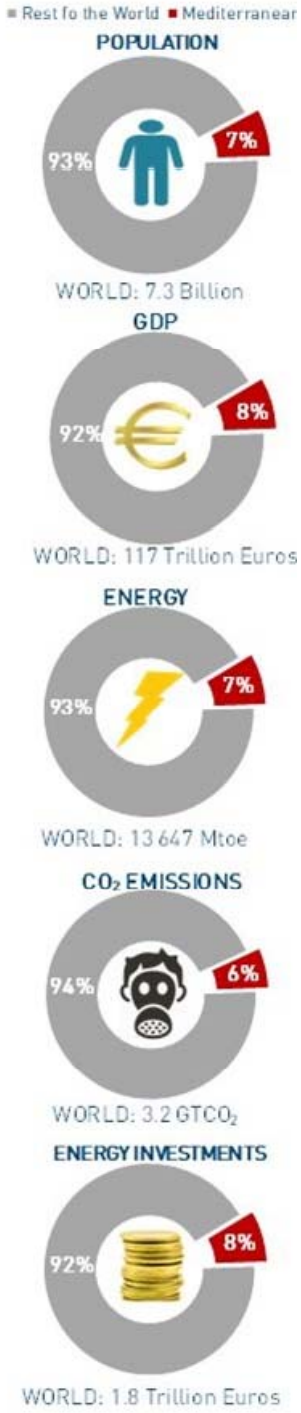
MEP2018, energy trends to 2040 for a sustainable future

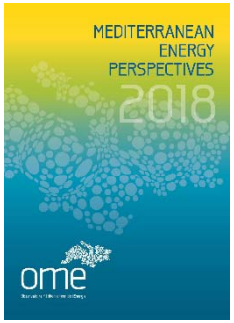
MEDITERRANEAN ENERGY PERSPECTIVES 2018

Madrid, 10 April 2019

MEP 2018 IN A NUTSHELL

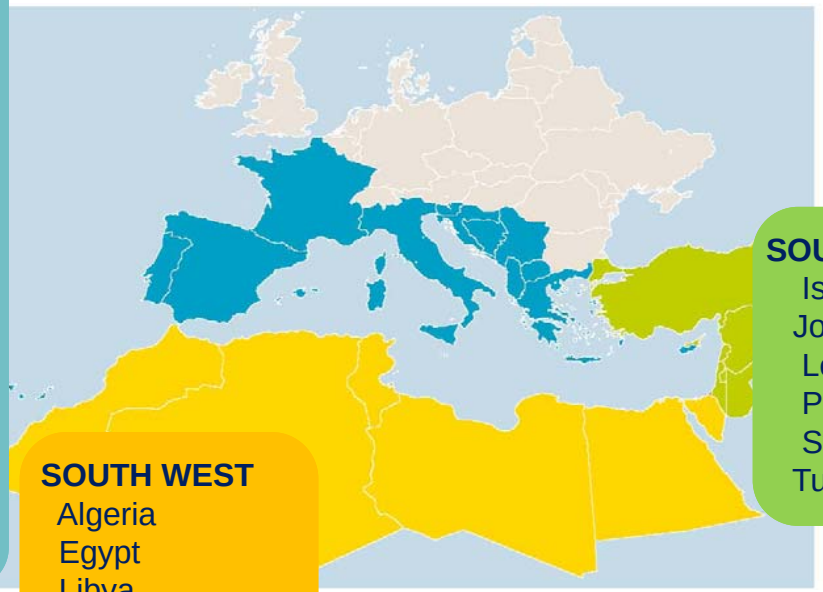
CELEBRATING 10 years





NORTH

Croatia
Cyprus
France
Greece
Italy
Malta
Portugal
Slovenia
Spain
Other North
- Albania
- Bosnia H.
- Macedonia
- Montenegro
- Serbia



SOUTH WEST

Algeria
Egypt
Libya
Morocco
Tunisia

SOUTH EAST

Israel
Jordan
Lebanon
Palestine
Syria
Turkey

- ***25 countries covered, 20 individual country models***
- ***In-house econometric bottom-up model (based on GDP/Population/Prices)***
- ***2015/2016-2017 historical data and projections to 2040***
- ***2 demand scenarios, 1 supply module***

TWO DEMAND SCENARIOS

The Reference Scenario is a Baseline Scenario (RS):

- **takes into account past trends, current policies and ongoing projects.**
- **Incorporates the Nationally Determined Contributions (NDCs)**
- **but it assumes that international financing and other aids will not be forthcoming. Only unconditional NDC targets are assumed to be met in this scenario.**

The Proactive Scenario (PS)

- **is based on the implementation of strong energy efficiency programmes and increased diversification in the energy mix based on the NDCs submitted by each country.**
- **Assumes that international financing will be made readily available and that all targets of the NDCs will be met in full.**

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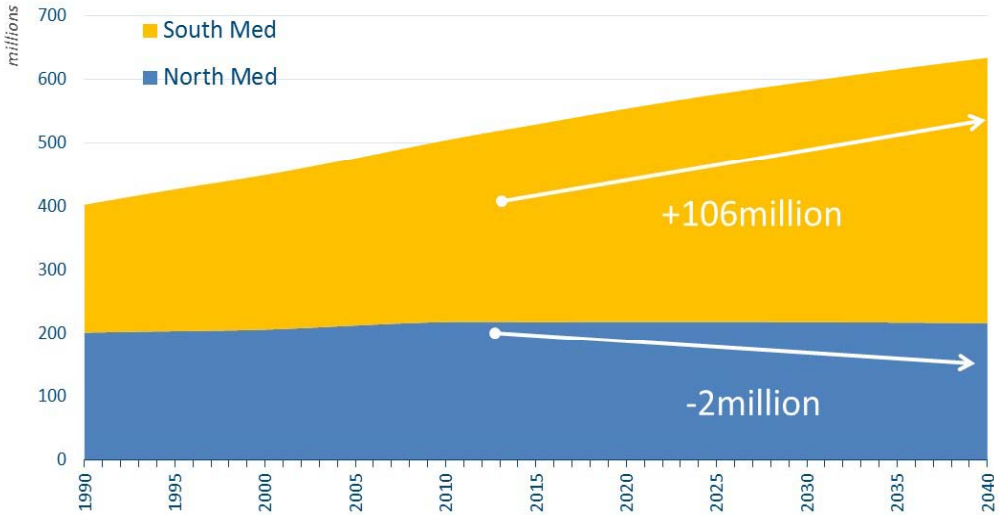
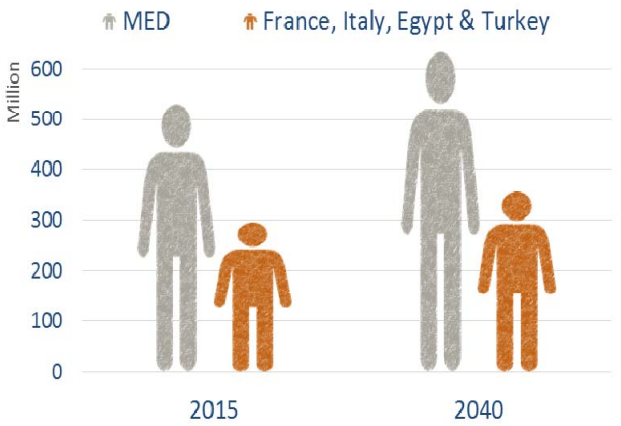
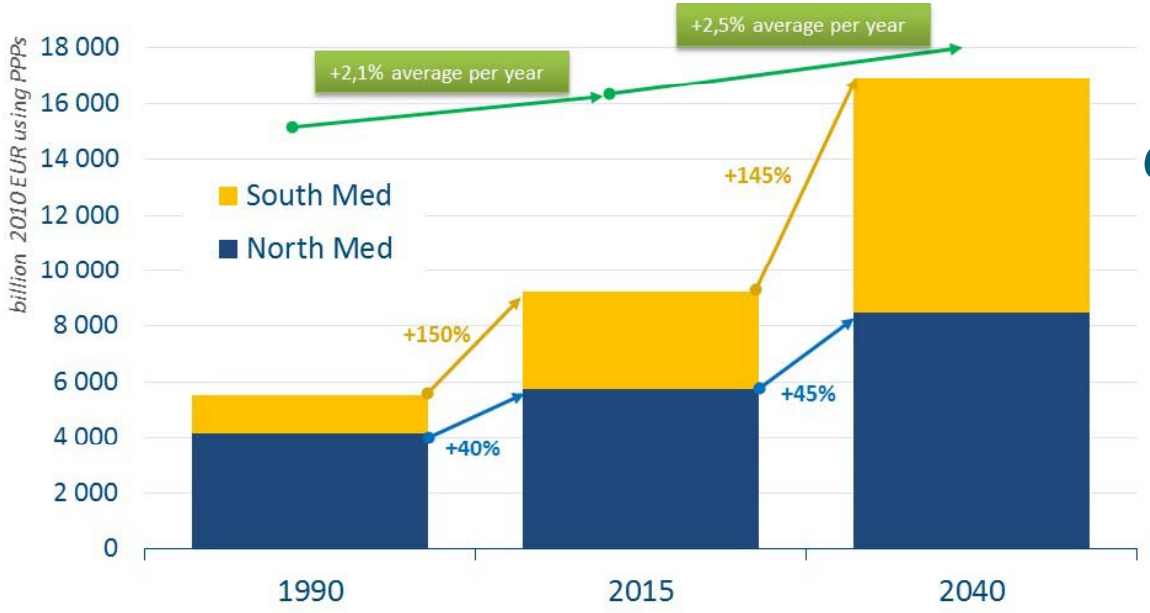
MEDITERRANEAN POPULATION & GDP FORECASTS





