Community Power Based Transition of Cities to 100 % Renewable Energy

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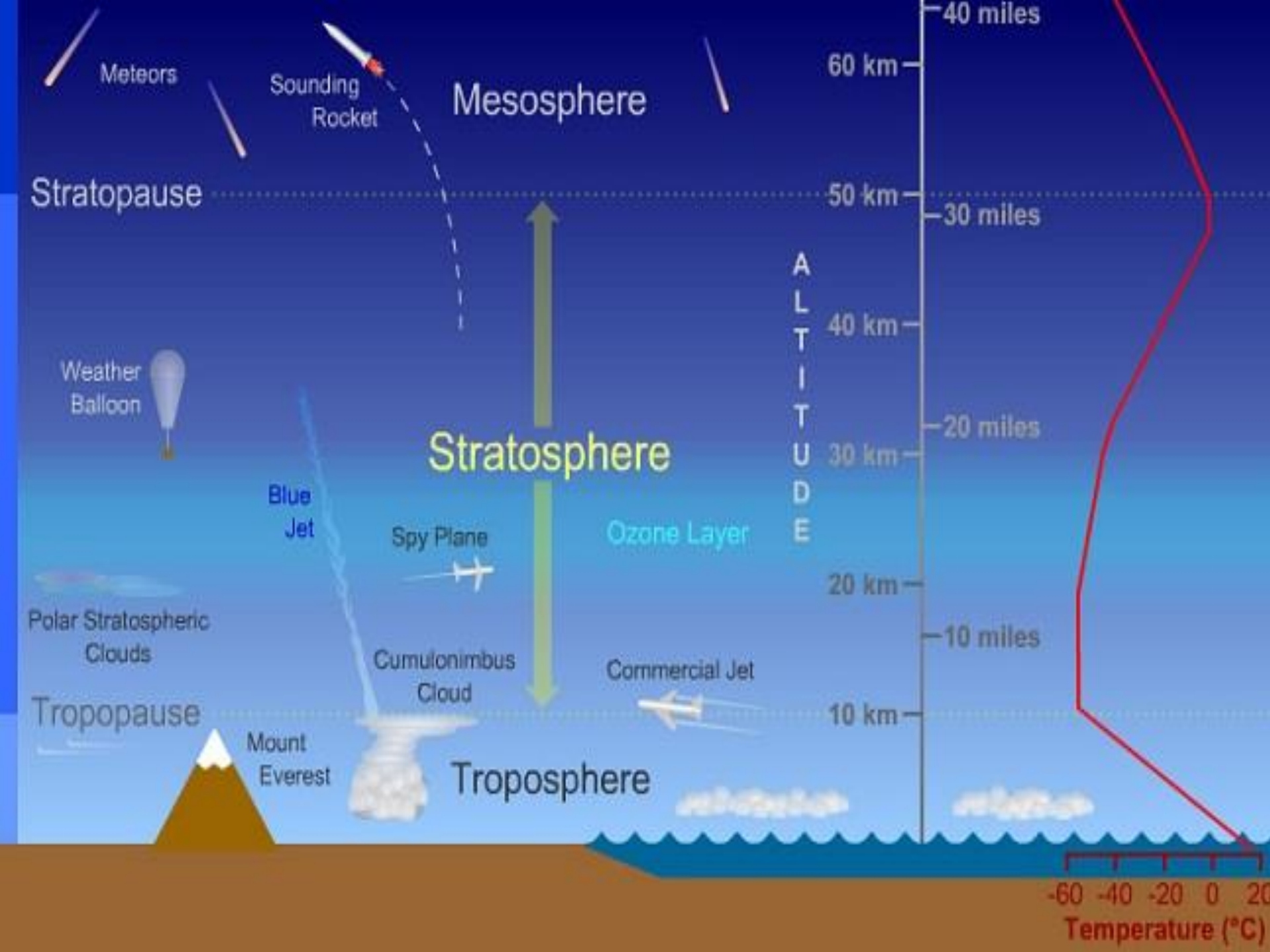
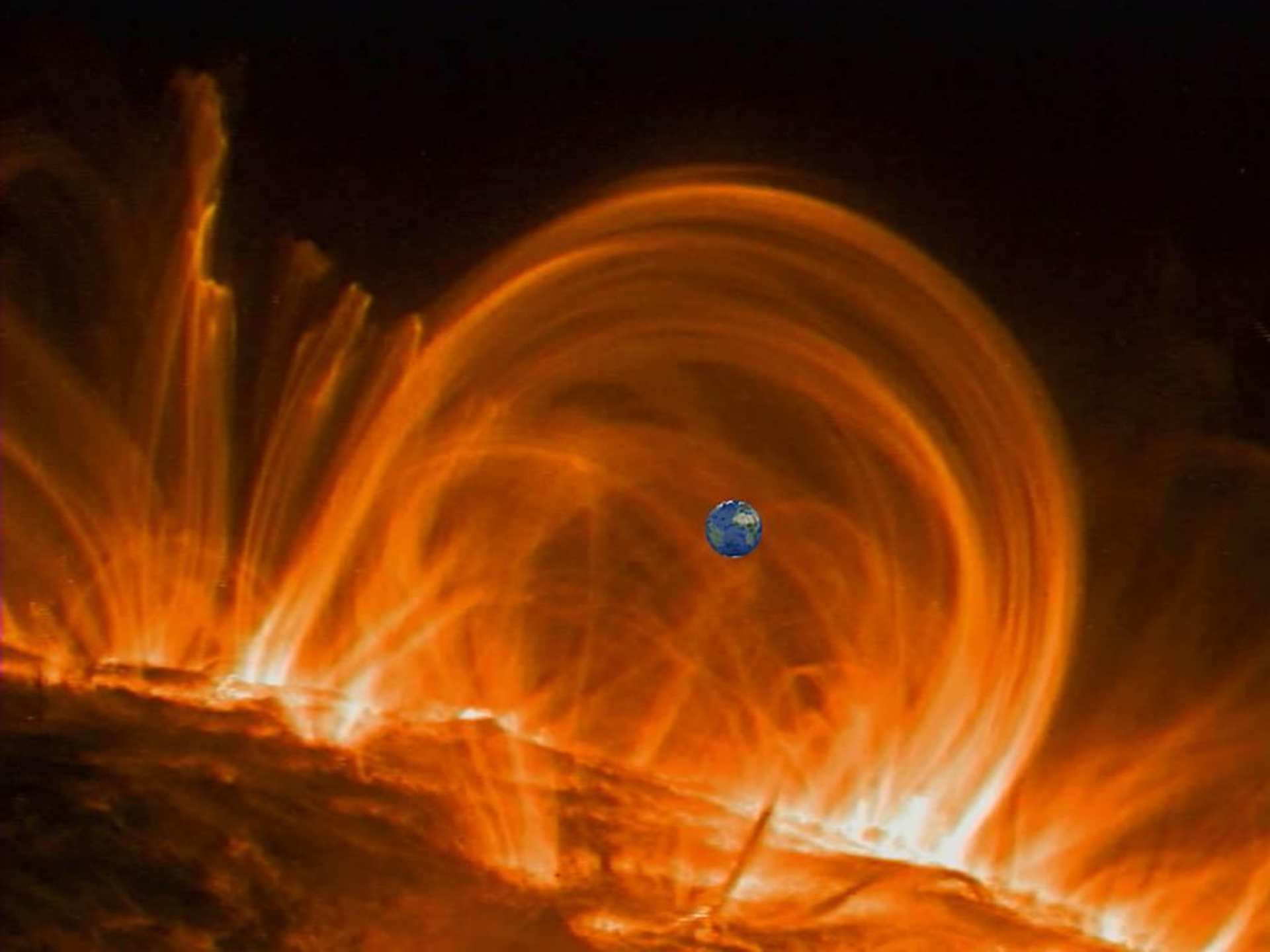
ENERGYPATH 2018: Grid Integration Conference
Desales University, Center Valley, PA USA 26 July 2018


Meteors
Sounding Rocket
Mesosphere
Stratopause
Weather Balloon
Stratosphere
Blue Jet
Spy Plane
Ozone Layer
Polar Stratospheric Clouds
Cumulonimbus Cloud
Commercial Jet
Tropopause
Mount Everest
Troposphere
ALTITUDE
60 km
50 km
40 km
30 km
20 km
10 km
40 miles
30 miles
20 miles
10 miles
-60 -40 -20 0 20
Temperature (°C)



ANESTHESIOLOGY
The Journal of the American Society of Anesthesiologists, Inc.

From: Oxygen and Life on Earth:An Anesthesiologist's Views on Oxygen Evolution, Discovery, Sensing, and Utilization
Anesthes. 2008;109(1):7-13. doi:10.1097/ALN.0b013e31817b5a7e

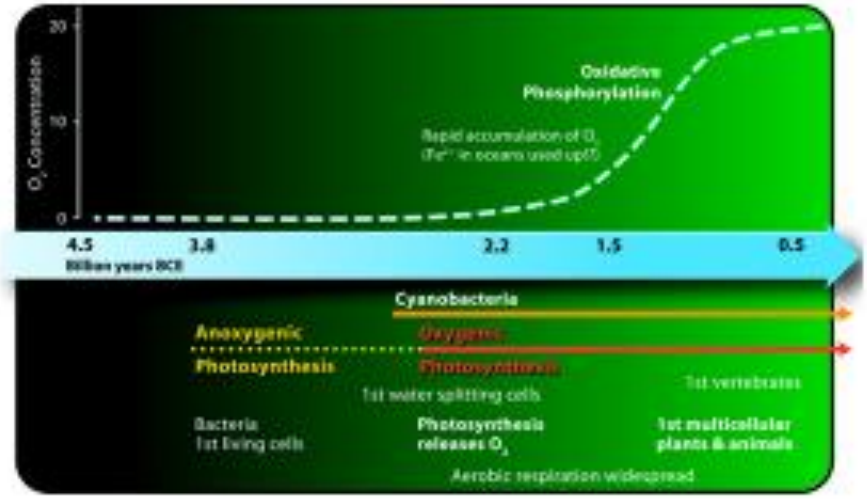
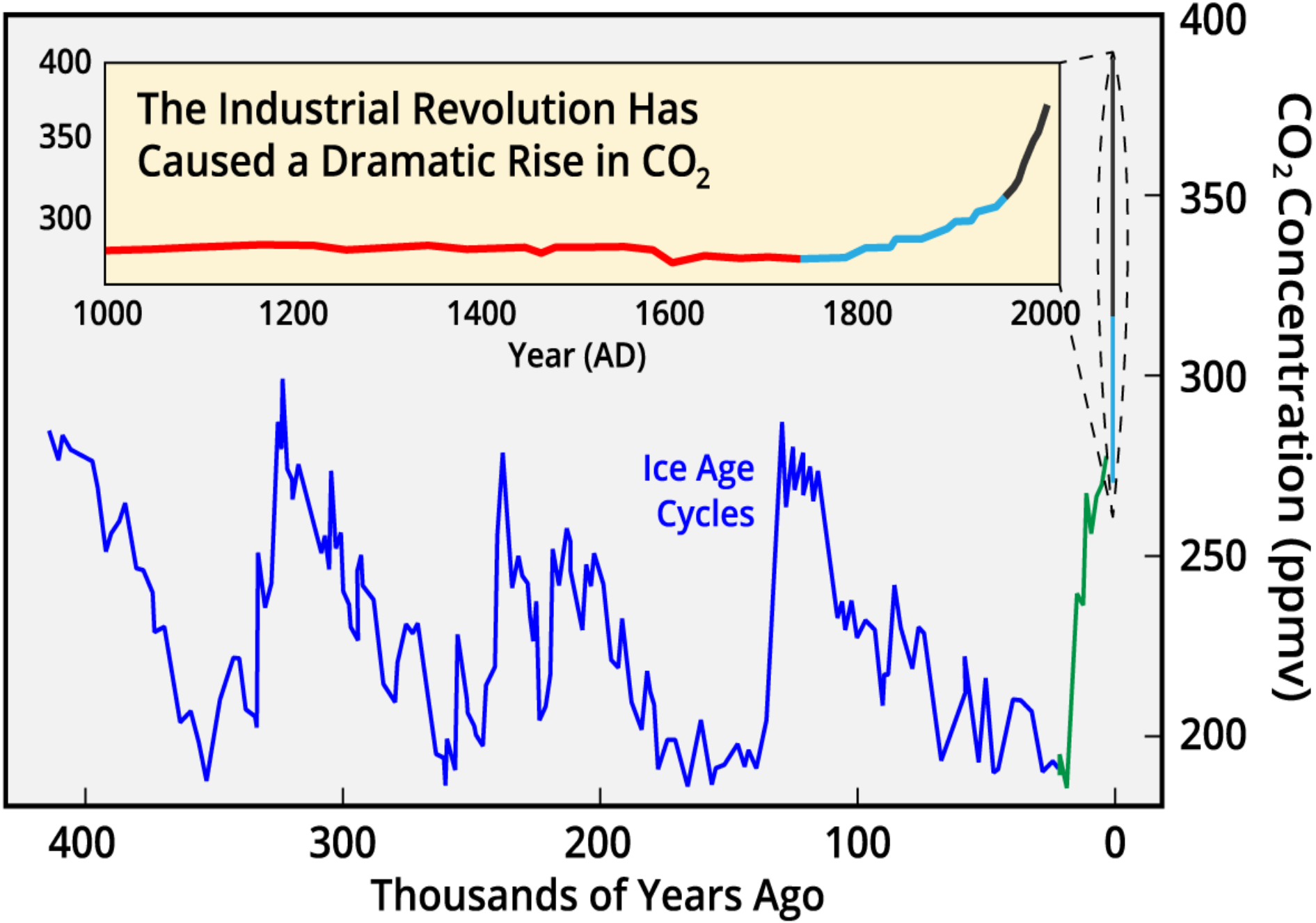


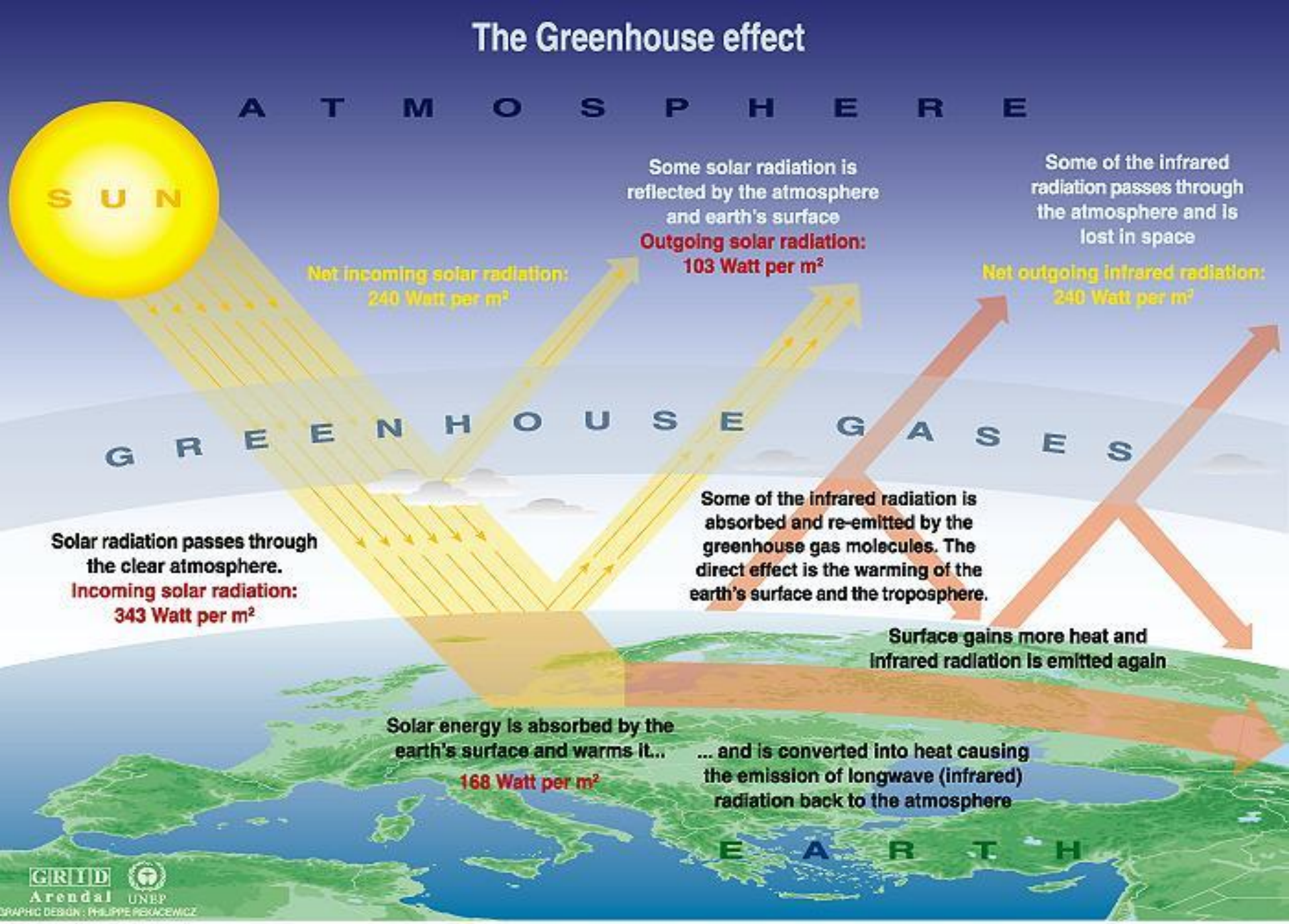
Figure Legend:

Fig. 1. Geological time scale and development of oxygen in Earth's atmosphere. BCE = before current era.

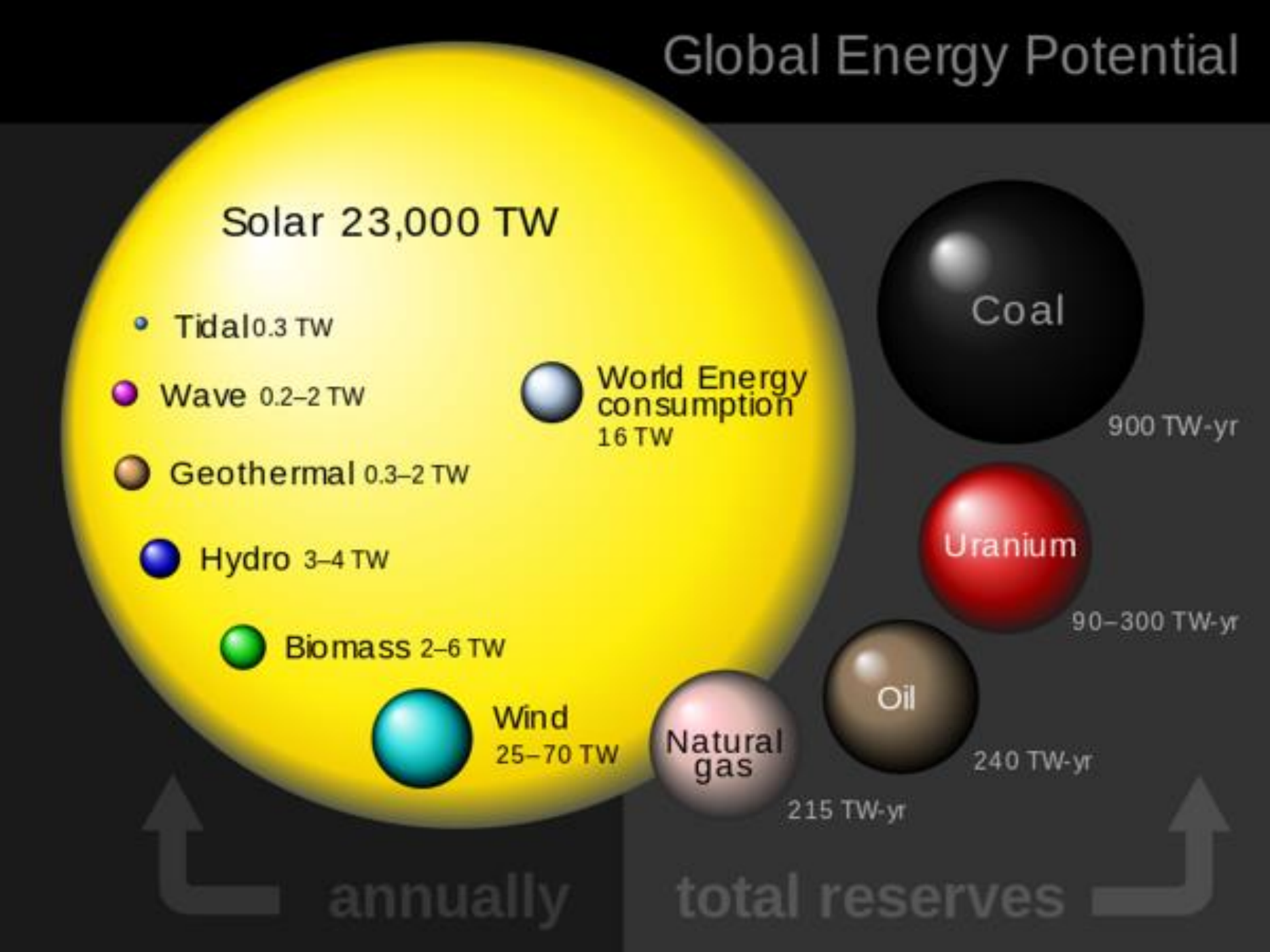
Carbon Dioxide Variations



The Greenhouse effect

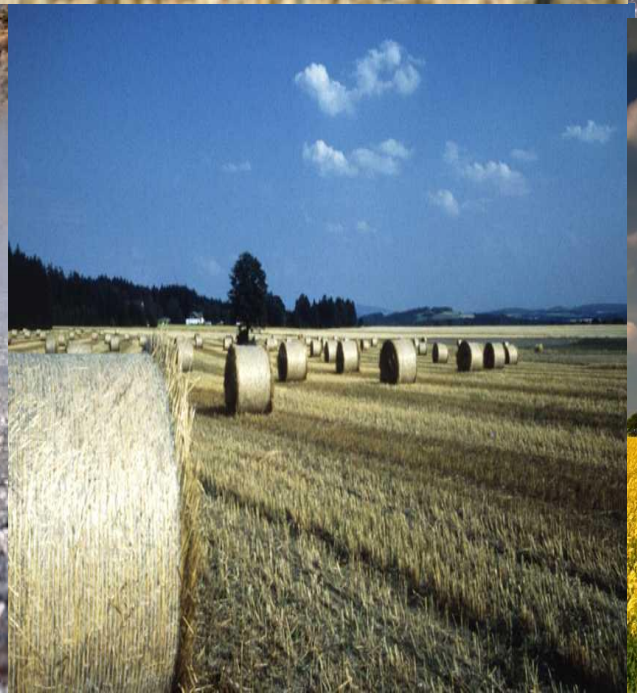


Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the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

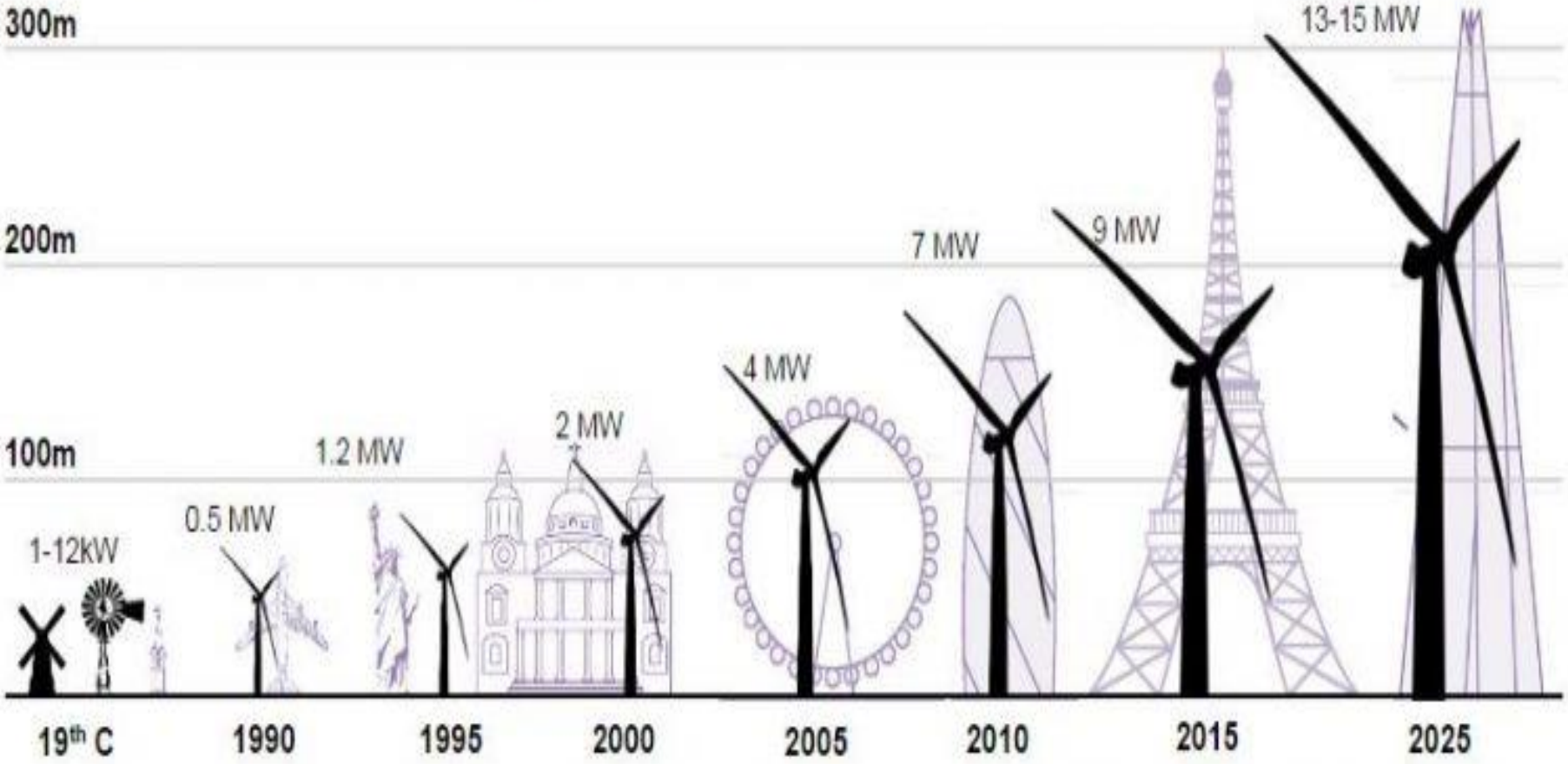

Global Energy Potential
Solar 23,000 TW
Tidal 0.3 TW
Wave 0.2–2 TW
Geothermal 0.3–2 TW
Hydro 3–4 TW
Biomass 2–6 TW
Wind 25–70 TW
World Energy consumption 16 TW
Coal
900 TW-yr
Uranium
90–300 TW-yr
Oil
240 TW-yr
Natural gas
215 TW-yr
annually
total reserves





