

**CENTRO EURO-MEDITERRANEO
PER I CAMBIAMENTI CLIMATICI**



**FONDAZIONE ENI
ENRICO MATTEI**

Beyond the Financial Crisis: Regional Energy Policy and Global Carbon Constraints

Side Event - COP 15 - Copenhagen Climate Change Conference 2009

Climate Policy After Copenhagen: A Focus on Europe and the MENA Region

Emanuele Massetti, FEEM and CMCC

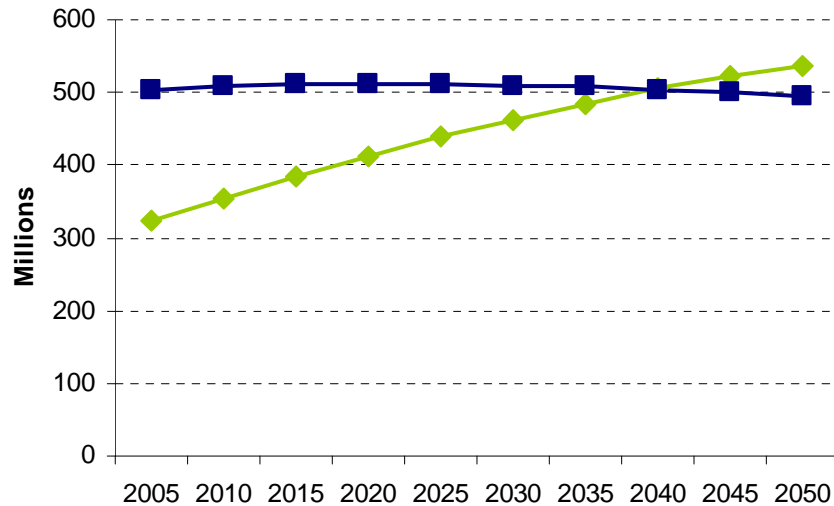
Copenhagen, 12 December 2009

Introduction

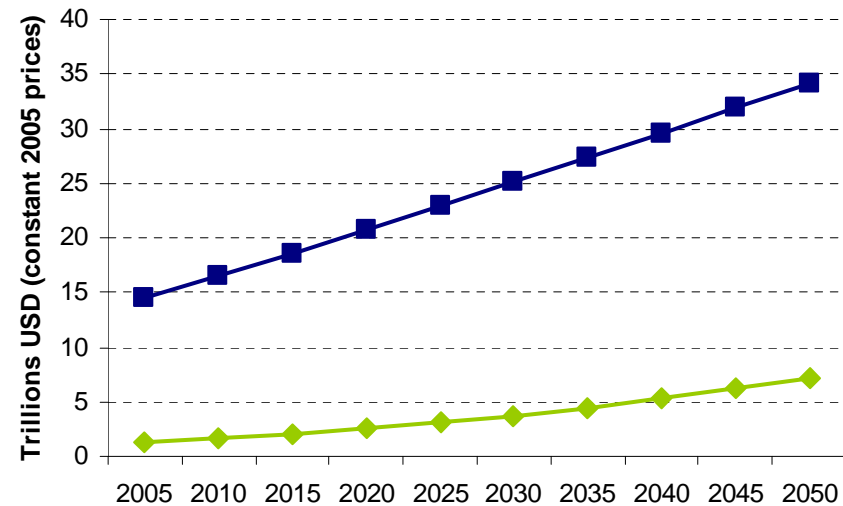
- Understanding major challenges of mitigation for Euro-Mediterranean Area, including Arab countries:
 - ▣ Europe (EU 27) and MENA (Middle East and Northern Africa)
- Insights derived from scenarios produced by the WITCH model developed at FEEM: www.witchmodel.org
- Scenarios, not forecasts...

The Underlying Trends

Population



GDP

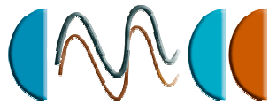


—◆— MENA —■— EUROPE

Source: WITCH Model Scenarios, 2009.

