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Future technologies for sustainable energy systems

Dr. Andreas Poullikkas
Ph.D, D.Tech, FIET
Chairman, Cyprus Energy Regulatory Authority
apoullikkas@cera.org.cy

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Future sustainable energy systems

Towards sustainability

EU medium and long term targets

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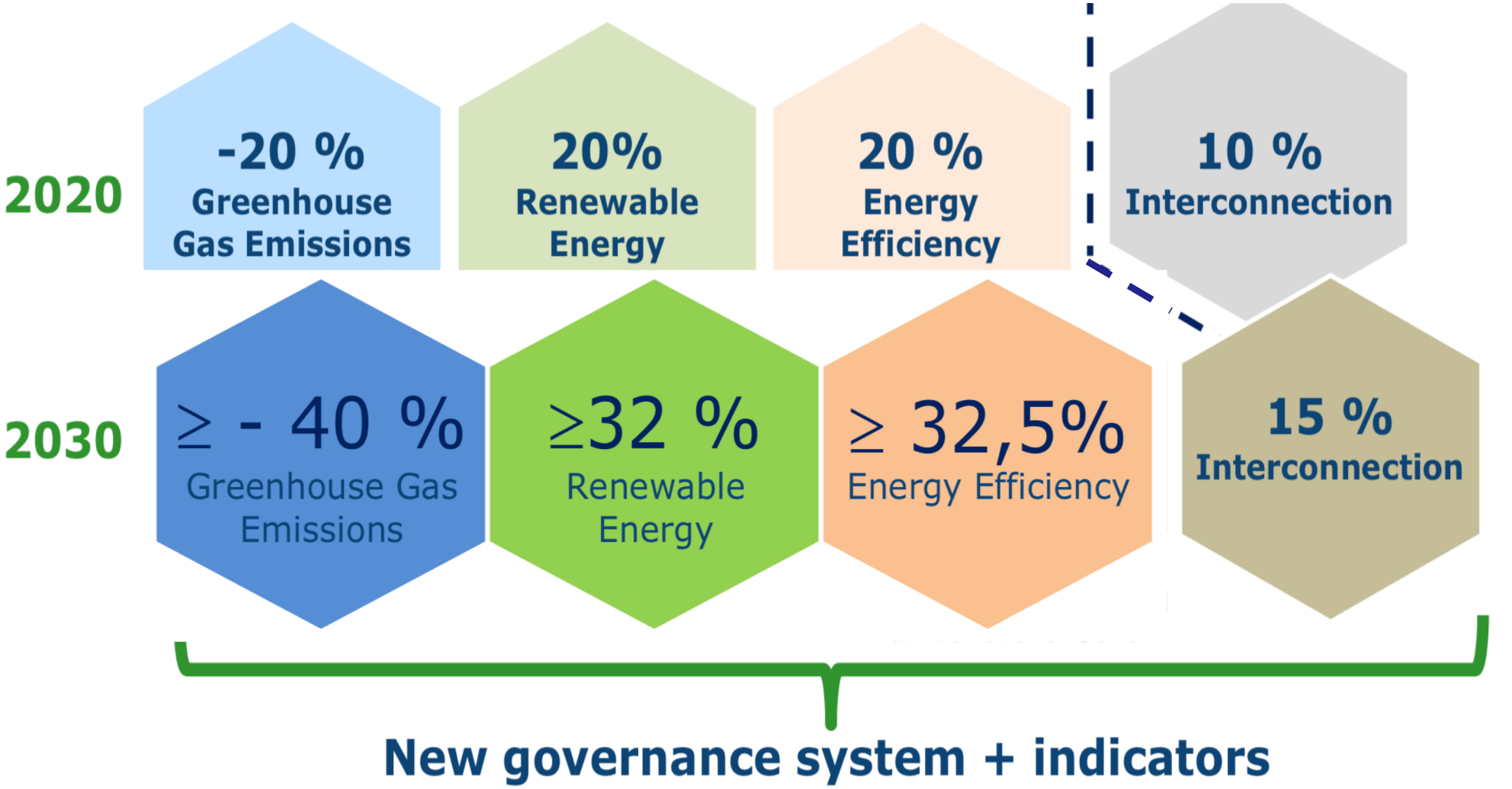
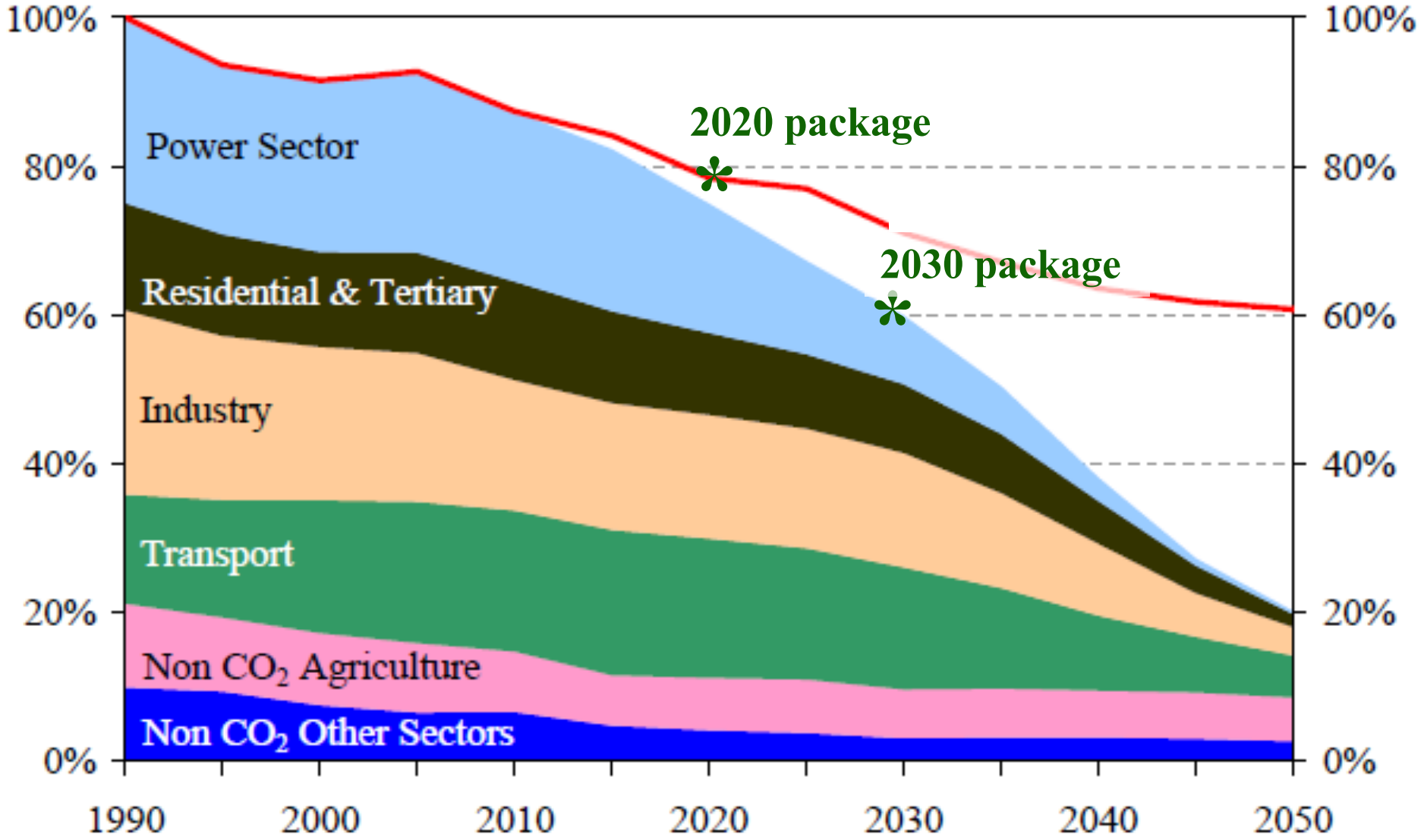


