100 % Renewable Energy is more possible in Turkey

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Renewable Energy Policies Climate Resilience, Sustainable Development & Poverty Reduction

INFORSE – HELIO – SSNC Side Event at

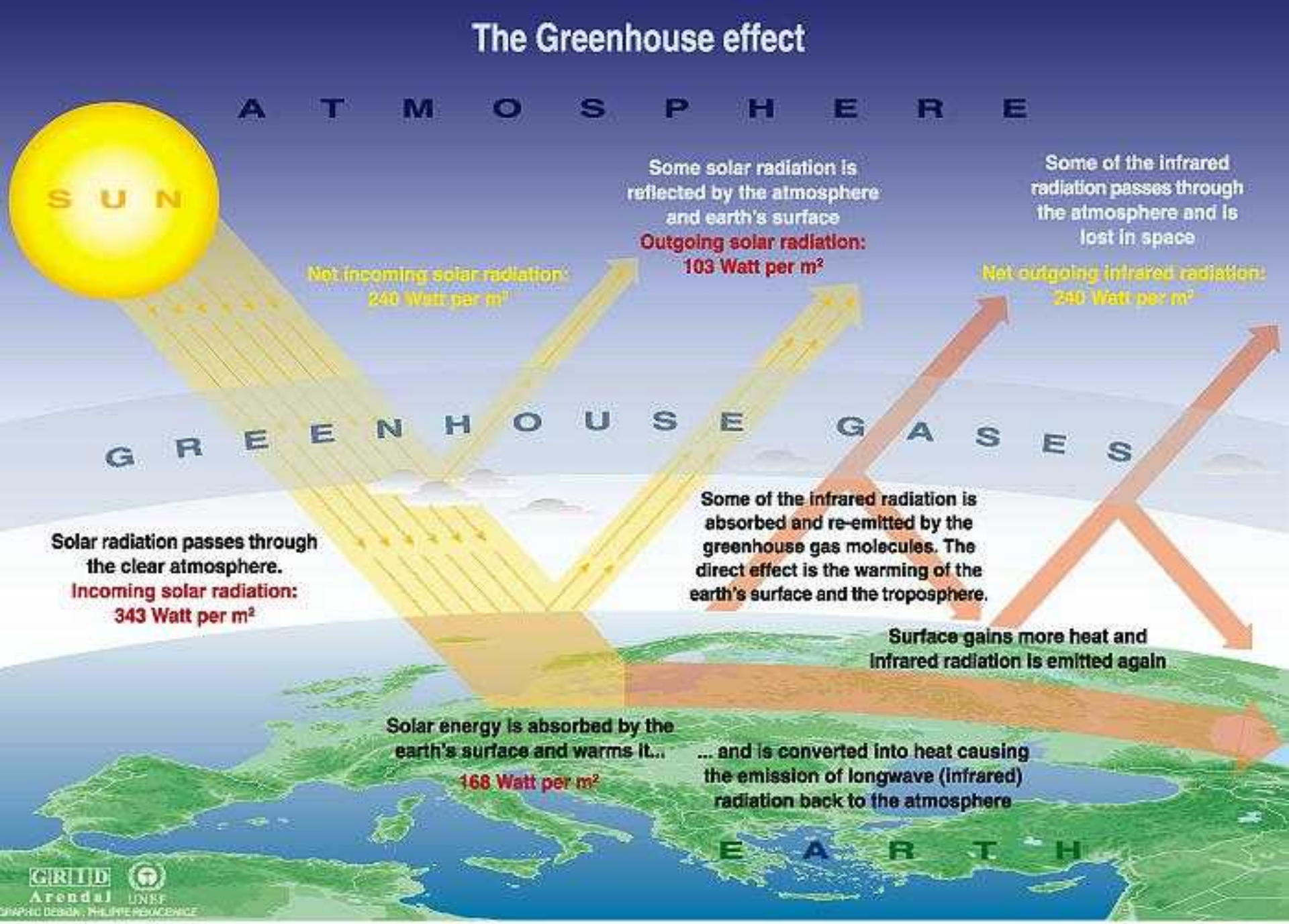
UNFCCC COP17

2 December 2011, Durban, South Africa

INFORSE-EUROPE
International Network for Sustainable Energy

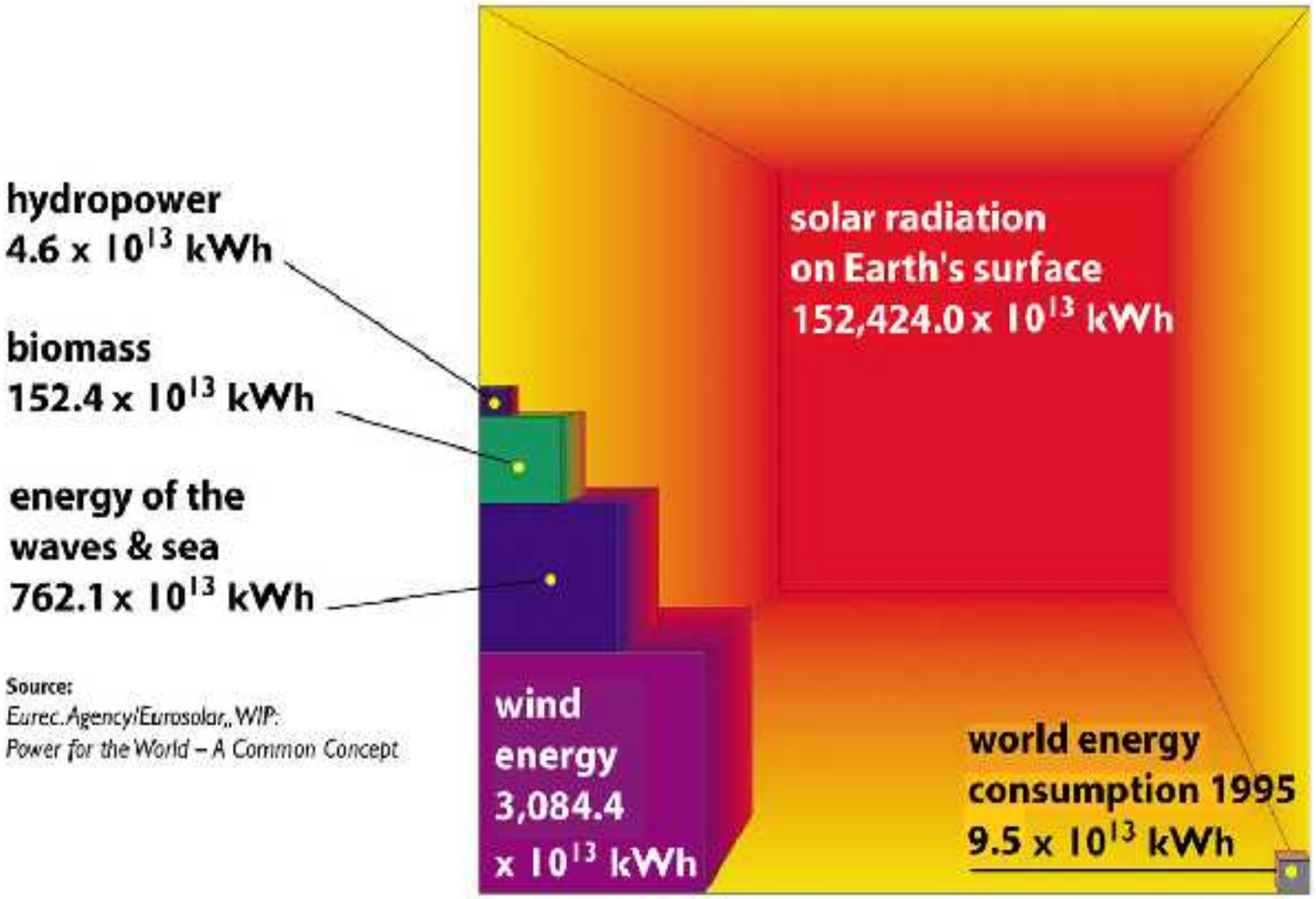
Proceedings :
http://www.inforse.org/europe/confi1_COP17.htm