—◆— MENA —■— EUROPE

- High population growth in MENA
- Faster growth, but income gap remains



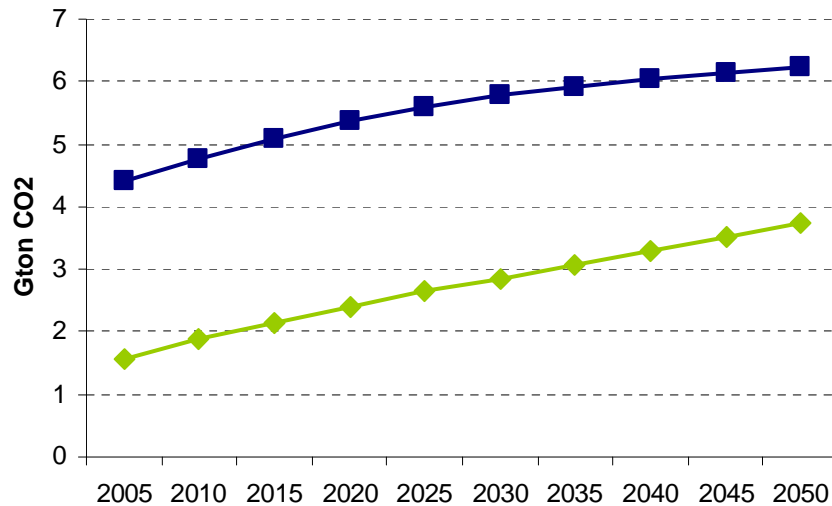
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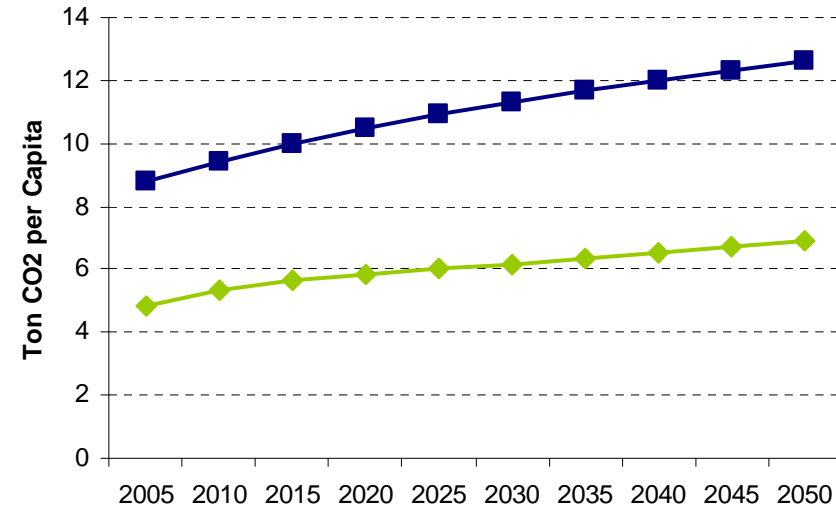
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Emissions (no climate policy)

CO2 Emissions



CO2 Emissions Per Capita



—◆— MENA —■— EUROPE

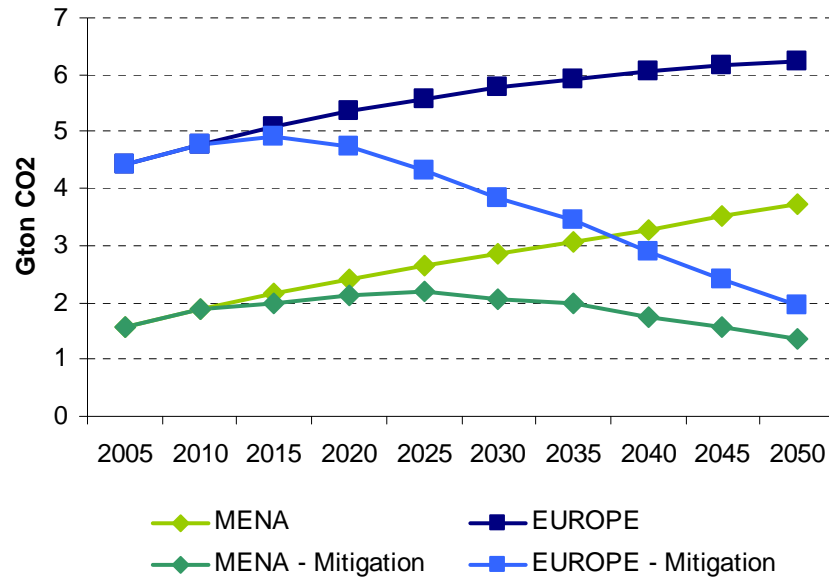
Source: WITCH Model Scenarios, 2009.