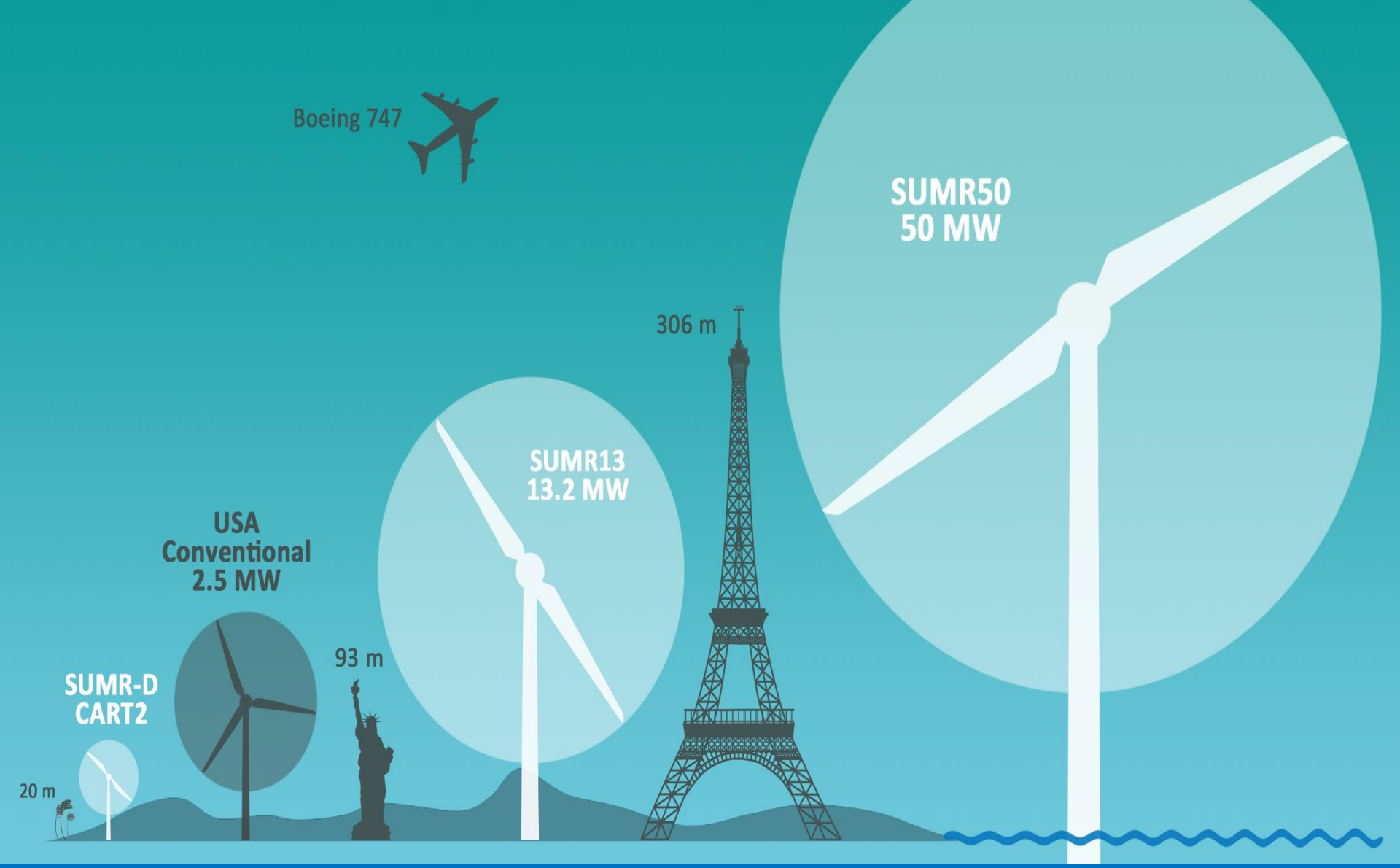



Evolution of wind turbine heights and output



Sources: Various; Bloomberg New Energy Finance

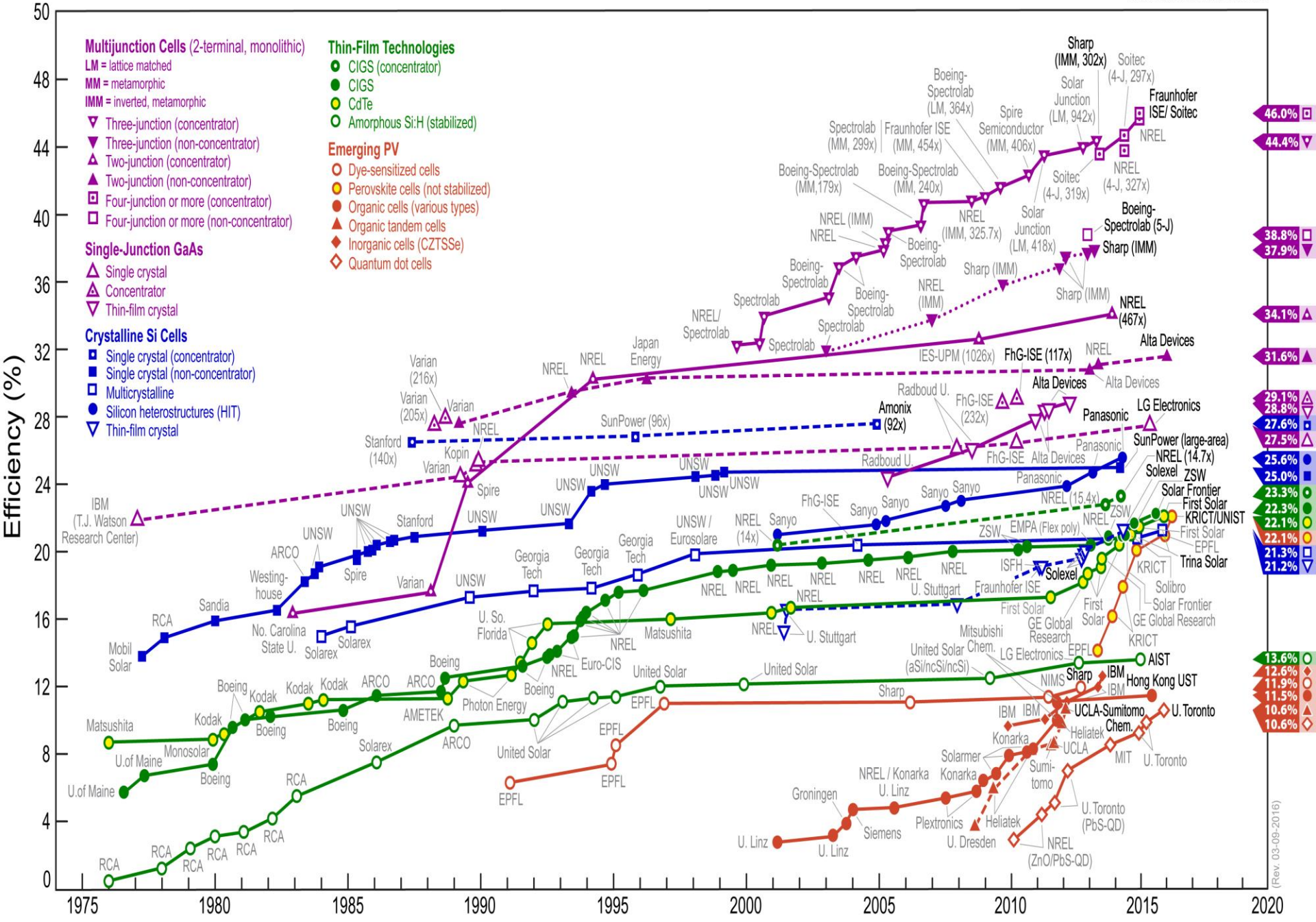
Bloomberg
New Energy Finance



Alliance of six institutions led by researchers at the University of Virginia are designing the world's largest wind turbine

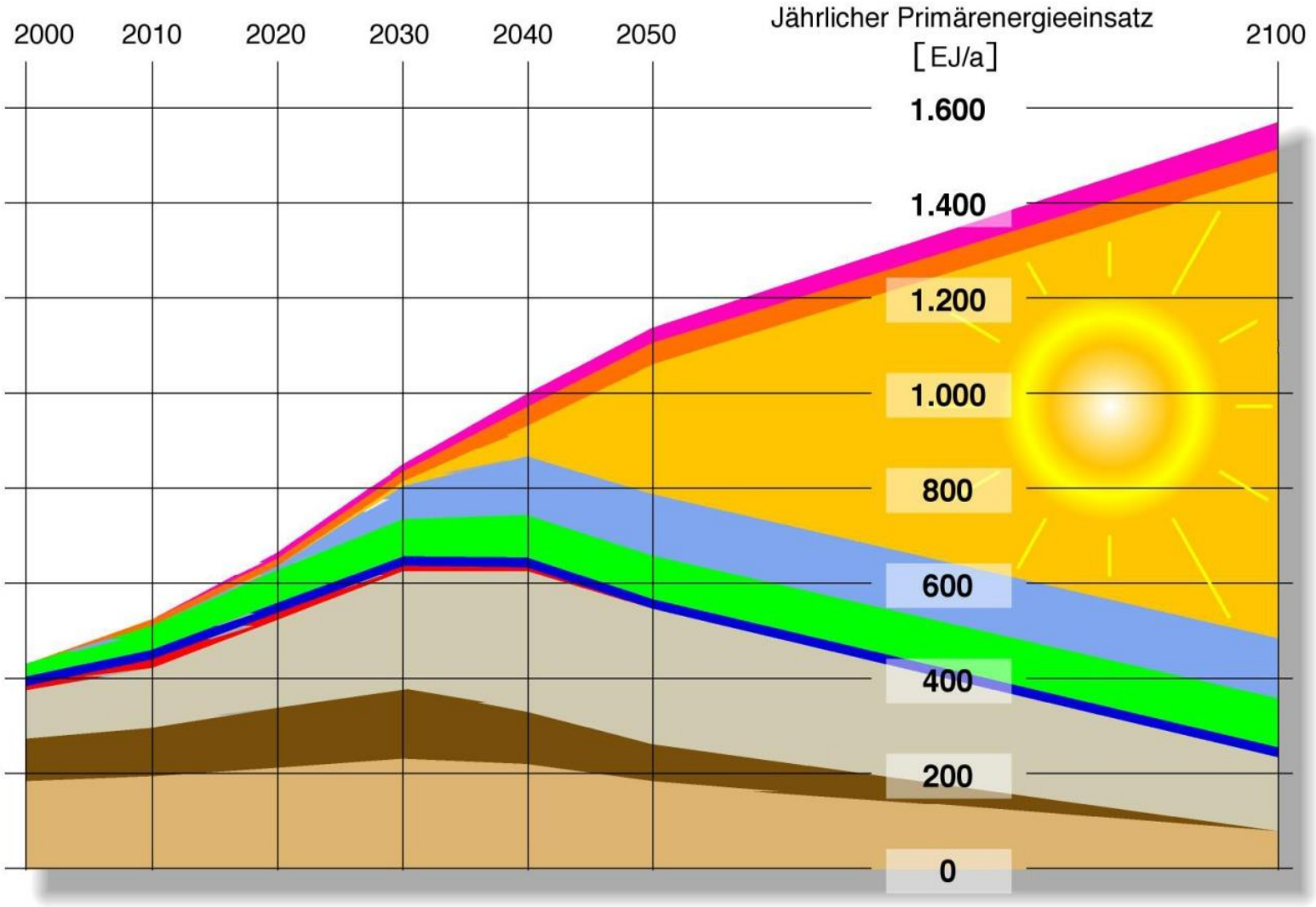
Best Research-Cell Efficiencies

NREL
NATIONAL RENEWABLE ENERGY LABORATORY



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

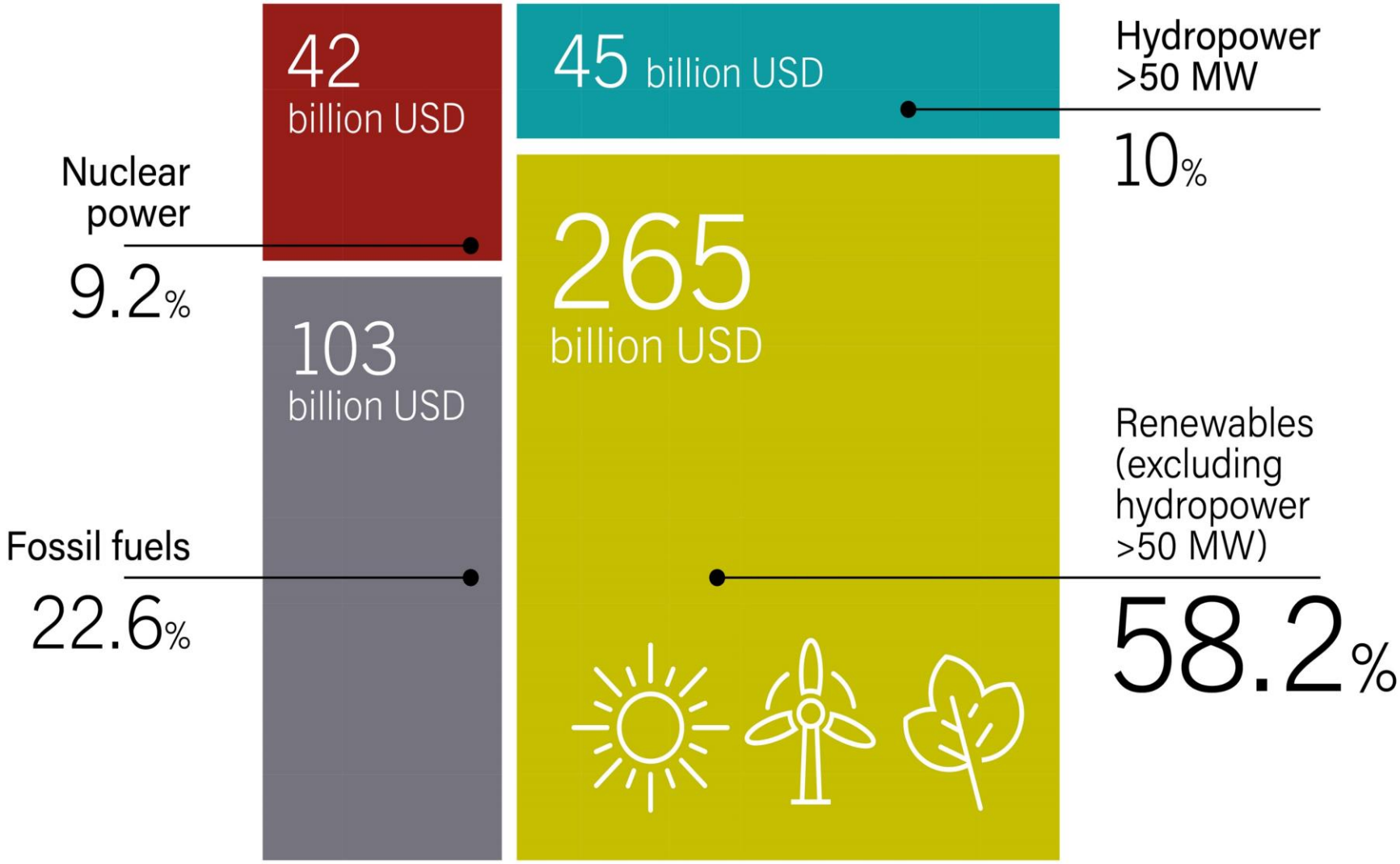
Gas

Kohle

Öl

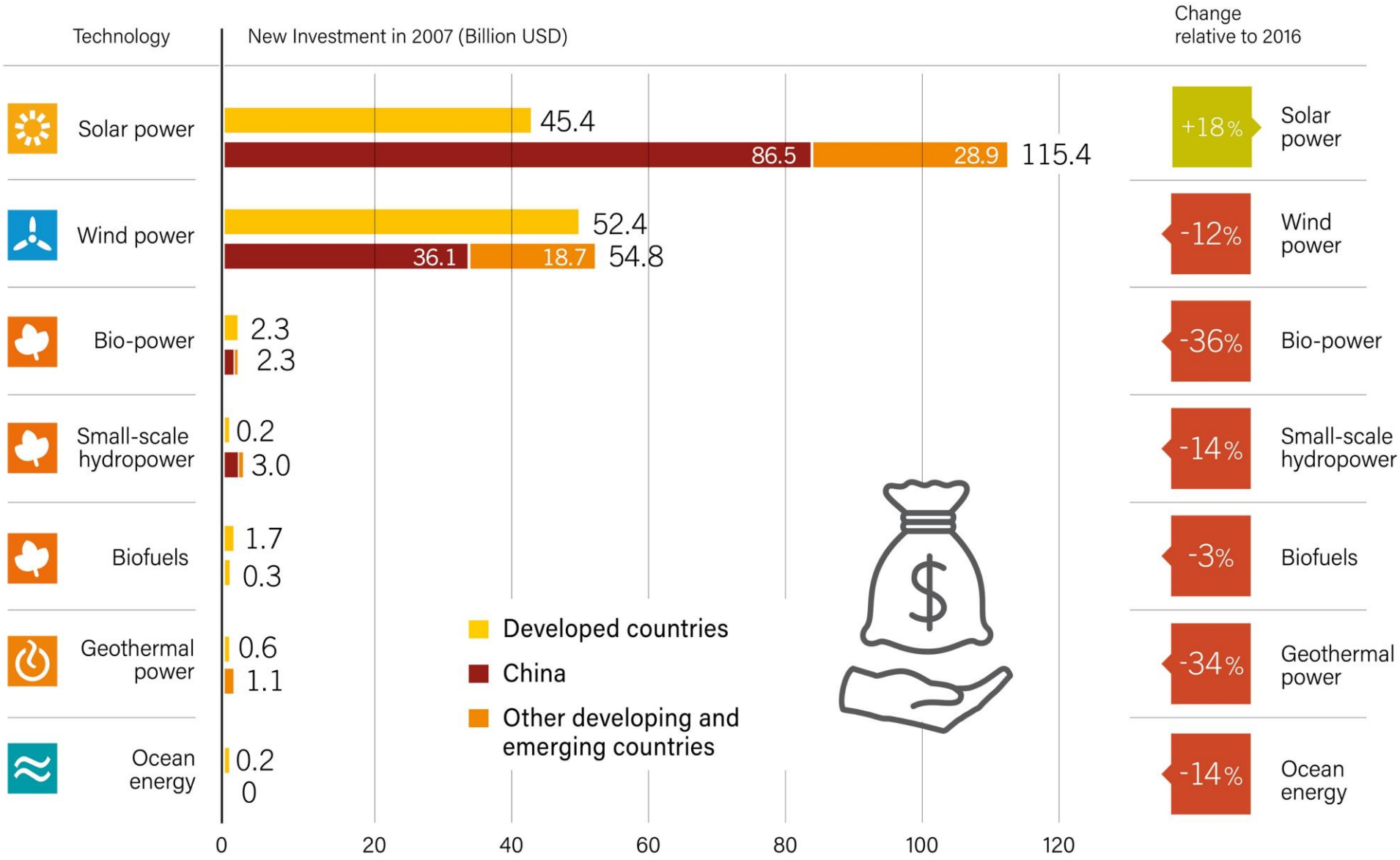
Quelle: solarwirtschaft.de

Global Investment in New Power Capacity, by Type (Renewables, Fossil Fuels and Nuclear Power), 2017



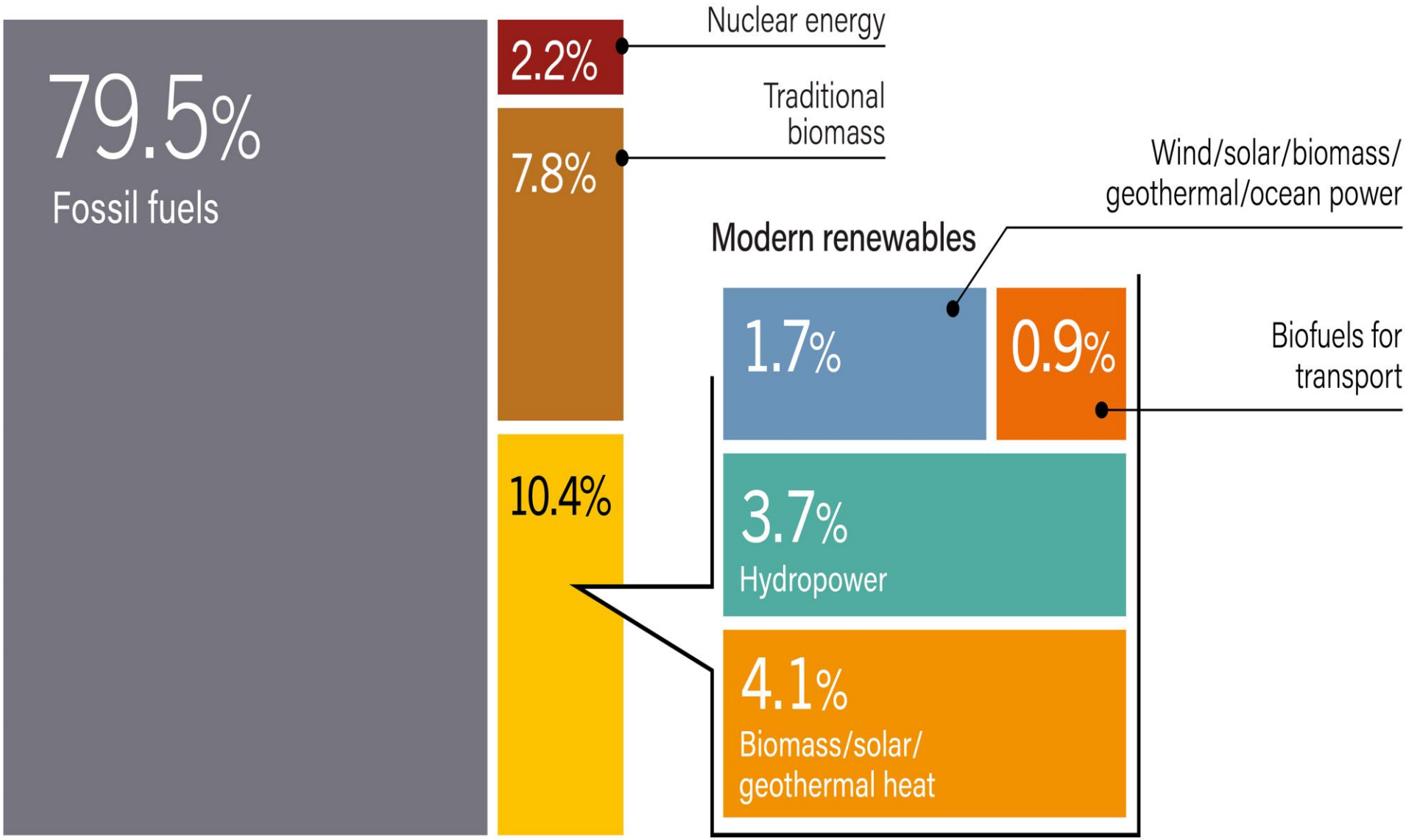
Source: BNEF

Global New Investment in Renewable Energy by Technology in Developed, Emerging and Developing Countries, 2017