The Greenhouse effect



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

The Potential of Renewable Energies Worldwide



Source:
Eurec.Agency/Eurosolar, WIP:
Power for the World – A Common Concept






Benefits

Renewable energies are inexhaustible.

Renewable energies are available almost everywhere.

Renewable energies represent multiple win-win options.

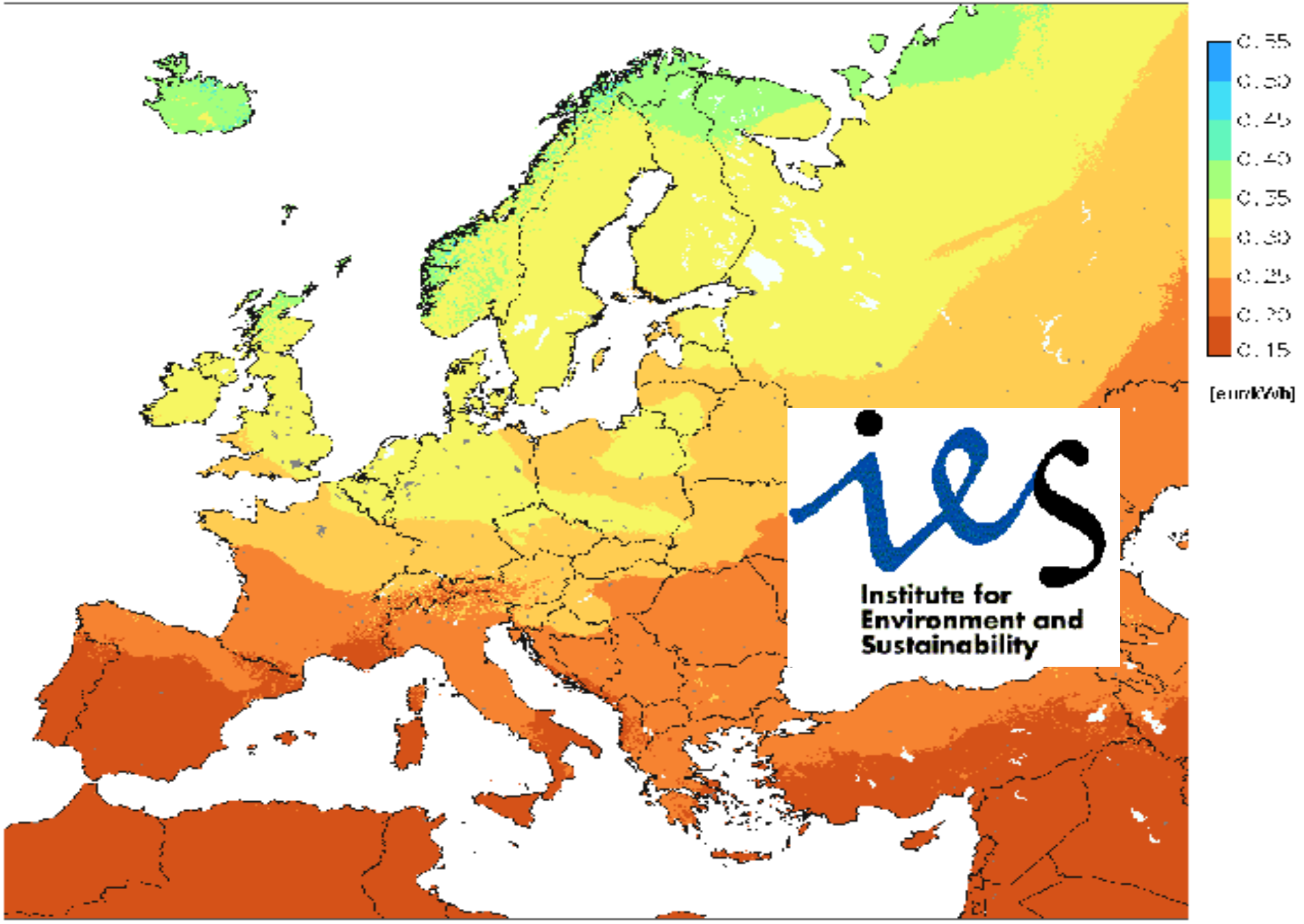
They reduce dependence on oil.

They help save foreign currency.