—◆— MENA —■— EUROPE

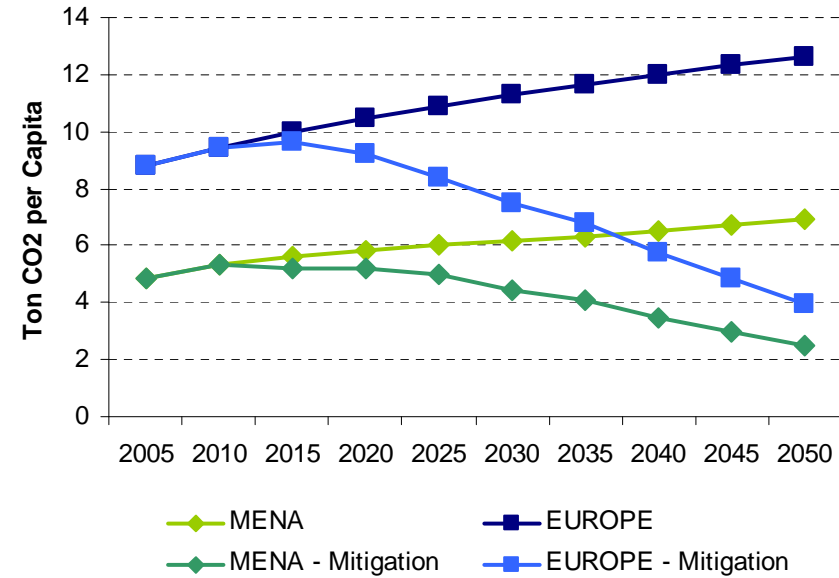
- Steady growth of emissions, especially in MENA
- Emissions per capita remain higher in Europe

Emissions (535 ppm CO₂-eq at 2100)

CO₂ Emissions



CO₂ Emissions Per Capita

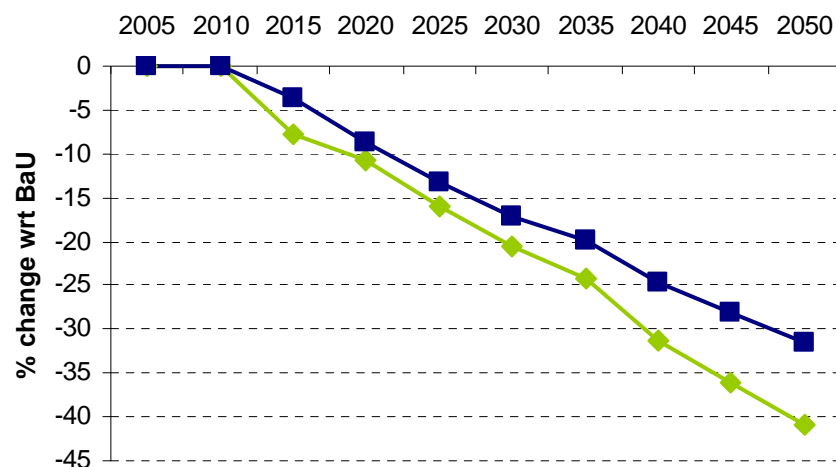


Source: WITCH Model Scenarios, 2009.