105 million people more by 2040. All in the South



GDP to increase the most in the South

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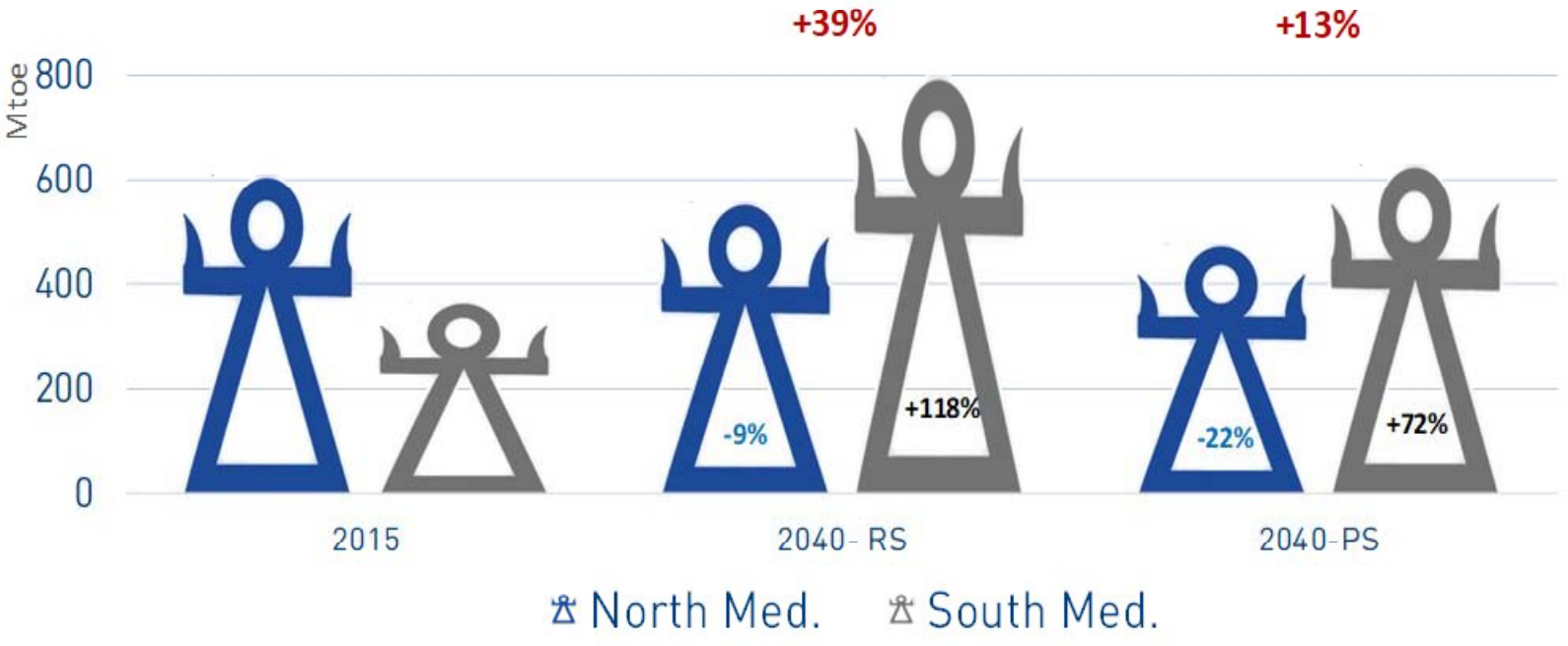
INCREASE IN ENERGY DEMAND

DIVIDED BY THREE



As for population growth, all of energy demand increase in the South.

In the Proactive Scenario energy demand would be 18% lower in 2040 than in the Reference Scenario.

In the North: -14% and in the South: -21%

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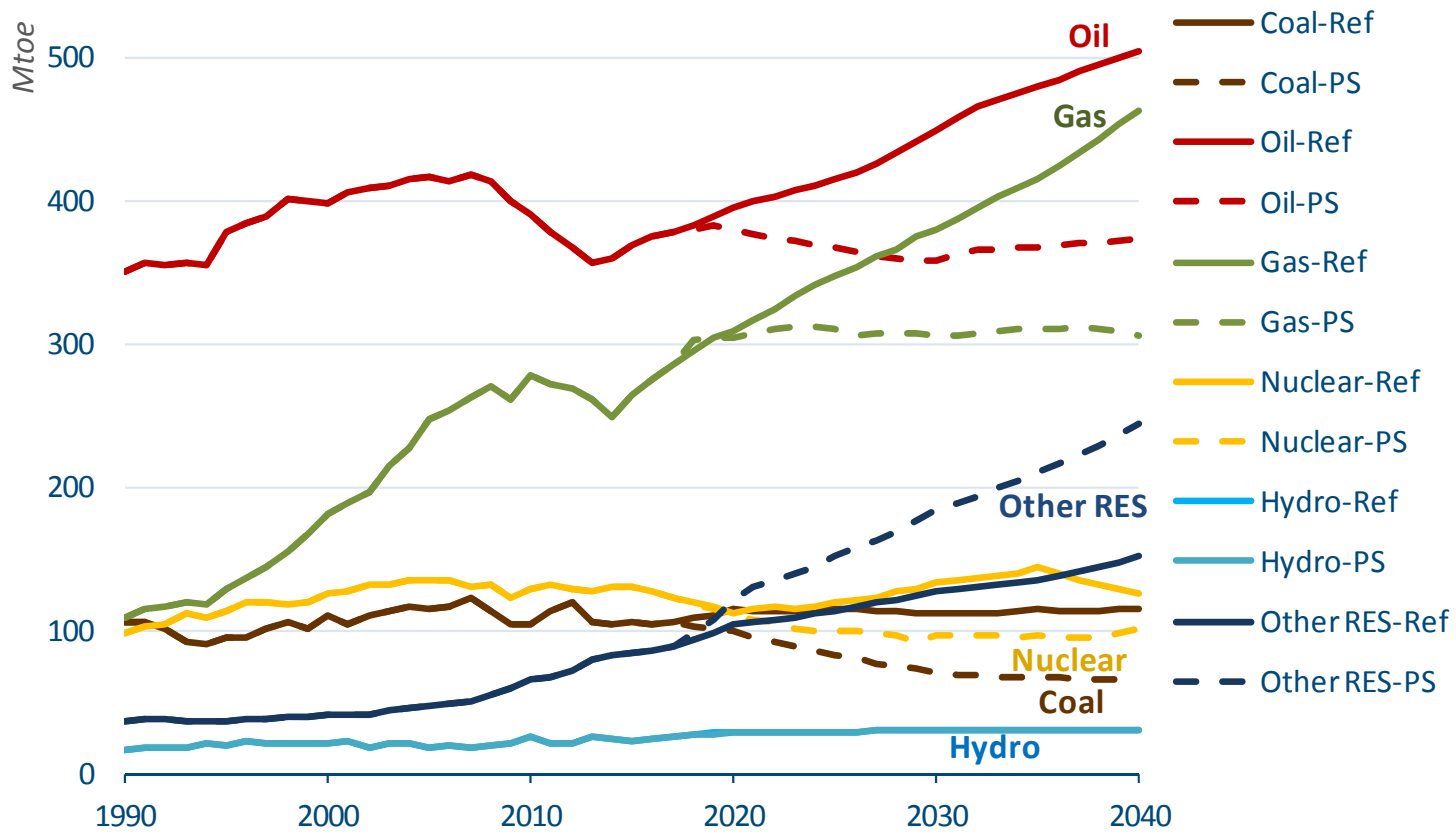
PRIMARY ENERGY DEMAND BY FUEL

by Scenario



Oil & Gas to remain the dominant fuel in the energy mix.
Renewables catch-up with gas in the Proactive scenario.