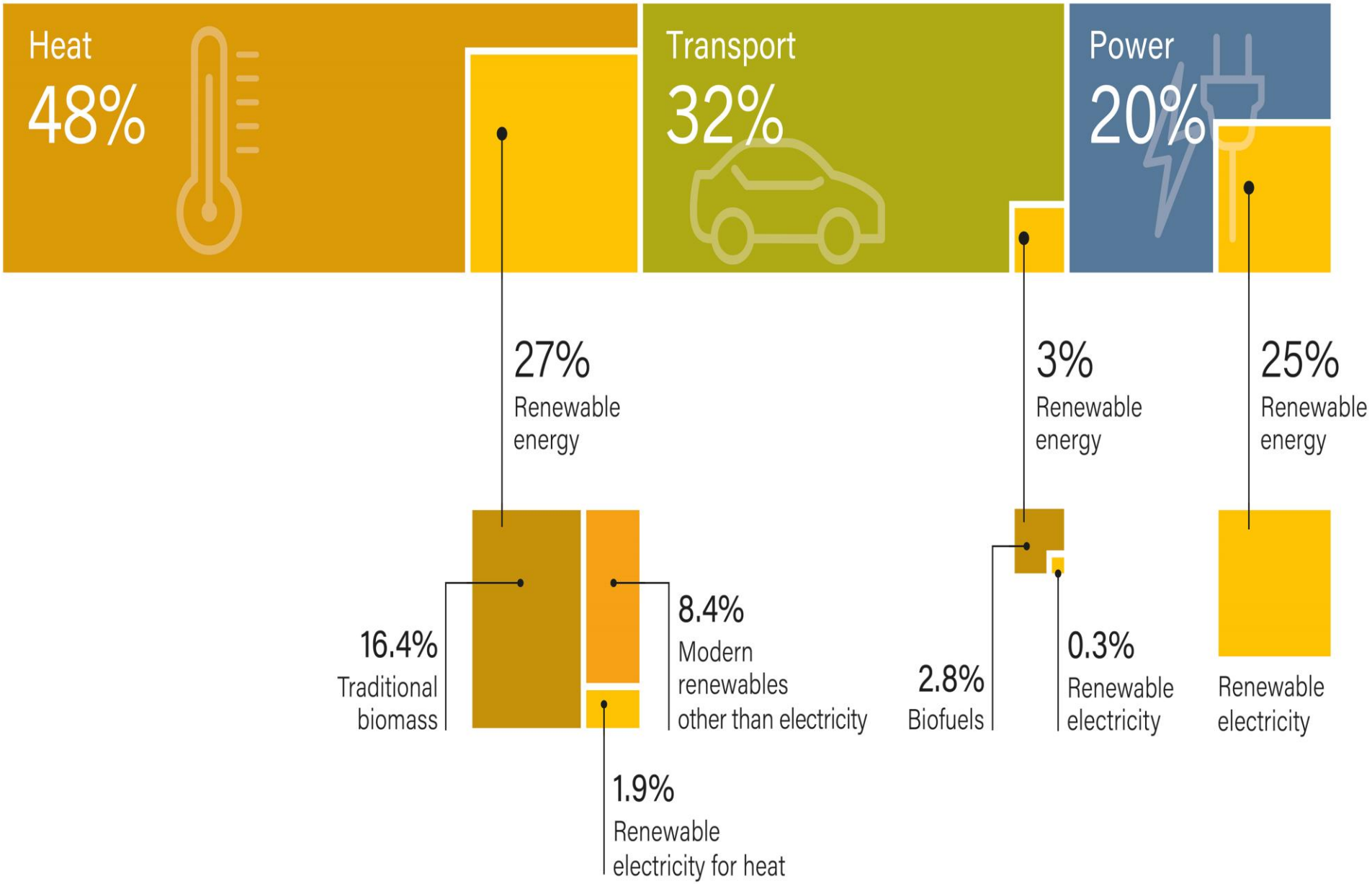


Source: BNEF

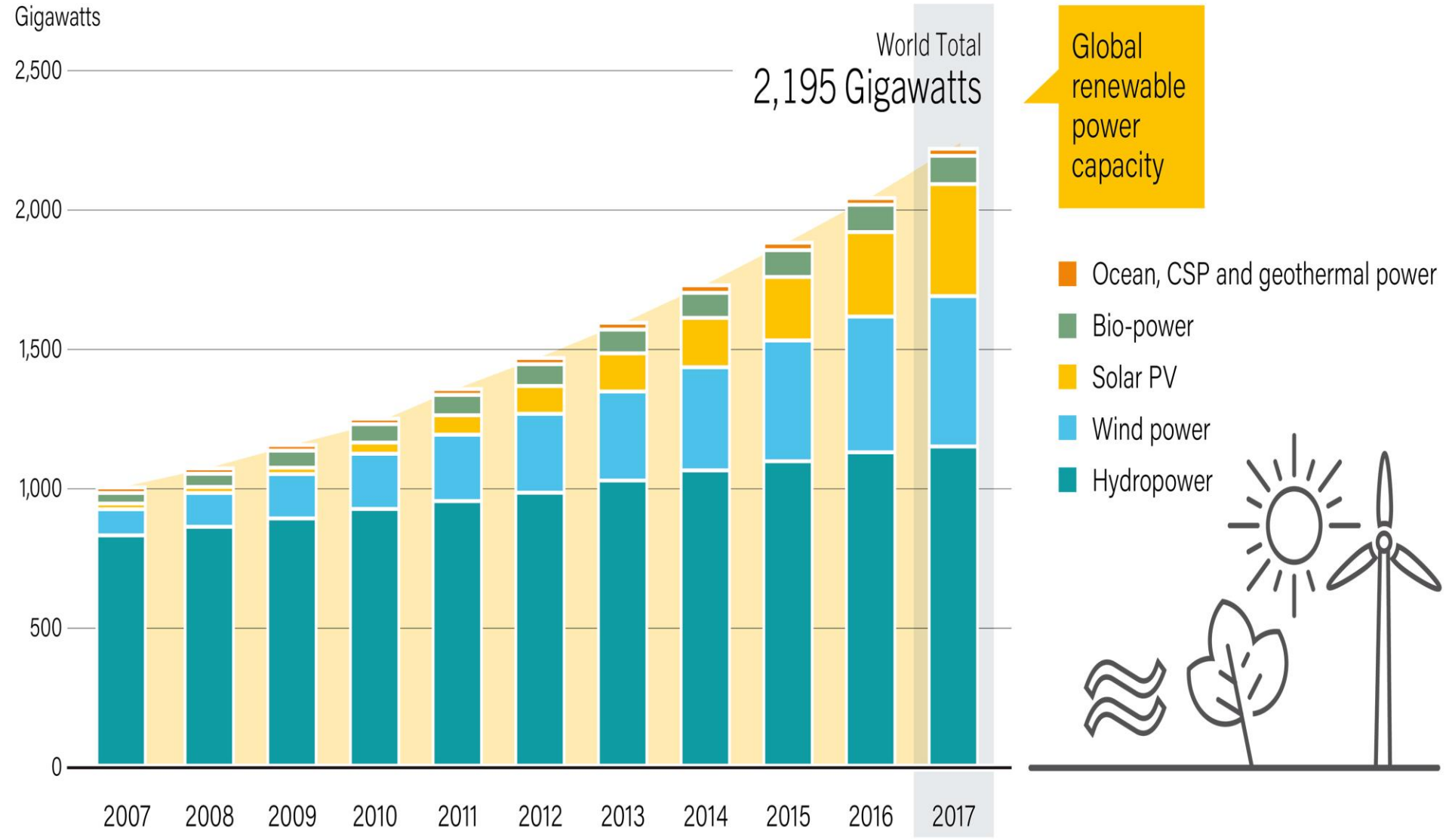
Estimated Renewable Share of Total Final Energy Consumption, 2016



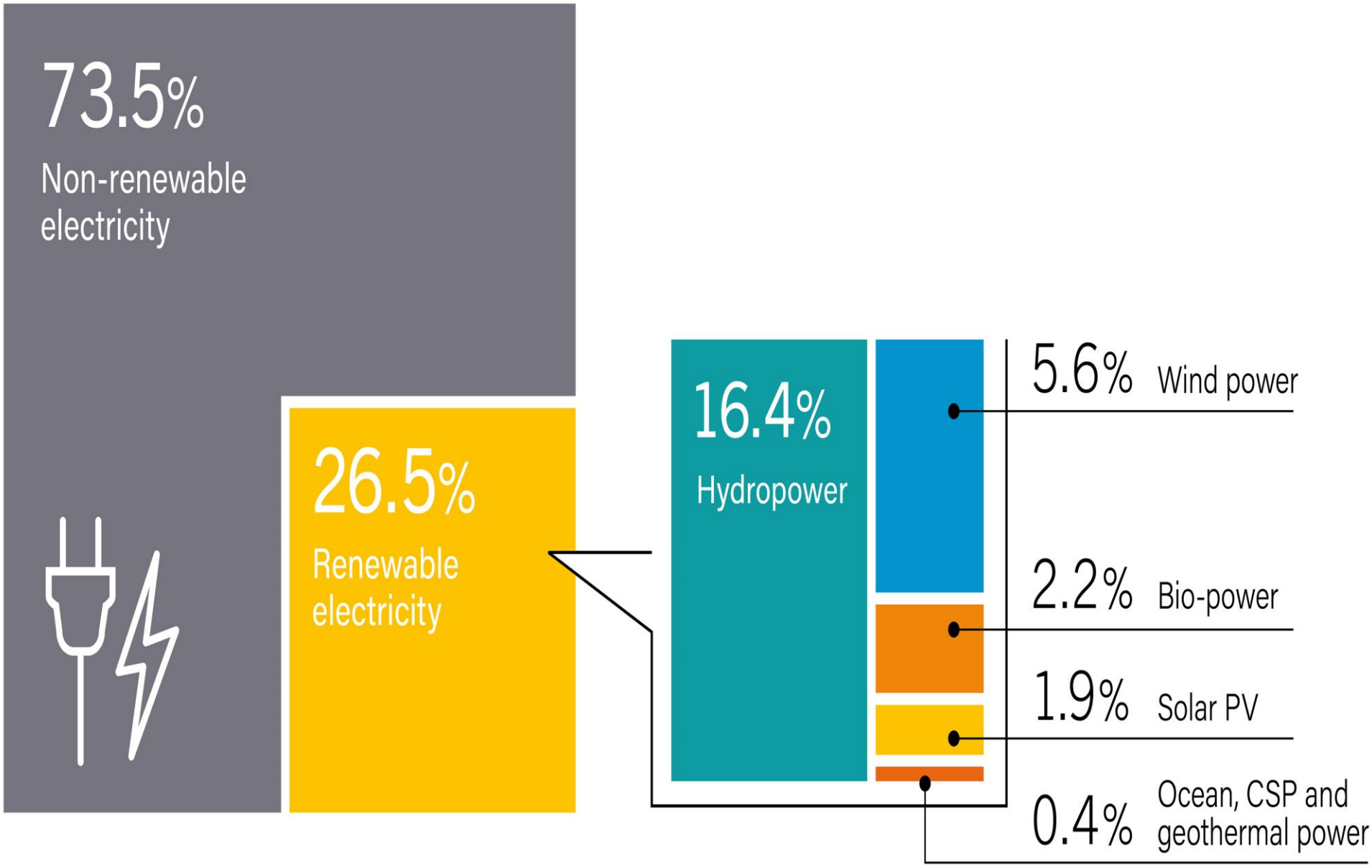
Renewable Energy in Total Final Energy Consumption, by Sector, 2015



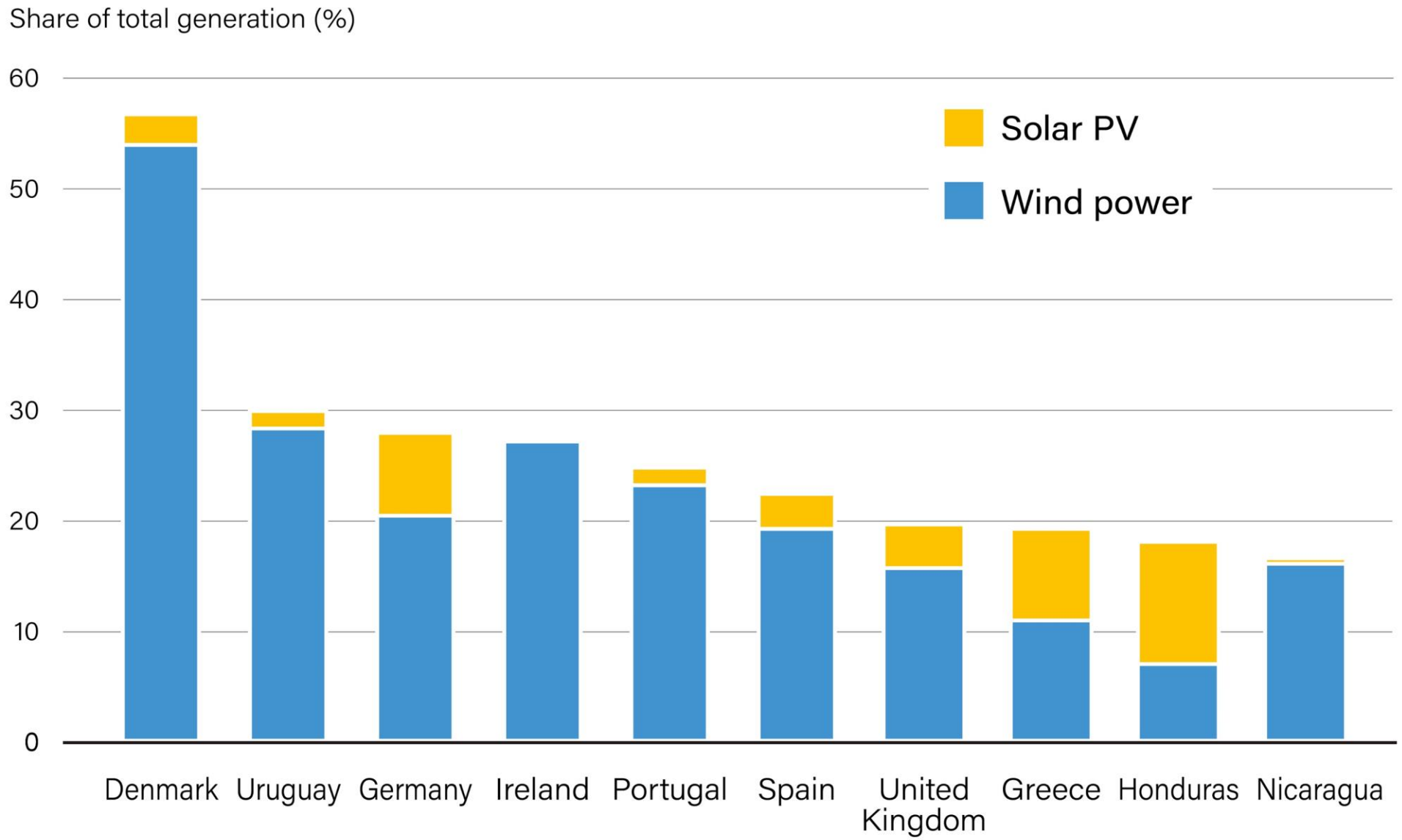
Global Renewable Power Capacity, 2007-2017



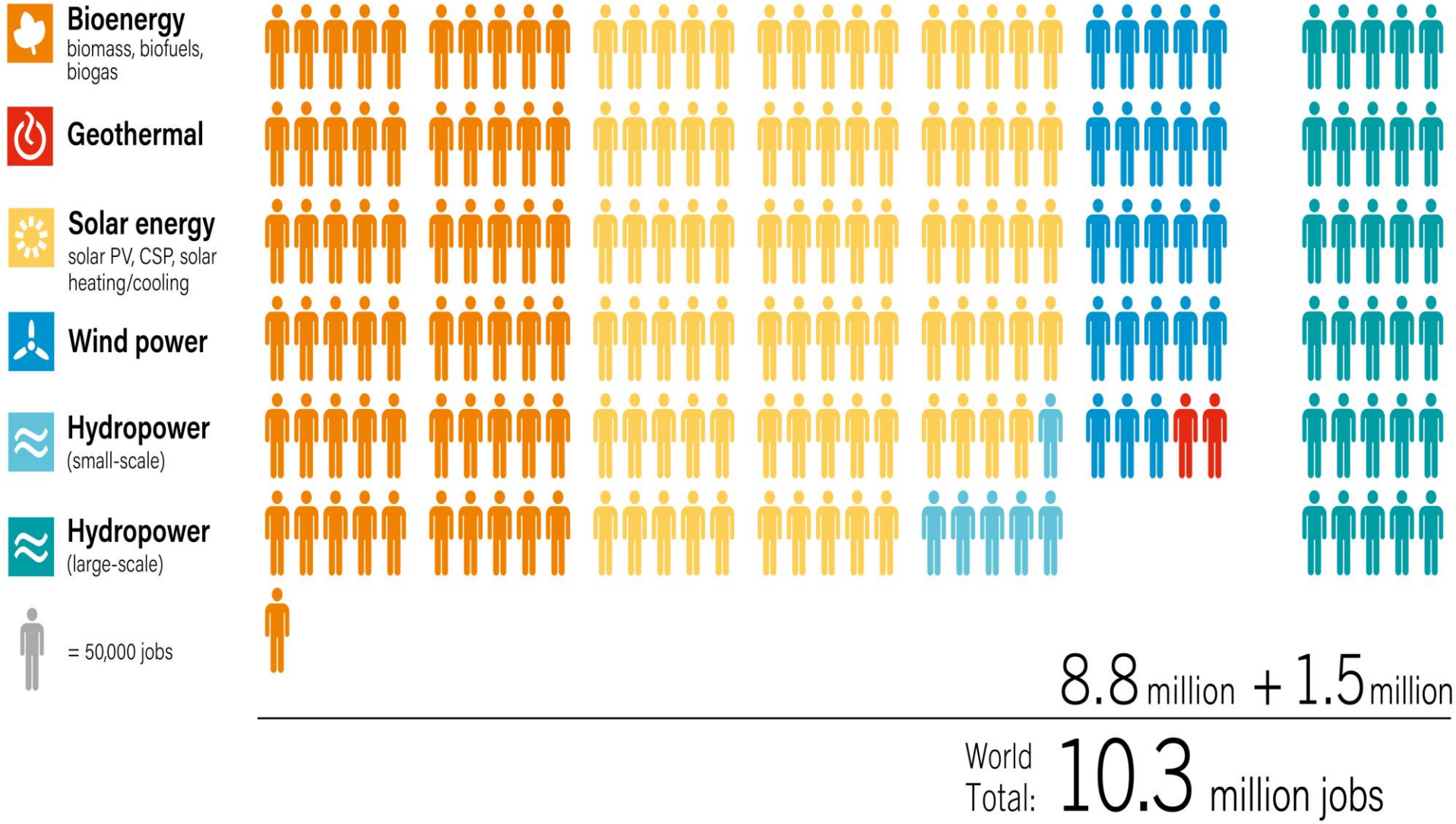
Estimated Renewable Energy Share of Global Electricity Production, End-2017



Share of Electricity Generation from Variable Renewable Energy, Top 10 Countries, 2017

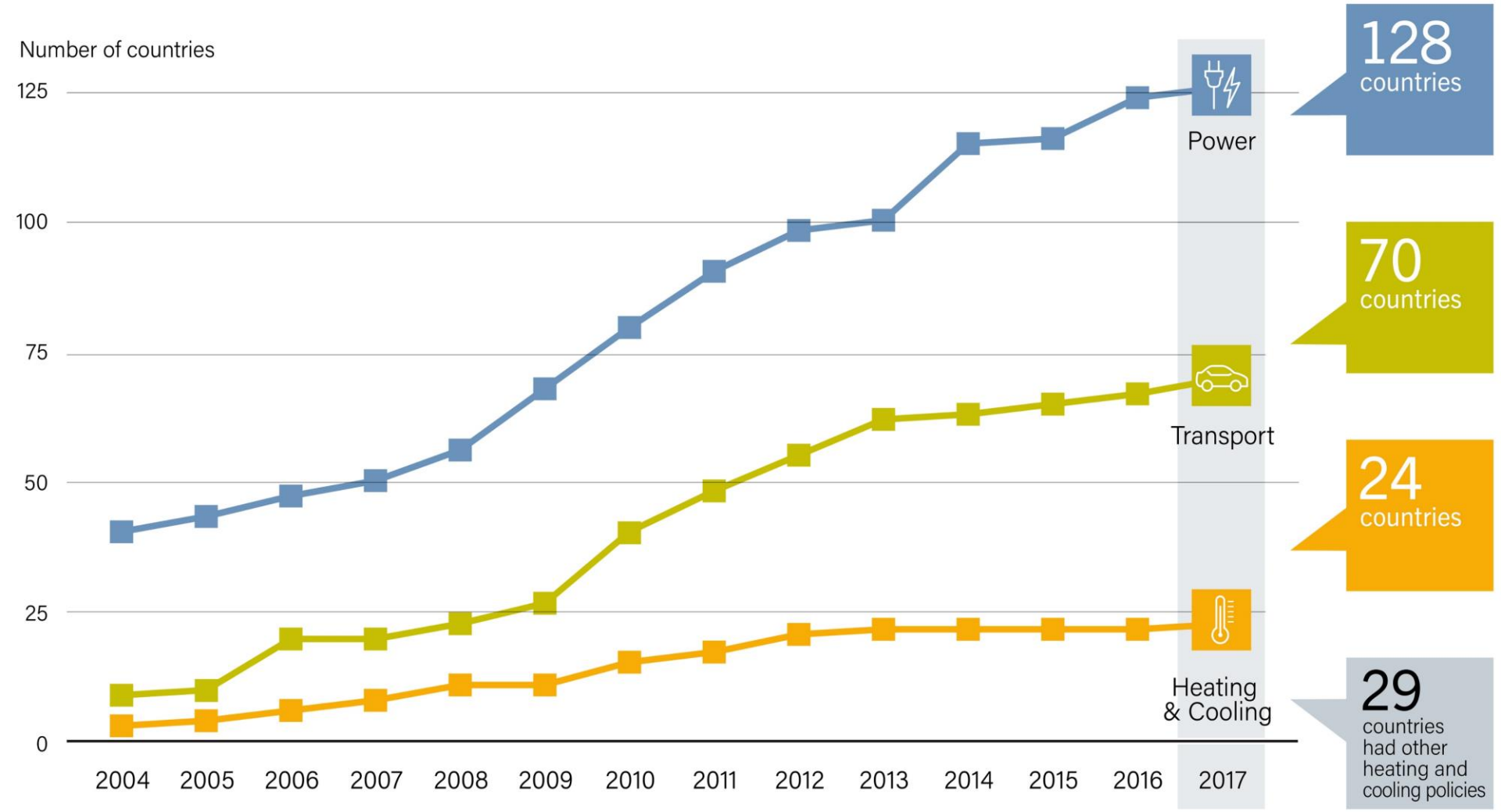


Jobs in Renewable Energy



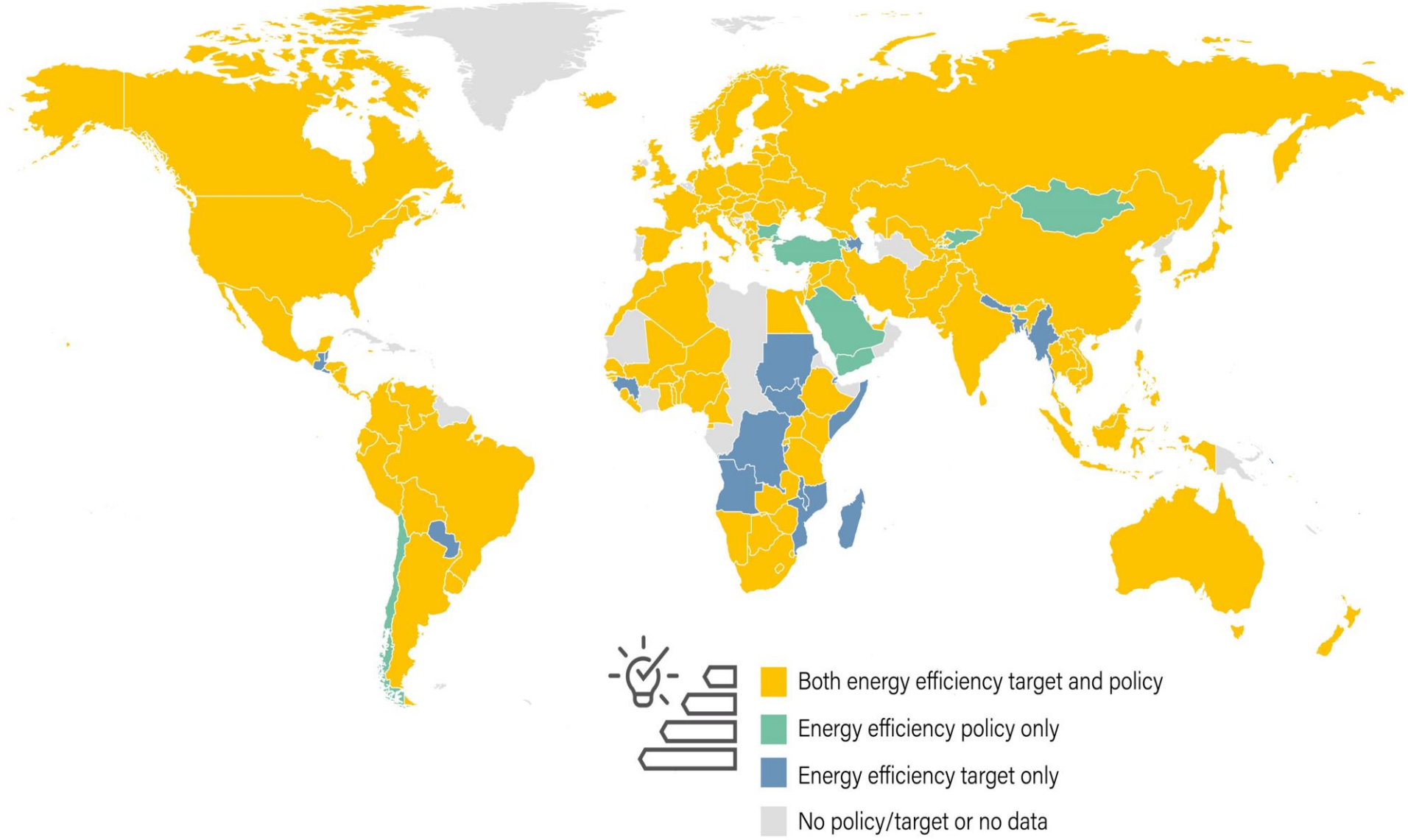
Source: IRENA

Number of Countries with Renewable Energy Regulatory Policies, by Sector, 2004-2017