- Sharp contraction of emissions in EUROPE
- Emissions of MENA peak in 2025

Europe: Decarbonizing Energy

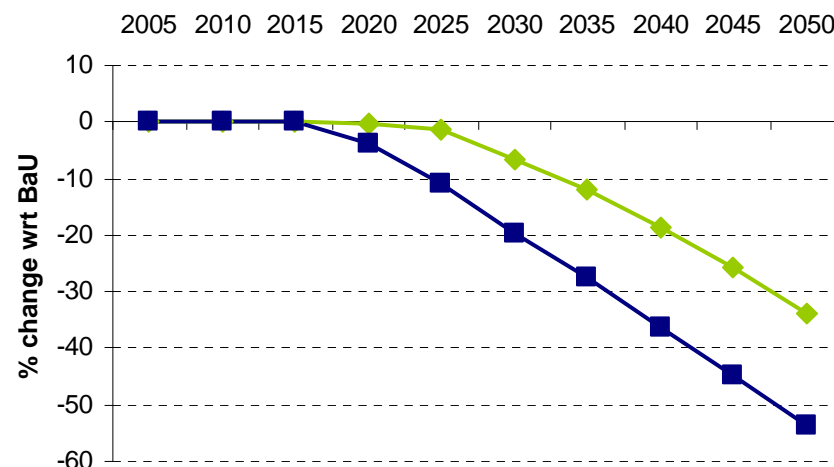
Energy Intensity of Output
% change wrt BaU



—◆— MENA —■— EUROPE

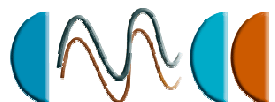
Source: WITCH Model Scenarios, 2009.

Carbon Intensity of Energy
% change wrt BaU



—◆— MENA —■— EUROPE

- MENA: increases energy efficiency
- Europe: reduces carbon intensity of energy



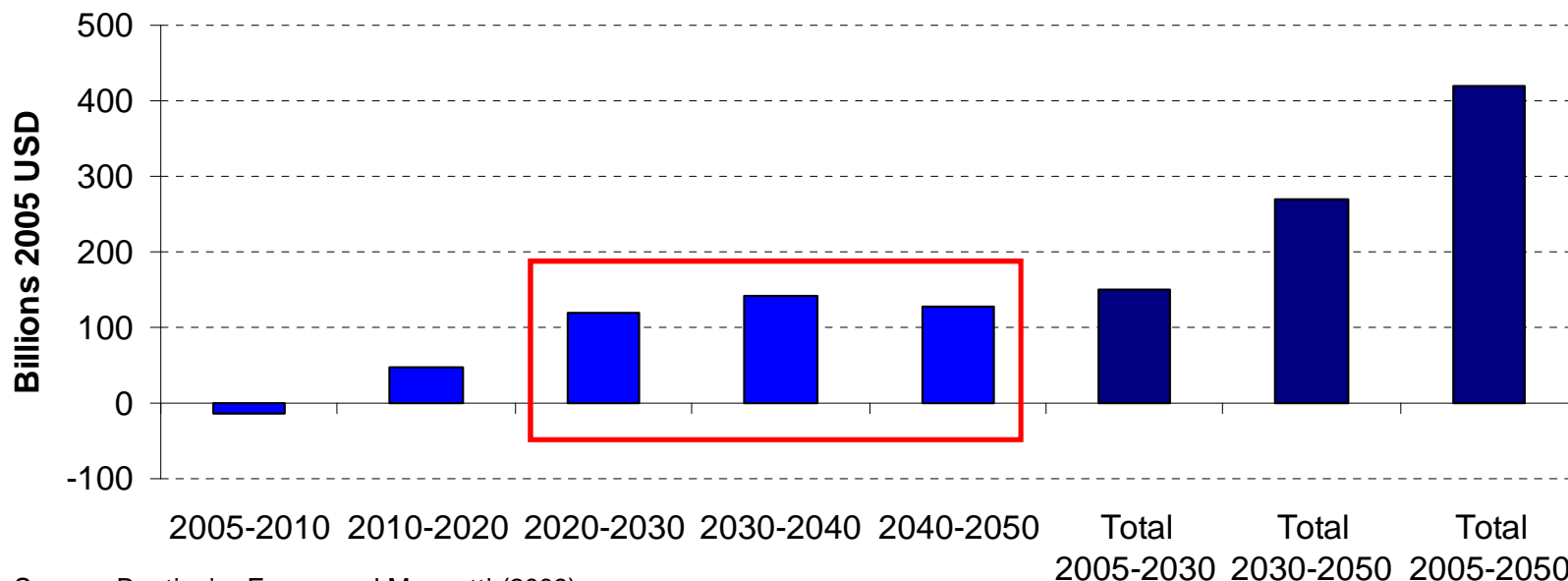
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Europe: Financing Decarbonization