The PS allows for substantial savings in oil and gas

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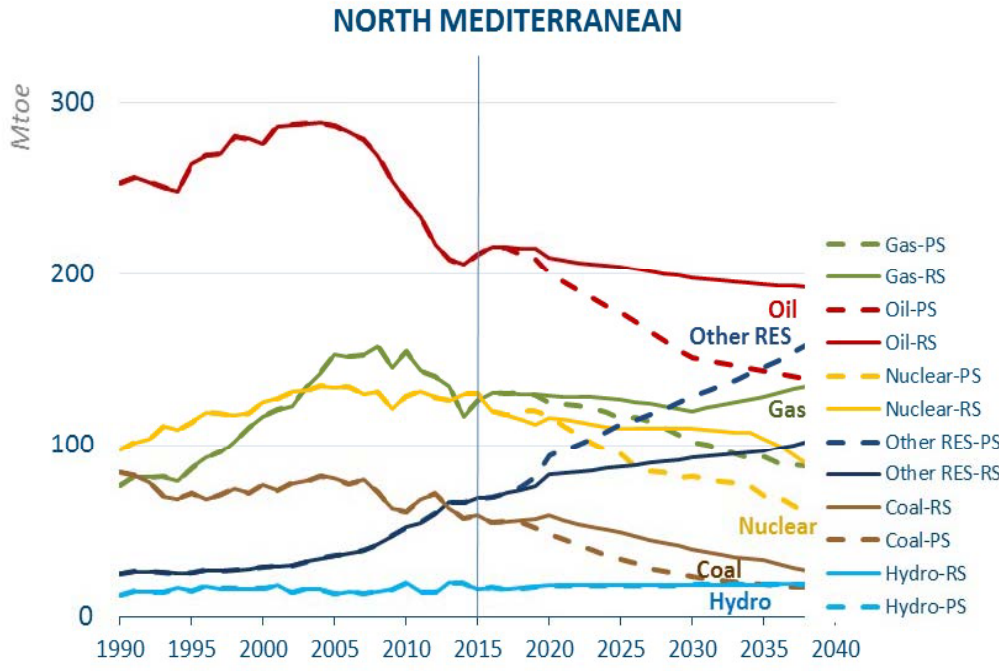
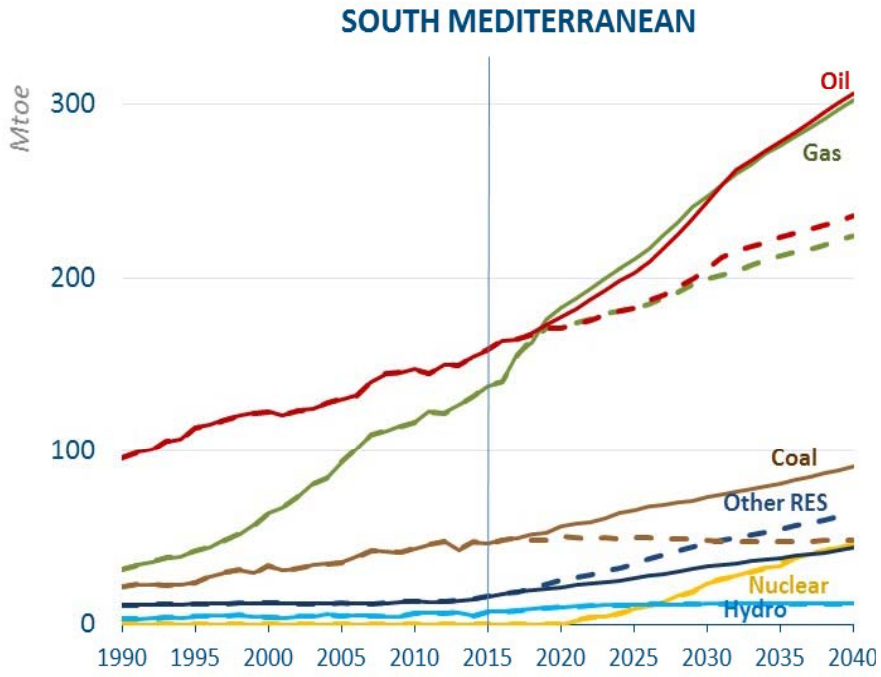
ENERGY DEMAND BY FUEL & REGION





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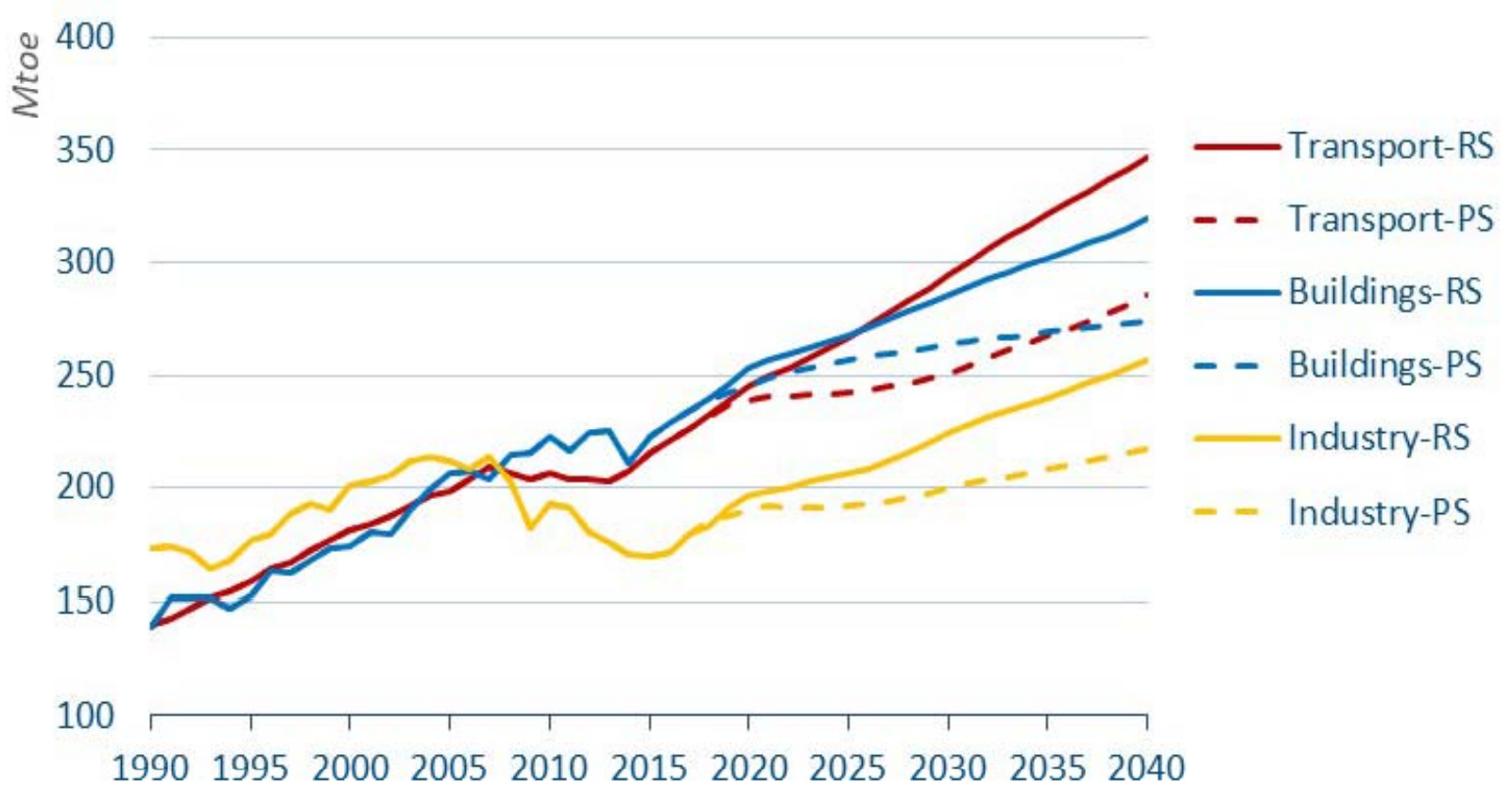
Trajectories are very different between the two shores. In the North, RES will become the second largest fuel after oil, and before gas in the PS by 2040.

The South oil and gas demand will remain substantially higher than any other fuel, even in the PS scenario.

TOTAL FINAL ENERGY CONSUMPTION



Med TFC to be 15% lower in PS than CS by 2040.

Even so, TFC will increase by 30% from now to 2040 in PS (+52% in RS).

All increase to be halved by 2040 in PS: 154Mtoe savings.

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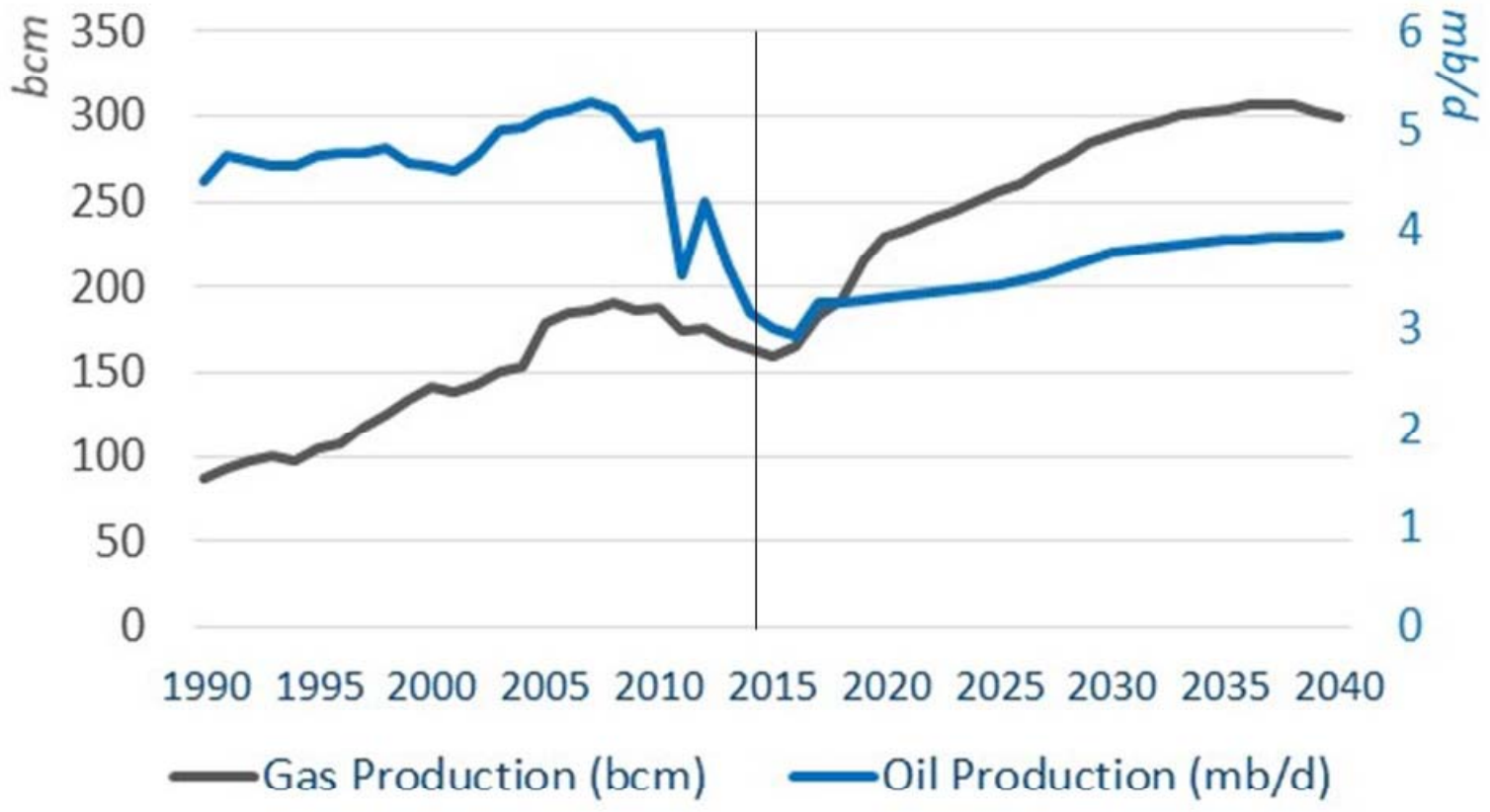
MEDITERRANEAN OIL AND GAS PRODUCTION