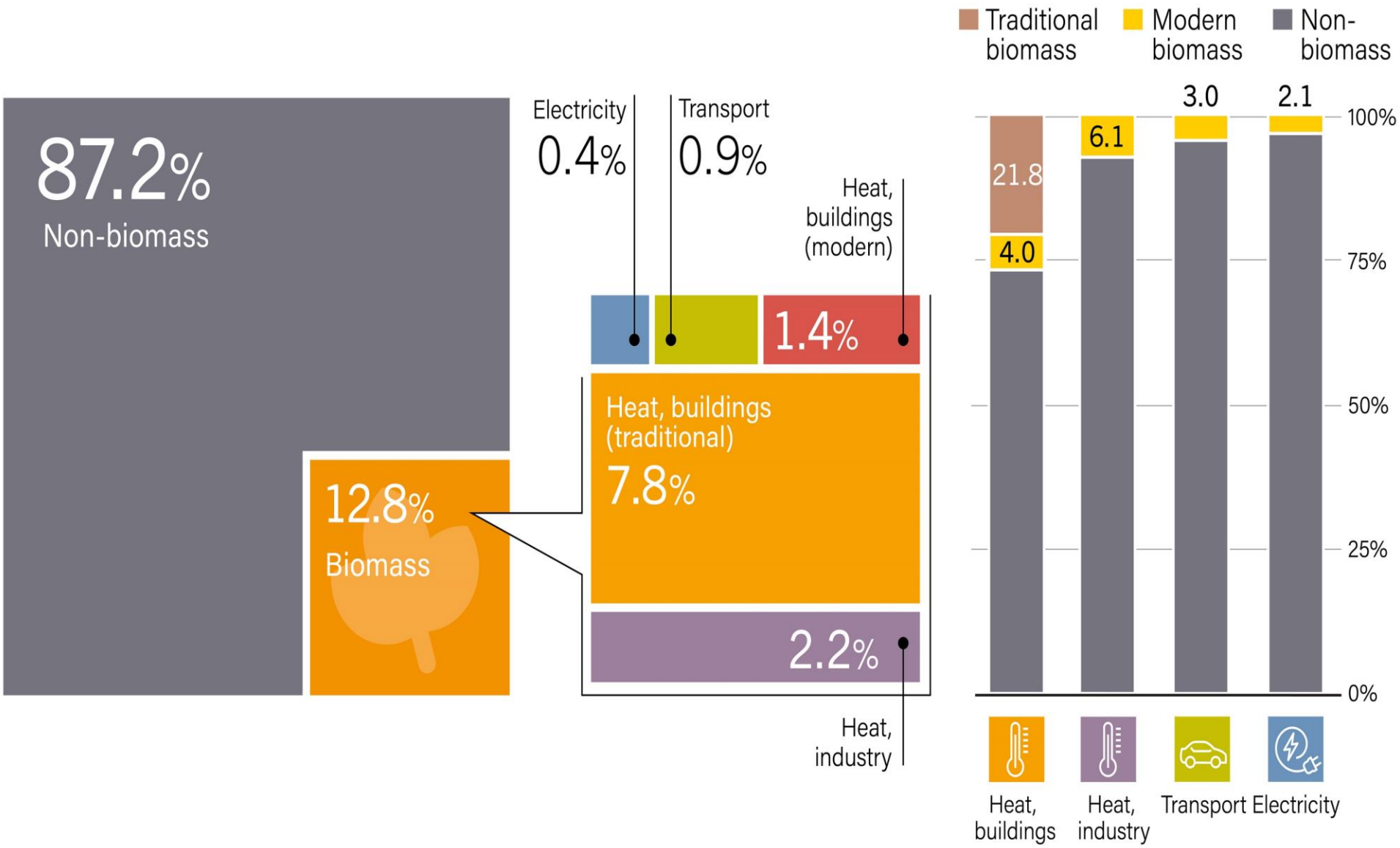
Source: REN21 Policy Database

Countries with Energy Efficiency Policies and Targets, End-2017

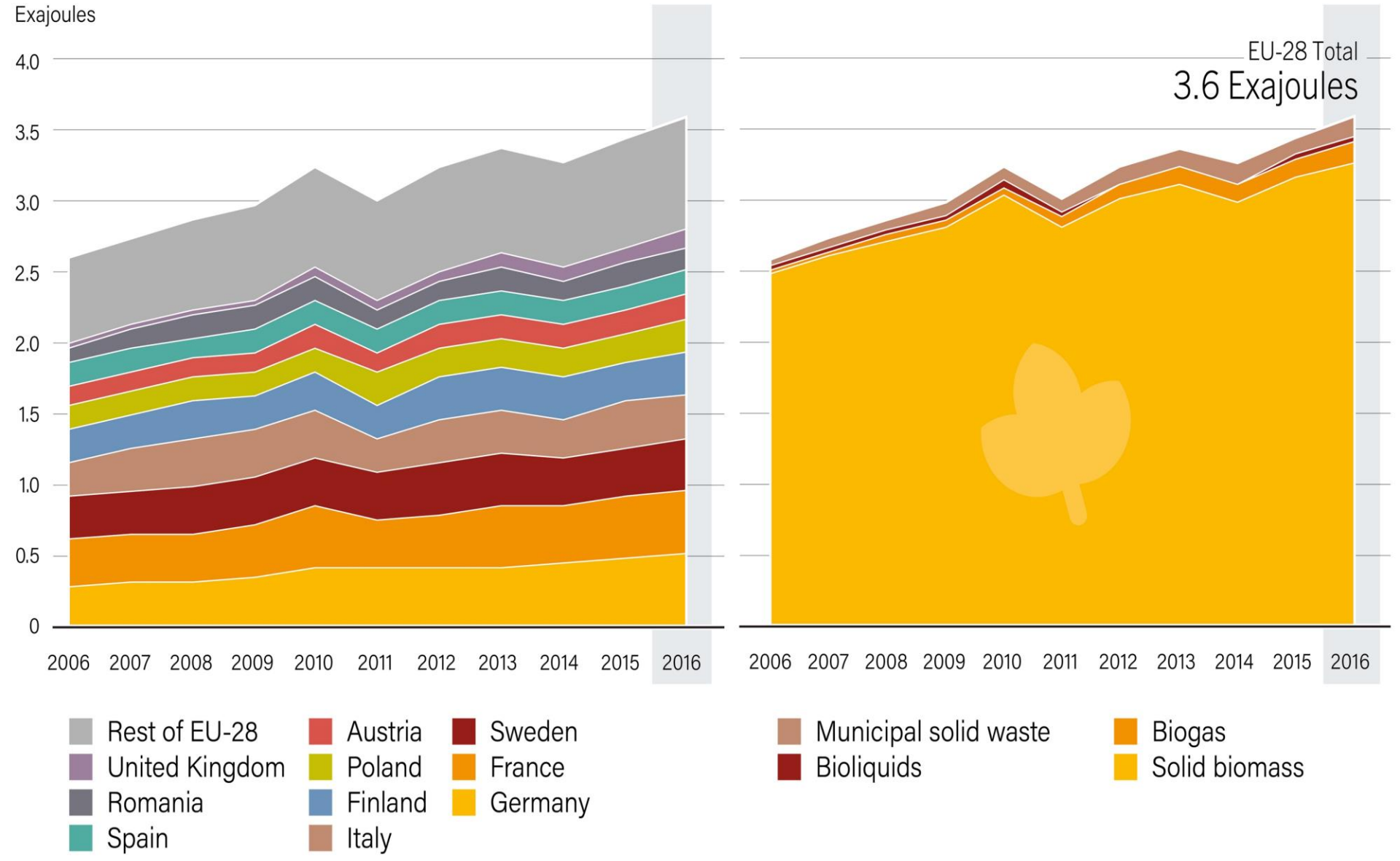


Source: REN21 Policy Database

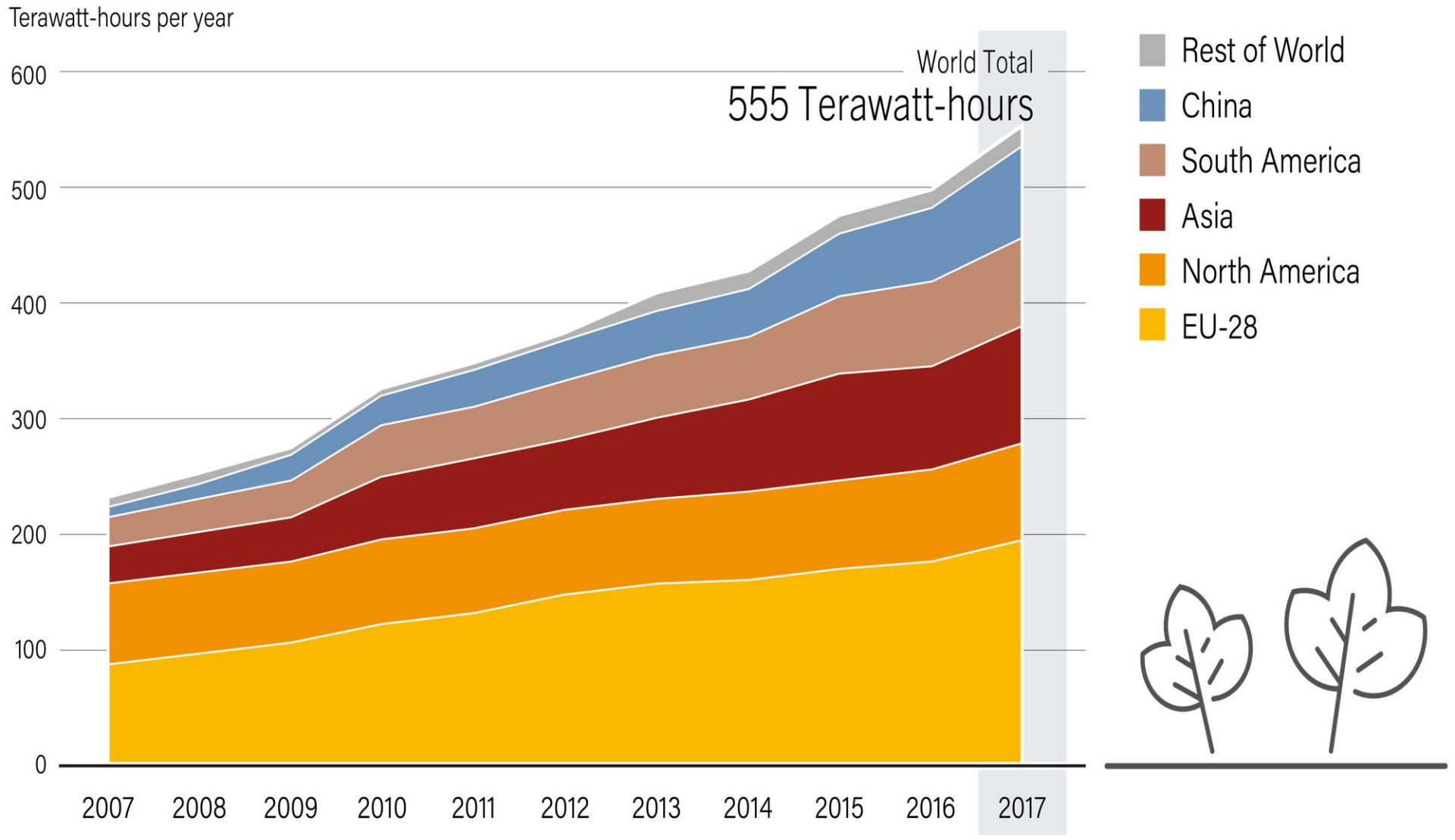
Shares of Bioenergy in Total Final Energy Consumption, Overall and by End-Use Sector, 2016



Consumption of Heat from Bioenergy in the EU-28, by Country and Fuel Source, 2006-2016



Global Bio-Power Generation by Region, 2007-2017



Global Trends in Ethanol, Biodiesel and HVO/HEFA Production, 2007-2017

HVO (hydrotreated vegetable oil) HEF (hydroprocessed esters and fatty acids)

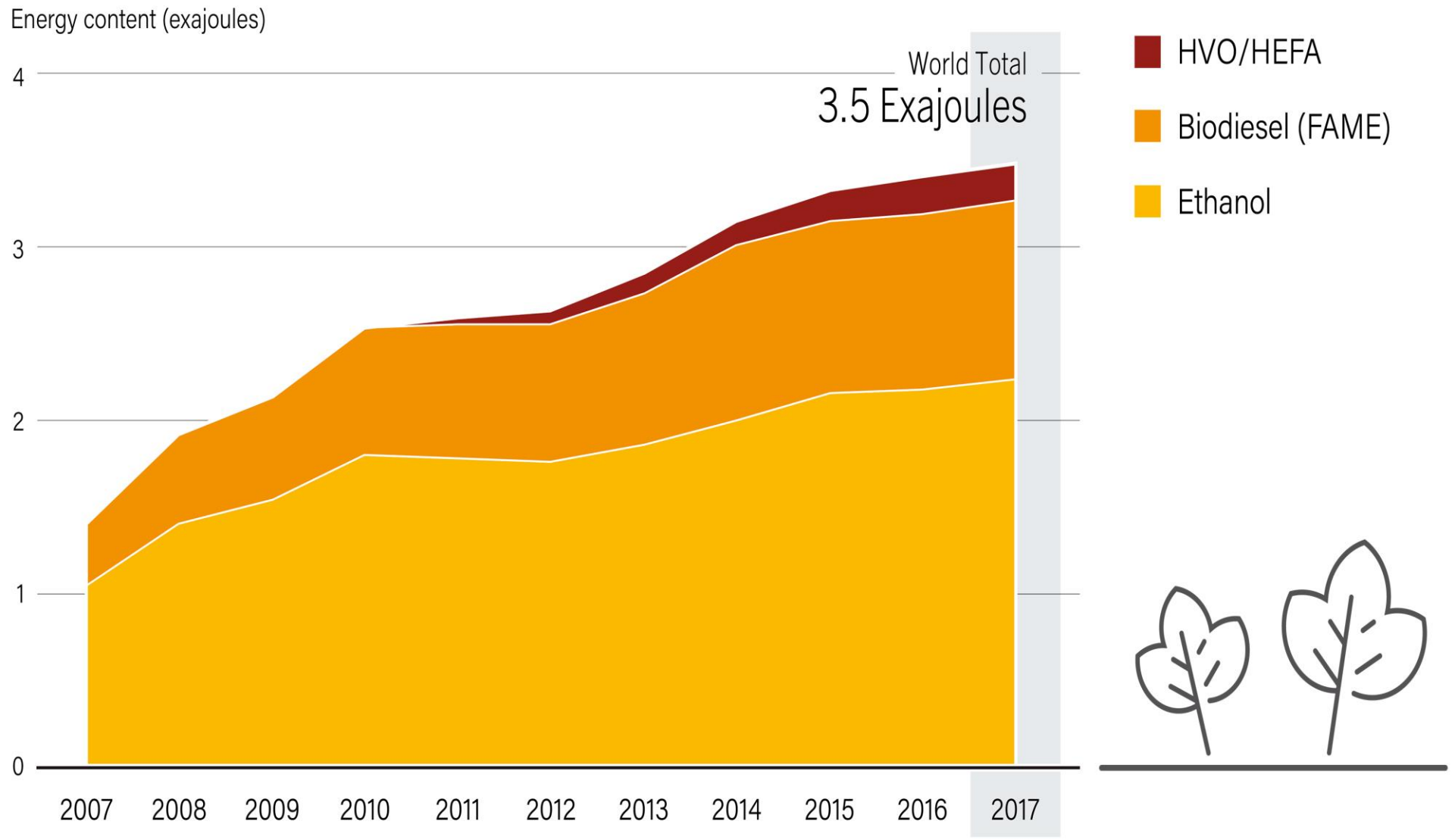
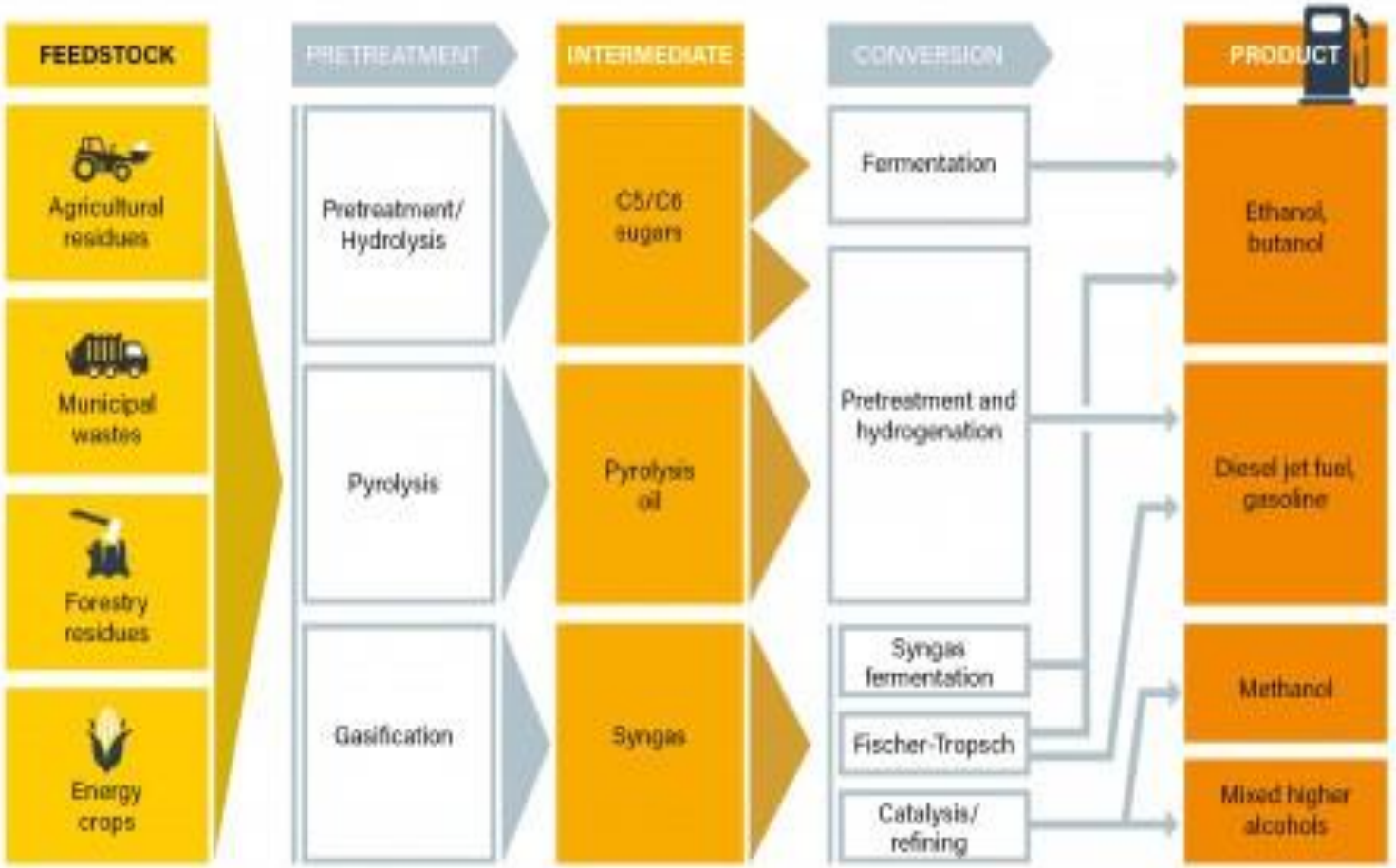
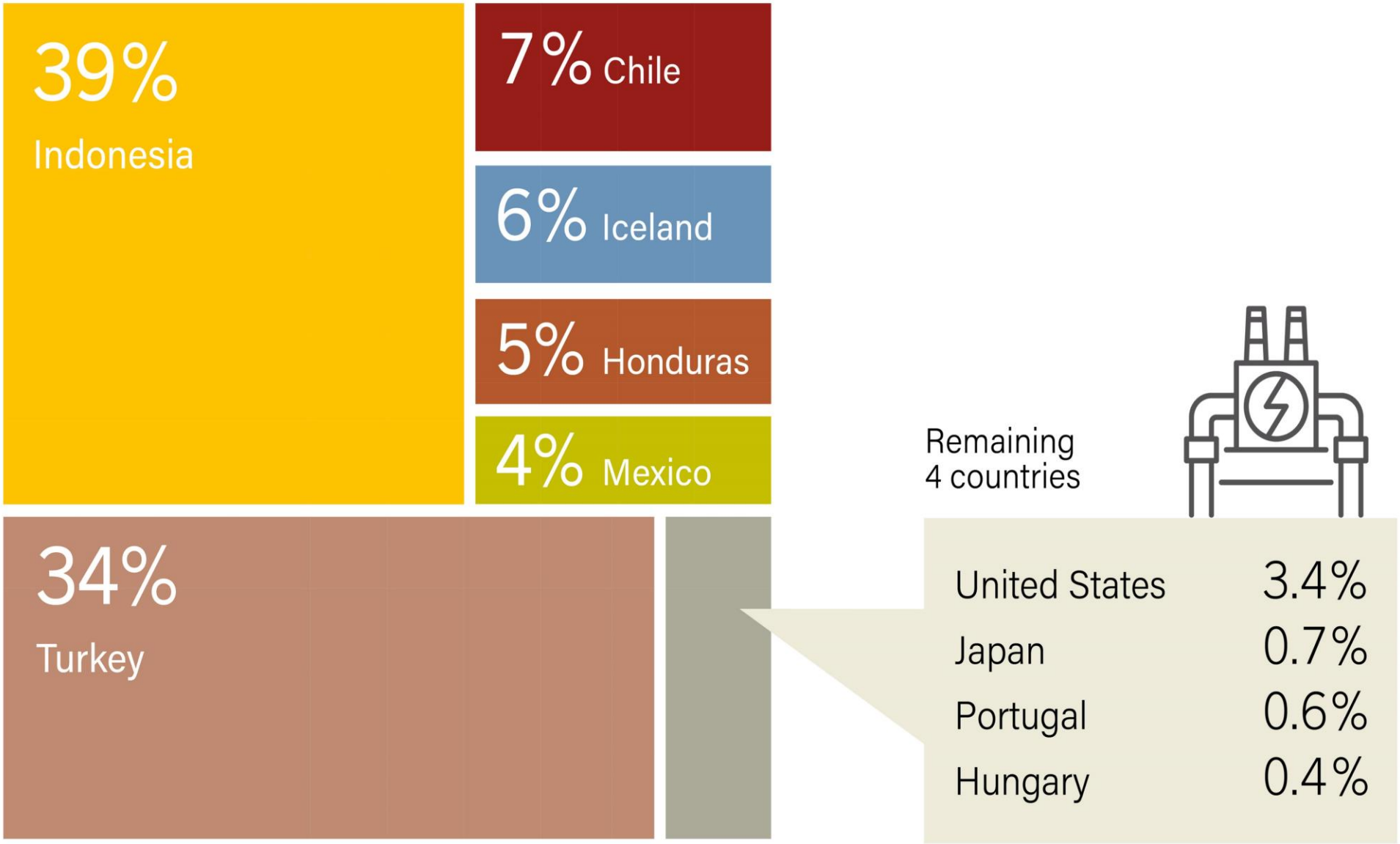


Figure: 10

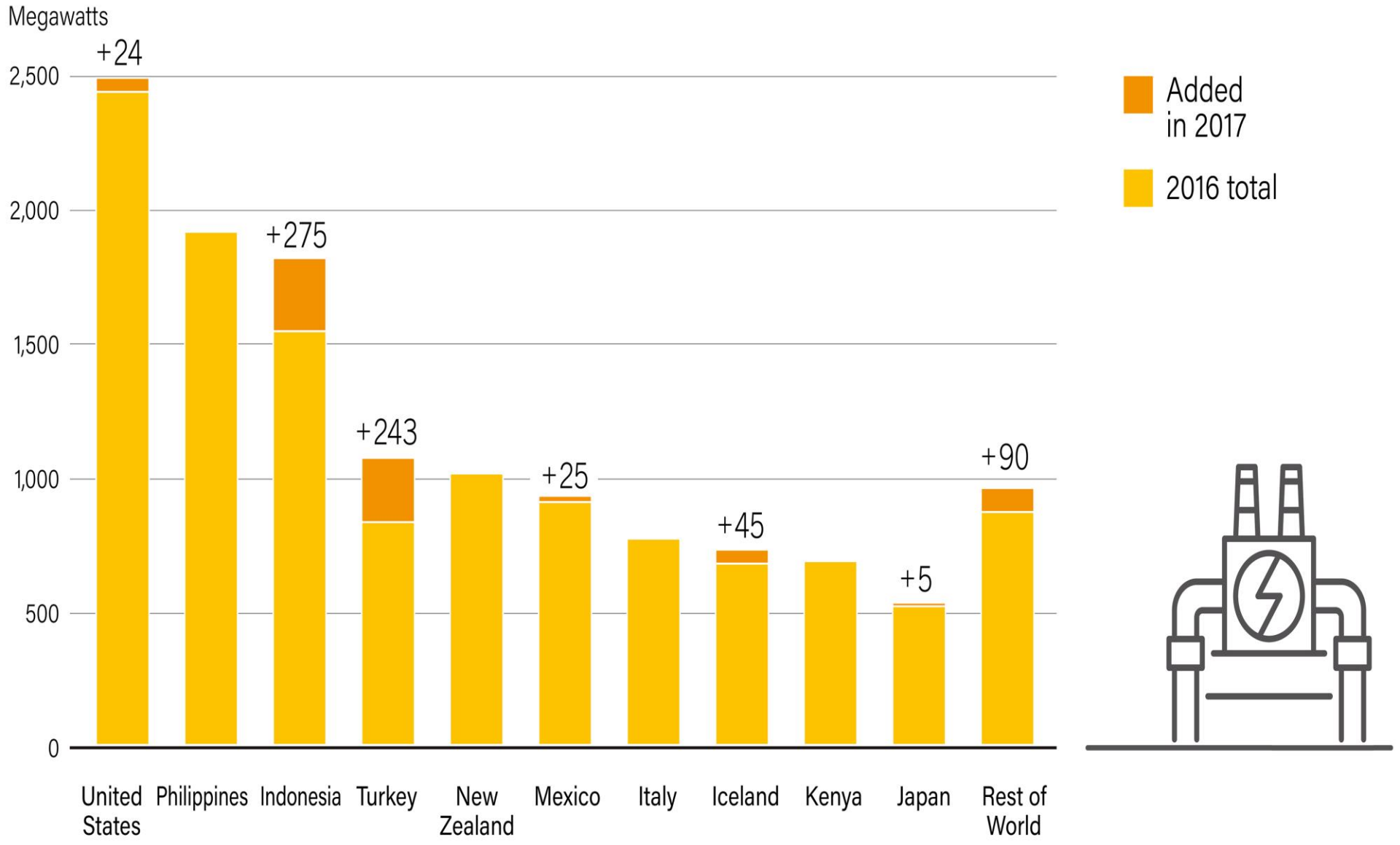
Some Conversion Pathways to Advanced Biofuels