2050 -80% Greenhouse Gas Emissions

EU reduction in greenhouse gas emissions



Current energy system

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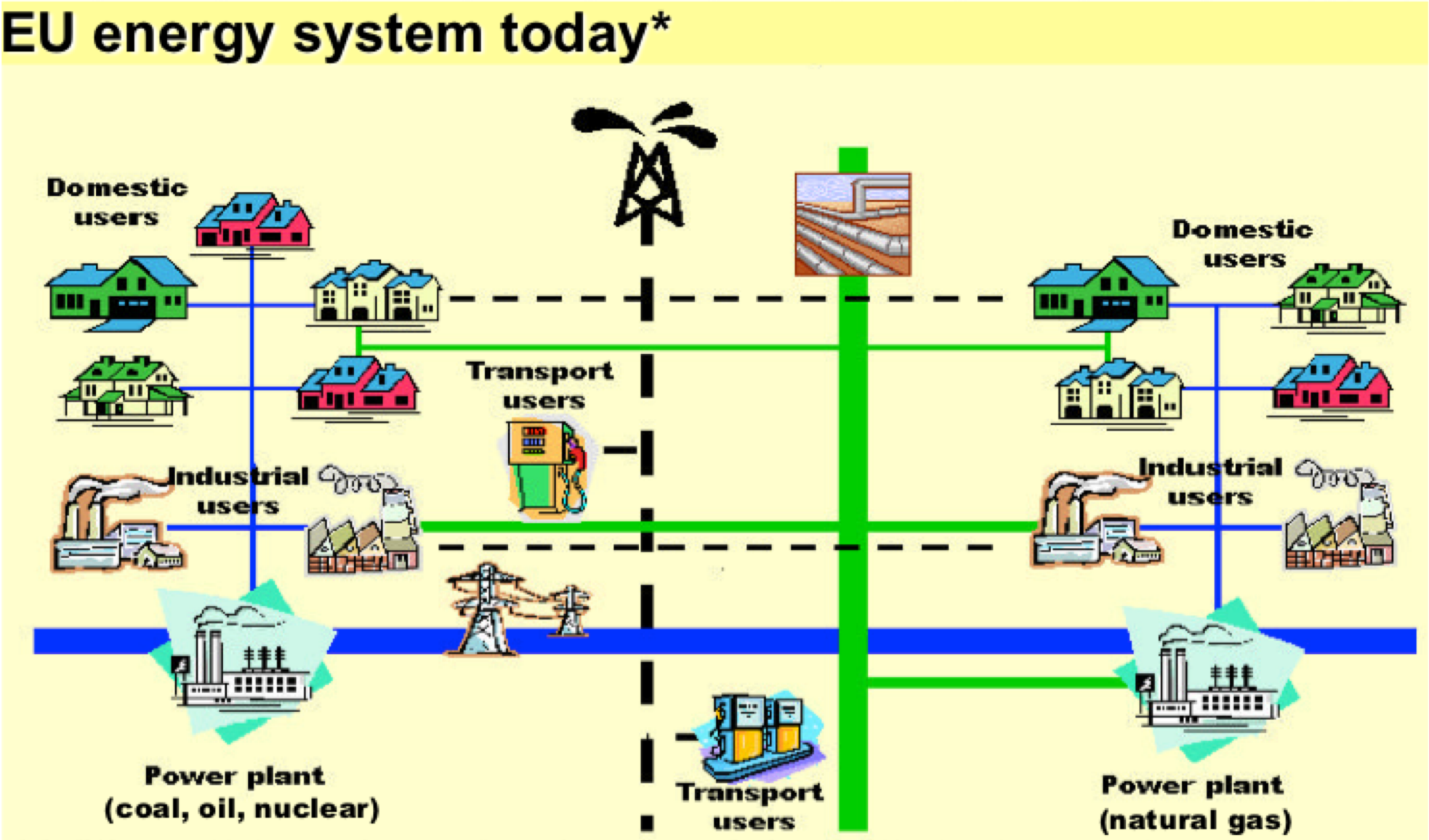
EU energy system today*



* Poullikkas A., 2009, *Introduction to Power Generation Technologies*, ISBN: 978-1-60876-472-3

Future energy systems (optimistic scenario)