Natural Gas production which has doubled since 1990 will double again to 2040, peaking late 2030s
Oil Production which fell to 3mbd in 2016 will reach 4mbd in 2040

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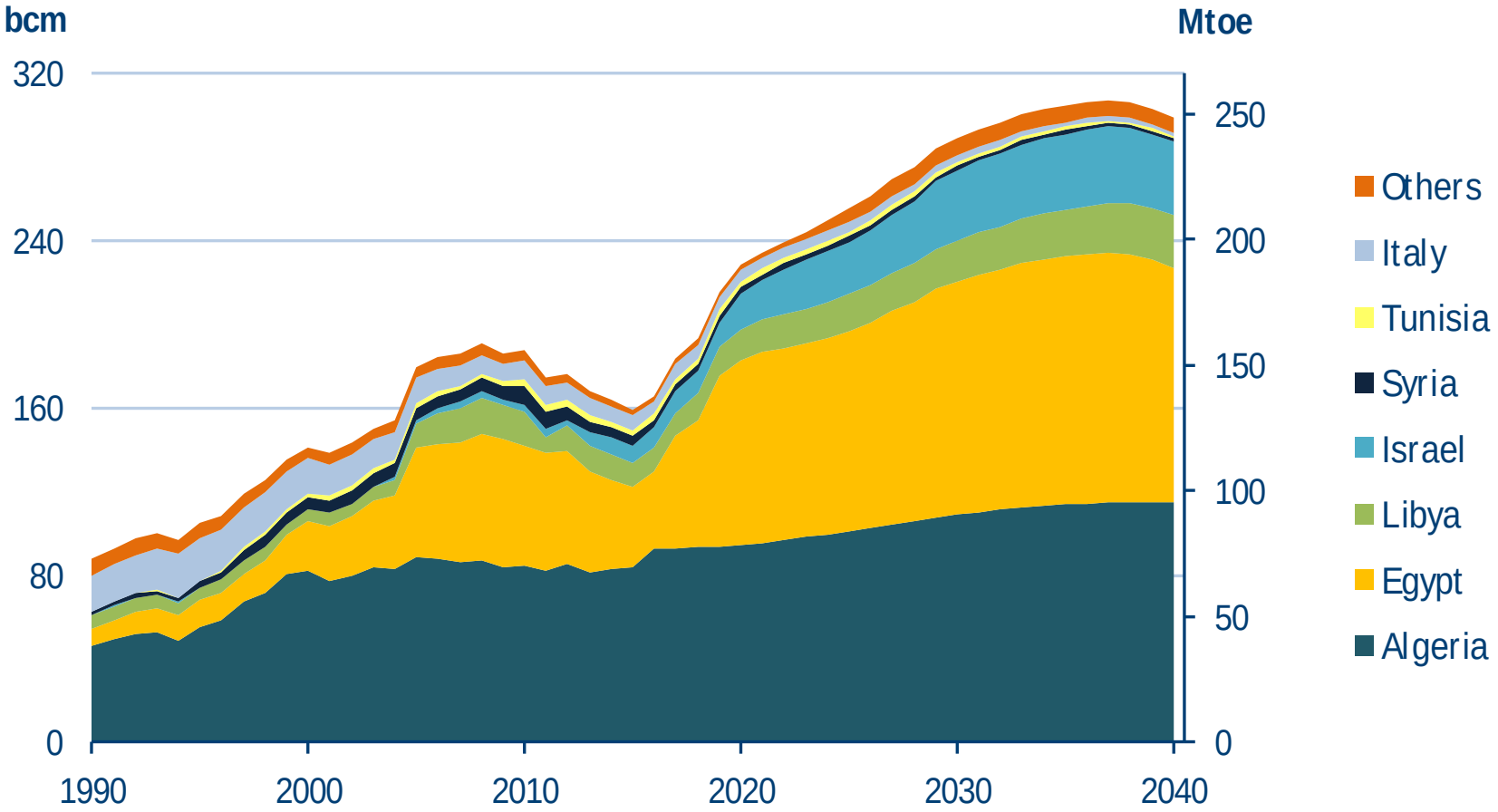
MEDITERRANEAN NATURAL GAS PRODUCTION BY COUNTRY



Gas production, which has nearly doubled since 1990, will do it again until it reaches its peak in 2037, before declining to 300 bcm in 2040.

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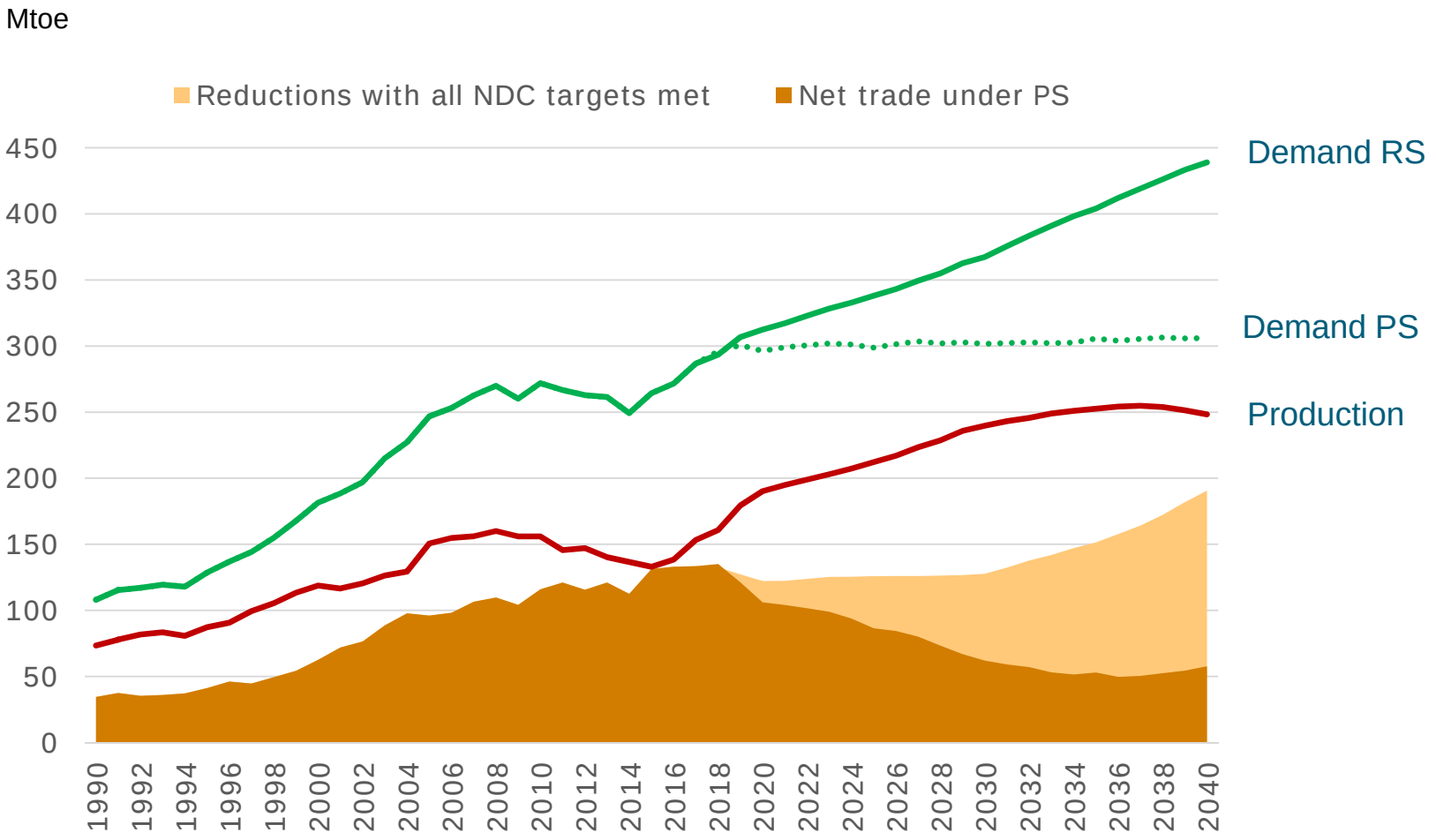
MEDITERRANEAN GAS BALANCE