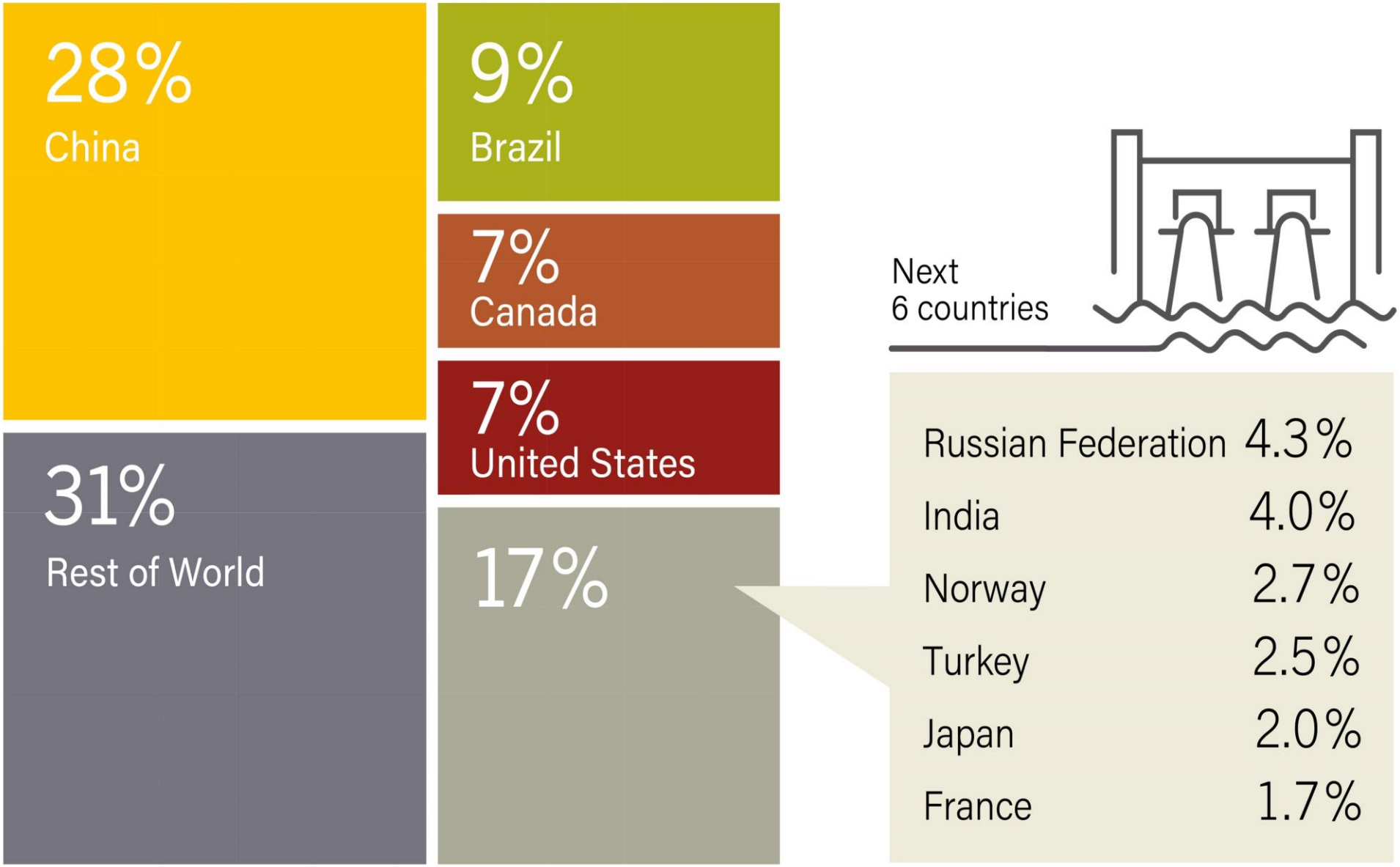
Geothermal Power Capacity Global Additions, Share by Country, 2017



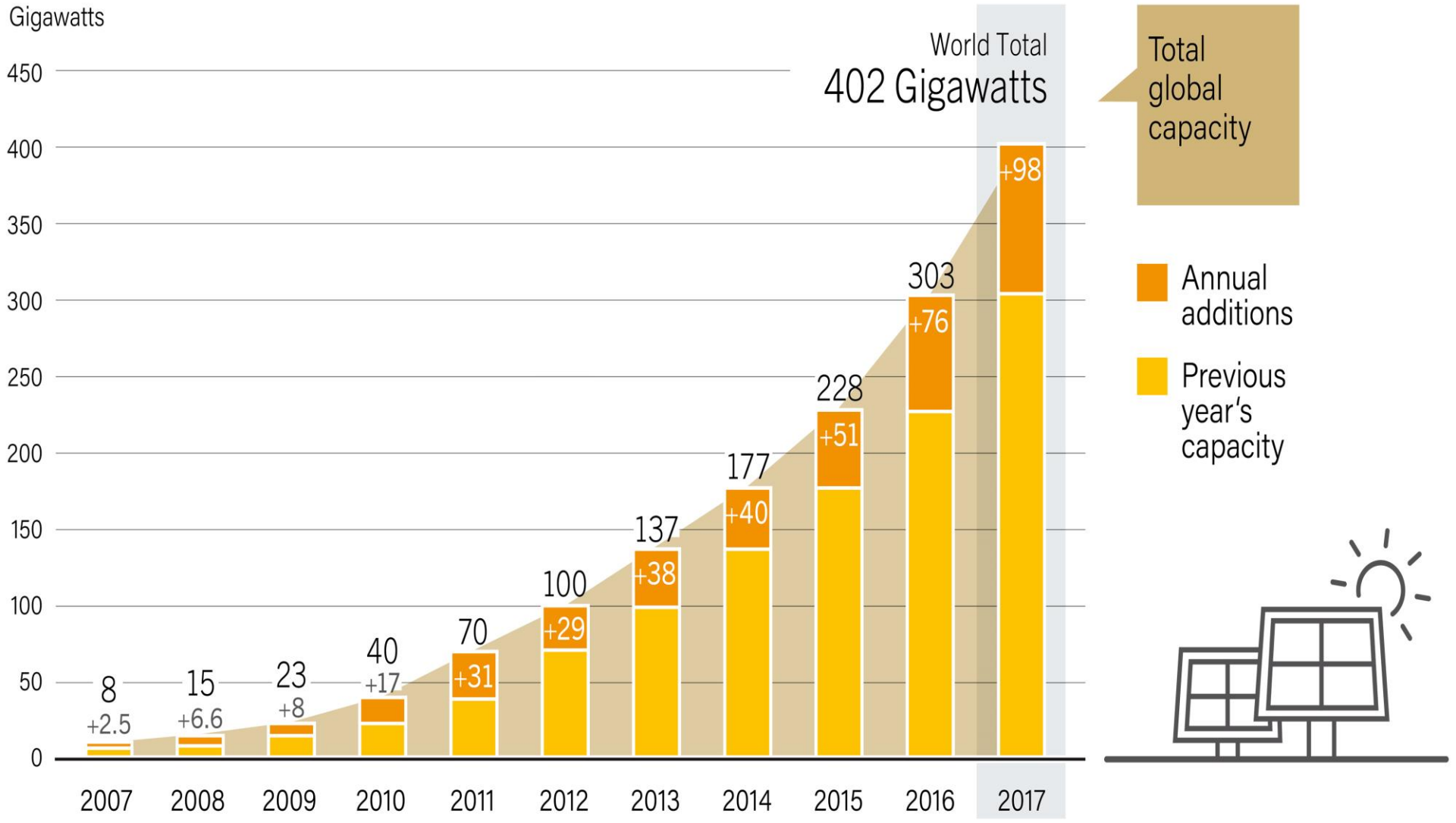
Geothermal Power Capacity and Additions, Top 10 Countries and Rest of World, 2017



Hydropower Global Capacity, Shares of Top 10 Countries and Rest of World, 2017

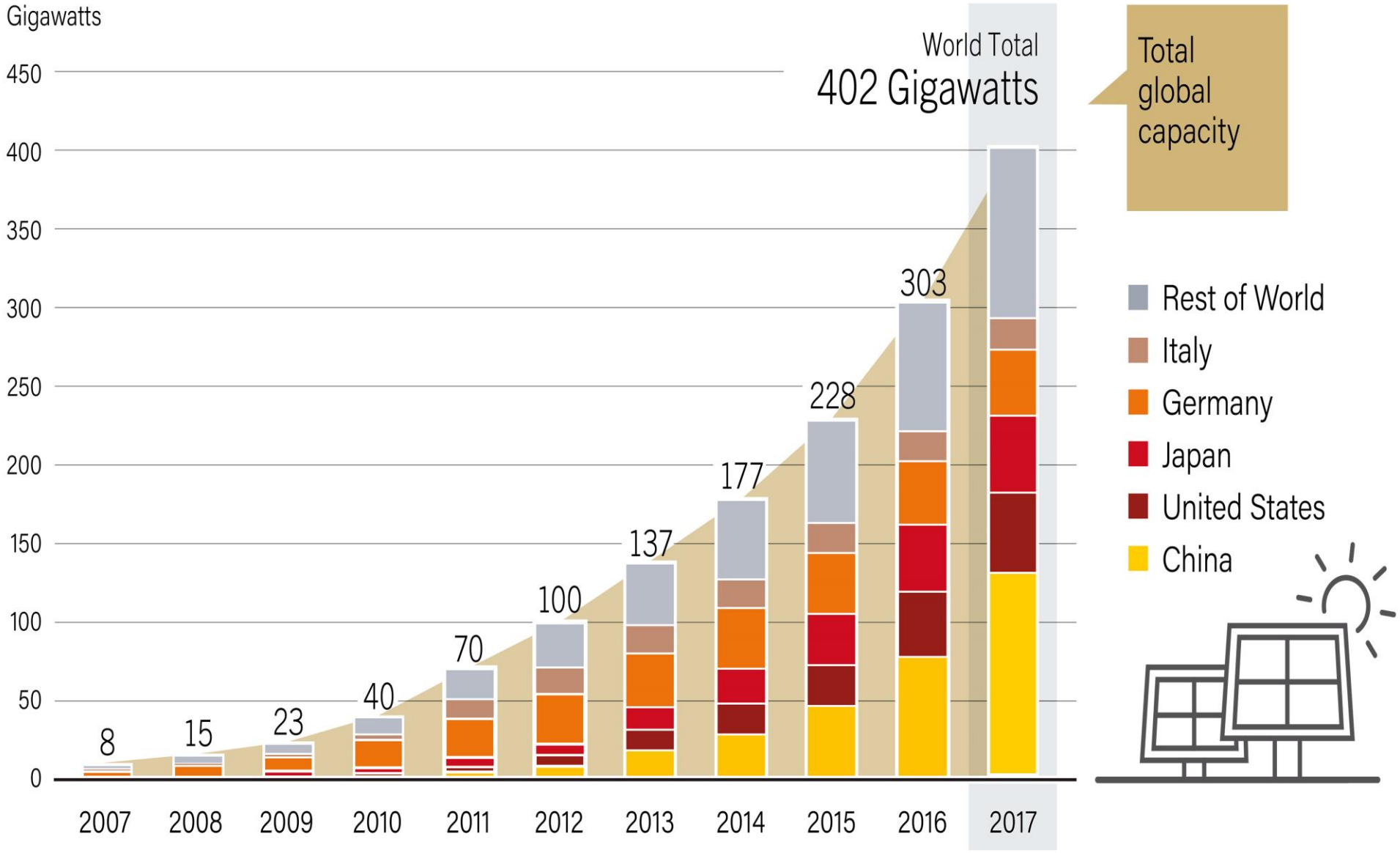


Solar PV Global Capacity and Annual Additions, 2007-2017

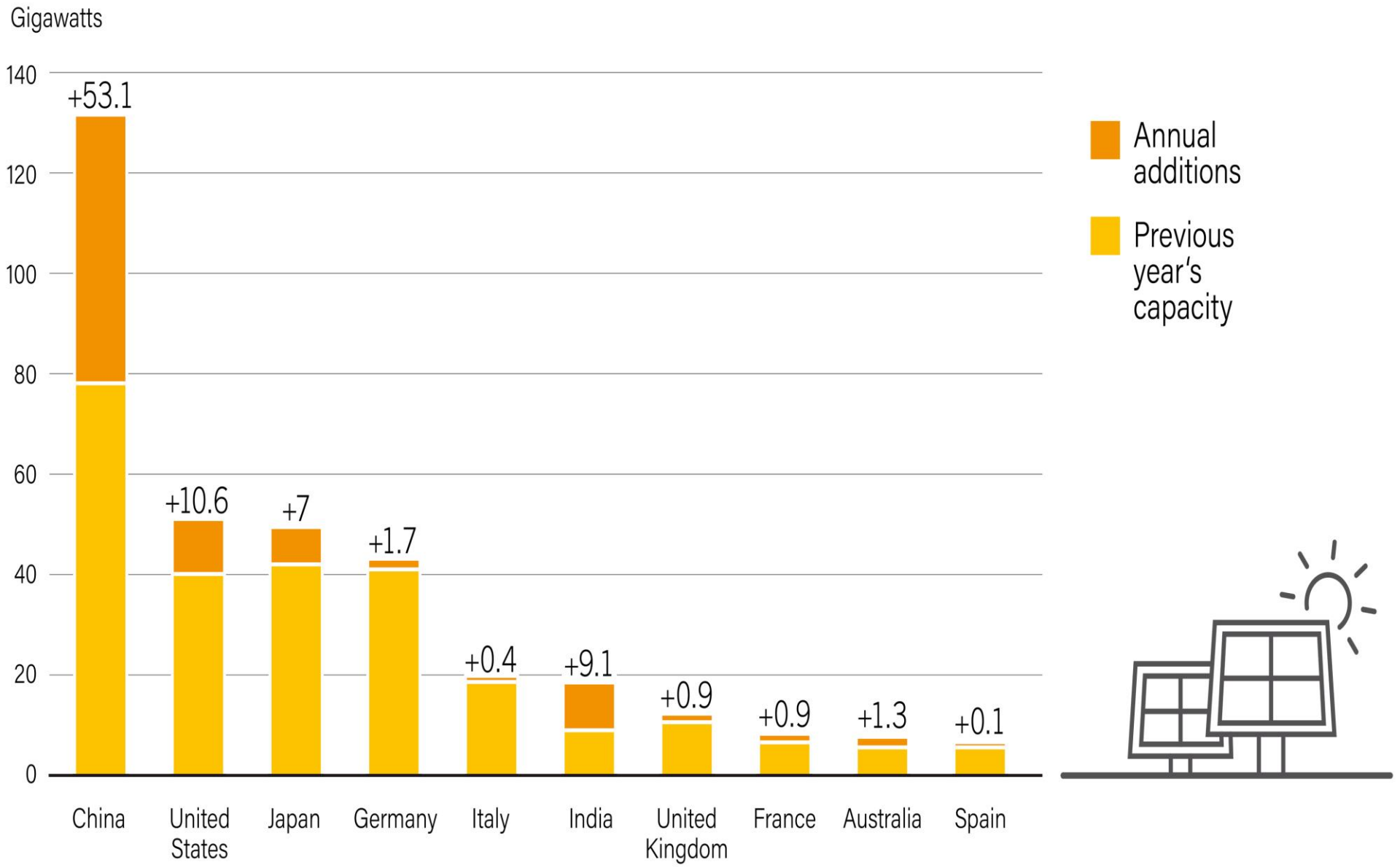


Source: IEA PVPS

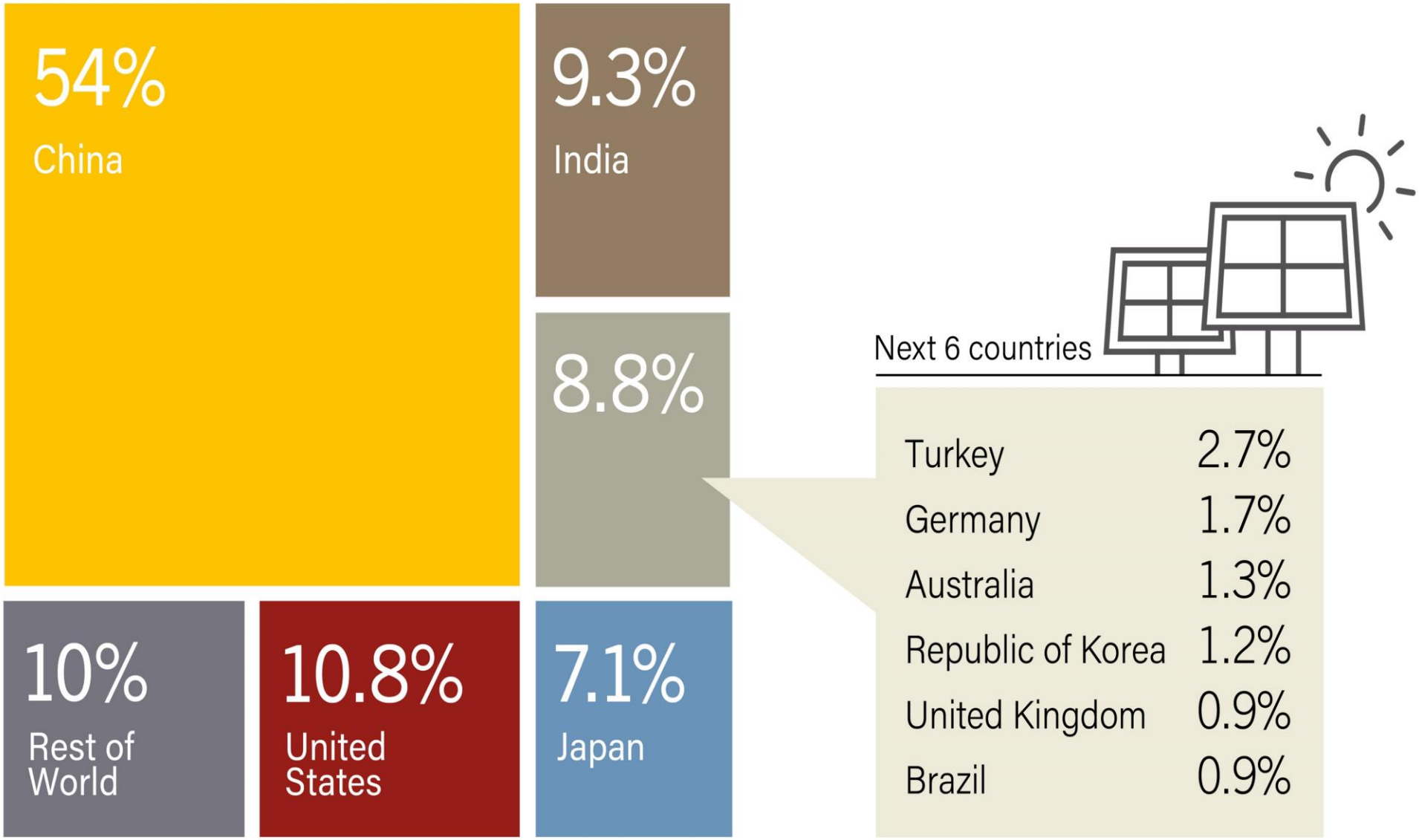
Solar PV Global Capacity, by Country or Region, 2007-2017



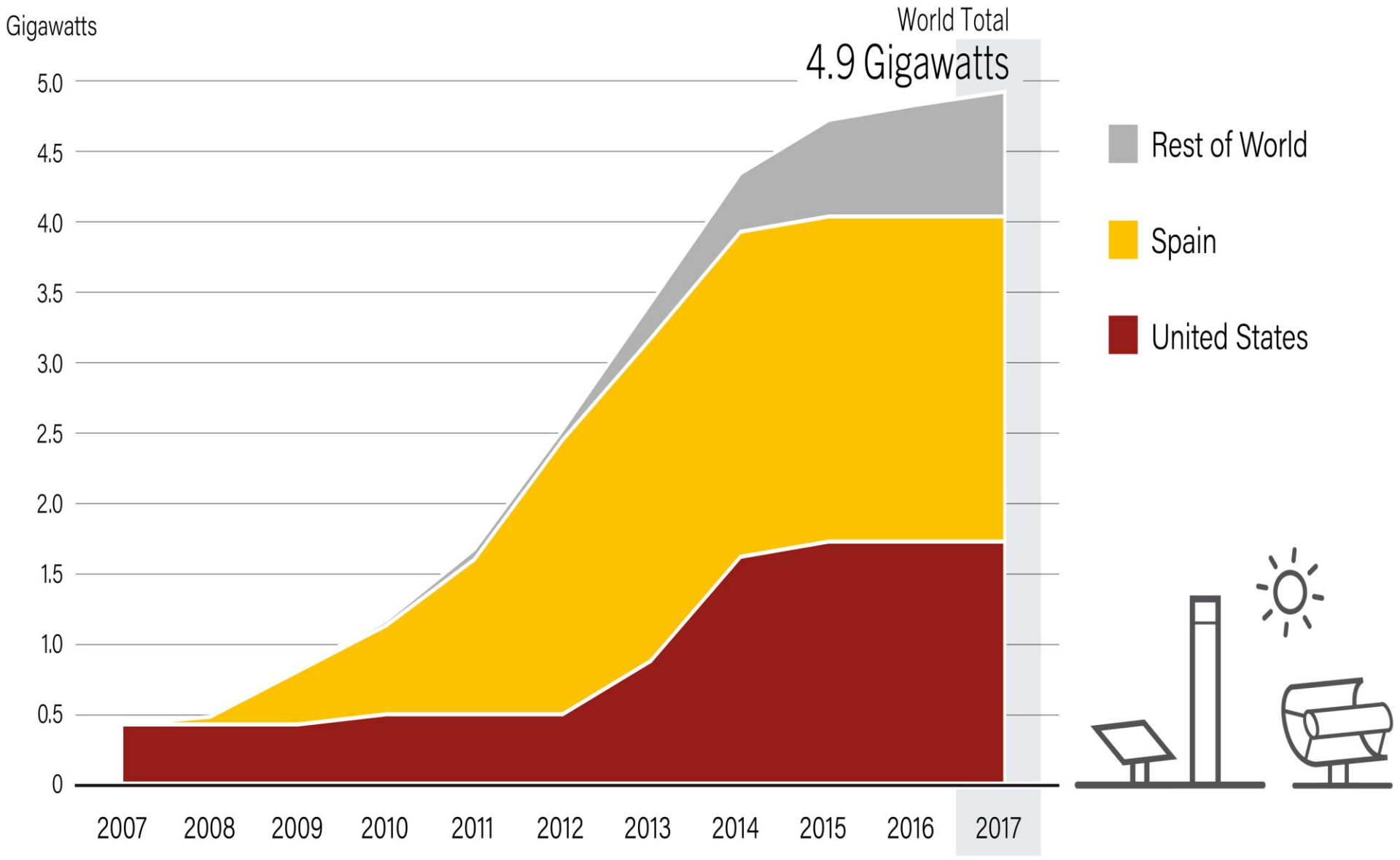
Solar PV Capacity and Additions, Top 10 Countries, 2017



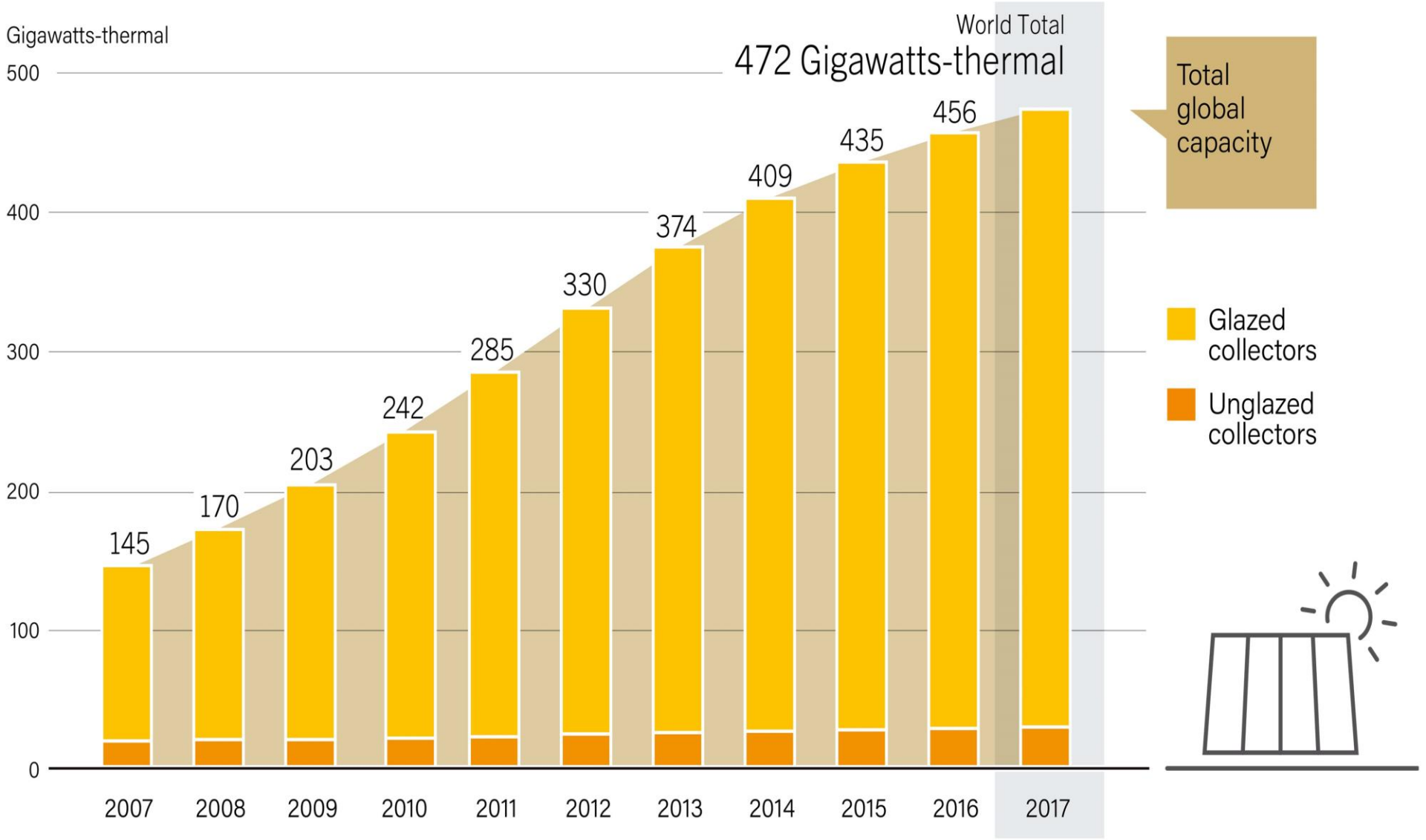
Solar PV Global Capacity Additions, Shares of Top 10 Countries and Rest of World, 2017



Concentrating Solar Thermal Power Global Capacity, by Country and Region, 2007-2017