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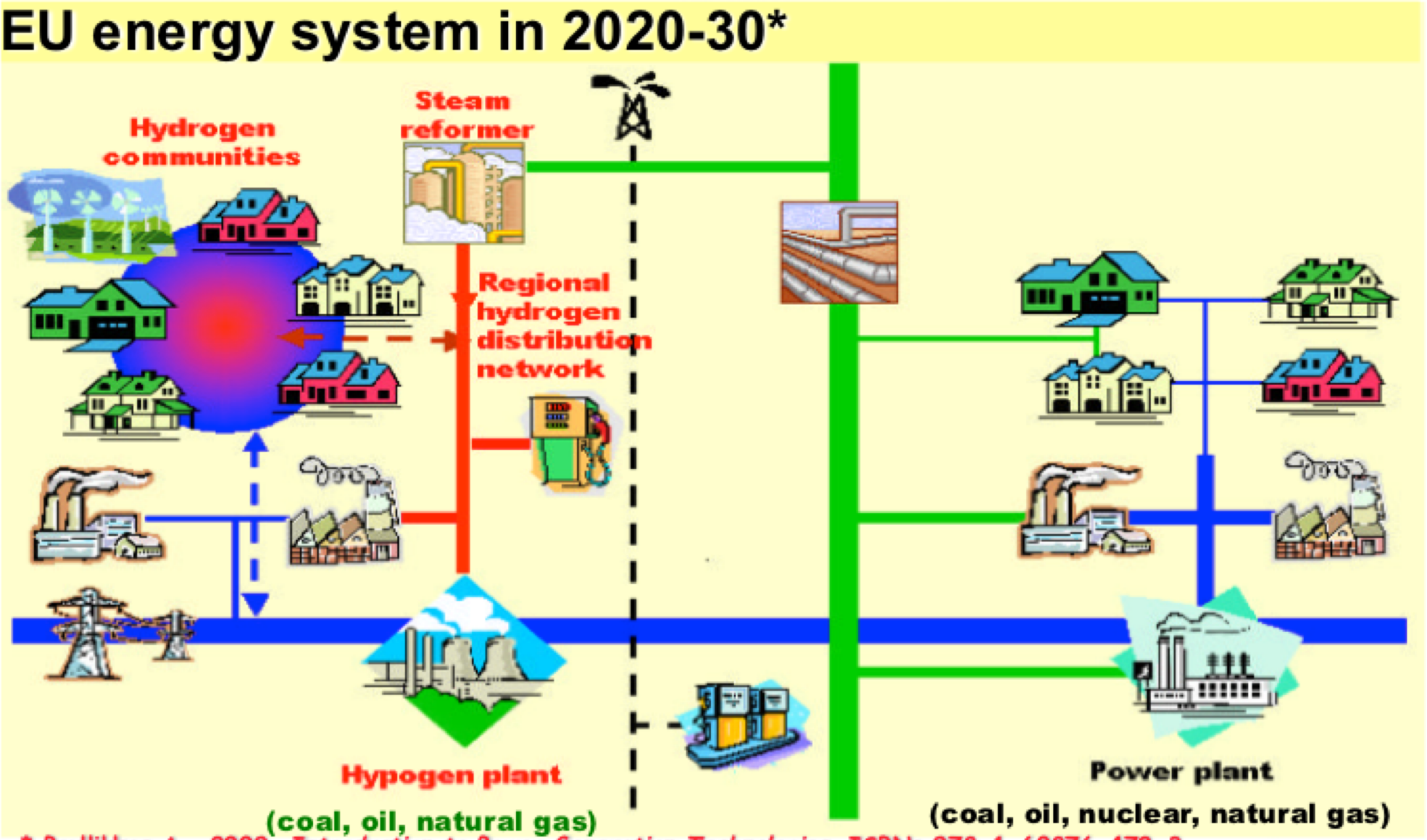

Future energy systems (optimistic scenario)