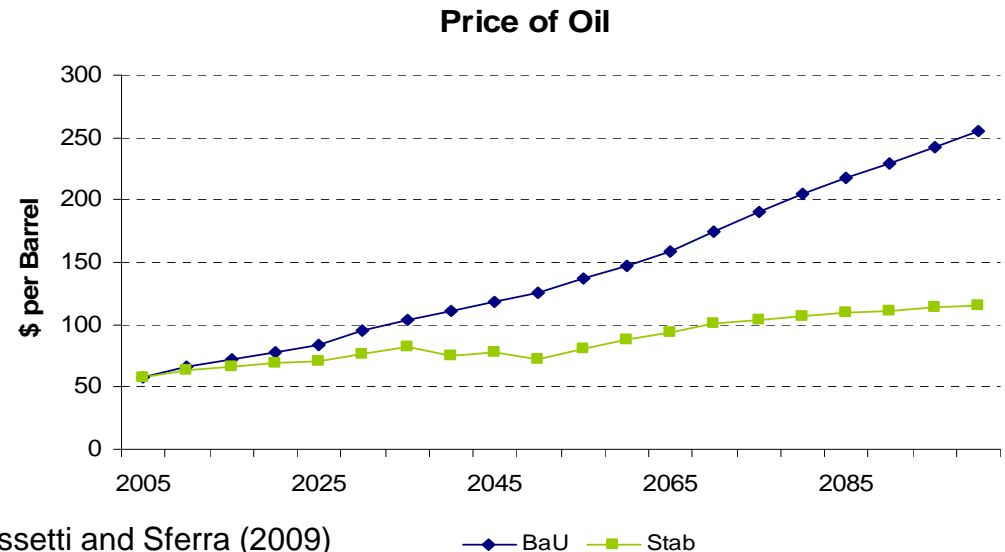
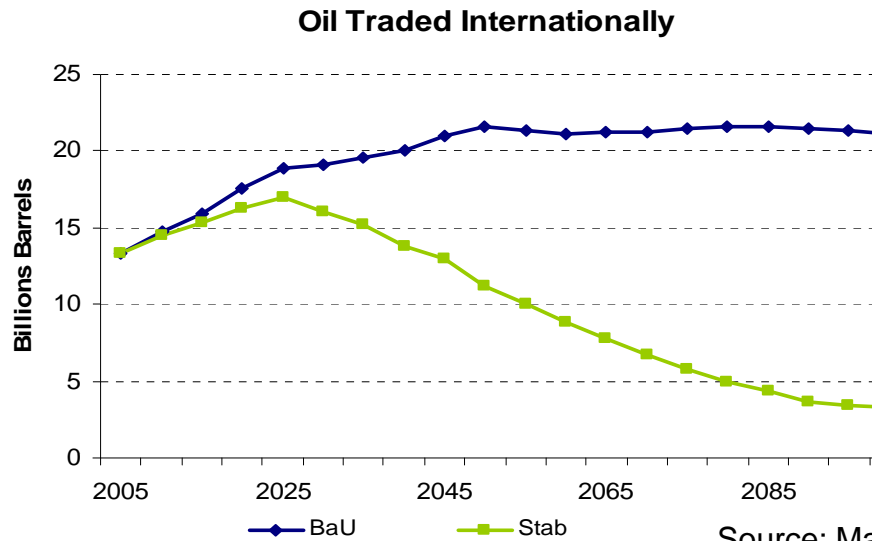
Incremental Investments in the Power Sector - Europe



Source: Bastianin, Favero and Massetti (2009)

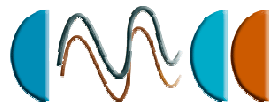
- Higher investments in power sector from 2020 onward
- Financially affordable, but riskier investments
- Problematic technologies: renewables, CCS, nuclear

MENA: No More Oil Exports...