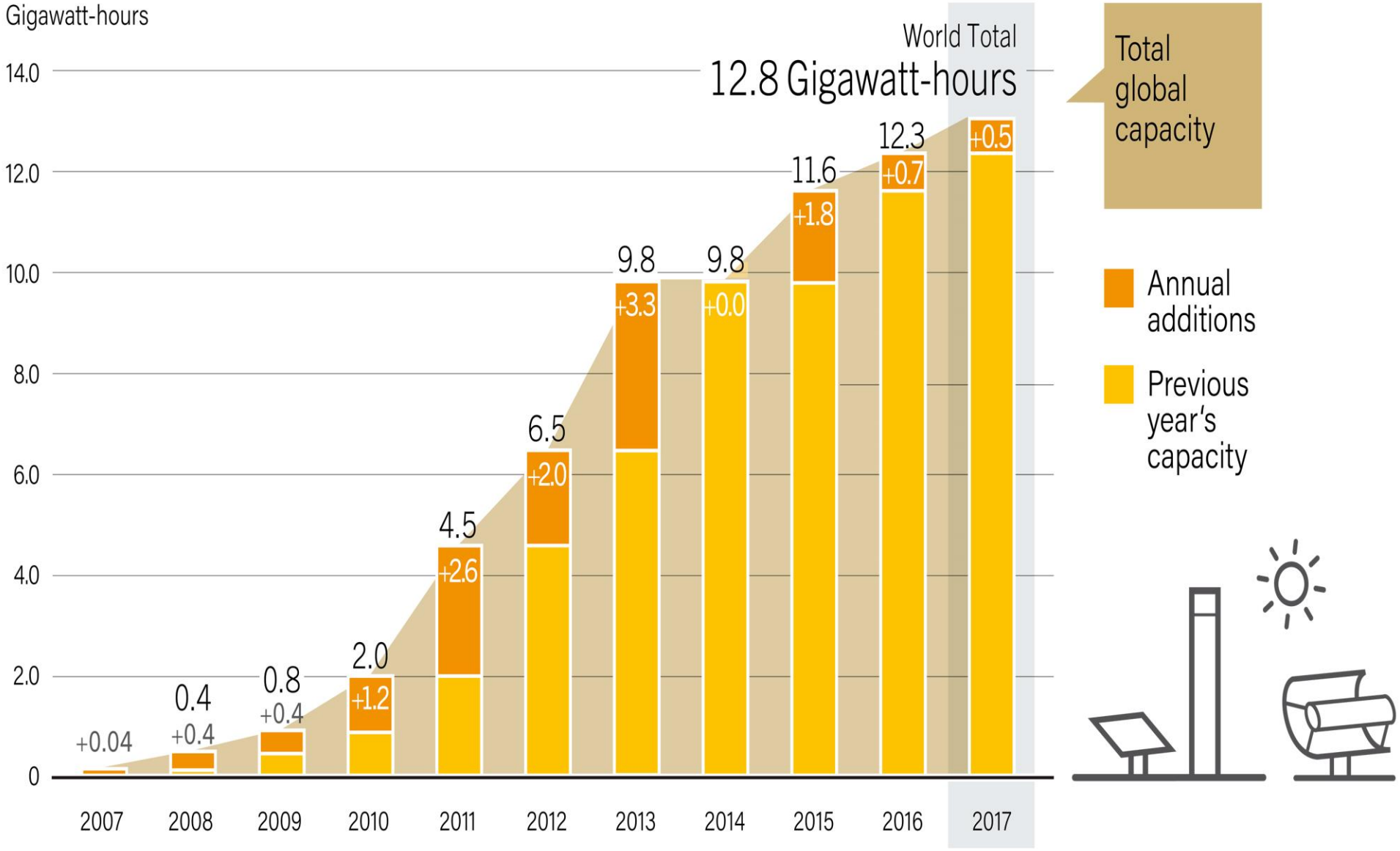


Solar Water Heating Collectors Global Capacity, 2007-2017

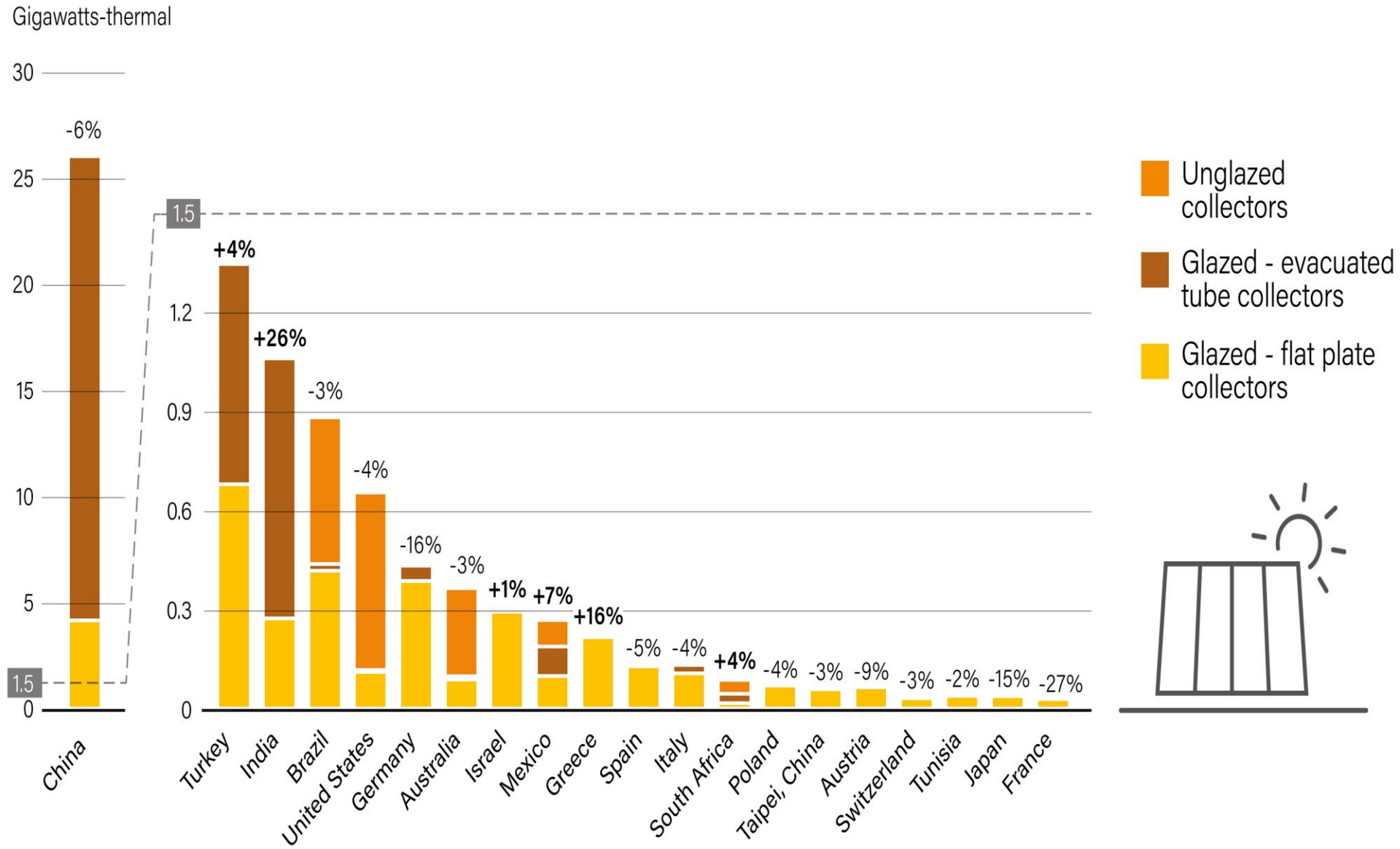


Source: IEA SHC

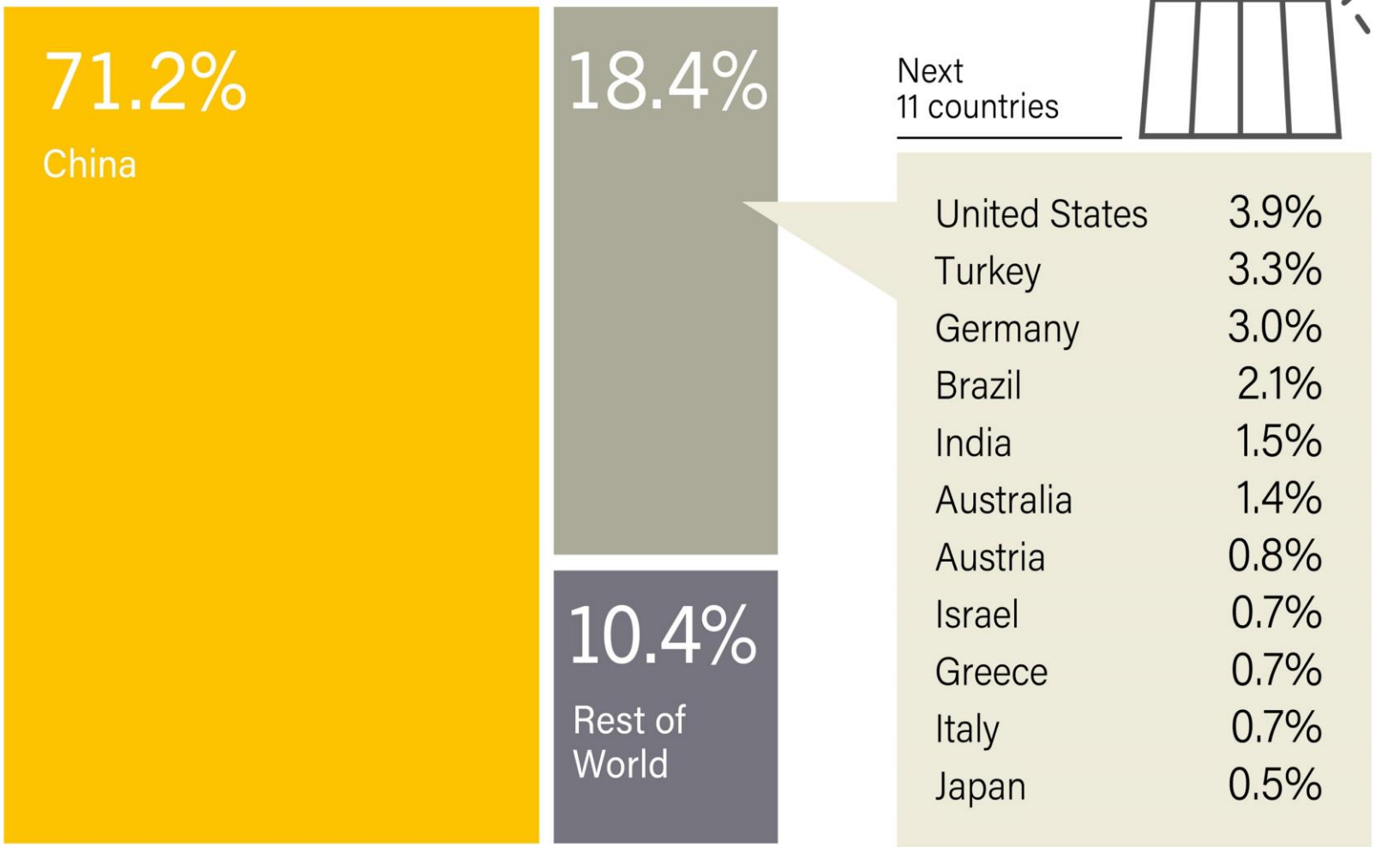
CSP Thermal Energy Storage Global Capacity and Annual Additions, 2007-2017



Solar Water Heating Collector Additions, Top 20 Countries for Capacity Added, 2017

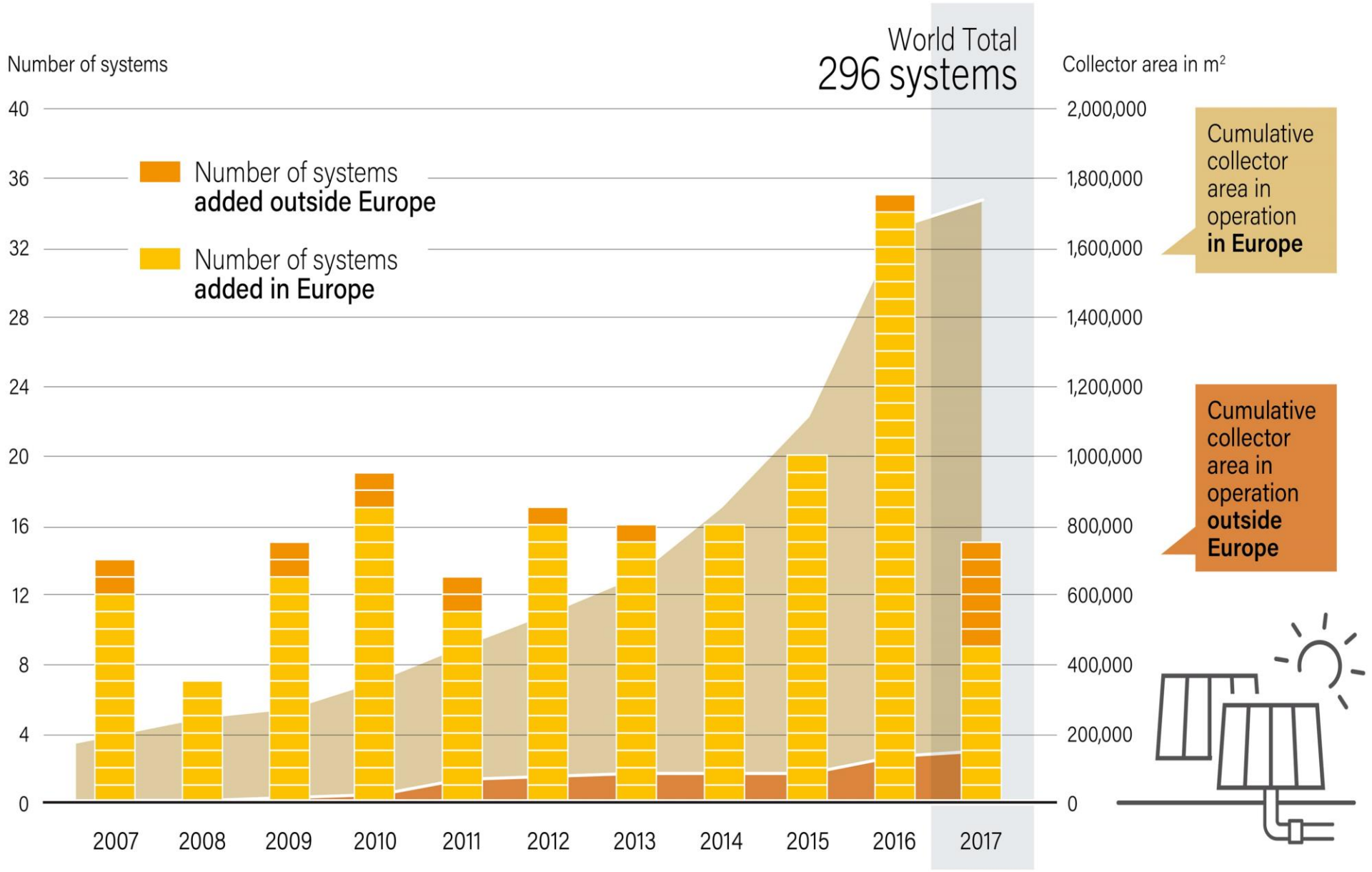


Solar Water Heating Collectors Global Capacity in Operation, Shares of Top 12 Countries and Rest of World, 2016

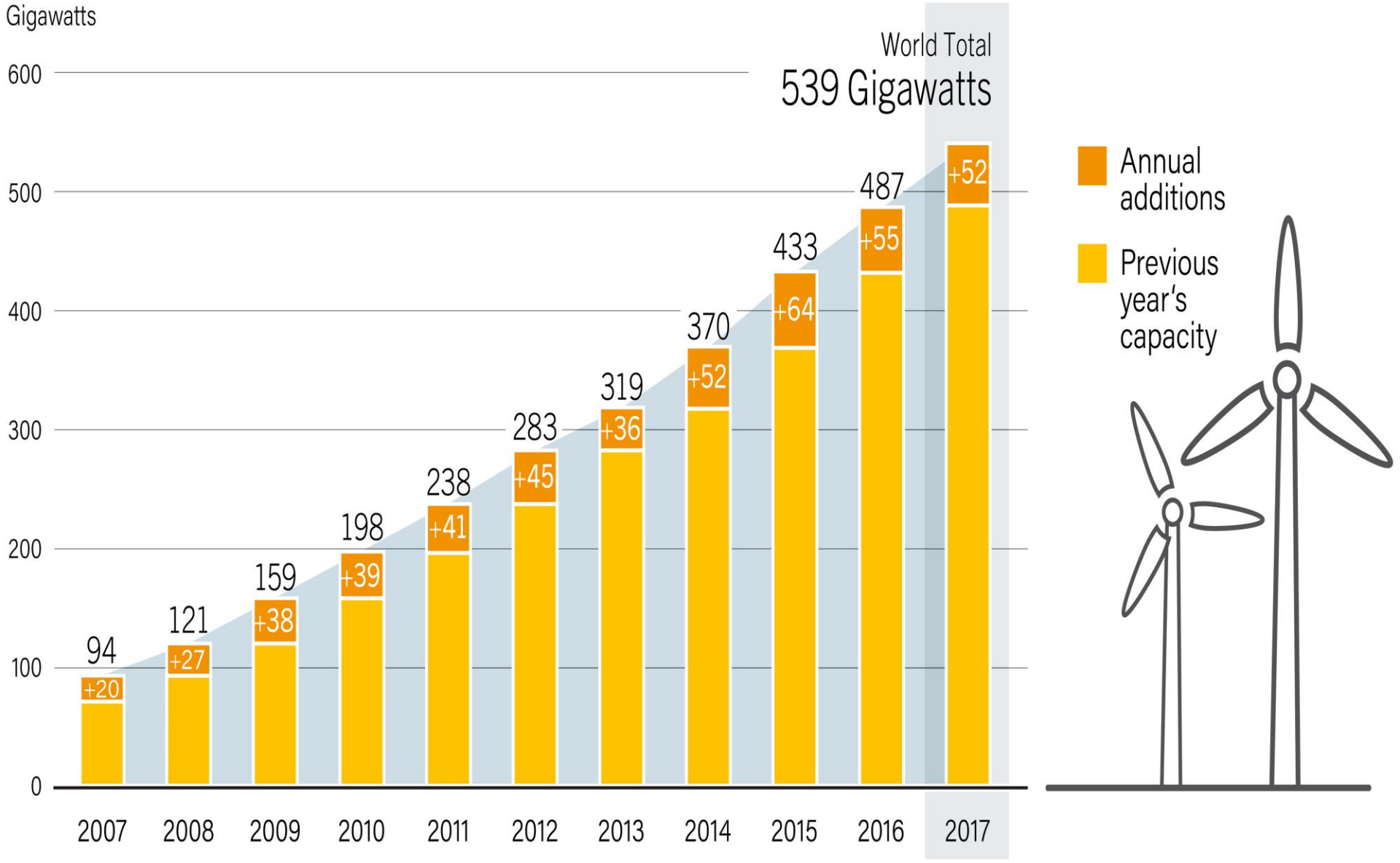


Source: IEA SHC

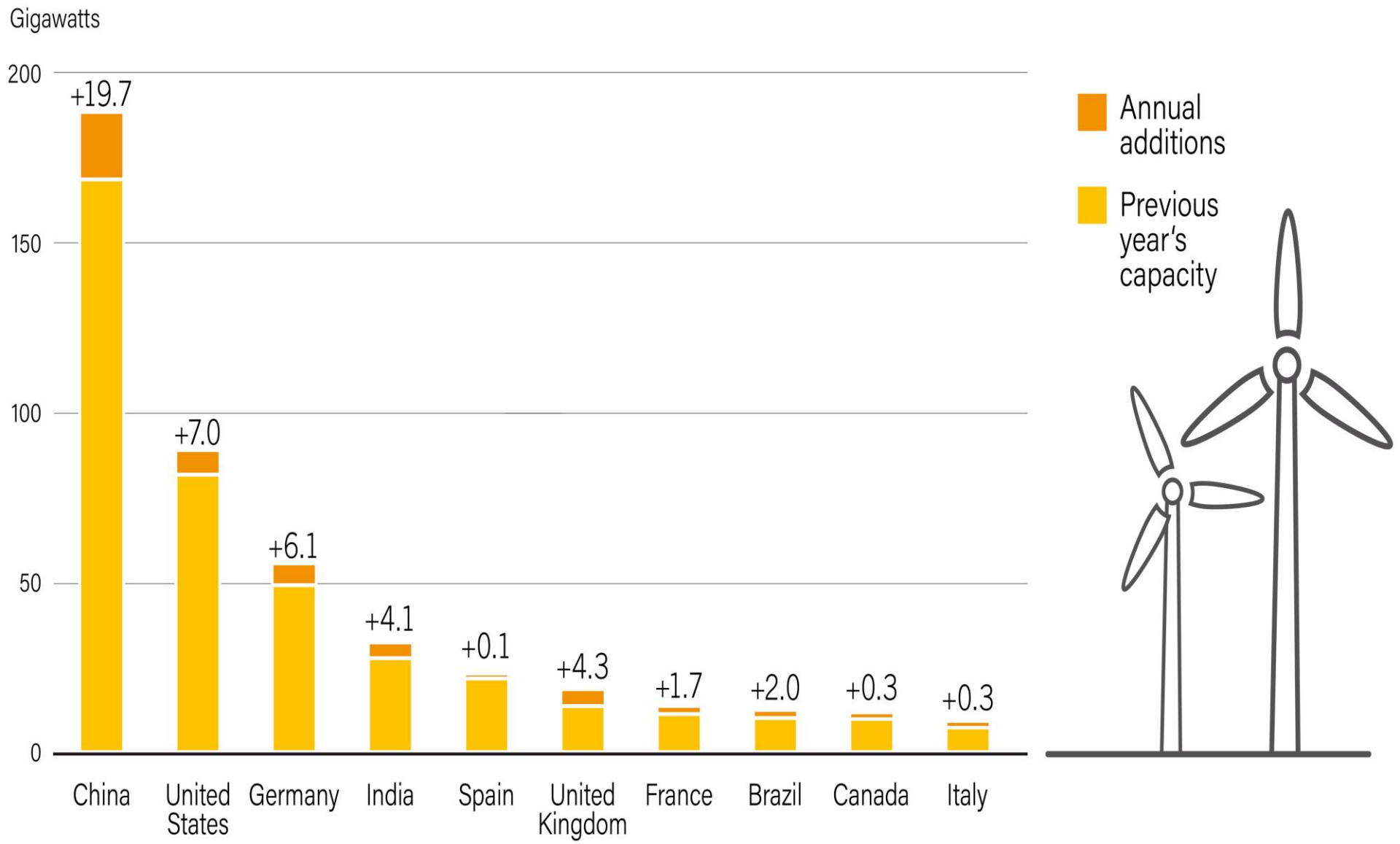
Solar District Heating Systems, Global Annual Additions and Total Area in Operation, 2007-2017



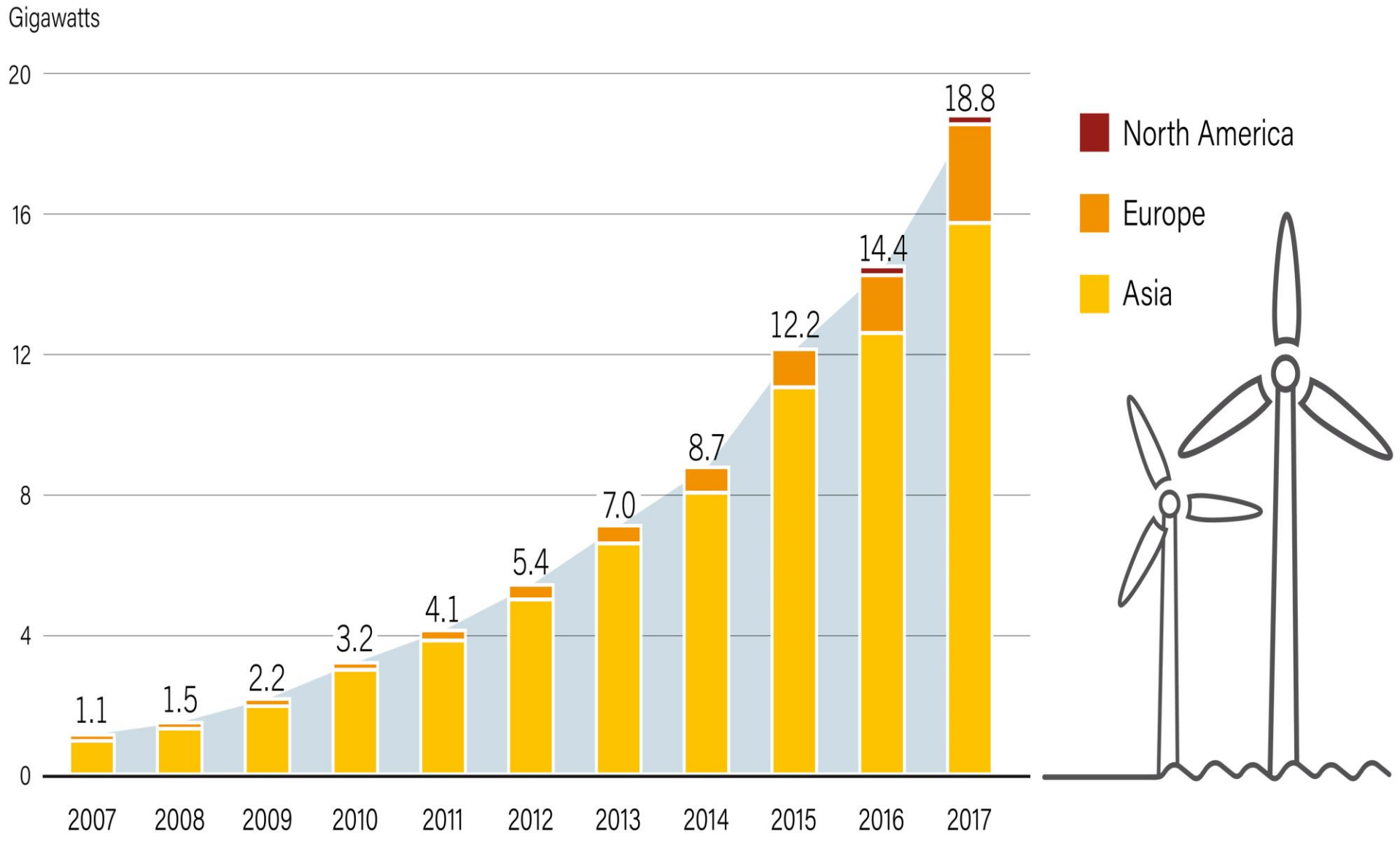
Wind Power Global Capacity and Annual Additions, 2007-2017