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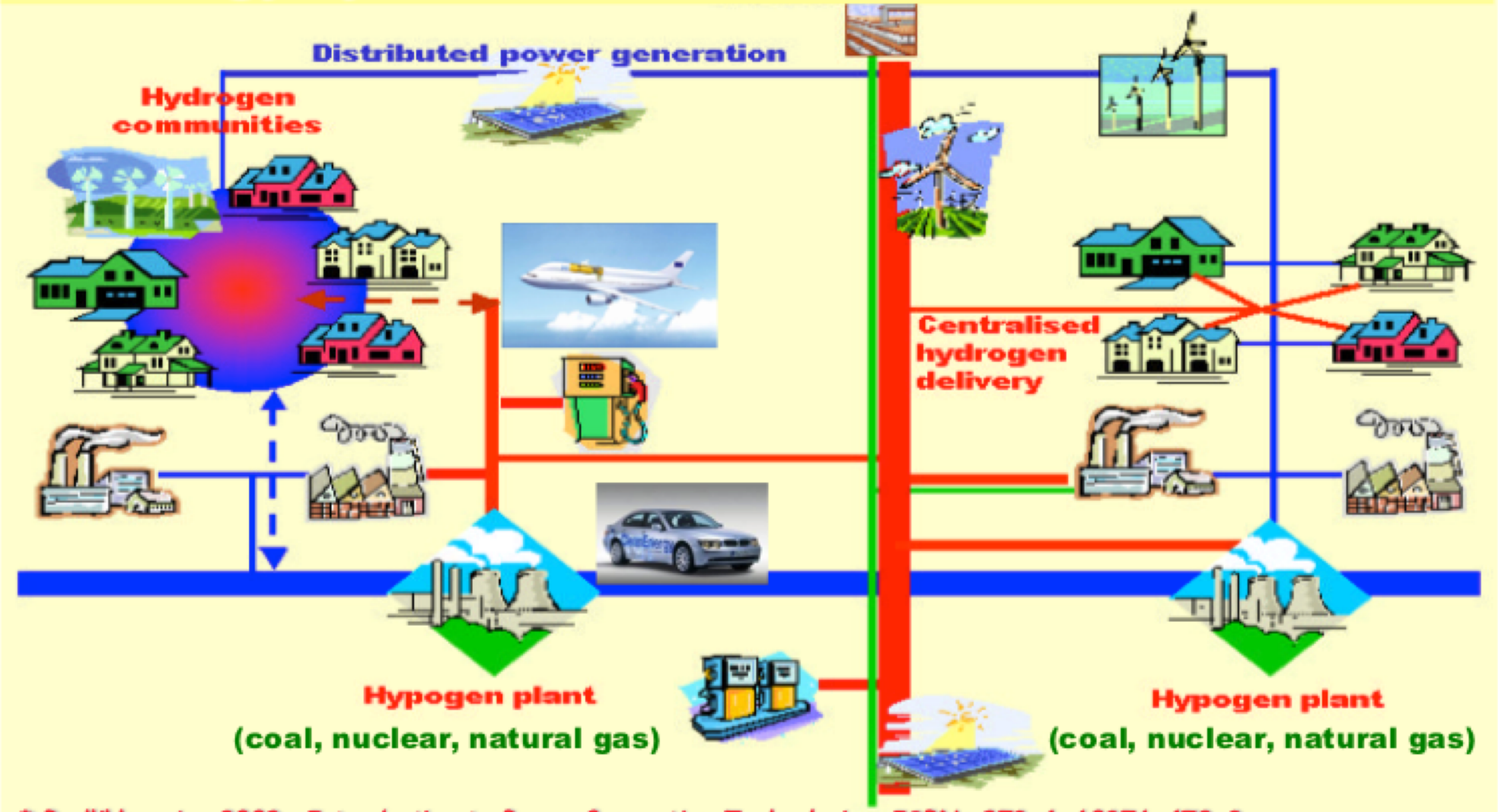
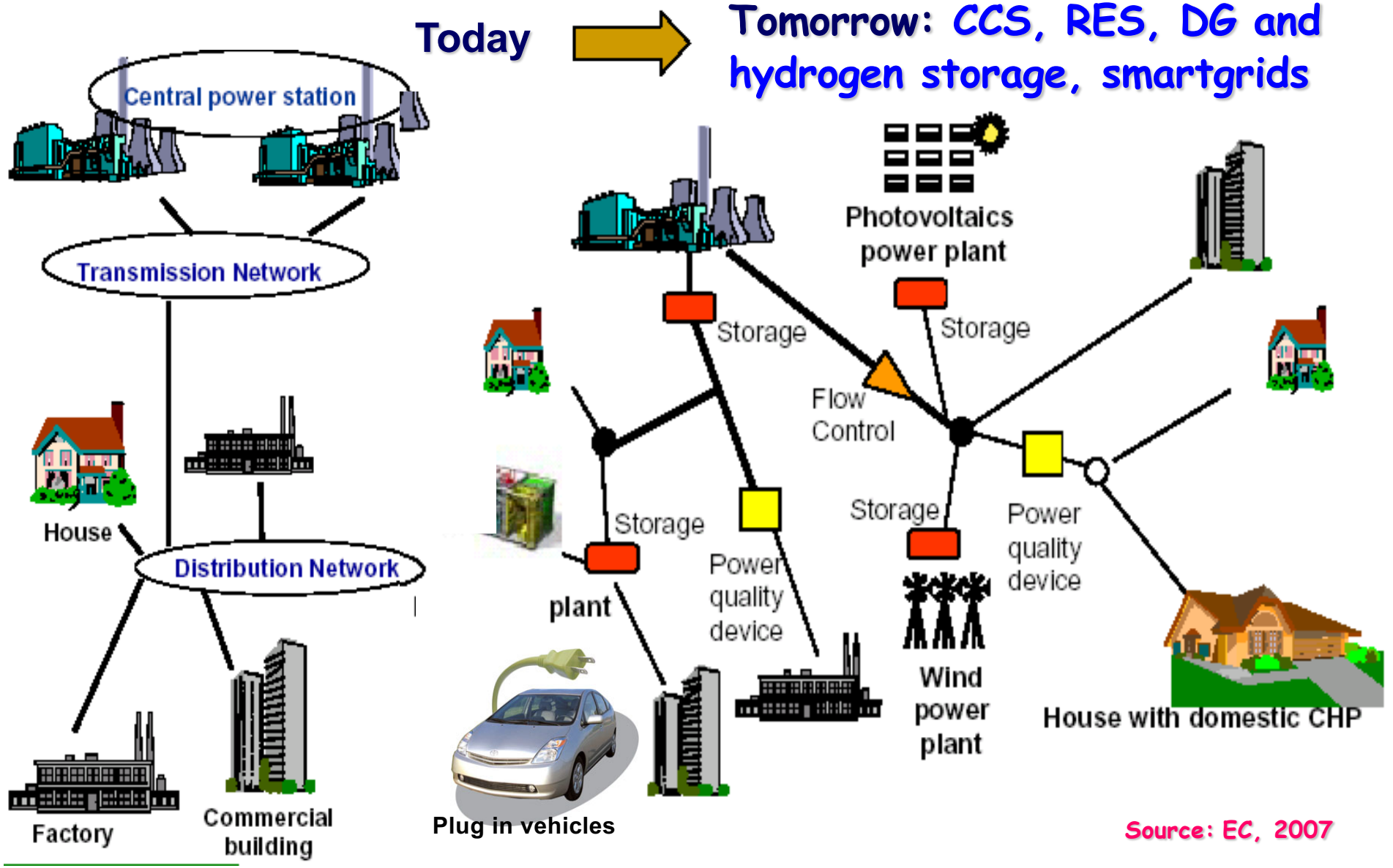
EU energy system in 2040-50*



* Poullikkas A., 2009, *Introduction to Power Generation Technologies*, ISBN: 978-1-60876-472-3

