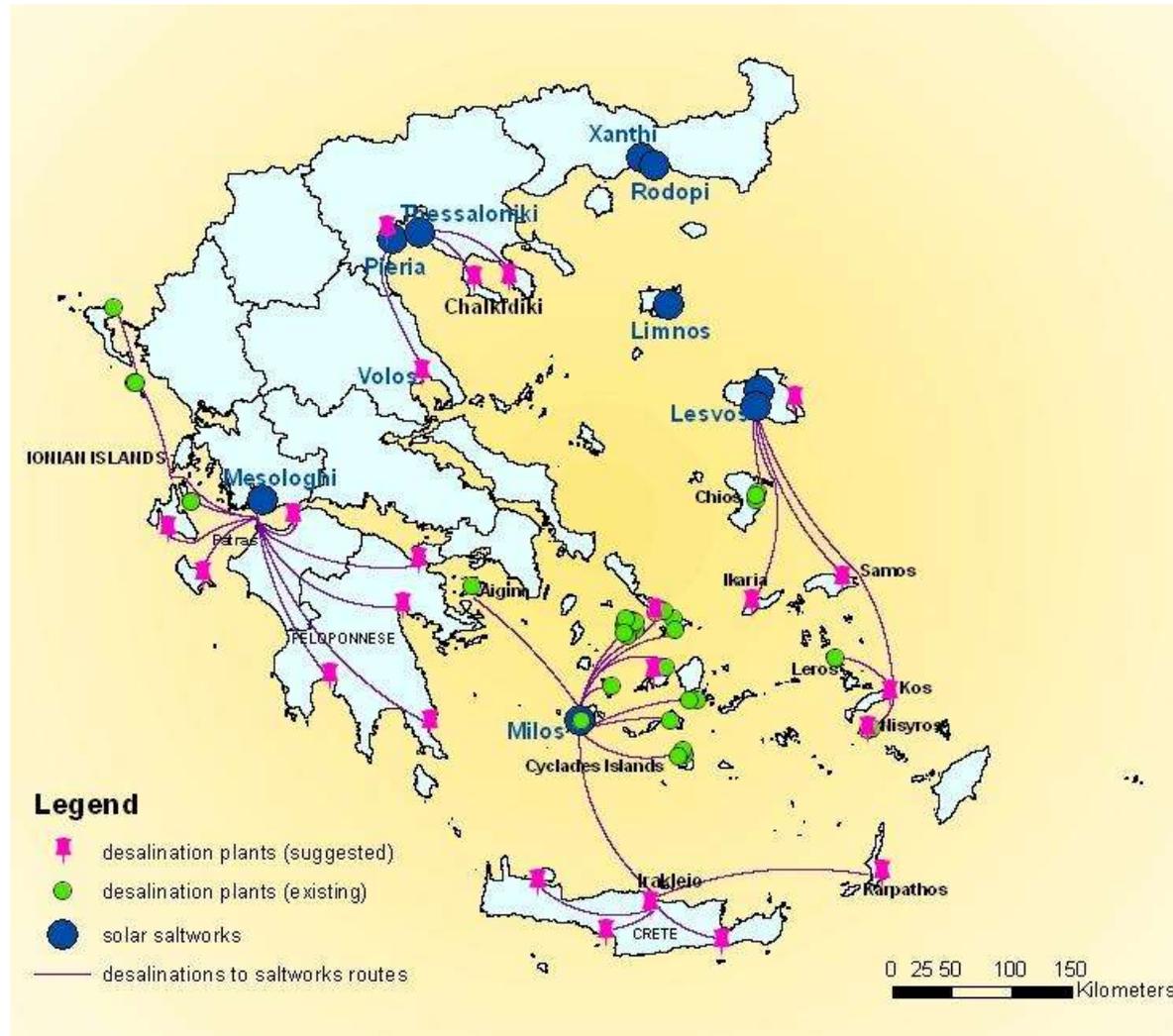
# The Concept of Solar Passive House

## Passive Solar Heating

*Design a new house for minimum heating bills*



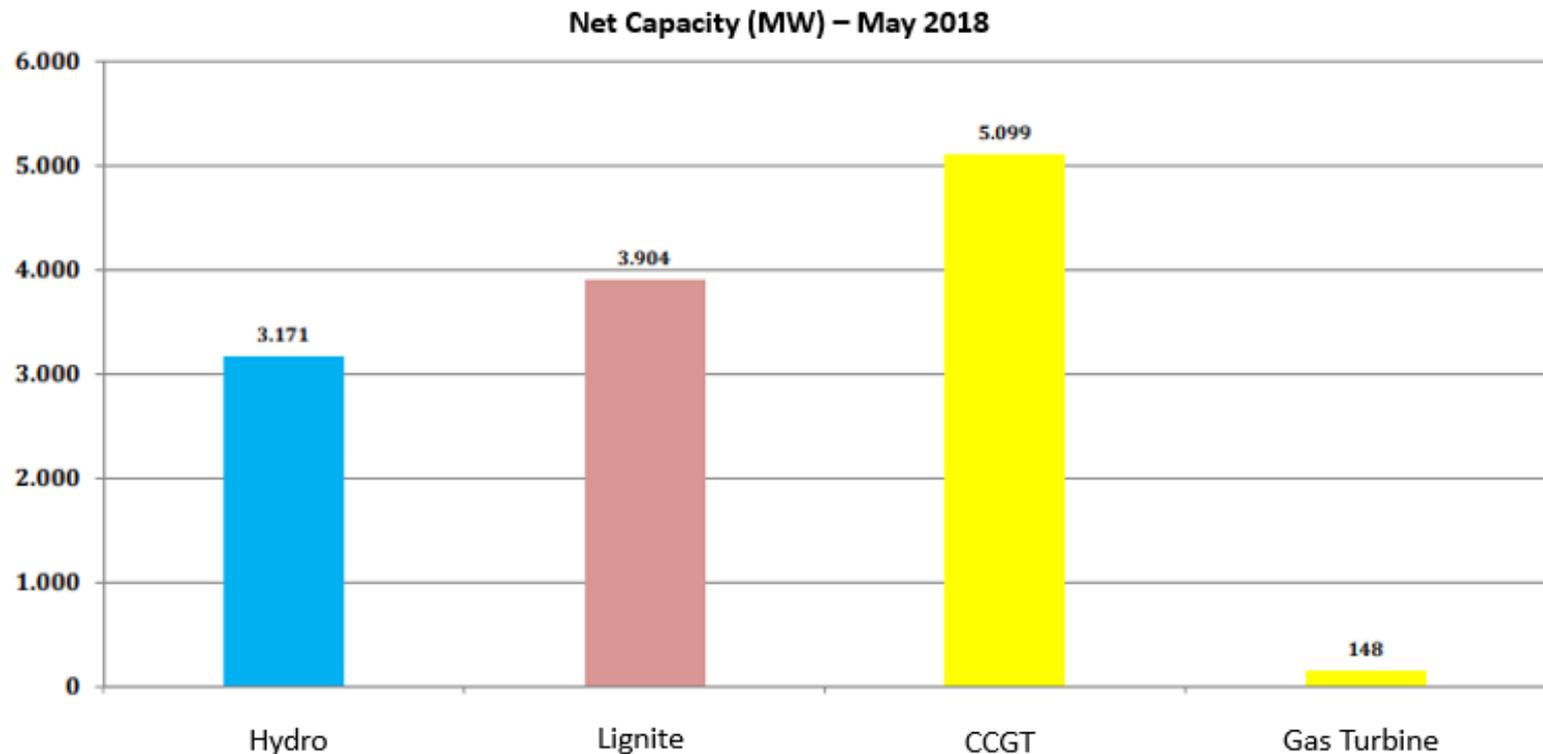
# Greece's Experience on Desalination Plants, Solar Saltworks and Transportation of Brine





## Greece's Expertise in EPC Contractors for Thermal Power Plants Using Gas

- The following graph shows the net capacity of the operating combined cycle gas turbine (CCGT) plants in Greece in May 2018.