They create green jobs

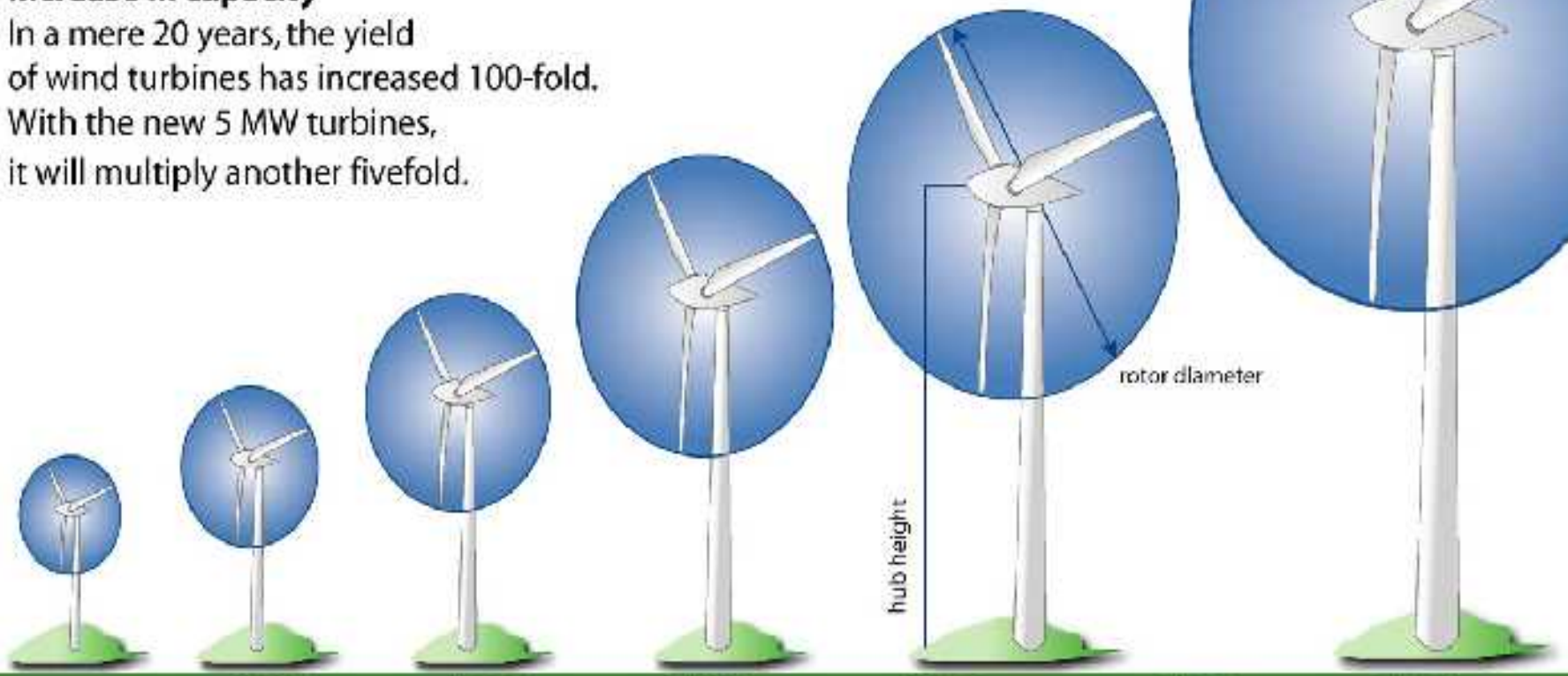
Electricity generation costs of large PV power station (5 MWp)

(system price 4 eur/Wp, interest rate 3%, inflation 2%, maintenance 1%, optimum angle mounting, capital payback time 20 years)