2015-2040: Gas demand to increase by 15% to 70%, depending on the scenario

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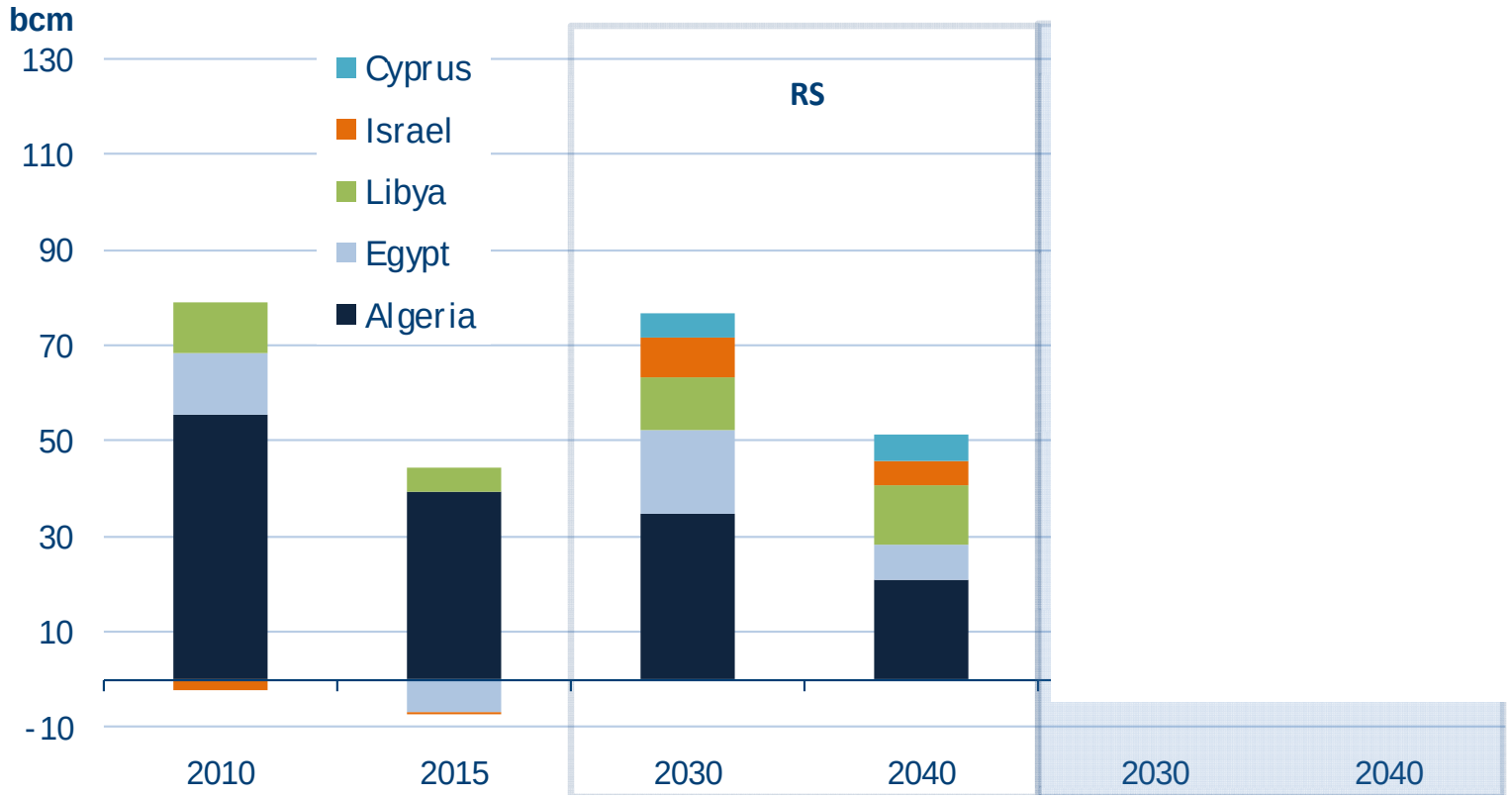
MEDITERRANEAN NATURAL GAS EXPORT POTENTIAL



Source: OME

By 2040, total gas export potential will increase moderately in RS but this level could be more than doubled (to 110 bcm/yr) in the PS.

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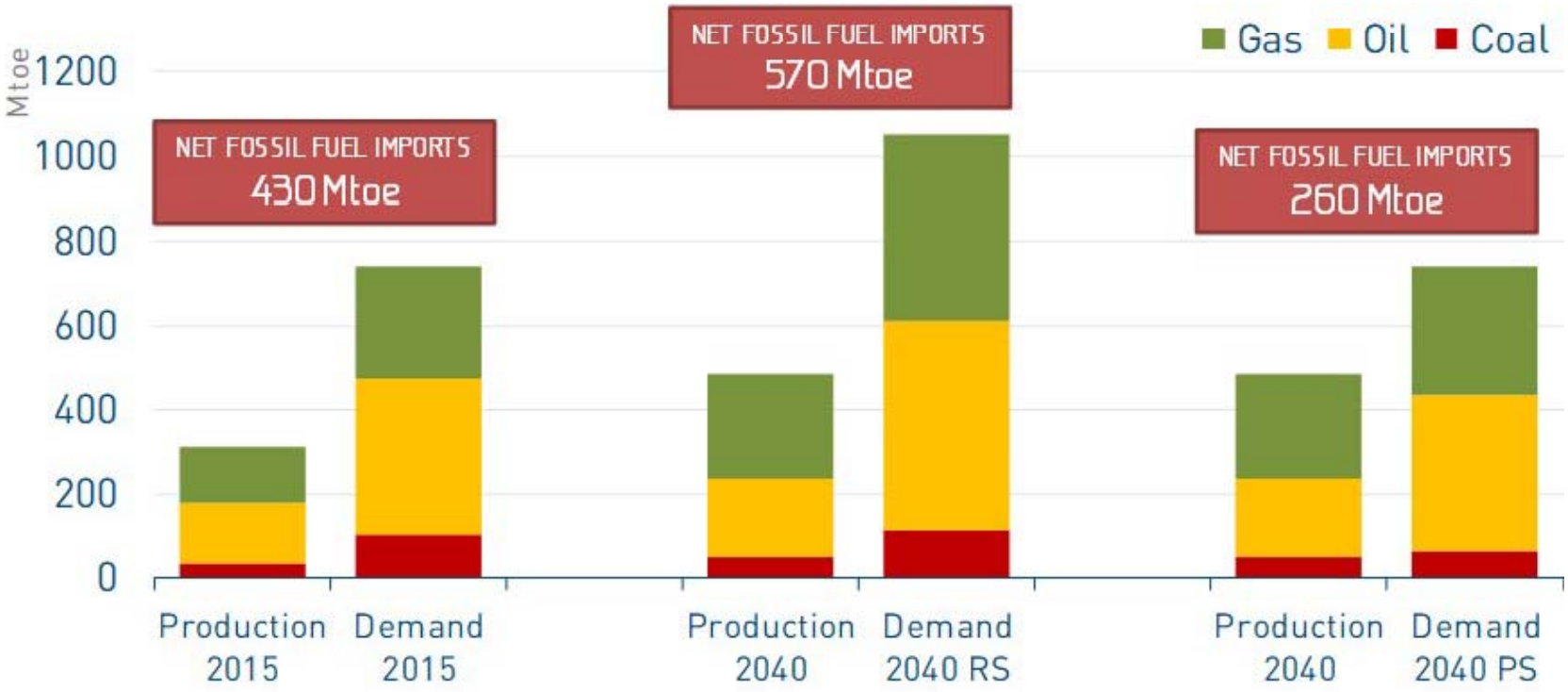
MEDITERRANEAN NET FOSSIL FUEL TRADE



Net trade would increase 33% in the Reference Scenario and actually decrease by 40% in the Proactive Scenario – less than half that of the CS in 2040; 310Mtoe avoided imports .

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ENERGY IMPORT DEPENDENCE

Net energy import dependence to increase in the South in the RS.

Only PS scenario would alleviate the dependence and increase energy security in the region.

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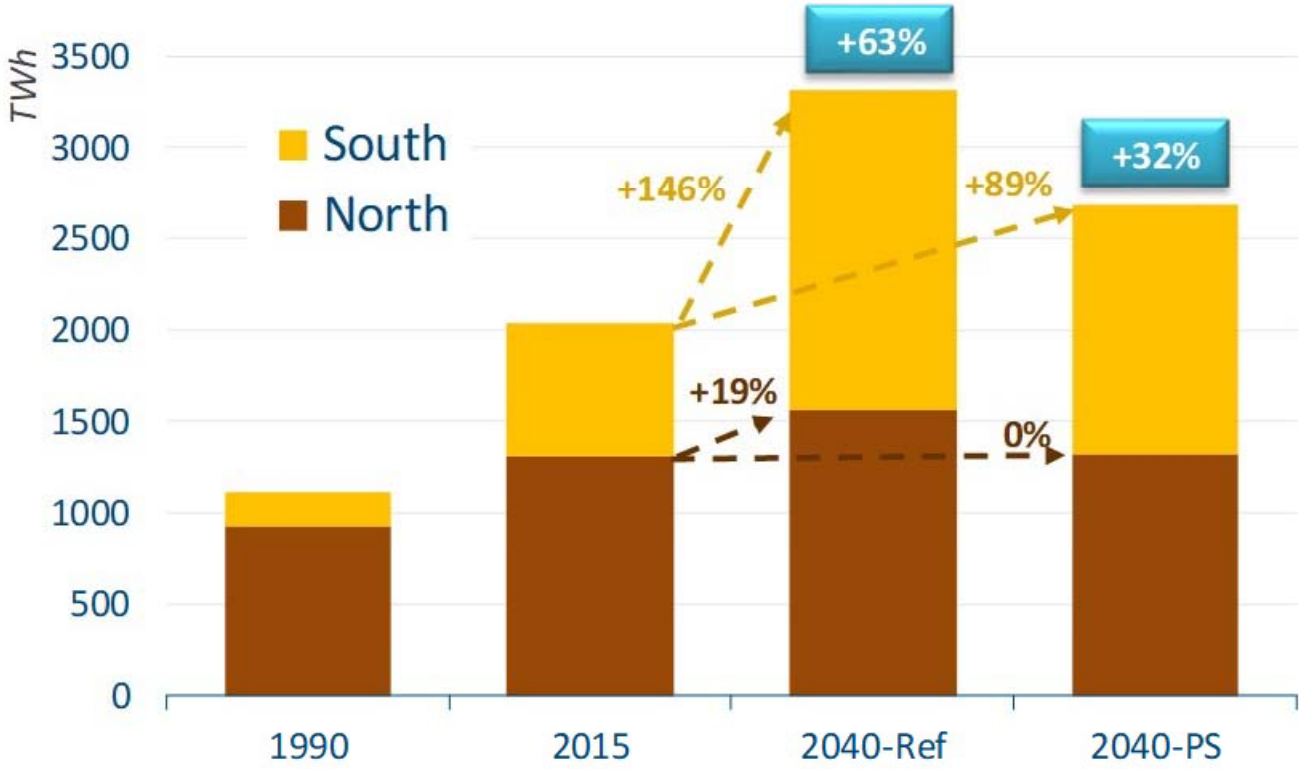
INCREASE IN ELECTRICITY GENERATION