Future power systems



Indigenous energy sources

In SE Mediterranean region

Gas reserves in SE Mediterranean region*

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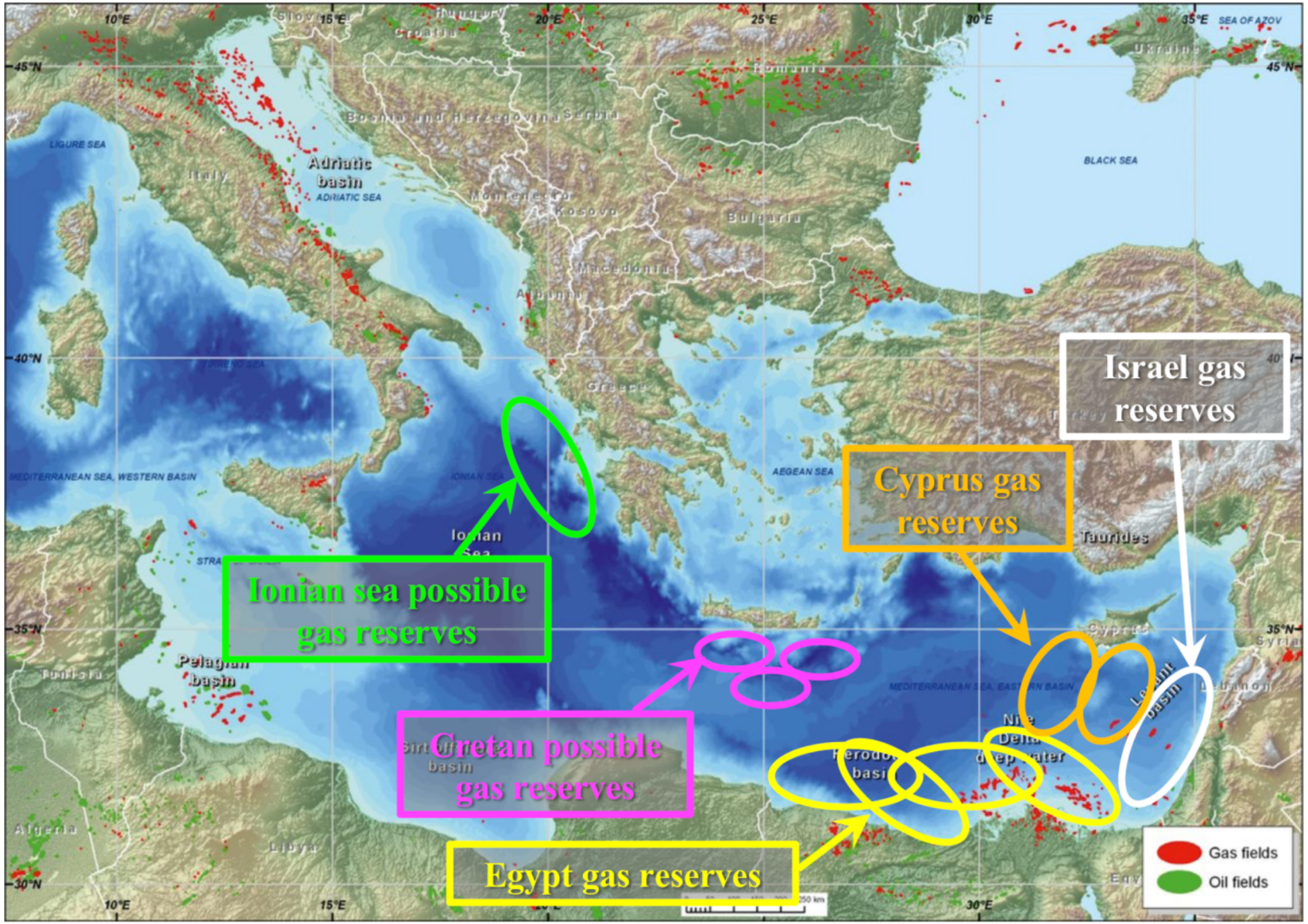

* A. Belopolsky, *et al.*, 2012, "New and emerging plays in the Eastern Mediterranean", *Petroleum Geoscience*

Wind potential in SE Mediterranean region*

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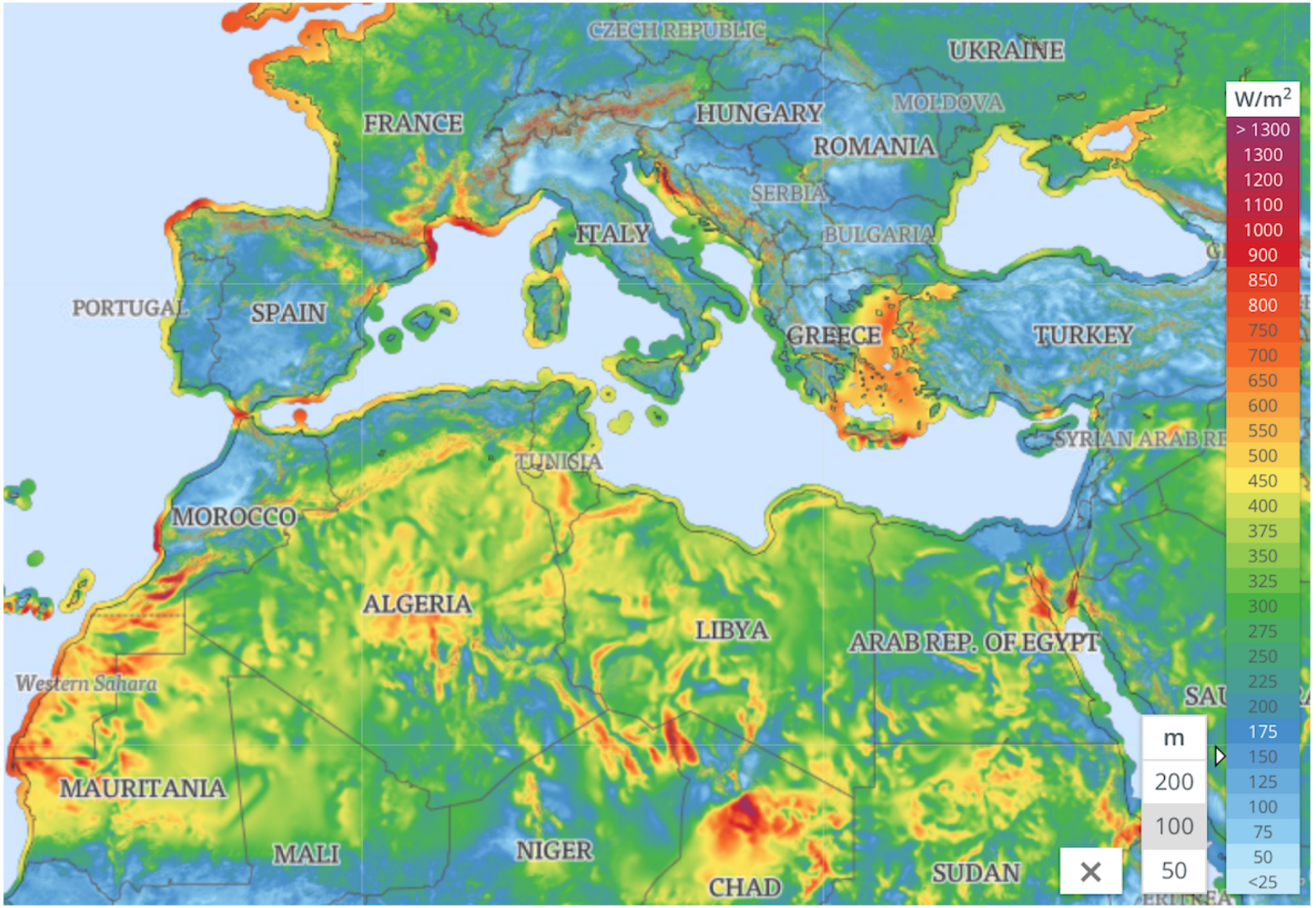