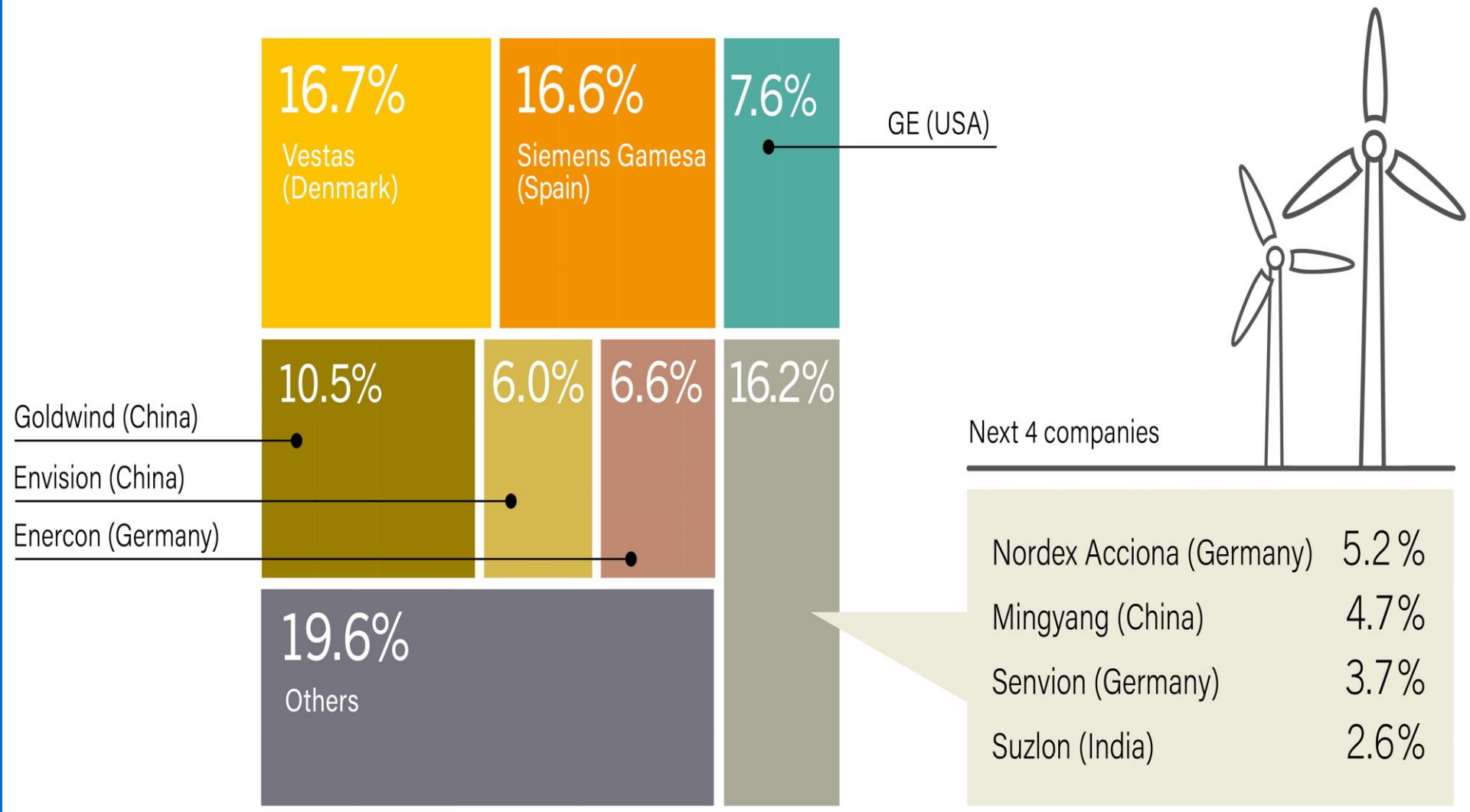
Wind Power Capacity and Additions, Top 10 Countries, 2017



Wind Power Offshore Global Capacity by Region, 2007-2017

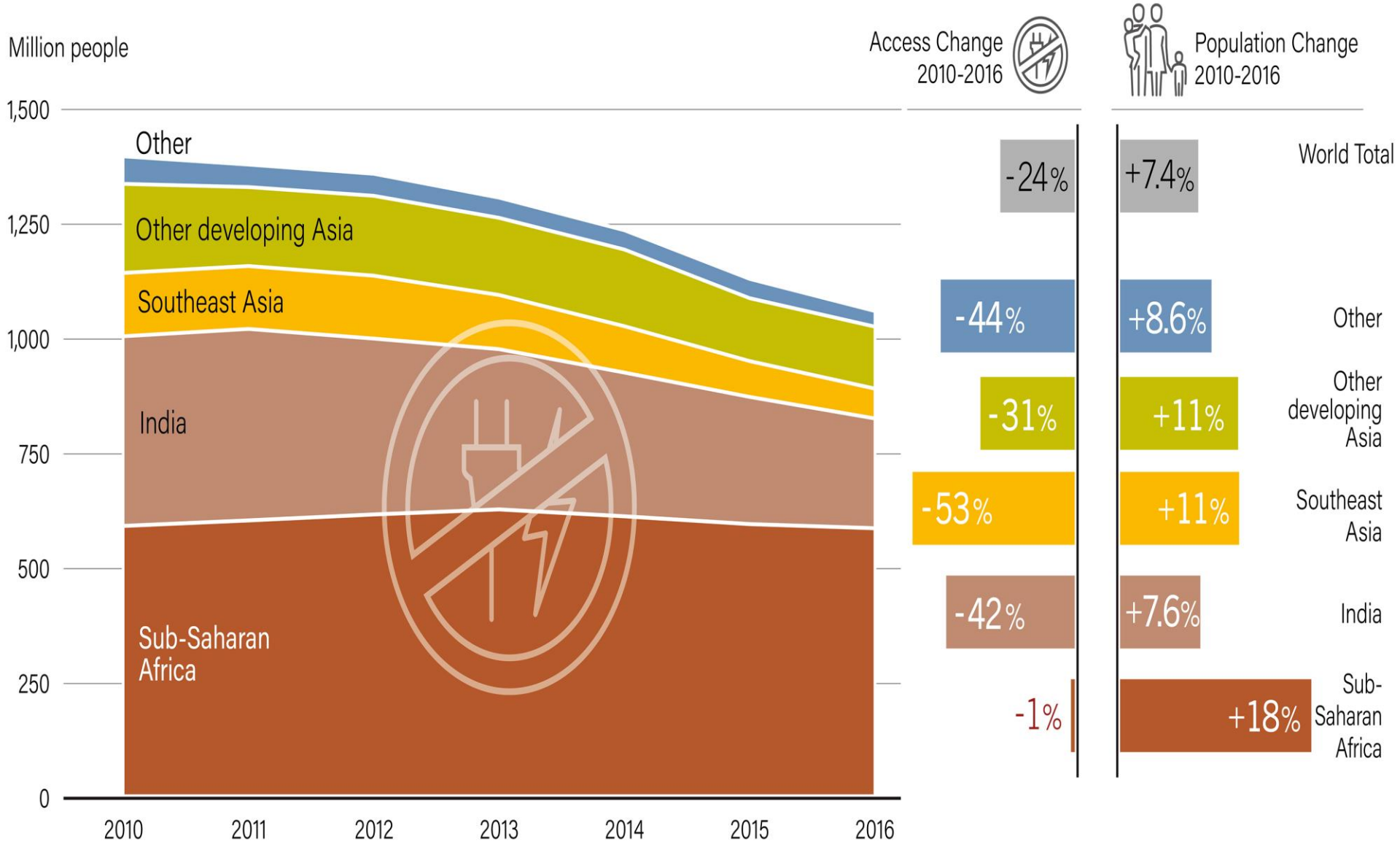


Market Shares of Top 10 Wind Turbine Manufacturers, 2017

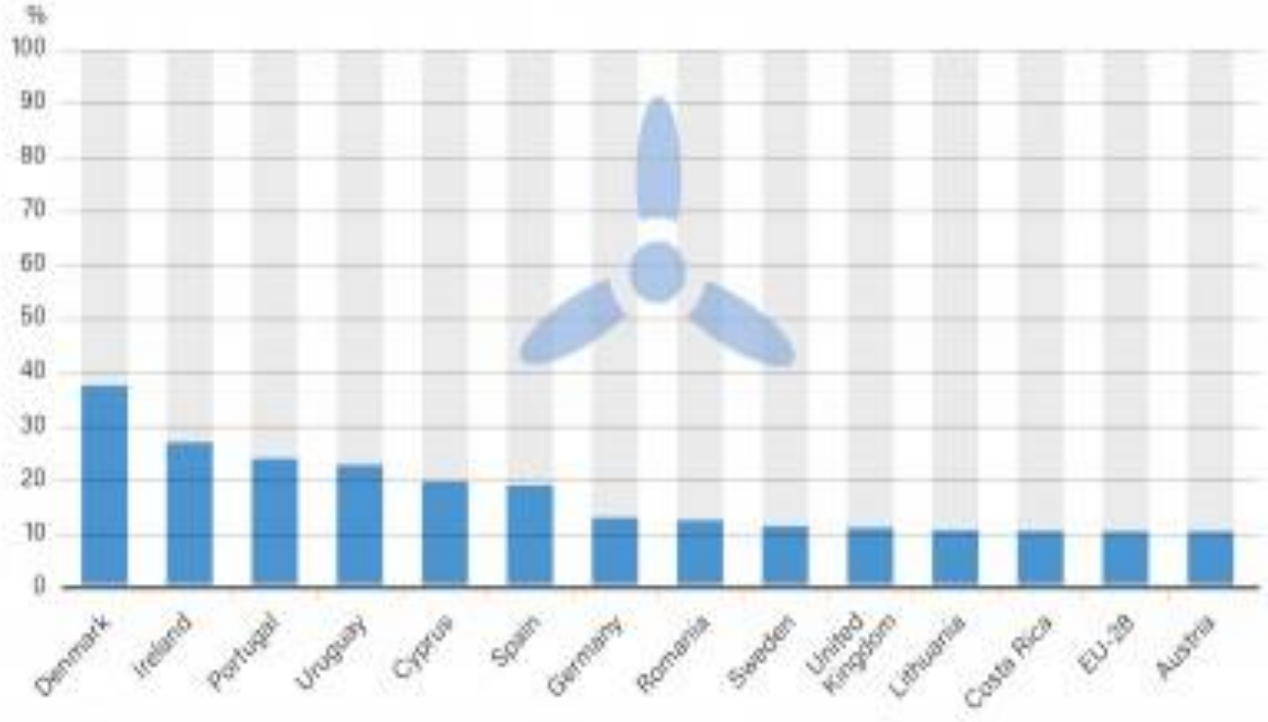


Source: FTI Consulting

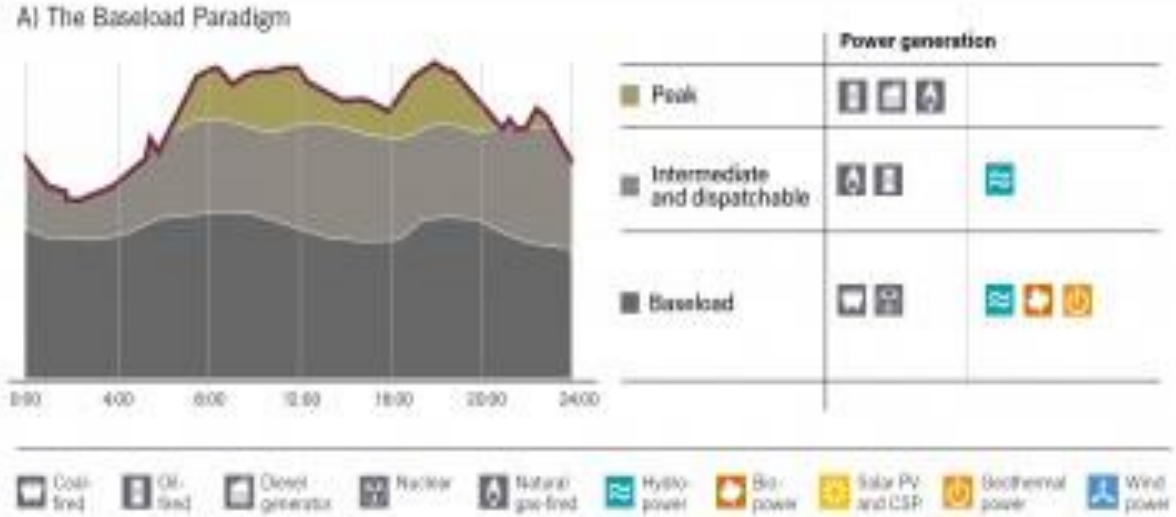
Population Without Access to Electricity, by Region or Country, 2010-2016



Share of Electricity Demand Met by Wind Power, Selected Countries with over 10% and EU-28, 2016

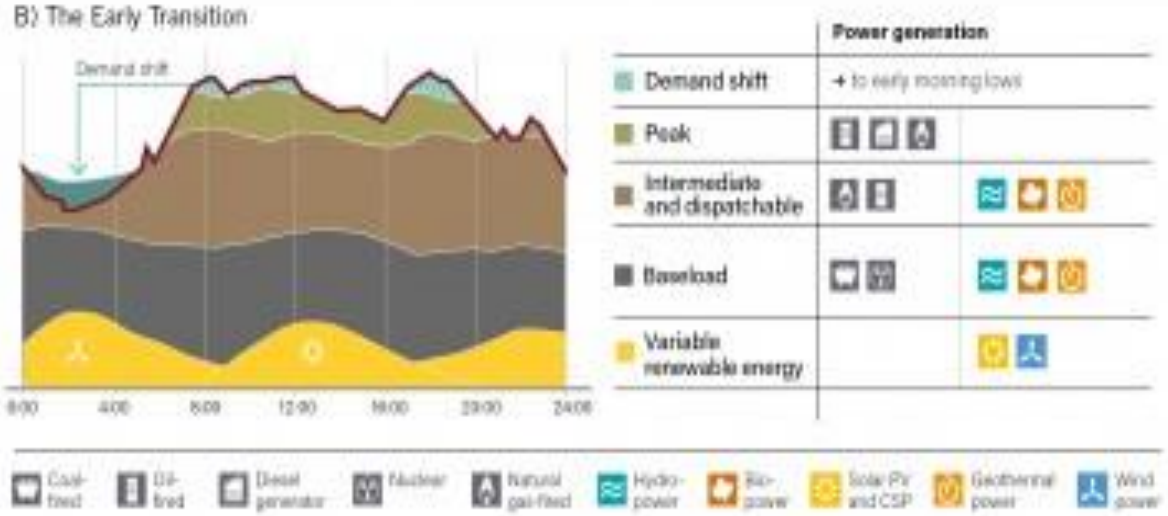


Conceptual Progression from the Baseload Paradigm to a New Paradigm of 100% Renewable Electricity



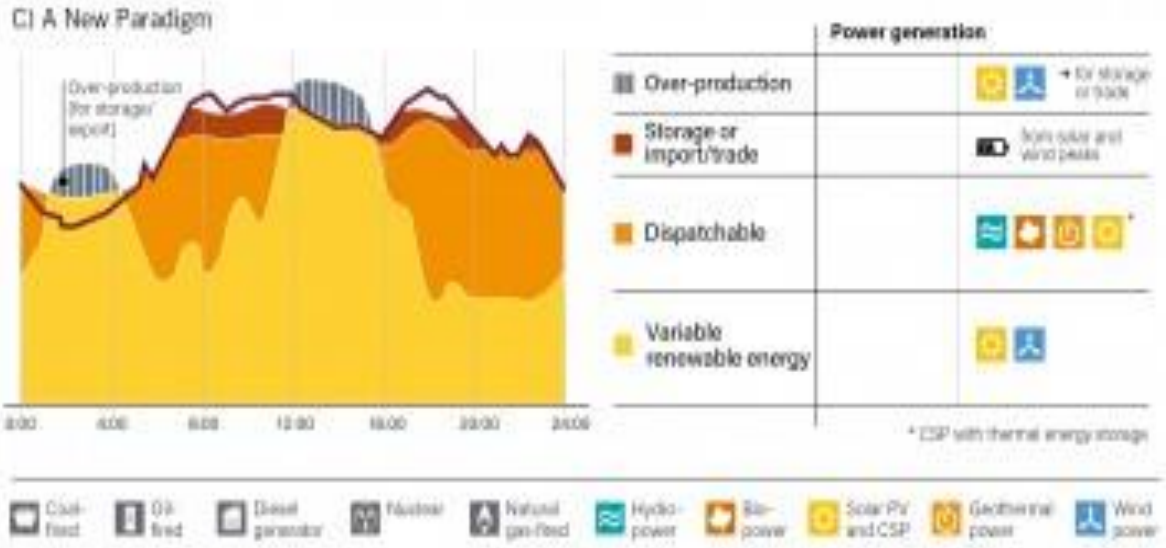
Conceptual Progression from the Baseload Paradigm to a New Paradigm of 100% Renewable Electricity

In the early stages of progression to larger shares of variable renewable generation, power systems make some adjustments in their grid operations, develop forecasting systems for renewable energy production, and introduce improved control technology and operating procedures for efficient scheduling and dispatch.



Conceptual Progression from the Baseload Paradigm to a New Paradigm of 100% Renewable Electricity

In the late stages of progression towards fully renewable power systems, variable renewable power will be integrated through advanced resource forecasting, grid reinforcements and strengthened interconnections, improved information and control technologies for grid operations, widespread deployment of storage technologies, greater efficiency and scope of demand response, and coupling of electricity, heating and cooling, and transport sectors.



GIVING THE RIGHT PRICE TO ENERGY PRODUCTION

External costs

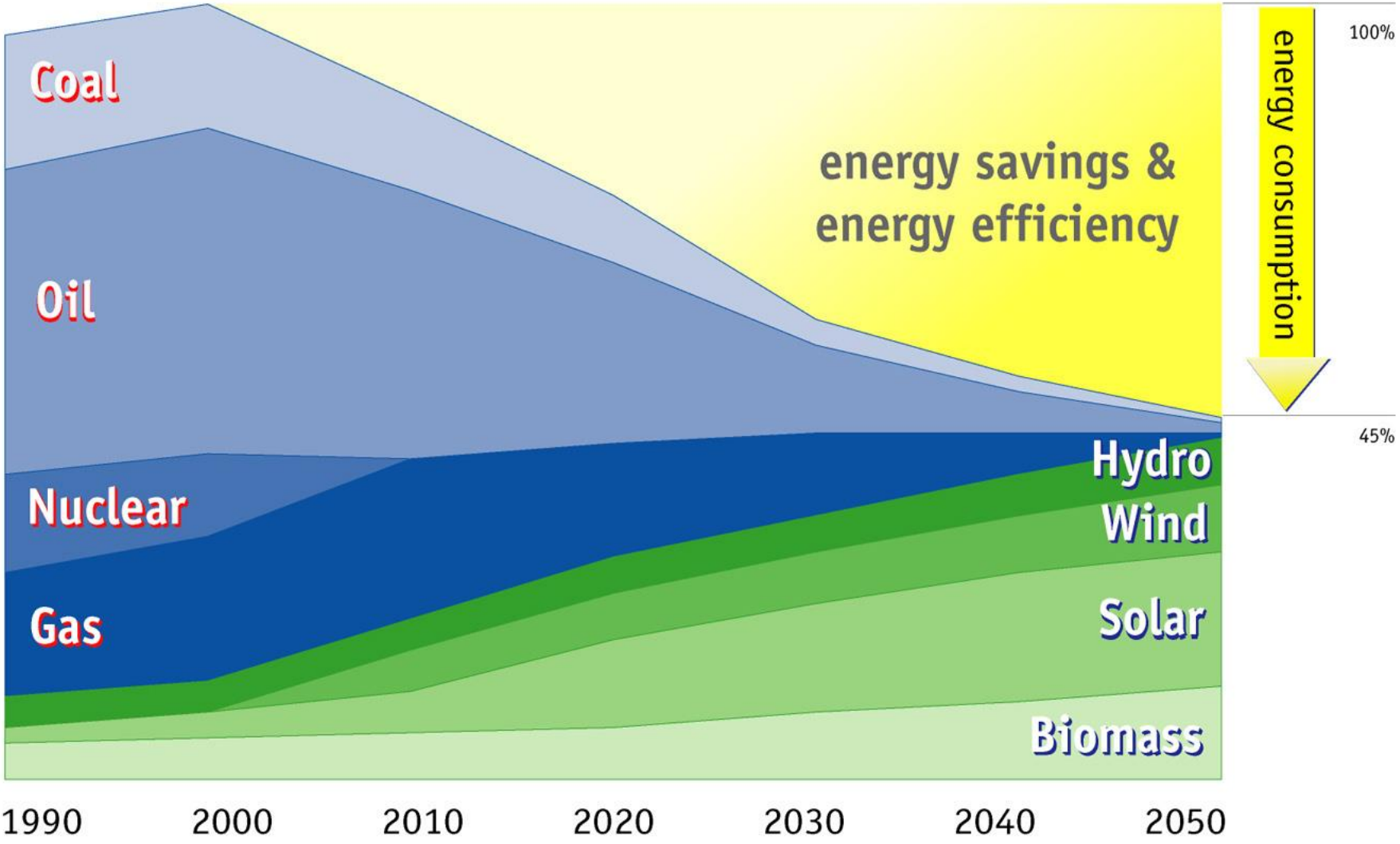
Internal or private costs

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

NEEDS-IP and CASES-CA

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

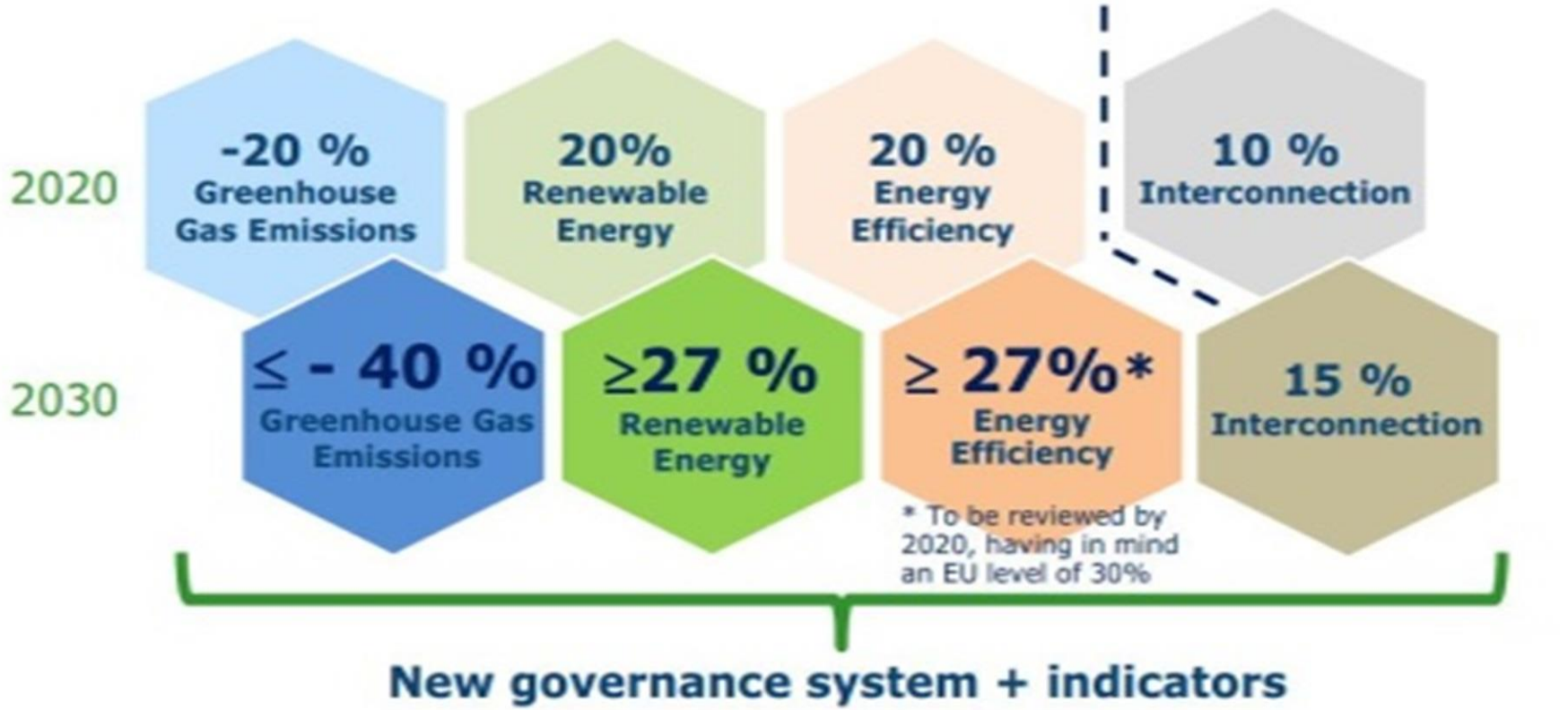
MS binding choice

HEATING & COOLING

MS binding choice

NATIONAL TARGETS & ACTION PLANS

EU 2030 Framework for Climate and Energy



Revolution Now

Accelerating Clean Energy Deployment

LAND-BASED WIND

Wind accounted for **31%** of all new generation capacity installed in the U.S. from 2008 through 2014

DISTRIBUTED SOLAR PV

Over **8 GW** installed by 2014, equal in capacity to 16 typical coal fired power plants