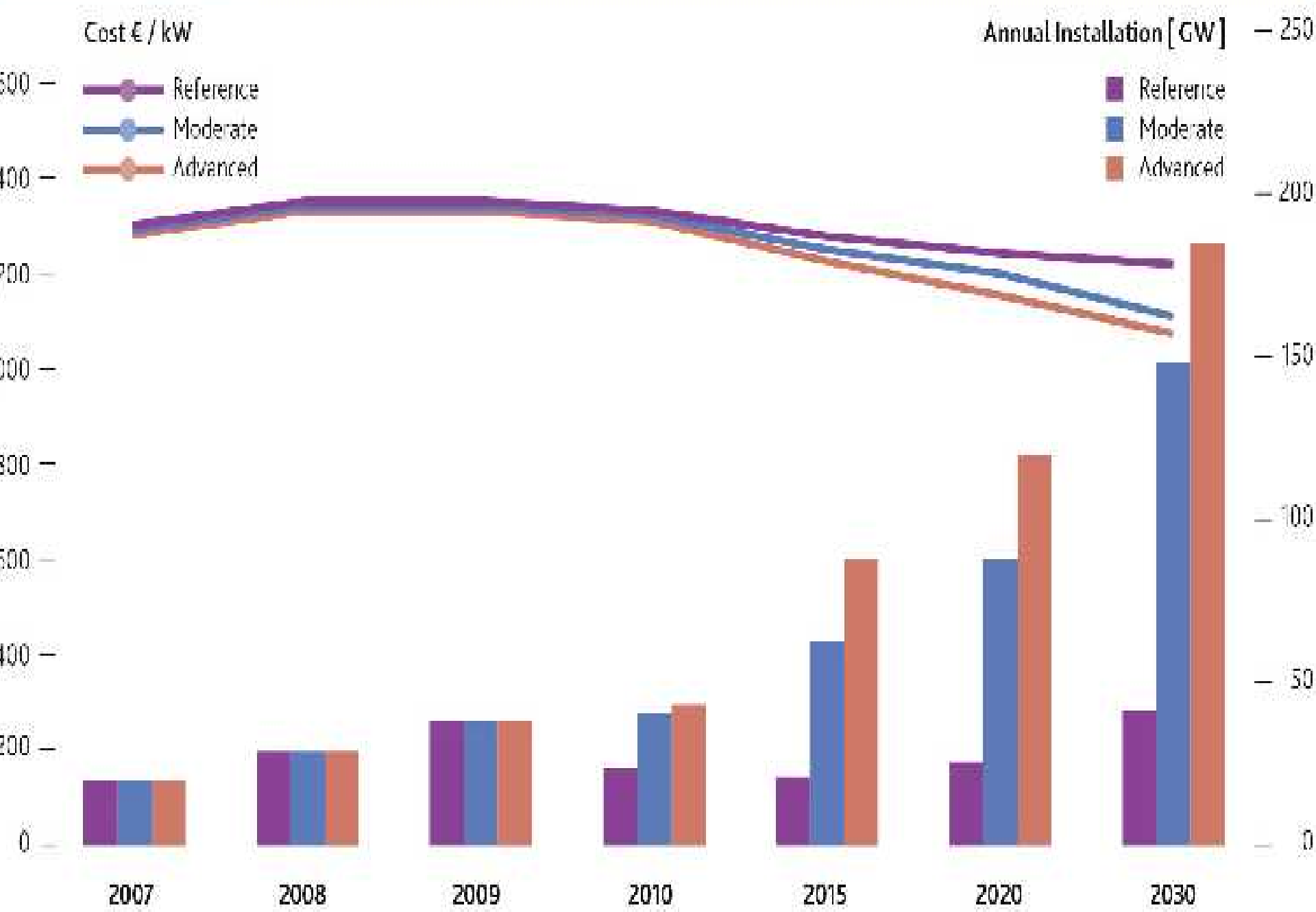


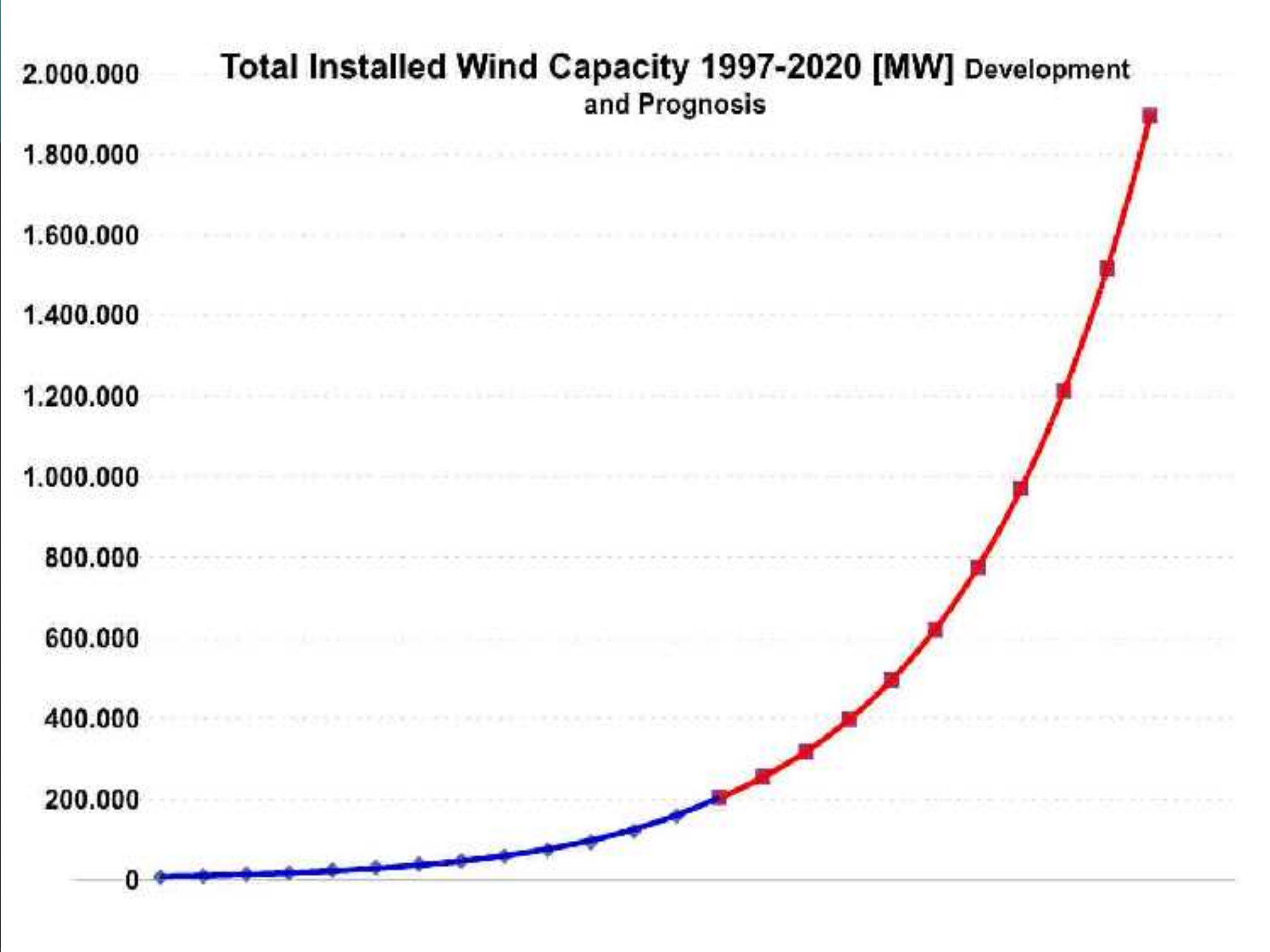
Development of Technology
500-fold Increase in Yield since 1980

Increase in capacity
In a mere 20 years, the yield
of wind turbines has increased 100-fold.
With the new 5 MW turbines,
it will multiply another fivefold.

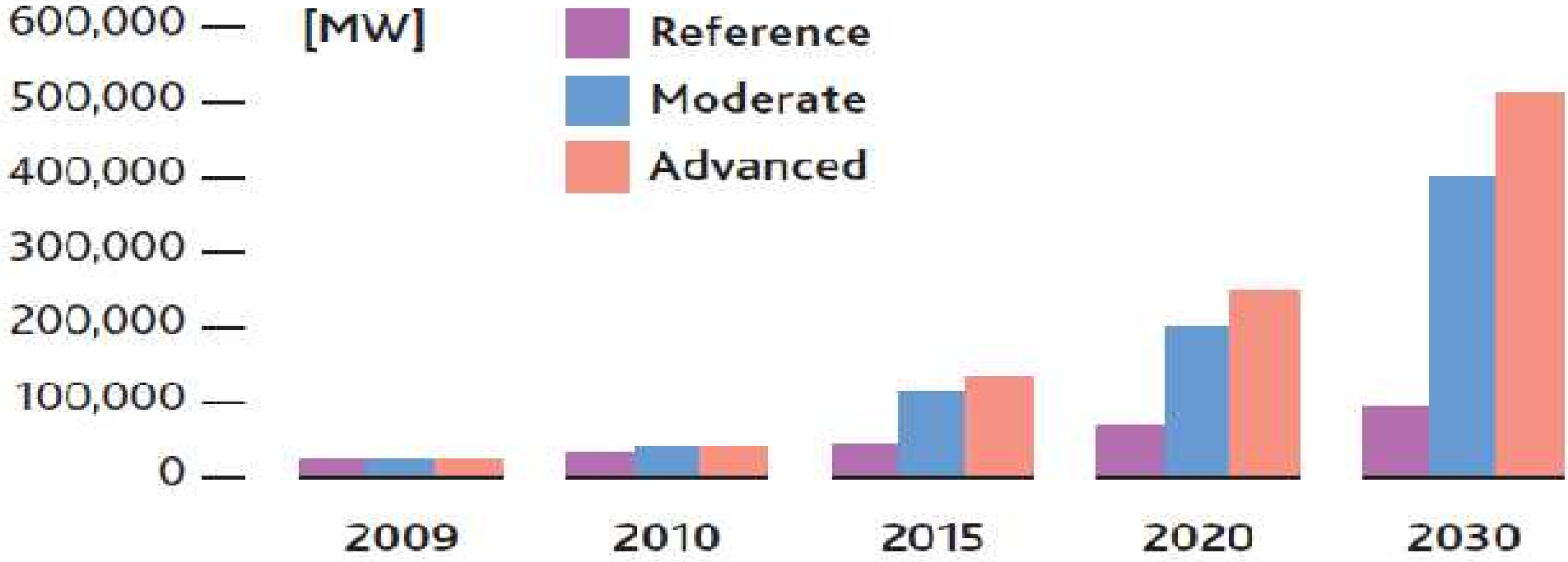


	1980	1985	1990	1995	2000	2005
rated power :	30 kW	80 kW	250 kW	600 kW	1,500 kW	5,000 kW
rotor diameter :	15 m	20 m	30 m	46 m	70 m	115 m
hub height :	30 m	40 m	50 m	78 m	100 m	120 m
annual energy yield :	35,000 kWh	95,000 kWh	400,000 kWh	1,250,000 kWh	3,500,000 kWh	appr. 17,000,000 kWh