* The Global Wind Atlas (https://globalwindatlas)

Solar potential in SE Mediterranean region*

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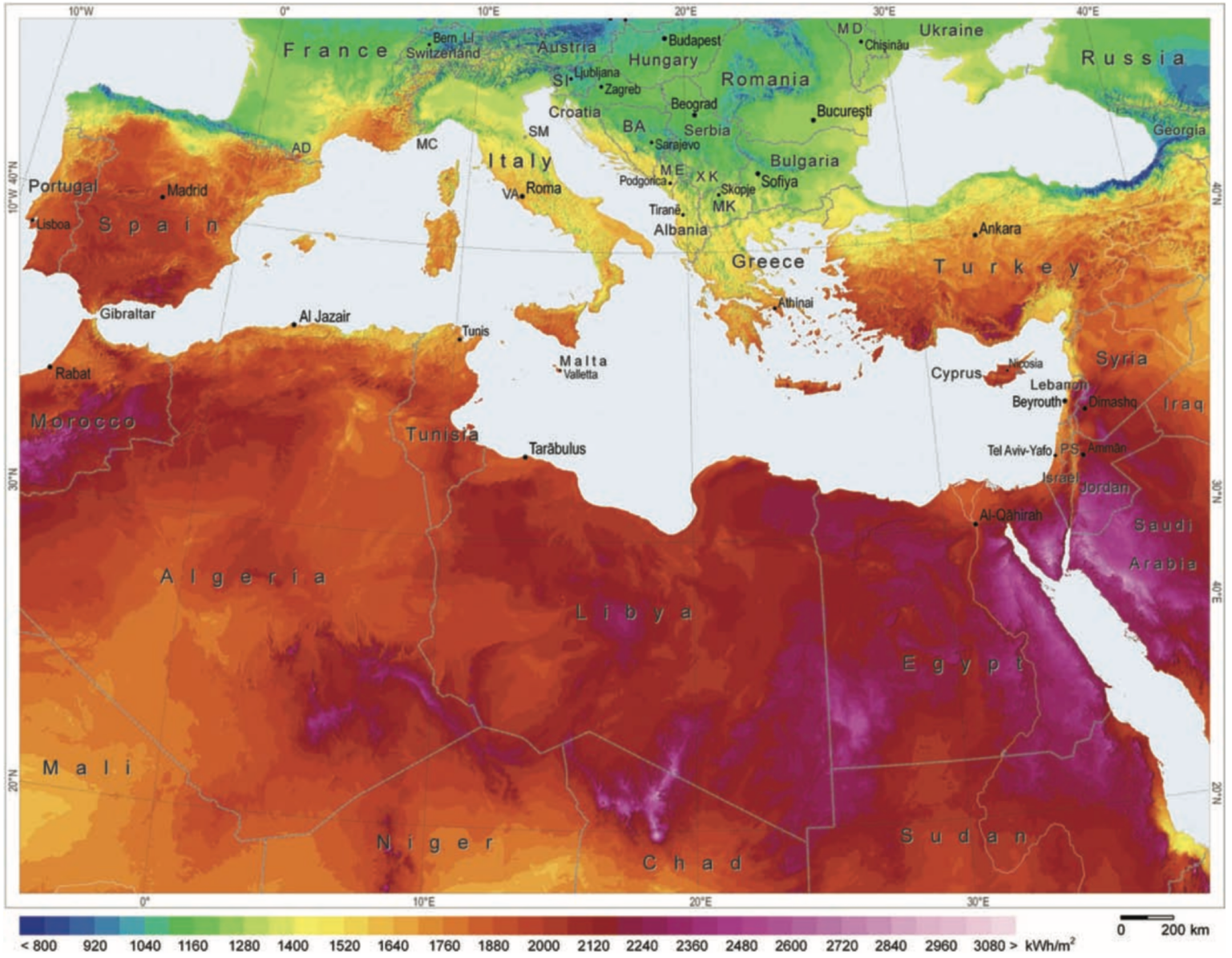

* Easac & Pihl, Erik. (2011). Concentrating Solar Power: Its potential contribution to a sustainable energy future

Main indigenous energy sources in SE Mediterranean region

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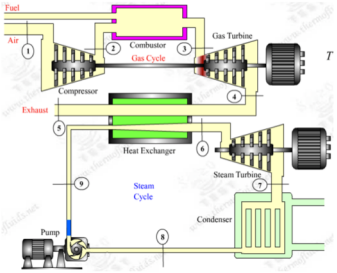
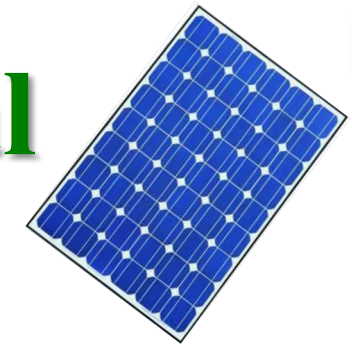
- Natural gas