HALVED



Electricity demand in the South will nearly triple,
(+1000TWh in the South, +250TWh in the North).
Increase halved in the PS

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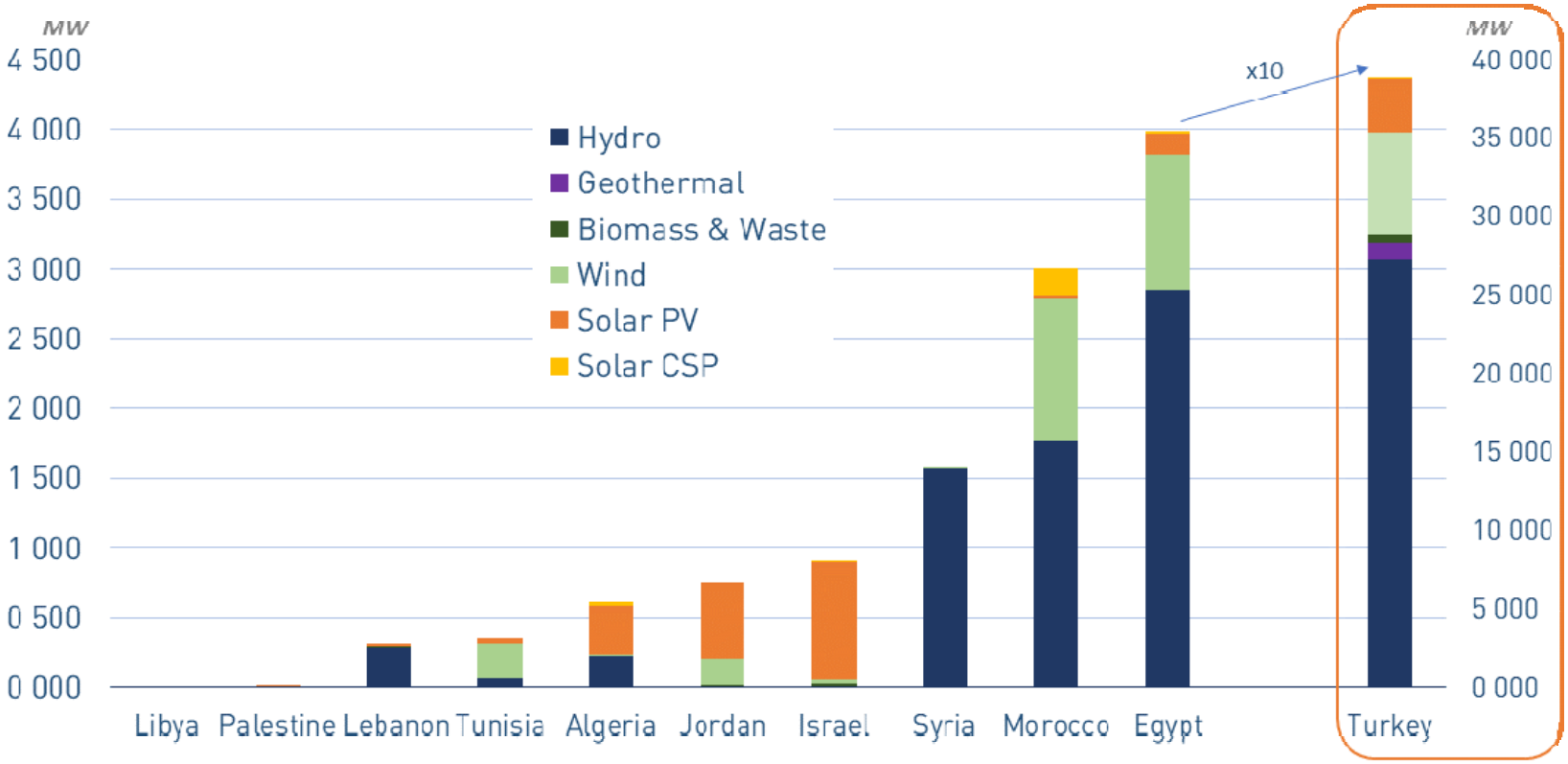
RES INSTALLED CAPACITY IN SEMC, 2017



Turkey accounts for nearly 80% of total RET capacity in the SEMCs; 70% of this capacity is hydropower.
Wind experienced a ten times growth in the past ten years, whereas solar PV increased by few MWs to 3 GW in 2017.

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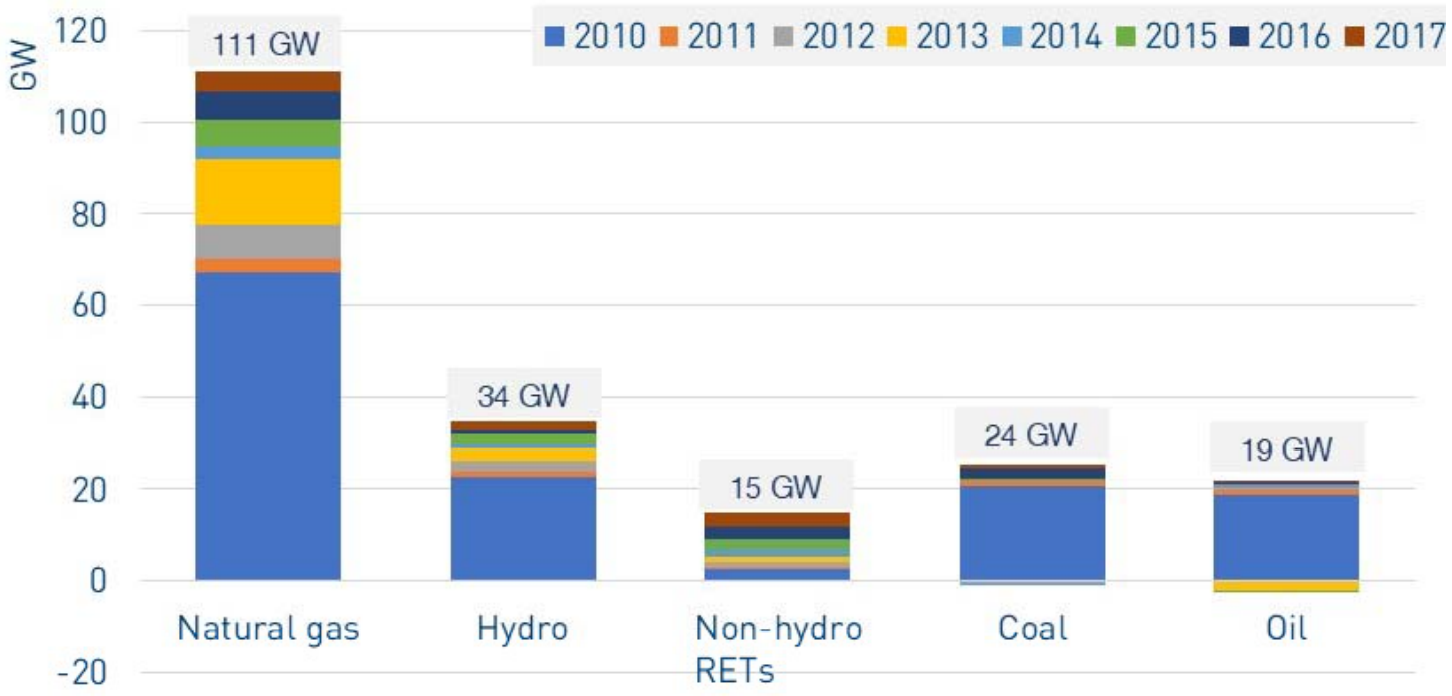
NET ELECTRICITY CAPACITY ADDITIONS BY TYPE



Natural gas is still dominating the electricity mix in terms of cumulative capacity

However, net additions of hydro and non-hydro RETs were higher than natural gas in 2017 vs. 2016 (5 GW vs. 4 GW)

RETs capacity grew by more than 24 GW since 2010, a net addition of 3 GW per year

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MEDITERRANEAN CAPACITY ADDITIONS