Cost € / kW
Reference
Moderate
Advanced
Annual Installation [GW]
Reference
Moderate
Advanced
500
400
300
200
100
0
250
200
150
100
50
0
2007
2008
2009
2010
2015
2020
2030


Total Installed Wind Capacity 1997-2020 [MW] Development and Prognosis
2.000.000
1.800.000
1.600.000
1.400.000
1.200.000
1.000.000
800.000
600.000
400.000
200.000
0

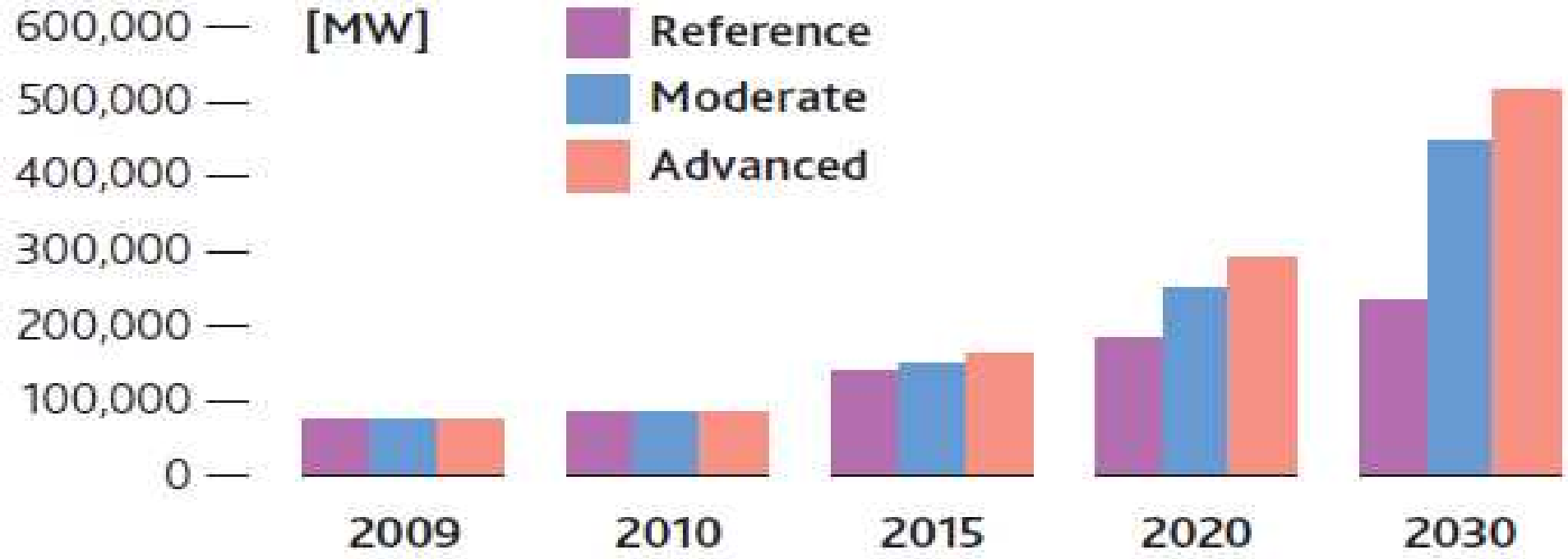
CHINA: CUMULATIVE WIND POWER CAPACITY 2009-2030



Year	Reference	Moderate	Advanced
2009	25,805	25,805	25,805
2010	32,805	39,608	41,030
2015	45,305	115,088	134,712
2020	70,305	200,026	250,397
2030	95,305	403,741	513,246

Kaynak: GWEC

OECD EUROPE: CUMULATIVE WIND POWER CAPACITY 2009-2030



Year	Reference	Moderate	Advanced
2009	75,565	75,565	75,565
2010	85,696	86,175	87,140
2015	138,596	150,049	165,109
2020	183,996	250,824	293,963
2030	233,796	447,432	514,806

Kaynak: GWEC

Context for European Interest in Renewable Energy

- Meltdown at Chernobyl nuclear plant, 1986
- Fukisima Japan in 2011
- Awareness of "social costs" of energy production
  - Olav Hohmeyer (Germany, 1990's) initiated the discussion
- Climate change/ attempt to meet Kyoto protocol requirements
- Relatively limited conventional fuels in Europe
- Renewable energy products/economic growth

J. F. Manwell, Professor and Director, Renewable Energy Research Laboratory Department of Mechanical and Industrial Engineering University of Massachusetts

GİVİNG THE RİGHT PRİCE TO ENERGY PRODUCTİON

External costs

Internal or private costs

Focus on EU 25, Bulgaria, Turkey, China, Brazil, India

NEEDS-IP and CASES-CA

ExternE

EXTERNAL COSTS (I)

Update impacts of:

- **Acidification**
  - on freshwater fish
- **Acidifying compounds**
  - (SO_2, NO_x and NH_3) on terrestrial ecosystems, including agriculture
- **Eutrophication**
  - on drinking water, boating, swimming, recreational fishing
- **Visual intrusion**
  - landscape aesthetics of renewable energy (wind and hydro) and eutrophication.

ExternE

EXTERNAL COSTS (II)

- **Energy security**

  assessment of policy options to reduce - and insure against - the costs of energy insecurity

- **Damocles risk**

  risk where the possible damage can be very high, but the probability that it occurs is very low

  - mega-dams or nuclear power plants.

- **Risk aversion**

Germany employs renewable energies to reduce dependency on nuclear power and fossil fuels

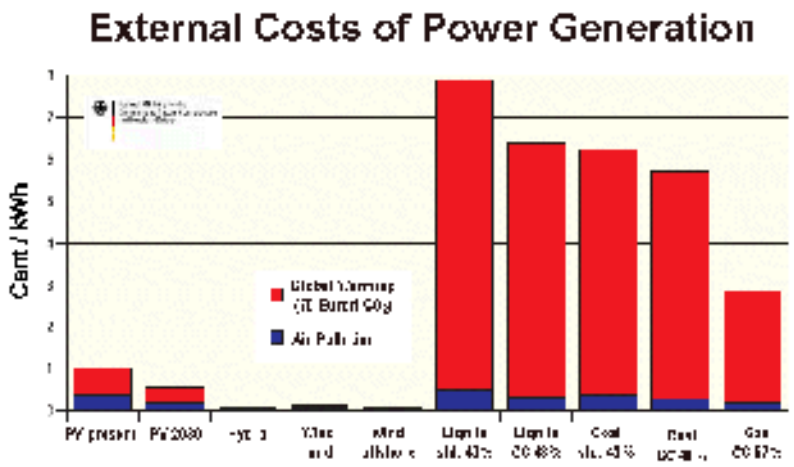
Phase-out by 2021 of all nuclear power plants (30% of current generation) has been legislated to avoid “another Chernobyl”.

75% of Germany’s energy supplies are imported.