- Wind potential

- Solar potential

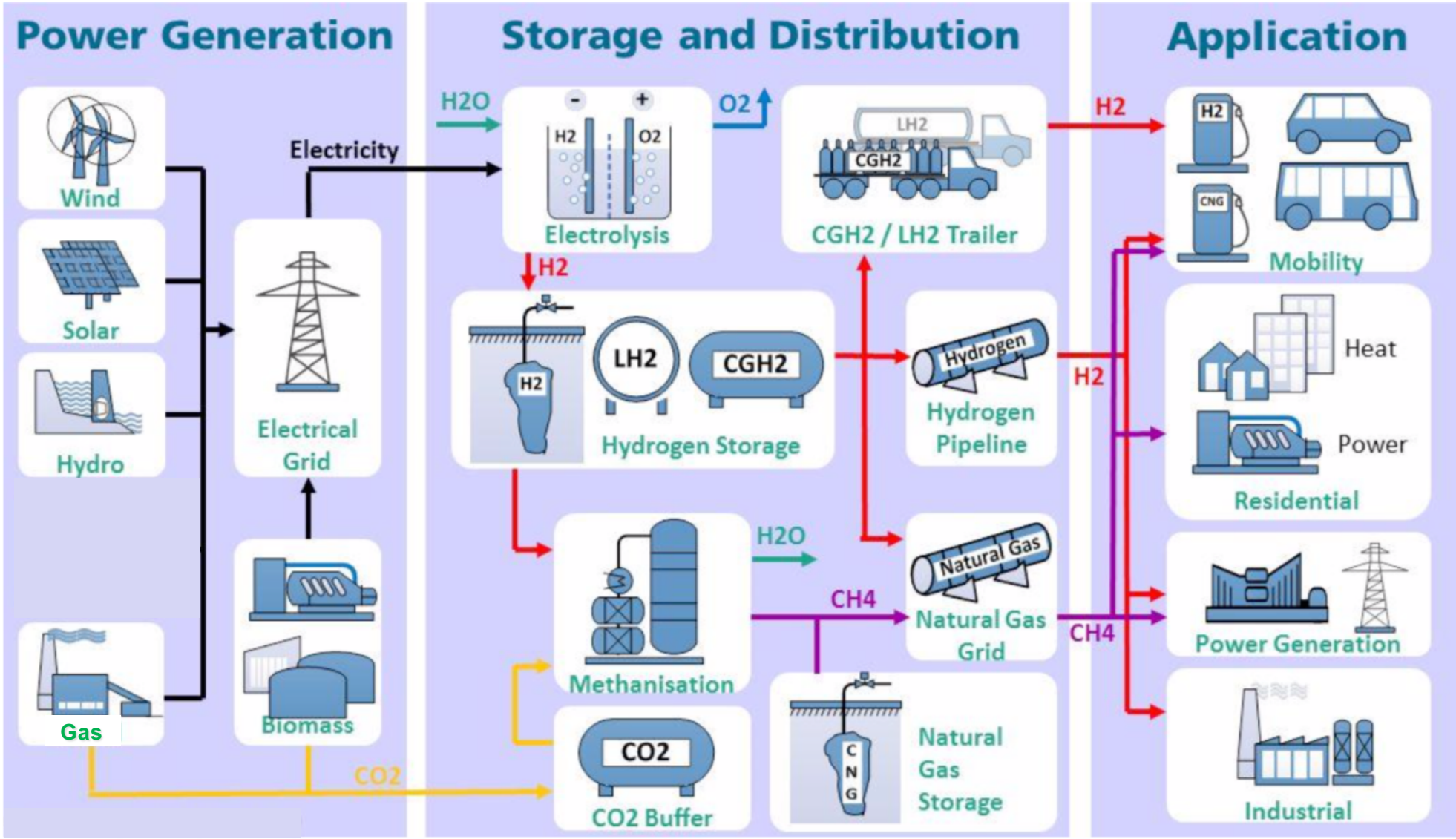


hydrogen

The role of hydrogen

Sustainable future in SE Mediterranean region

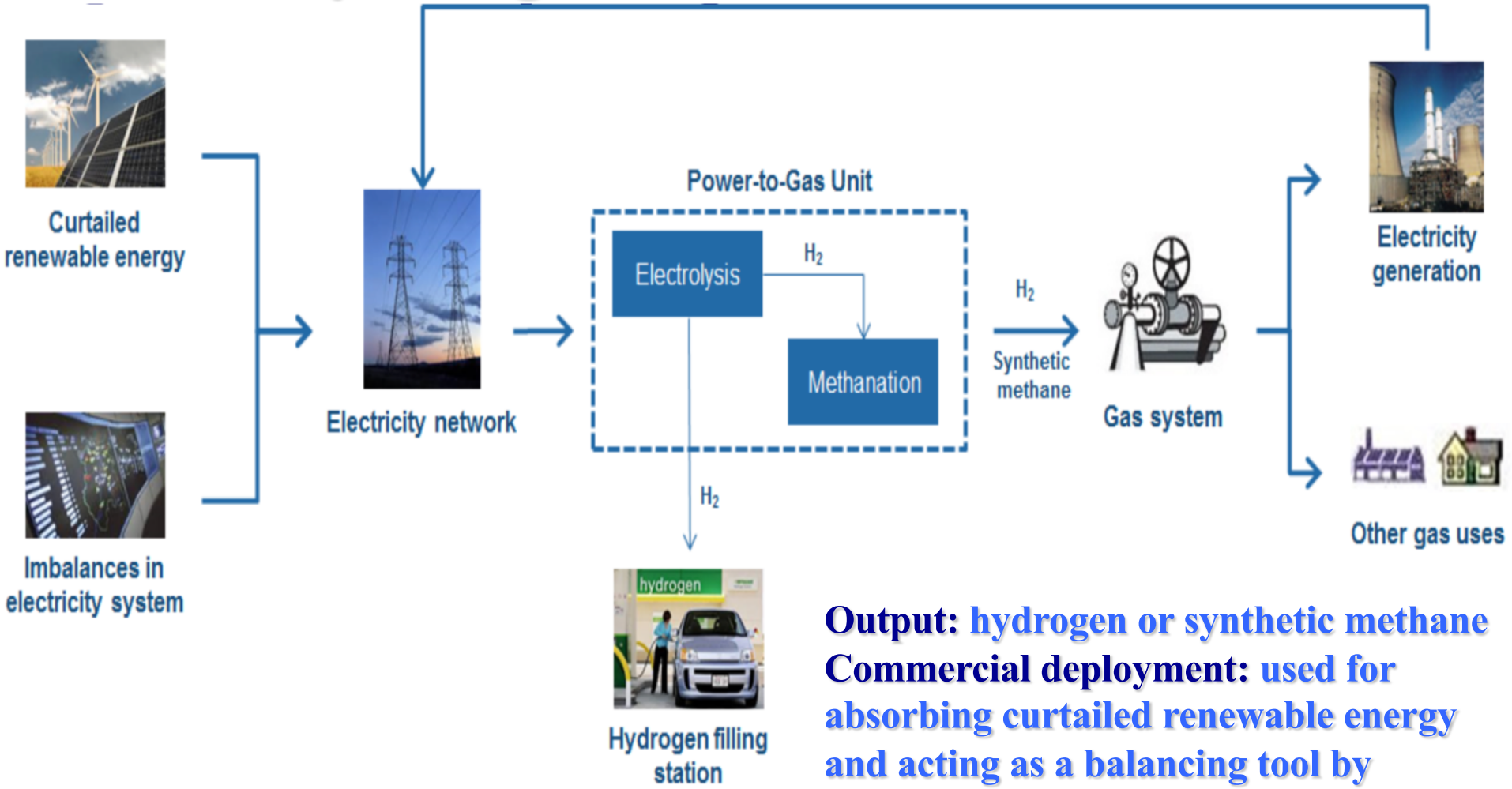
Potential role of hydrogen in the energy transition