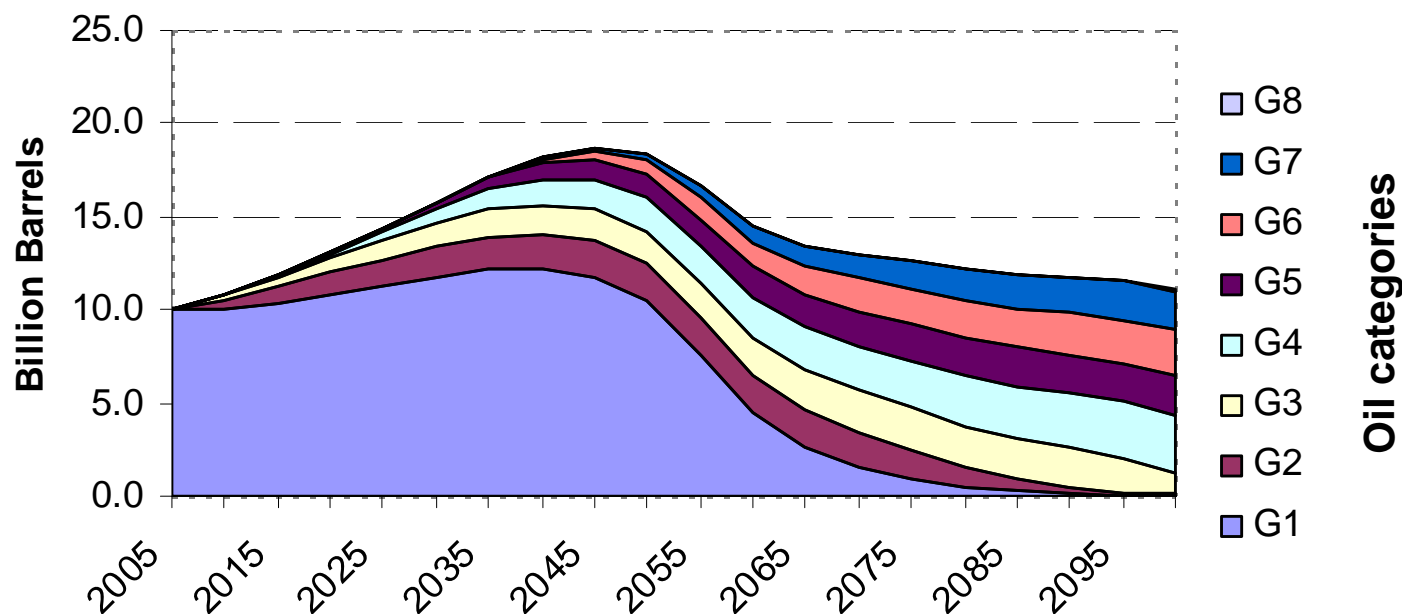
Source: Massetti and Sferra (2009)

- In a 550 ppm CO₂-eq stabilization scenario the international oil market is doomed to collapse
- Strong contraction of the oil price