Jeffrey H. Michel, MSc. Ing.-Büro Michel
Community of Heuersdorf 04565 Regis-Breitingen
Germany jeffrey.michel@gmx.net

Landscape devastation equivalent to excavation of Suez Canal every 25 days results from mining 180 million tons of lignite per year for generation of one quarter of Germany’s electricity (150 TWh/a).

Renewable feed-in payments enable higher costs to be avoided



The emissions of fossil fuel power plants impose a three to eightfold greater environmental burden than renewable energy generation.

Jeffrey H. Michel, MSc. Ing.-Büro Michel Community of Heuersdorf 04565 Regis-Breitingen Germany jeffrey.michel@gmx.net

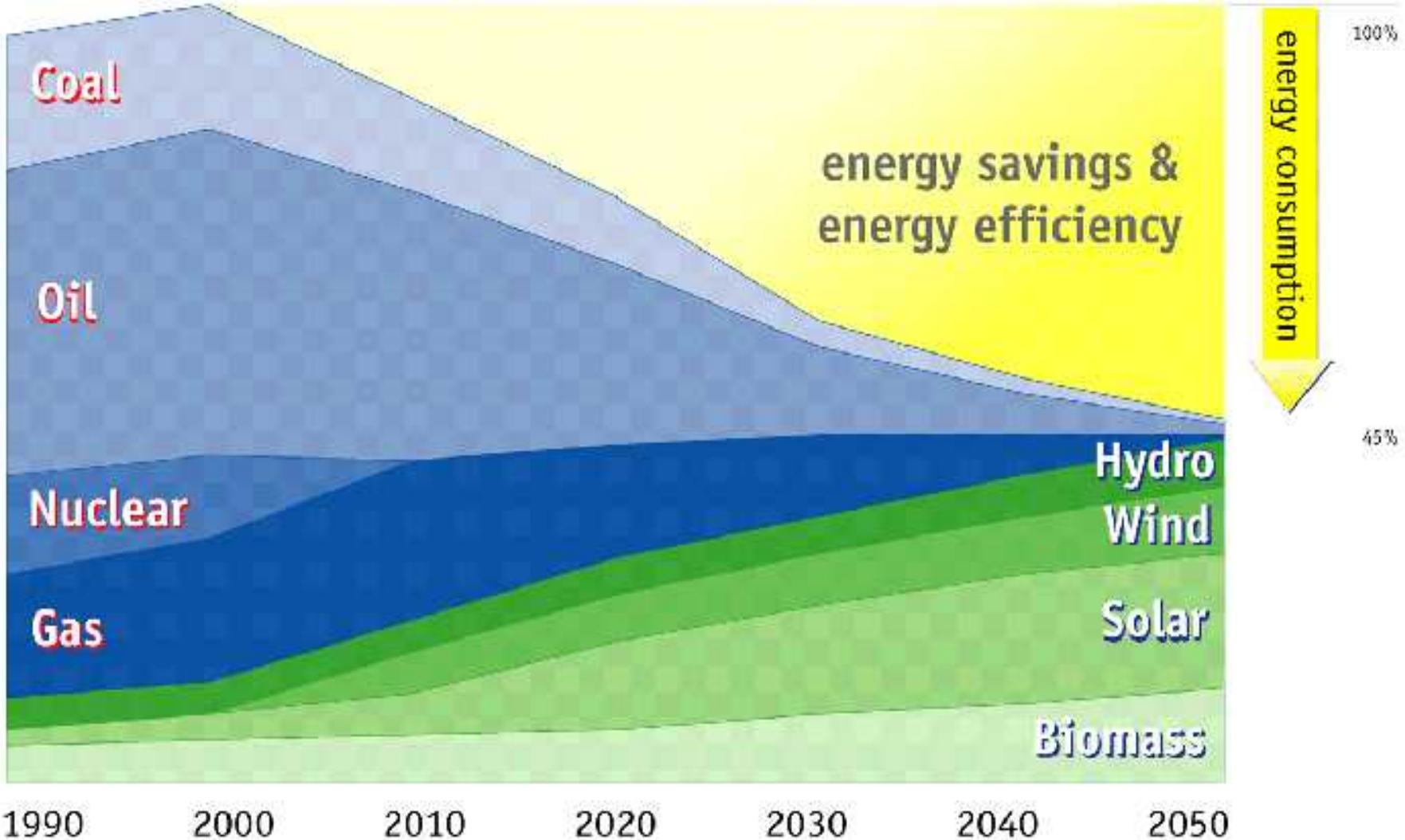
Incurred and Avoided Costs of the German Renewable Energy Sources Act (EEG) in 2006

Incurred Costs		Avoided Costs	
Feed-in payments	3.2 billion euro	Power purchases	5 billion euro
Reserve generating capacities	0.1 billion euro	Fuel imports	0.9 billion euro
		Climate, air pollution	3.4 billion euro

Source. *Erfahrungsbericht 2007 zum Erneuerbaren-Energien-Gesetz (EEG) gemäß § 20 EEG. BMU-Entwurf. Zusammenfassung* (Berlin. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, July 5, 2007), p. 5