FOSSIL-FUEL INSTALLED CAPACITY REDUCED

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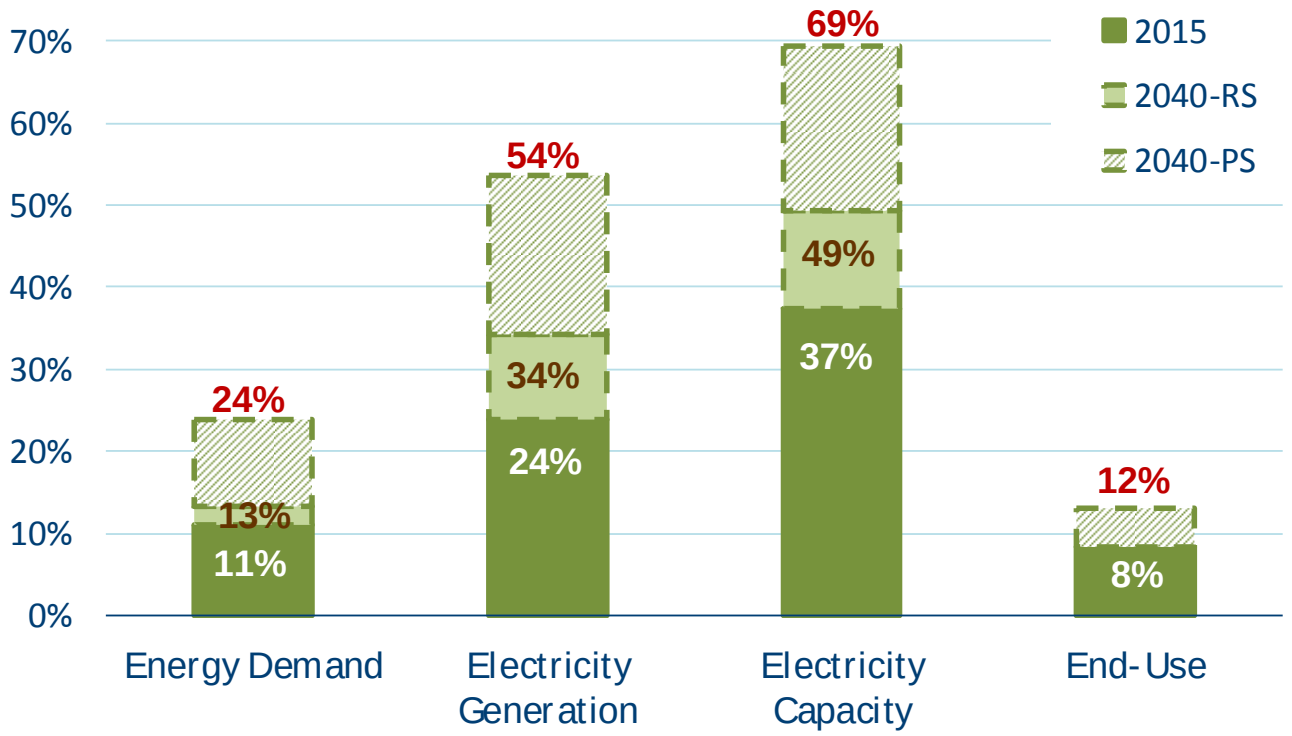
In the RS, 310GW to be added, reaching over 920GW total installed cap. And still 100GW of gas to be added.

Only 265GW additional in the PS (45GW spared), all fossil fuel based capacities reduced.

Solar and Wind to account for the lion share of capacity increase.

SHARE OF RENEWABLES IN THE MIX

A QUARTER OF ENERGY DEMAND



Share of RES expected to exceed 50% of electricity generation.

Renewables to reach nearly 40% of energy demand by 2040 in the North.

A lot of scope left for RES development in the South even under the Proactive Scenario especially in end-use sectors.

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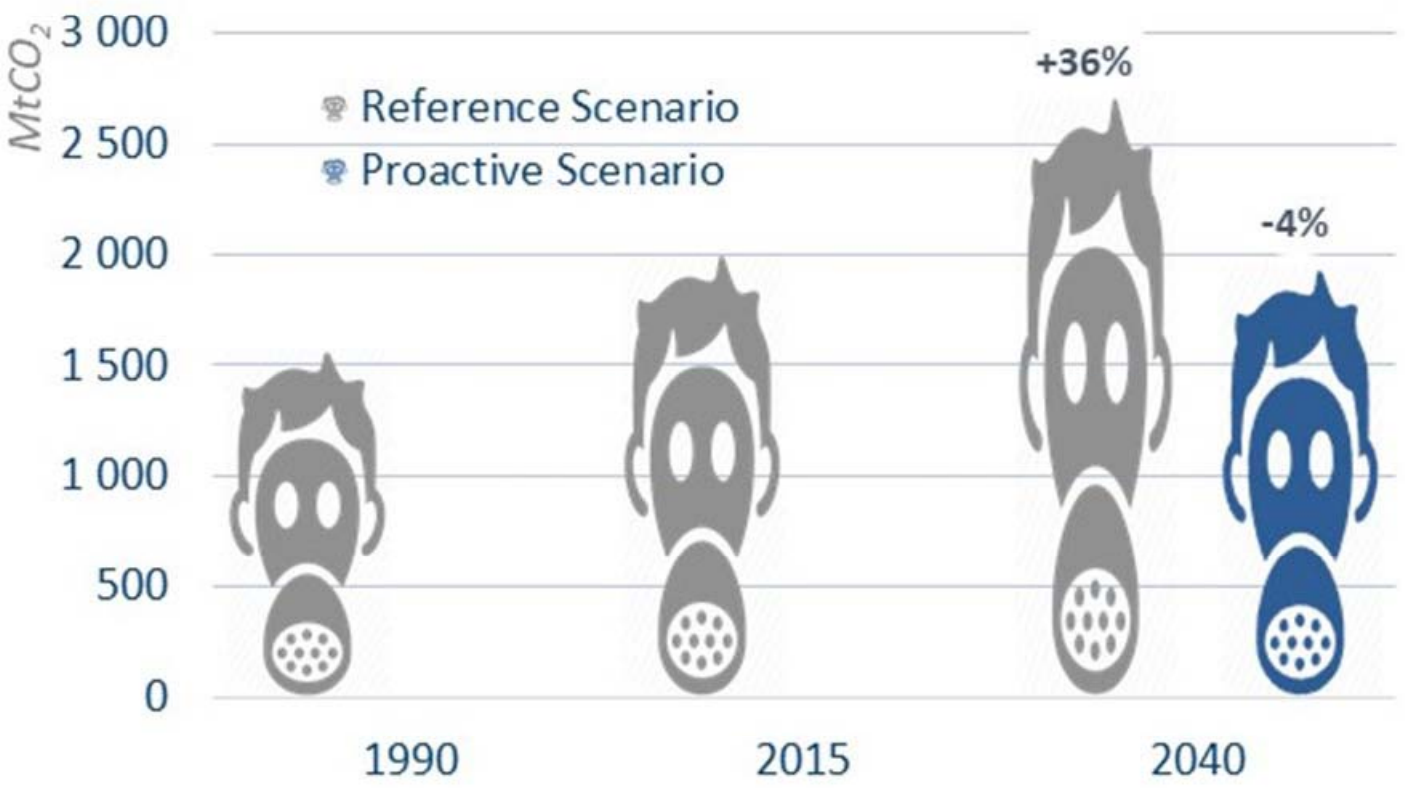
MEDITERRANEAN CO_2 EMISSIONS

TO DECREASE



Instead of adding 720Mt of dioxide, CO_2 emissions could actually decrease from current levels.
Additional CO_2 emissions cut by more than half in the South in the Proactive Scenario.

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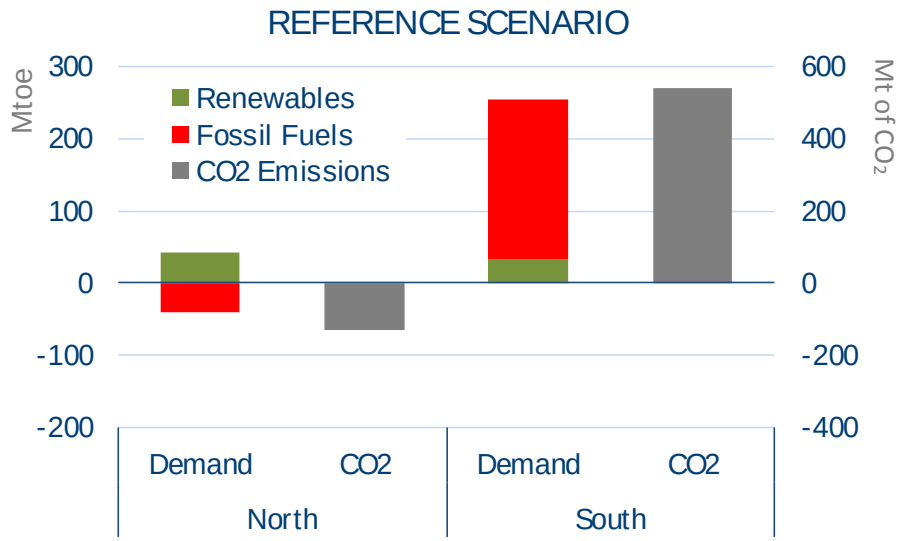
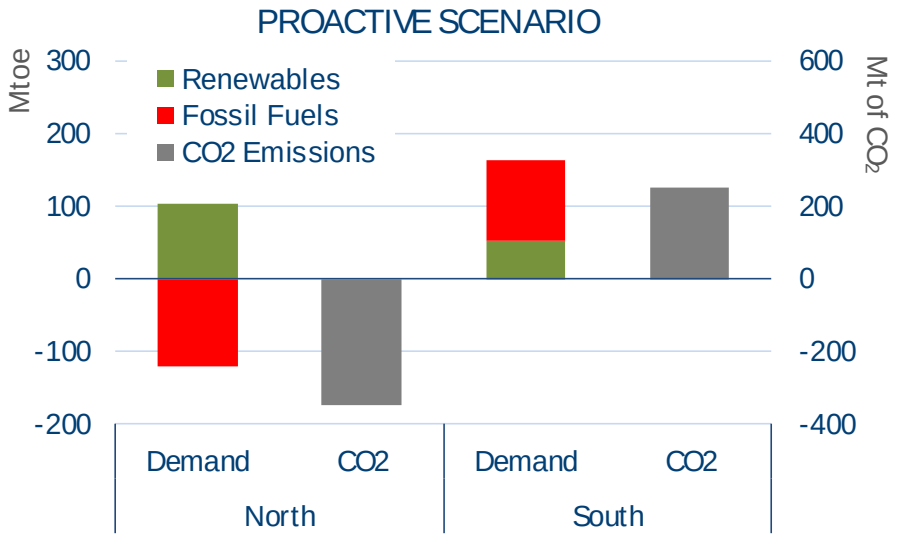
CHANGE IN ENERGY DEMAND & CO_2 EMISSIONS