...No More Oil Production in MENA

Oil production - MENA

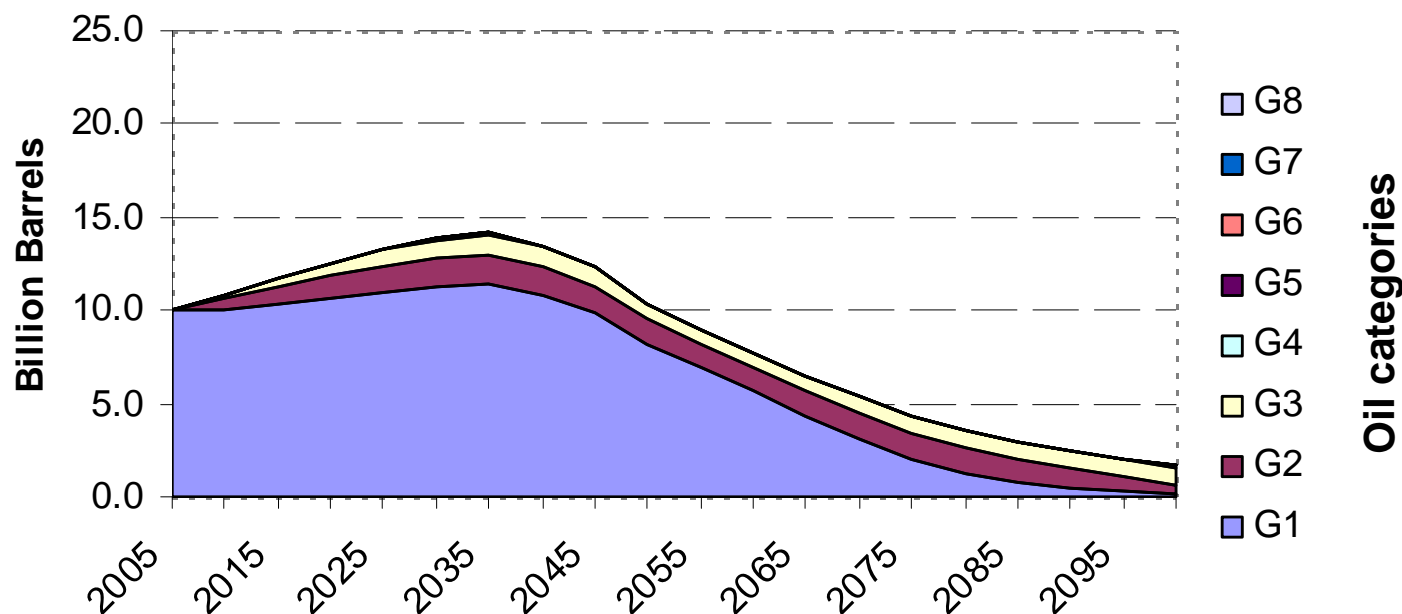


- Peak in 2045-2050 (but not world peak)
- Wide resources of cheap oil (category G1)

Source: Massetti and Sferra (2009)

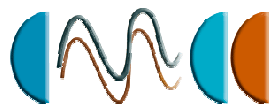
...No More Oil Production in MENA

Oil production - MENA



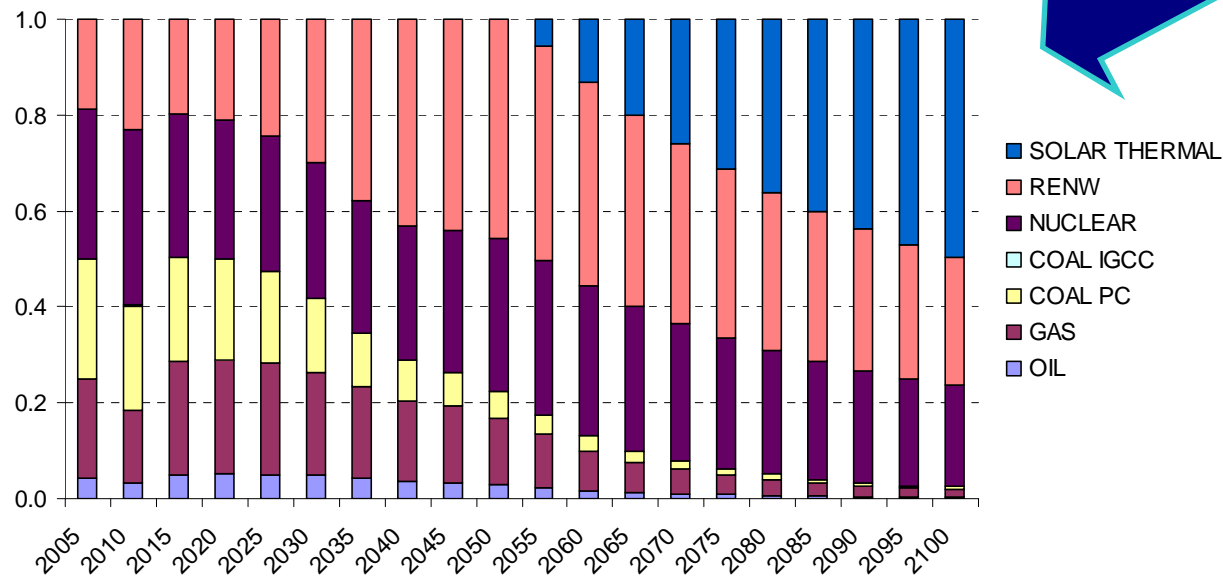
Source: Massetti and Sferra (2009)

- No big changes until 2035
- Collapse of oil production after 2035
- Need to restructure economies in all MENA region



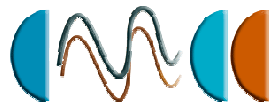
MENA: Electricity to EU?