Energy Scenario 2050
Primary Energy Consumption Covered

Source:
H. Lehmann, Wuppertal Institute for climate, environment and energy



EU Key Climate and Energy Objectives for 2020

By 2020 -20% EU GHG

By 2020 +20% ENERGY SAVING

By 2020 binding 20% RENEWABLES in final energy consumption at EU level

RES in transport
Min 10% binding

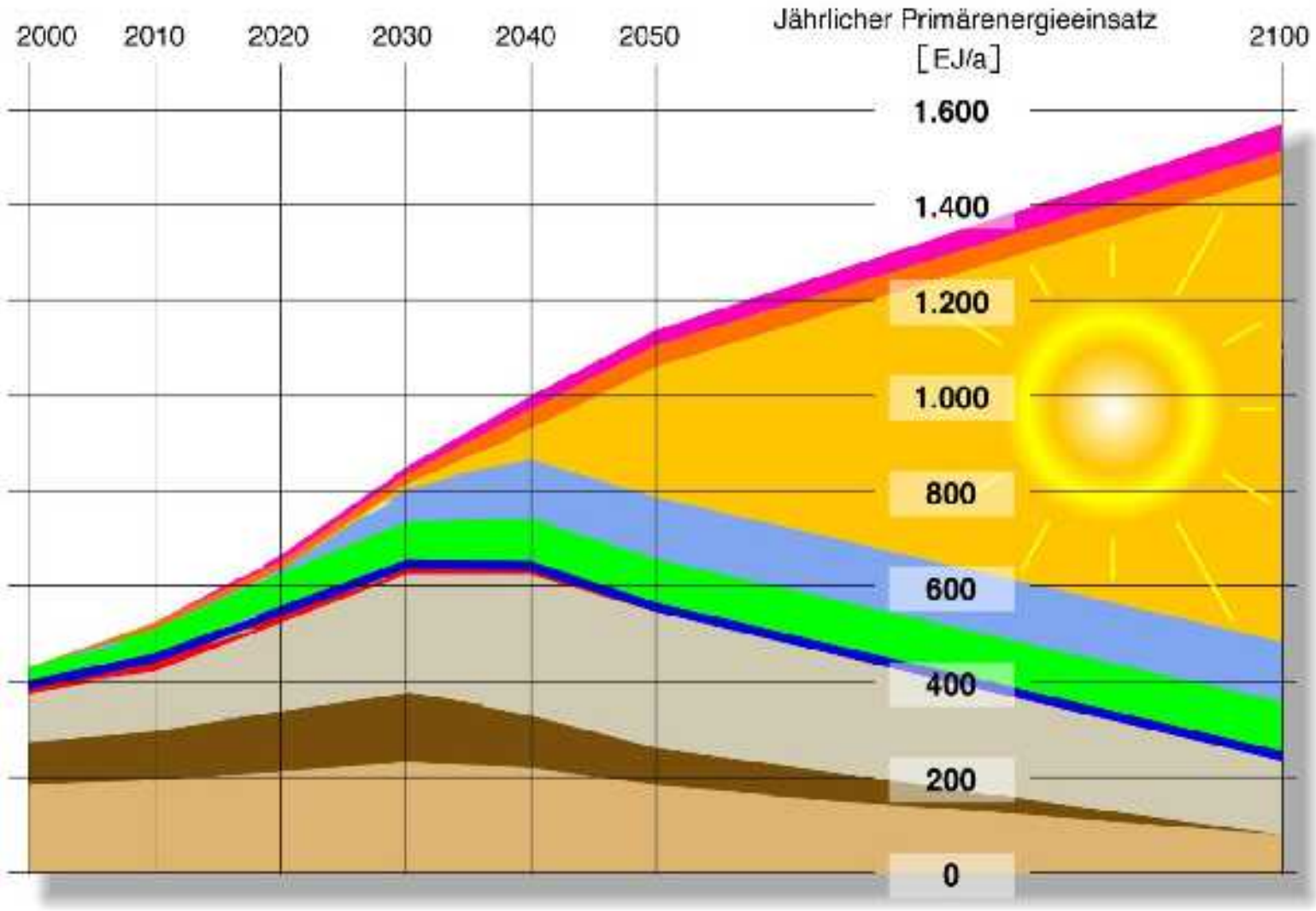
ELECTRICITY
MS binding choice

HEATING & COOLING
MS binding choice

NATIONAL TARGETS & ACTION PLANS

Veränderung des weltweiten Energiemixes bis 2100

Prognose des Wissenschaftlichen Beirates der Bundesregierung
Globale Umweltveränderungen



Andere Erneuerbare

Solarthermie (nur Wärme)

Solarstrom (Photovoltaik und solarthermische Kraftwerke)