REDUCING ENERGY DEPENDENCE





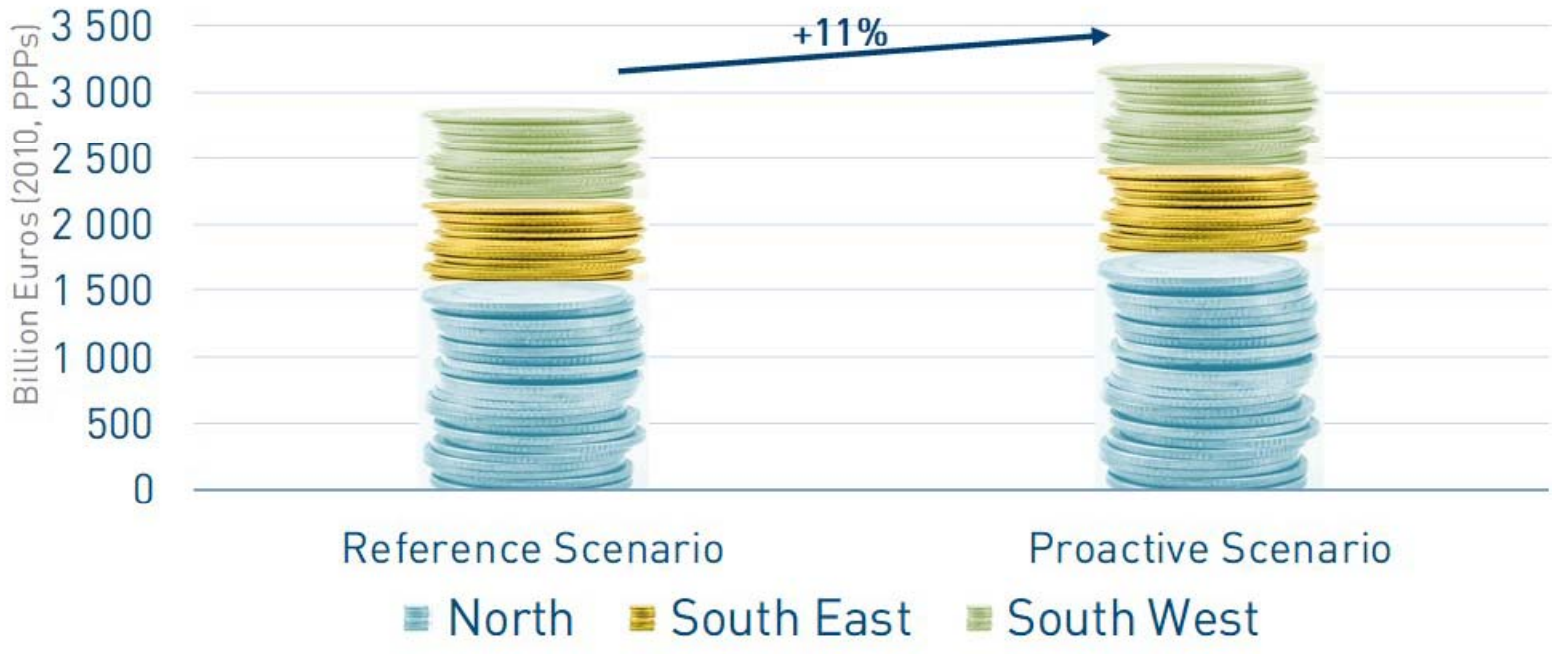
Overall energy dependence to fall from 42% to 23% (from 30% to 8% in the South)

Net increase in demand between 2018-2040, to come from renewables in the PS, leading to an overall decrease in carbon emissions to 2040.

But NOT ENOUGH TO LIMIT THE INCREASE IN TEMPERATURE BELOW 2 degrees

CUMULATIVE ENERGY INVESTMENTS

LIMITED INCREASE



In the Ref scenario Investment would reach 2,9 trillion euros vs 3,2 trillion in the PS, (just 11% more than in the Ref). 1% GDP per year vs 1.1% in PS.

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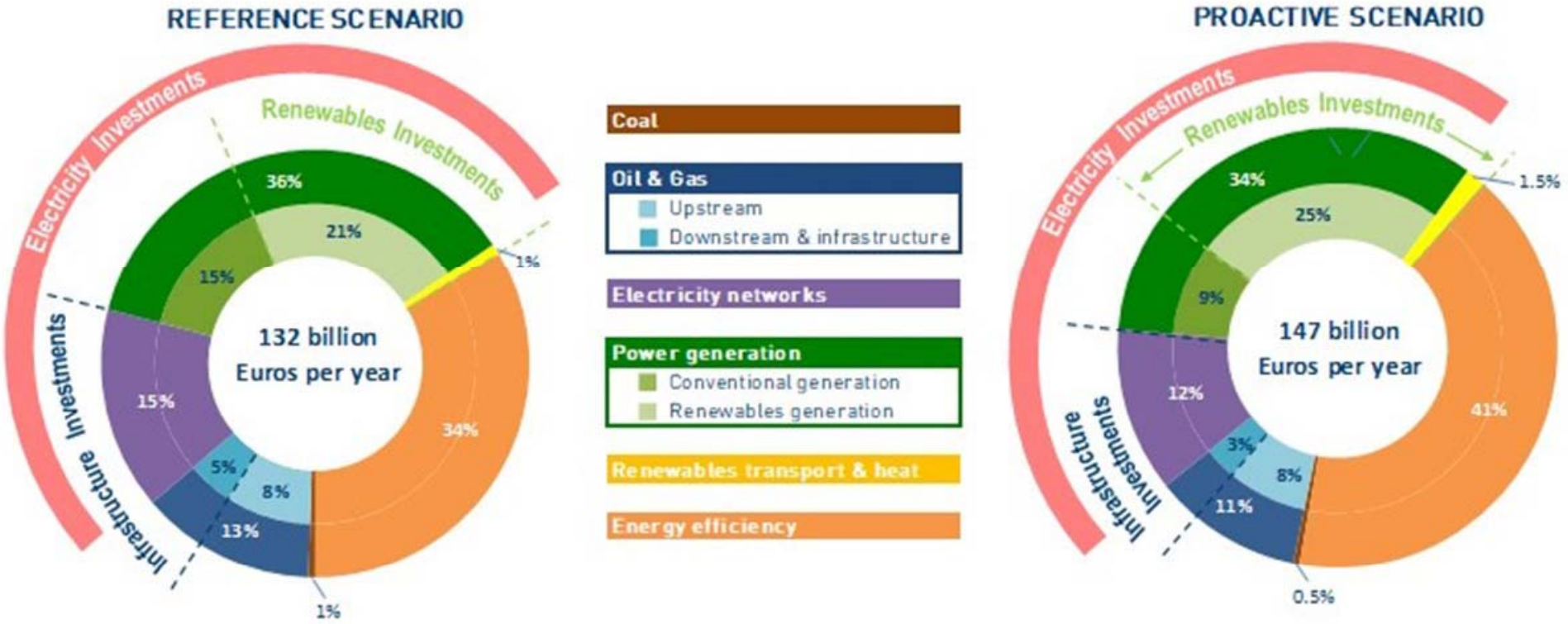
ENERGY INVESTMENTS BY TYPE



in the PS, structure of the investment needs will be radically different (+30% in energy efficiency investments €1 to €1.3 trillion).

Energy supply invest. stand at around €1.9 trillion, in both scenarios but their destination differs greatly, geared towards renewables in the PS.

IMPLEMENTING THE NDCs IN-FULL

Would lead to:

- **Limited increase in total MED energy demand (+13%)**
- **Limited increase in total MED electricity needs (+32%)**
- **Decrease in total CO_2 emissions at regional level (-4%)**
- **Reducing MED energy dependence (-10 percentage points)**

But

- **Still substantial increase in South energy demand (+32%) and electricity generation (+89%)**
- **Would NOT be enough to limit the increase in temperature below 2°C, even if international financing is made readily available, which at present is not forthcoming**
- **Renewables and energy efficiency targets well below potential in the South**

While the Proactive Scenario is more costly, positive externalities exist notably for employment and local economies that could help create a virtuous circle.

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