Western Europe Electricity Consumption - Stab- Constrained with Grid



Source: Massetti and Ricci (2009)

- Solar Thermodynamic: potentially important if either nuclear or ccs (or both) are not an option
- Only from second half of the century



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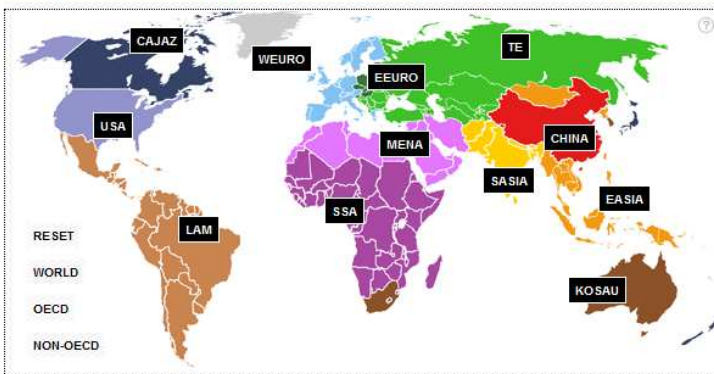
Conclusions

- Challenges:
 - Decarbonization of Energy Supply in Europe
 - Energy efficiency in MENA
 - Collapse of oil trade and oil price from 2035 onward

- How can we bring MENA in a climate agreement?

WITCH Policy Simulator

Compare scenarios Compare variables Compare regions



Stabilisation target at 2100

BaU
 535 ppm CO2-eq

Policy framework

Scenario

Variables

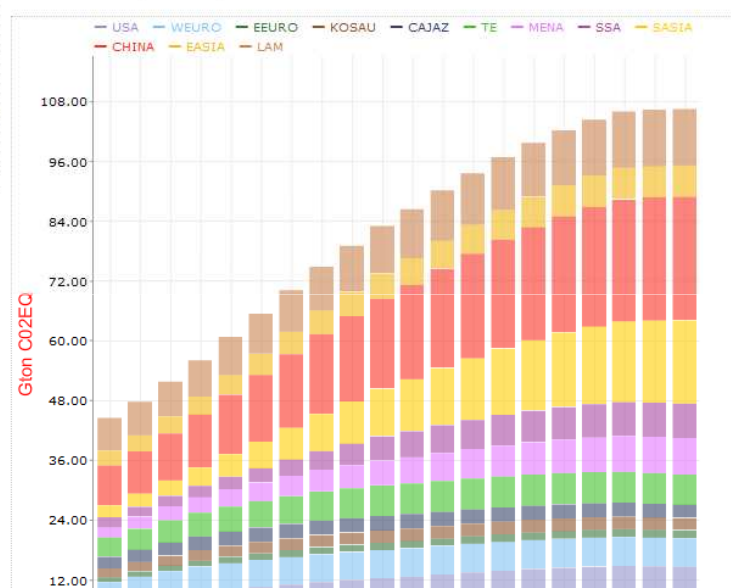
- ▼ Economy
 - ▶ Socio-economic variables
 - ▶ Investments
 - ▶ Technological progress
 - ▶ Energy system
 - ▶ Climate policy
- ▼ Climate
 - ▼ Total emissions
 - ALL GHG EMISSIONS [Gton CO2EQ]
 - ALL GHG EMISSIONS PER CAPITA [T CO2EQ PER CAPITA]
 - ▶ CO2 emissions
 - ▶ Other GHG emissions
 - ▶ Concentrations and temperature

From: 2005 To: 2100 Chart type: Bar chart Update results

You can save the results as an [excel spreadsheet](#), a [detailed report](#) or download the chart as an [image](#)

Business as Usual

ALL GHG EMISSIONS [Gton CO2EQ]



- WITCH policy simulator
- Soon online at www.witchmodel.org

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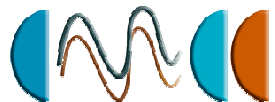
www.cmcc.it

www.feem.it



www.witchmodel.org

www.economicclimatechange.com



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