Wind

Biomasse

Wasserkraft

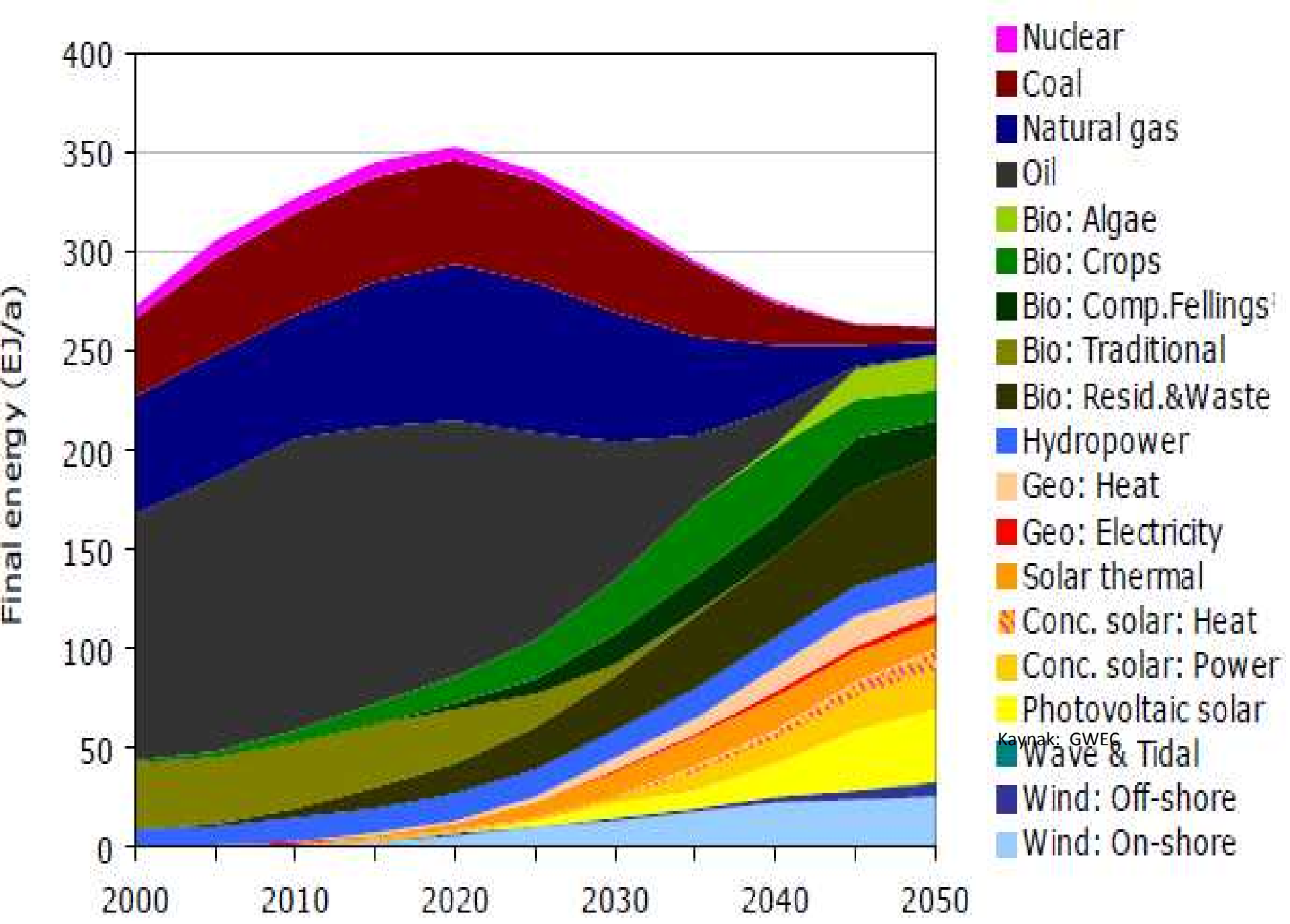
Kernenergie

Gas

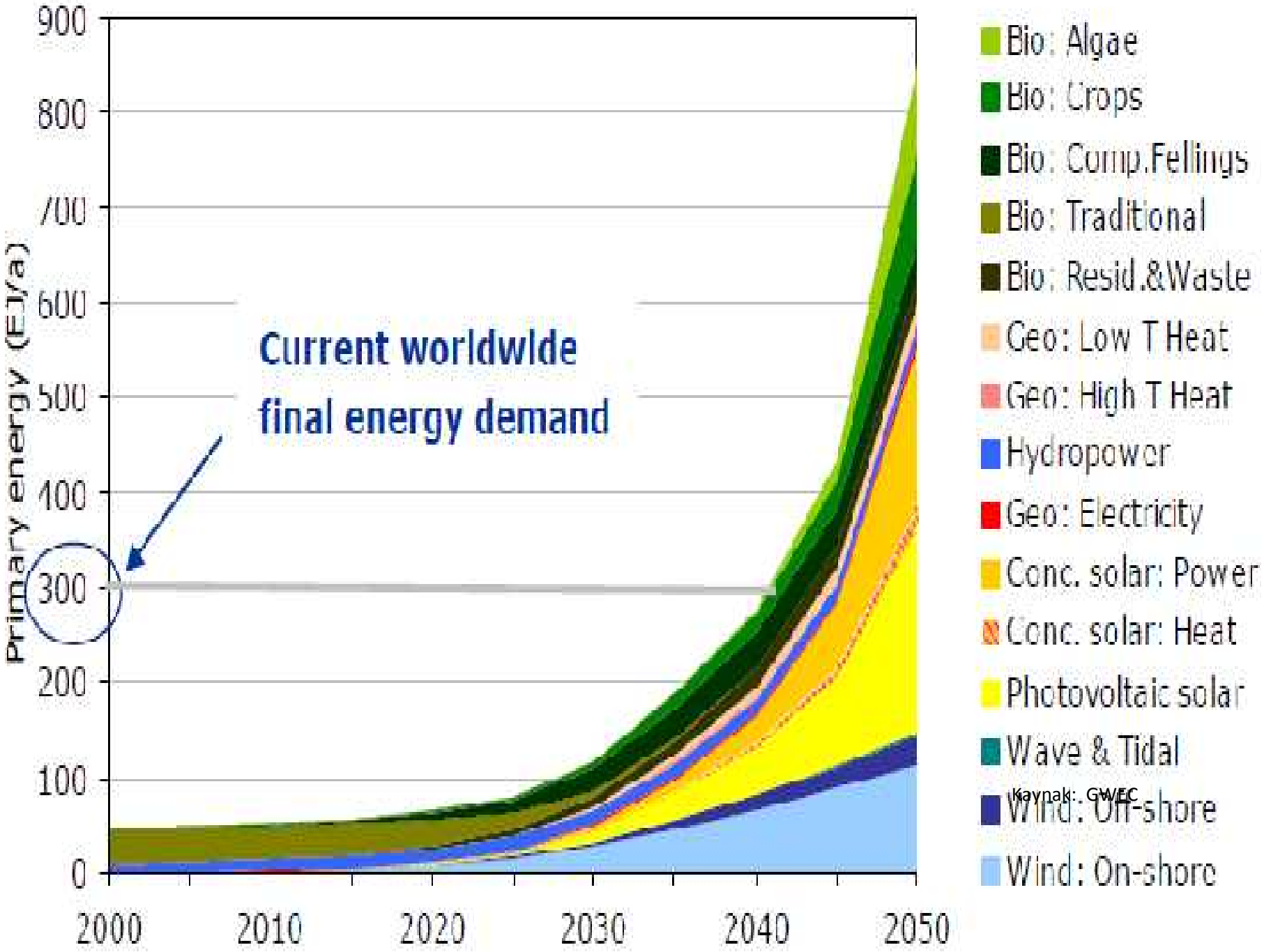
Kohle

Öl

Quelle: solarwirtschaft.de


Final energy (EJ/a)
400
350
300
250
200
150
100
50
0
2000
2010
2020
2030
2040
2050
Nuclear
Coal
Natural gas
Oil
Bio: Algae
Bio: Crops
Bio: Comp.Fellings
Bio: Traditional
Bio: Resid.&Waste
Hydropower
Geo: Heat
Geo: Electricity
Solar thermal
Conc. solar: Heat
Conc. solar: Power
Photovoltaic solar
Wave & Tidal
Wind: Off-shore
Wind: On-shore

Kaynak: GWEC


900
800
700
600
500
400
300
200
100
0
Primary energy (EJ/a)
Current worldwide
final energy demand
2000
2010
2020
2030
2040
2050
Bio: Algae
Bio: Crops
Bio: Comp.Fellings
Bio: Traditional
Bio: Resid.&Waste
Geo: Low T Heat
Geo: High T Heat
Hydropower
Geo: Electricity
Conc. solar: Power
Conc. solar: Heat
Photovoltaic solar
Wave & Tidal
Wind: Off-shore
Wind: On-shore

Kaynak: GWEC

Is Solar Energy a Reliable Option in Turkey

- 100% renewable is possible
- Consider renewables together and give priority to end use efficiency
- internalize externalities
- stop harmfull subsidies and
- Prevent transfer of polluting technologies from one country to another

The main barriers

- Existing long term take or pay agreements for fosile and nuclear power plants and related infrastructure investments.
- Non –existence of a long term strategy in energy decision making mechanism

100% Renewable Energy is POSSIBLE

IRENEC 2012
INTERNATIONAL 100 % RENEWABLE ENERGY CONFERENCE AND EXHIBITION

28–30 June 2012, İstanbul

EUROSOLAR Turkey, the Turkish Section of European Association for Renewable Energies, in line with the vision of the Association, is organizing every year **IRENEC, International 100% Renewable Energy Conferences,** to set up an international platform to discuss the technical, economic, social aspects of transition to 100% Renewable Energy and to build the courses to realize this vision in industry, architecture, transportation, social communities and housing.

Following the paths to be set out in the conclusions of IRENEC2011, the global challenge to transform totally the existing energy network in line with 100% renewable energy future shall be the main theme of the topics of IRENEC2012.

IRENEC

General Topics of the Conference

- Energy-Economy-Environment
- Integrated Energy Decision Support Tools
- Energy end use efficiency
- Storage Technologies of Renewable Energies
- Internalization of external Costs
- Wind Turbine Technologies
- Process Heat Production from Solar Energy
- Electricity from Sun
- Biomass energy and Related Technologies
- Geothermal Energy Implementation
- Zero Energy Buildings
- Education, Training and Research for 100 % Renewable Energy
- Relations and Interactions of Nature and Human Activities
- Smart Grids for Renewable Energy Integration
- Climate Change: GHG Mitigation and Adaptation
- Zero Carbon Cities
- Financing Renewable Energies

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President, EUROSOLAR Turkey
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EUROSOLAR Turkey