Source: EU, 2019

Power-to-Gas (P2G)

- **energy storage technology linking the electricity and gas infrastructure**



Output: hydrogen or synthetic methane
Commercial deployment: used for absorbing curtailed renewable energy and acting as a balancing tool by electricity TSOs

The Super Smart Grid after 2050*
(may allow for 100% RES)

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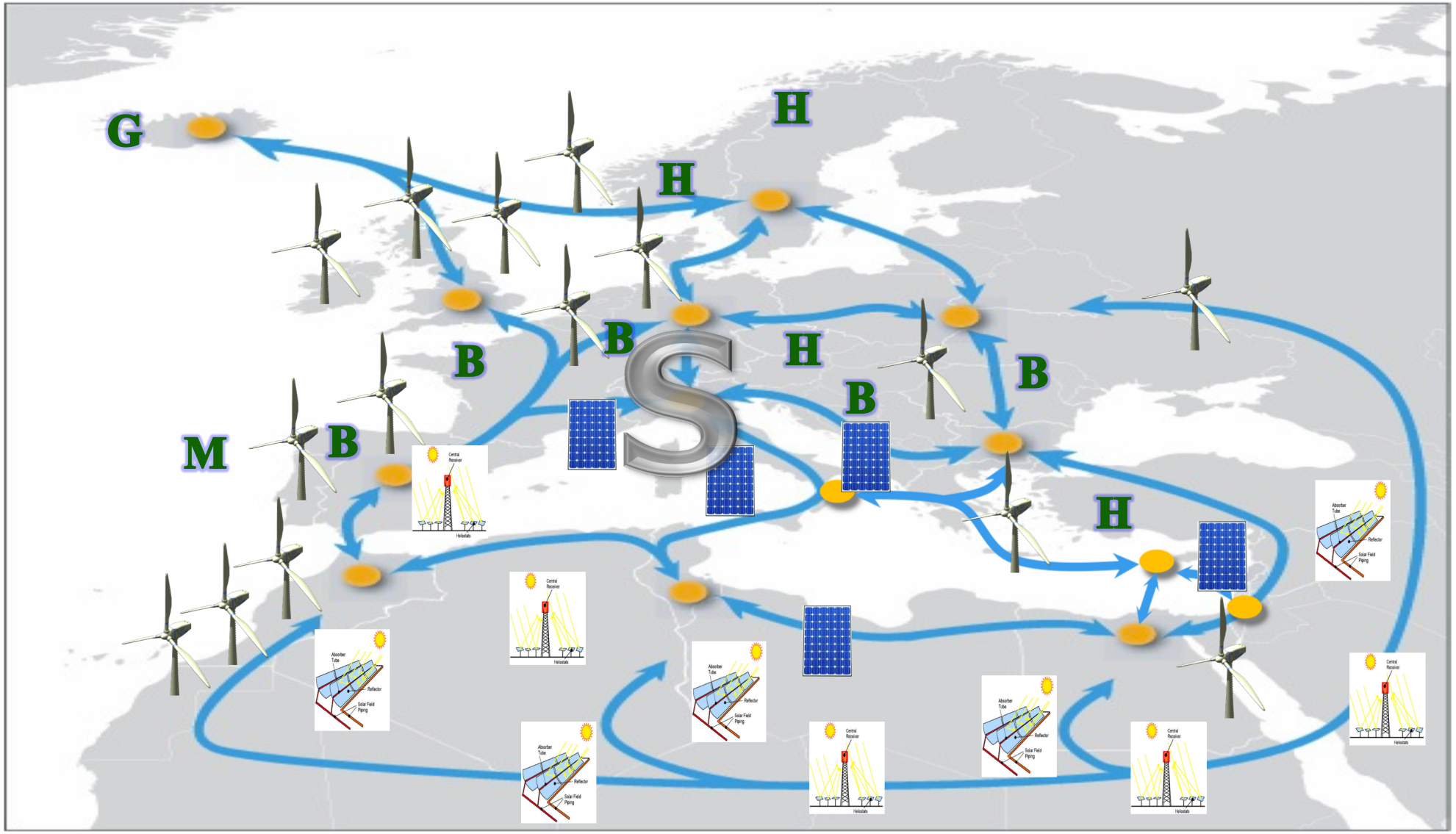

* Poullikkas A., 2013, *Sustainable Energy Development for Cyprus*, ISBN: 978-9963-7355-3-2

Next steps

Towards hydrogen economy

Next steps

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First steps towards the development of sustainable energy strategy

- **Horizon up to 2060**
- **Development of strategic plan:**
  - ~ **Electrical interconnections**
  - ~ **Integration of sustainable technologies**
  - ~ **Pipeline interconnections (or virtual pipelines)**
  - ~ **Use of hydrogen after 2030**
  - ~ **Hydrogen production**
    - From renewables
    - From natural gas
- **Energy exporters to EU**