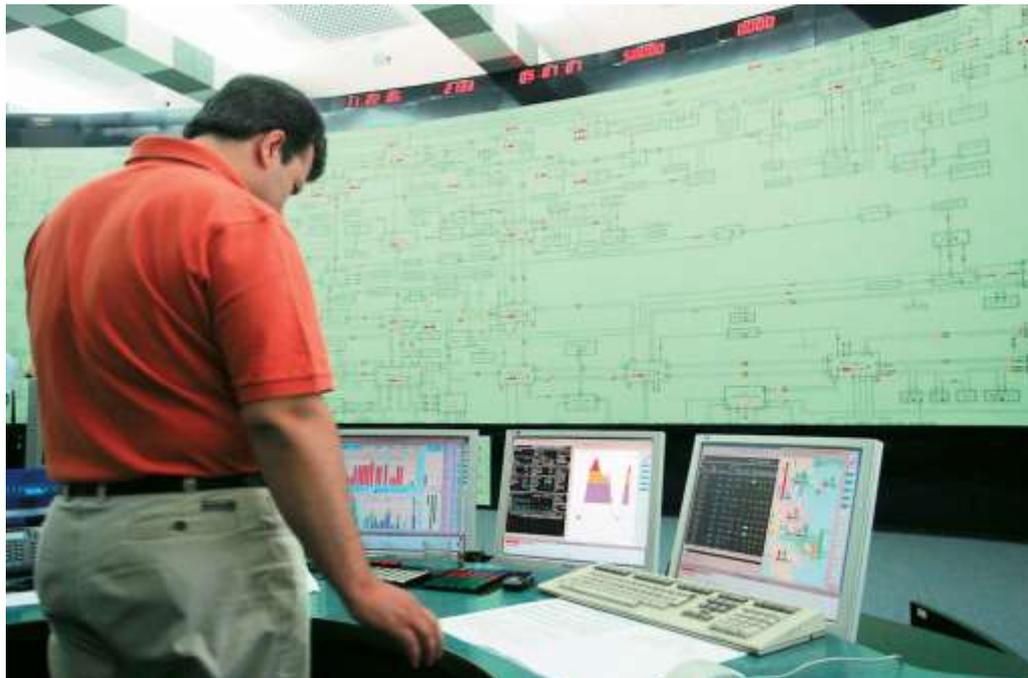


# Greece's Expertise in Electricity Dispatching Systems

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Greece's **National Energy Control Center** has its headquarters in Agios Stefanos and is connected electronically with the power stations, high-voltage cables and substations across the national interconnected system via three regional energy control centers:

1. The **North** in the Ptolemaida region.
2. The **South** in the area of Agios Stefanos and
3. The **Thessaloniki energy control center**



## Greece's Energy Export Activities (I)

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- On the export side, Greek companies are becoming increasingly active in the export of oil products to a **small group of countries in the region (i.e. Lebanon, Egypt, Libya)** and the **provision of integrated engineering services**, as EPC contractors, **for the construction of major power generation plants with latest projects in Iraq, Syria and Libya.**
  - These are natural gas fired combined cycle plants in the range of 300-500 MW of installed capacity each but lately also involve photovoltaic parks, stand alone or grid connected.
  
- The development of main electricity interconnection projects between North Africa and Europe, via Greece, is also under consideration.

## Greece's Energy Export Activities (II)

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- Greece maintains export activities in the following energy sectors:
  - **Oil products** in the East Mediterranean and Balkan regions
  - **Electricity:** According to IENE's data, **Greece's average electricity exports in June 2018 were 314,856 MWh** and were distributed per interconnection as follows:
    - **FYROM:** 173,797 MWh (55%)
    - **Albania:** 112,484 MWh (36%)
    - **Italy:** 14,775 MWh (5%)
    - **Bulgaria:** 13,790 MWh (4%)
    - **Turkey:** 10 MWh (0%)
  - **Building materials for insulation** (e.g. aluminum)
  - **Solar thermal systems** (e.g. solar and water heaters)
  - **Electricity storage** (e.g. batteries for RES systems – Systems Sunlight SA)
  - **Cables:** Use of them in electricity transmission and distribution networks, RES, interconnections of islands with the continental system as well as offshore wind farms (e.g. Hellenic Cables SA, a subsidiary of Cenergy Holdings, exports underwater and overhead high- and ultra-high voltage cables)
  - **Electronic meters for industrial and commercial applications** (e.g. Corinth-based Landis + Gyr SA exports meters in France and other French-speaking markets around the world)
  - **Oil and gas pipelines** (e.g. Thisvi-based Corinth Pipeworks SA)
  - **Energy advisory services**

# Greece's Systems Sunlight

Used Lead-Acid Batteries



**SUNLIGHT Recycling**

The most Contemporary Lead-Acid Batteries Recycling Plant in Europe



High Quality Lead

 **SUNLIGHT**  
Reliable Battery Solutions

**SYSTEMS SUNLIGHT: EU's TOP Industrial Battery Unit | Continuous Investments in Infrastructure, R&D, HR**

Source: Systems Sunlight

# Greece's Cenergy Holdings



## Markets

- Oil & Gas transportation & drilling
- Energy transmission & Renewables
- Telecom & data transmission
- Construction & Industrial



Our companies



provide solutions



Oil & Gas



Power transmission & distribution



Renewables



Telecom



Construction

# Greece's Hellenic Cables and Fulgor

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# Greece's Landis + Gyr



Source: Landis + Gyr

# Potential of Greece's Energy Exports

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- According to Panhellenic Exporters Association, Greece's energy exports (oil products, electricity, gas, etc.) **reached €7 billion in 2016, accounting for almost 28% of the country's total exports**. Similarly, Greece imported energy products and raw materials worth €9.8 billion or 23% of total imports.
  
- Greece's exports are expected to increase significantly over the next decade in the following energy sectors:
  - **Oil products** in the East Mediterranean and Balkan regions
  - **Design, procurement, installation, maintenance and supervision of RES systems and increase of number of engineers and energy inspectors**
  - **Solar thermal systems and PV installations**
  - **Electricity storage** (e.g. batteries for RES systems)
  - **Cables:** Use of them in electricity transmission and distribution networks, RES, interconnections of islands with the continental system as well as offshore wind farms
  
- **Greece's energy exports have the potential to reach €10-12 billion by 2025, balancing imports or even creating a surplus of exports.**

# Greek Export Capabilities in the Energy Sector

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- Refining and downstream infrastructure
- Pipeline design and installation
- Electricity grid design and installation
- Electricity cable production and installation
- Solar thermal water heaters
- PV system procurement, design and installation
- Energy efficiency improvement for buildings (design, materials, electronic control systems)

**Thank you for  
your attention**

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