LEDS

78 million total LED bulbs installed through 2014—a six-fold growth since 2012

UTILITY-SCALE SOLAR PV

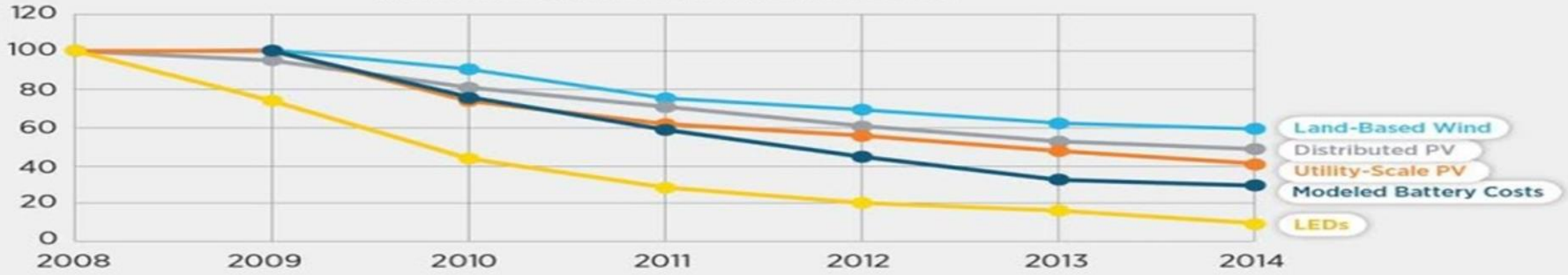
Grew by **68%** in 2014 to 9.7 GW total—over 99% of this total has been installed since 2008

EVS

Nearly **300,000** EVs sold through 2014

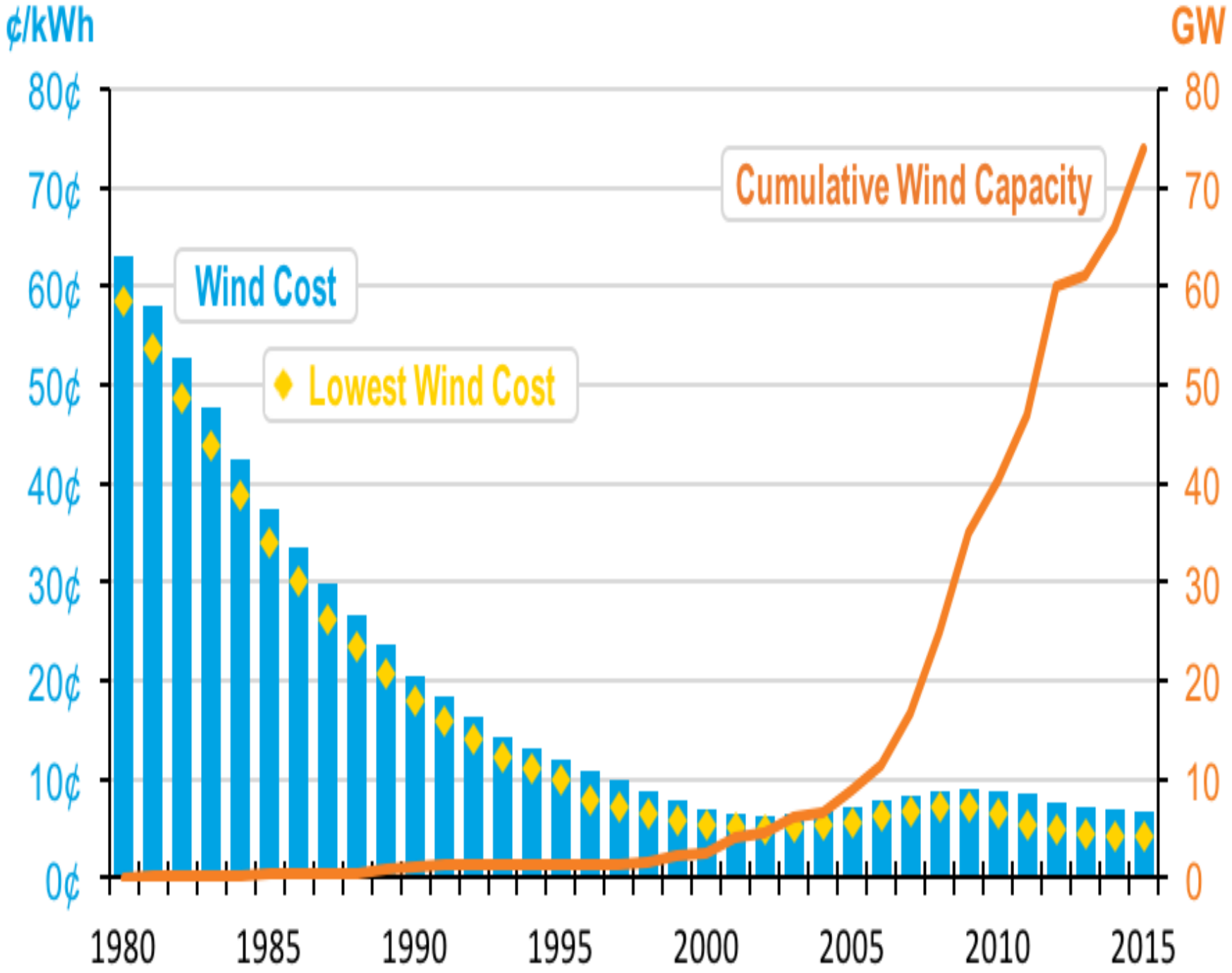
Falling Costs for Clean Energy Technologies

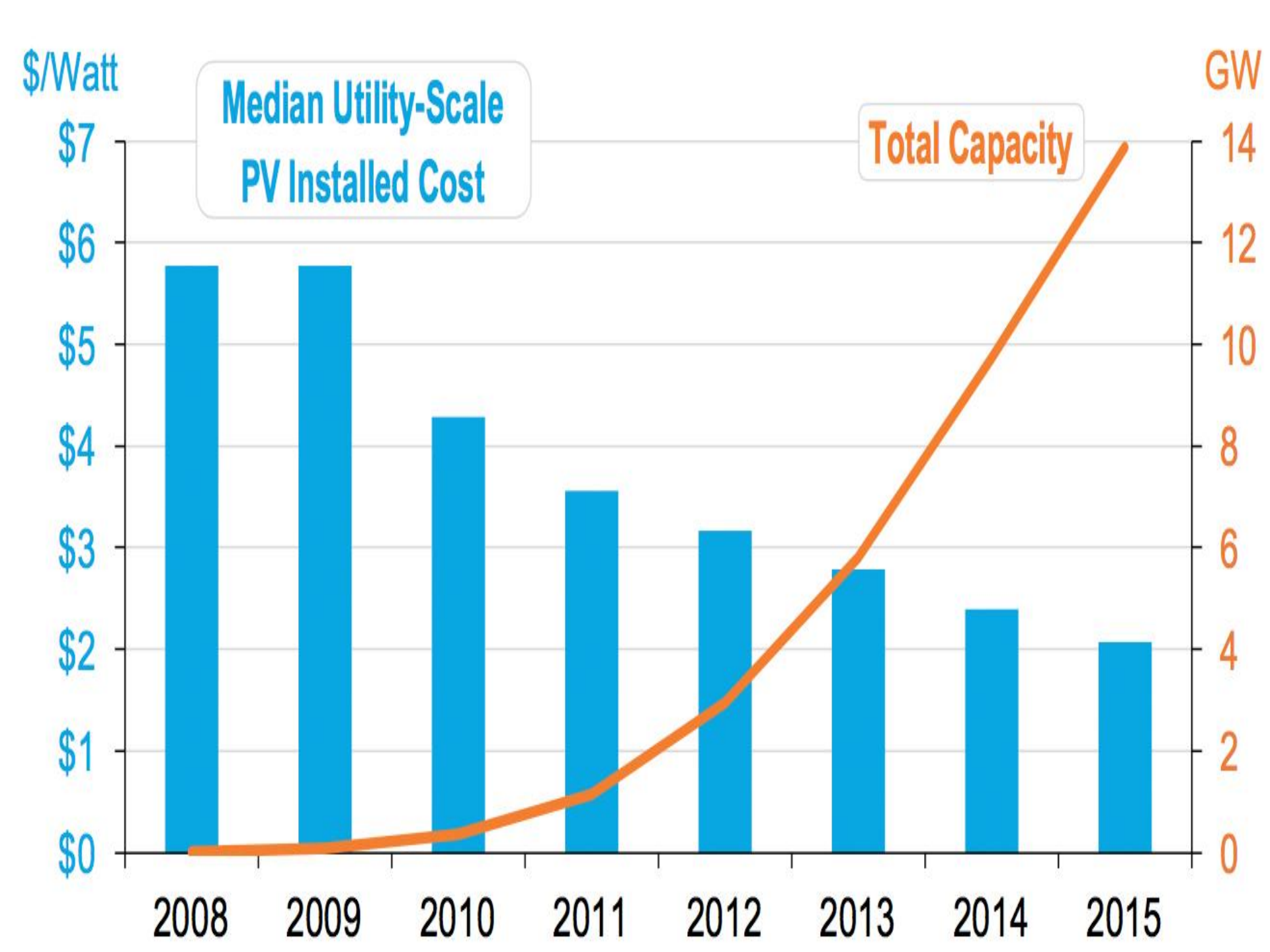
Indexed Cost Reductions Since 2008

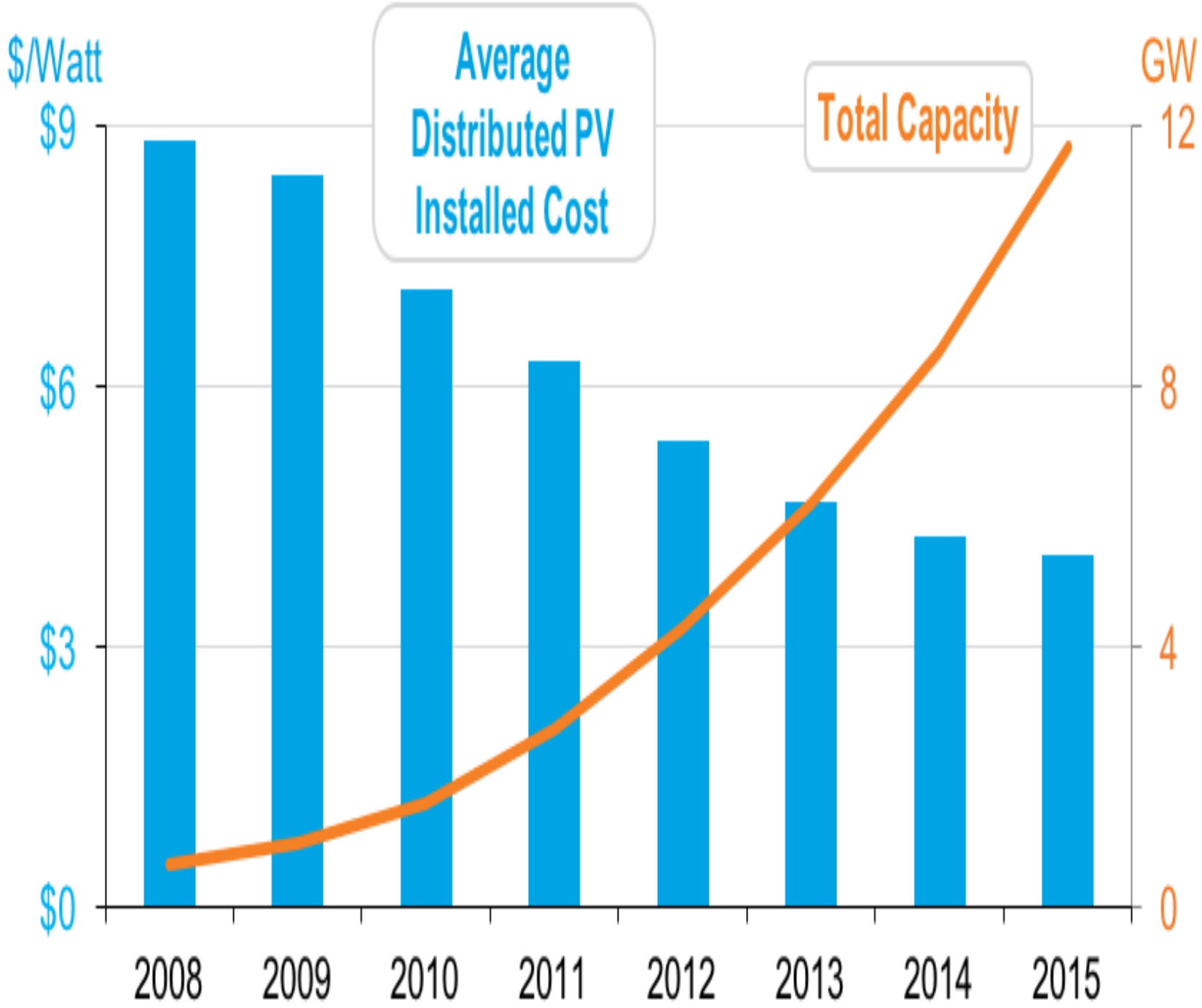


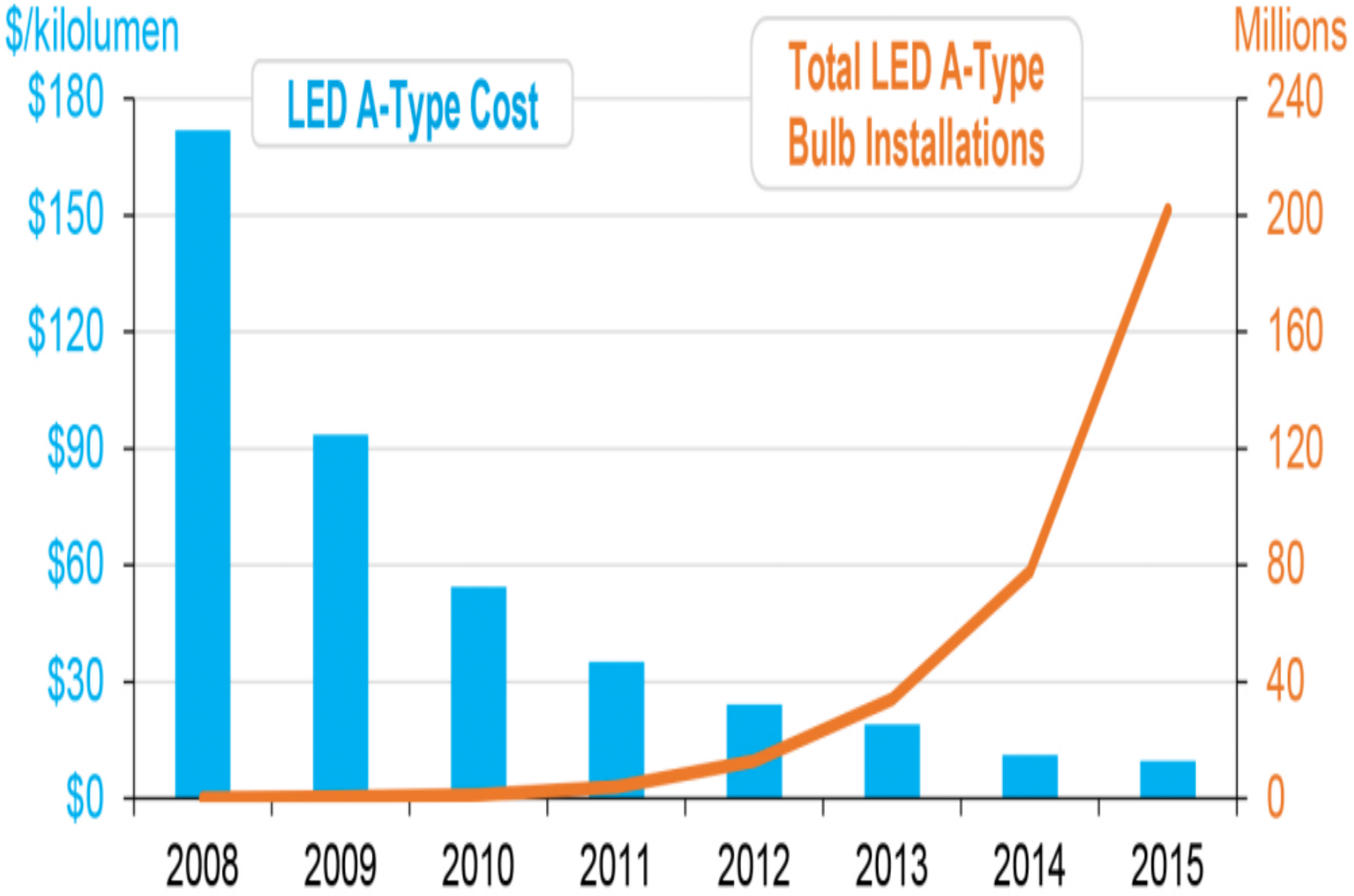
Deployment Sources:
Land-Based Wind: Wiser, R; Bolinger, M. 2014 *Wind Technologies Market Report*. LBNL. August 2015. http://go.usa.gov/3SRFQ
Utility & Distributed PV: GTM & SEIA, *U.S. Solar Market Insight: 2014 Year-in-Review*. March 2015. Assuming one coal plant is typically 0.5 GW.
LEDs: U.S. Department of Energy. Solid-State Lighting Program. *Adoption of Light Emitting Diodes in Common Lighting Applications*. Prepared by Navigant Consulting, July 2015. http://go.usa.gov/3SRzJ
EVs: Argonne National Laboratory. *2014 Vehicle Technologies Market Report*. March 2015. http://go.usa.gov/3S735.

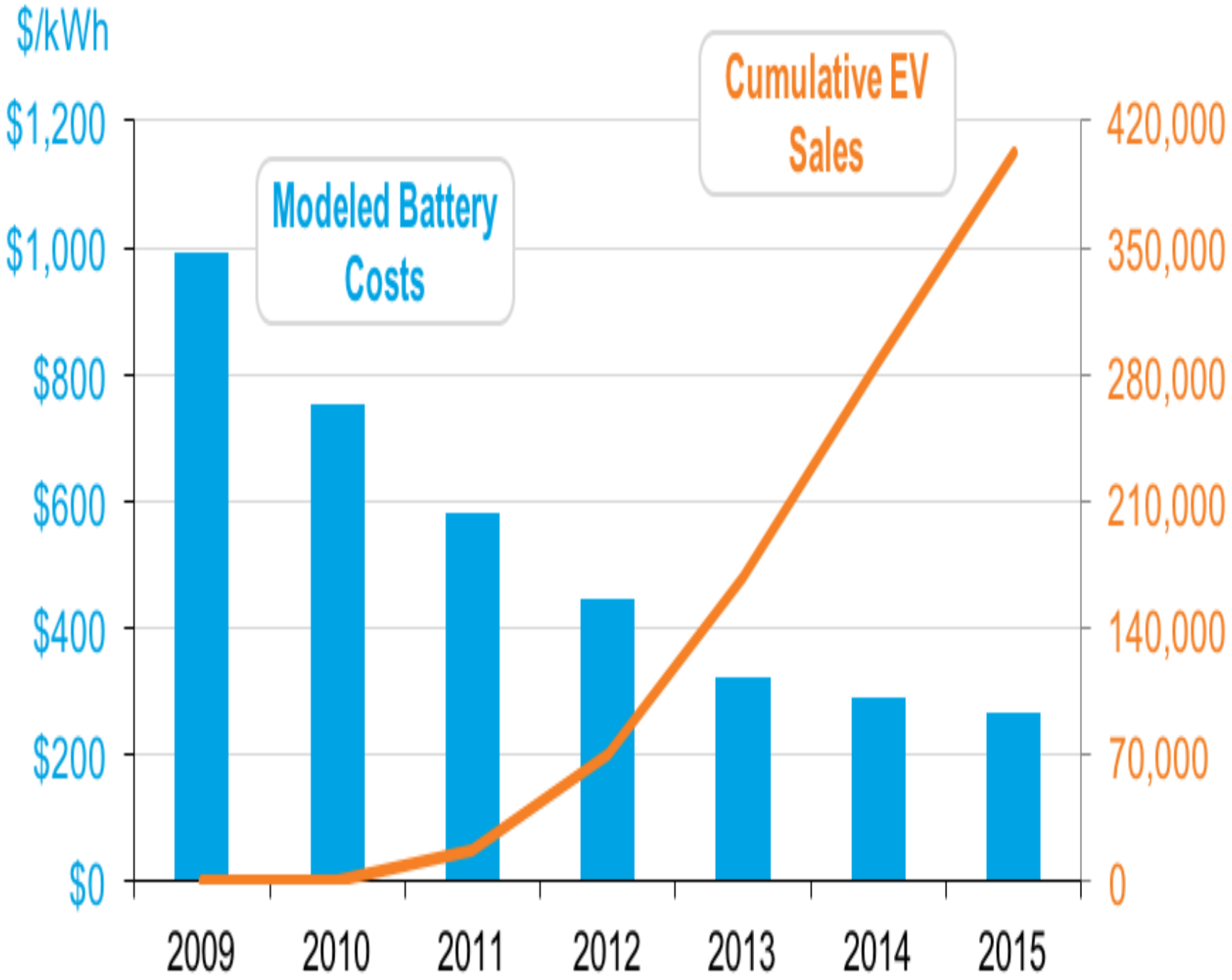
Cost Sources:
Land-Based Wind: Wiser, R; Bolinger, M. 2014 *Wind Technologies Market Report*. LBNL. August 2015. http://go.usa.gov/3SRFQ. Bolinger, M.; Wiser, R., *MEMORANDUM - Documentation of a Historical LCOE Curve for Wind in Good to Excellent Wind Resource Sites*, LBNL, June 11, 2012. Updated Feb. 10, 2014.; and Moné, C.; Lantz, E. *Fiscal Year 2015 WWPTO LCOE Reporting Memorandum*. NREL September 2015.
Utility-Scale PV: Bolinger, M.; Seel, J. *Utility-Scale Solar 2014: An Empirical Analysis of Project Cost, Performance, and Pricing Trends in the United States*. LBNL, 2015. http://go.usa.gov/3SReG.
Distributed PV: Barbose, G.; Darghouth, N. *Tracking the Sun VIII: The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States*. LBNL, 2015. http://go.usa.gov/3SRz3.
LEDs: U.S. Department of Energy, SSL Program, *LED Lamp & Luminaire Product Tracker – A19 Lamps*. Q2 2015.
Modeled Batteries: Costs are modeled costs for high-volume battery systems, derived from DOE/UIS Advanced Battery Consortium PHEV Battery development projects.

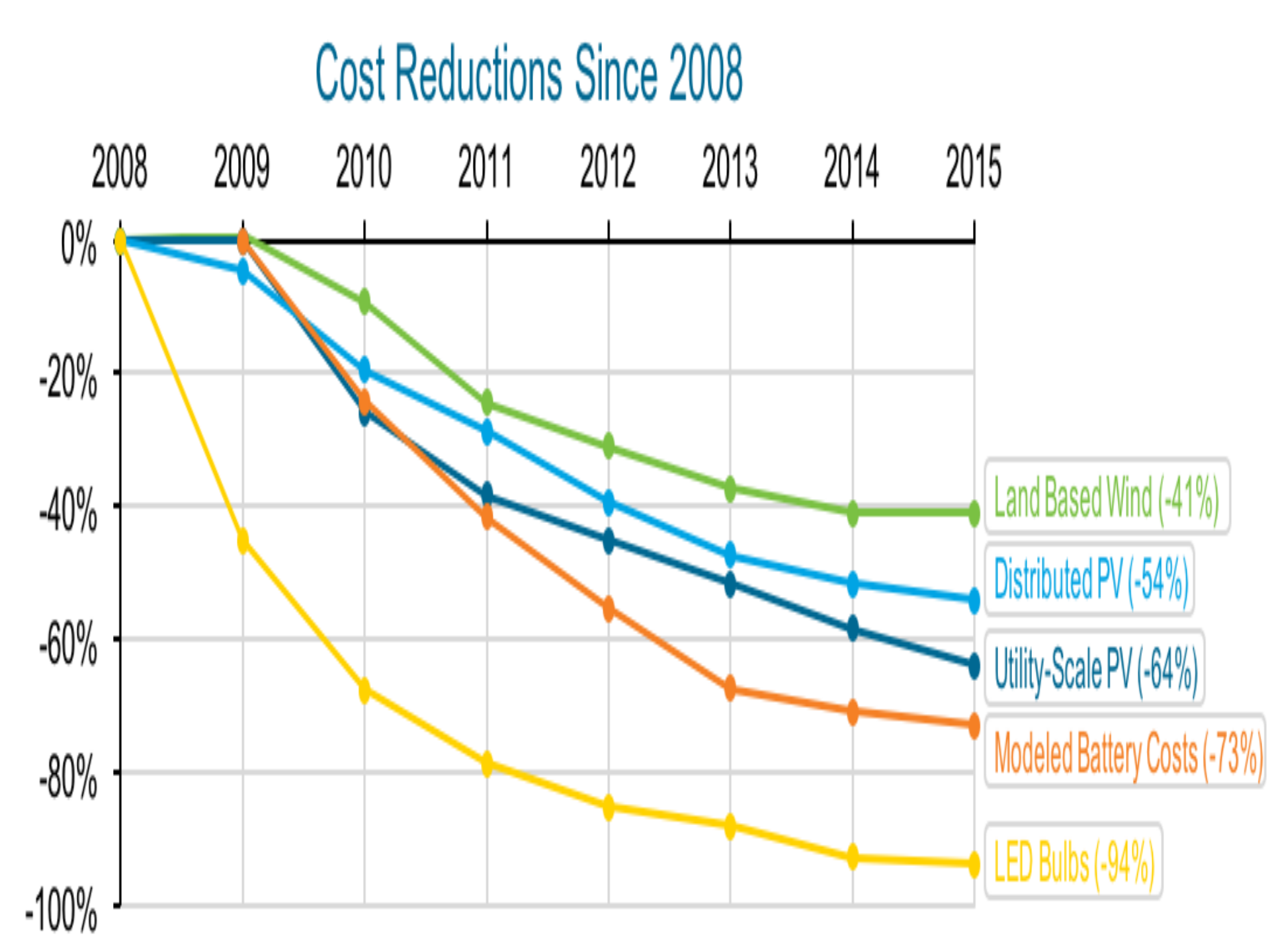

¢/kWh
GW
80¢
70¢
60¢
50¢
40¢
30¢
20¢
10¢
0¢
80
70
60
50
40
30
20
10
0
Cumulative Wind Capacity
Wind Cost
Lowest Wind Cost
1980
1985
1990
1995
2000
2005
2010
2015


$/Watt
Median Utility-Scale
PV Installed Cost
Total Capacity
GW
$7
$6
$5
$4
$3
$2
$1
$0
14
12
10
8
6
4
2
0
2008
2009
2010
2011
2012
2013
2014
2015


$/Watt
$9
$6
$3
$0
Average Distributed PV Installed Cost
Total Capacity
GW
12
8
4
0
2008
2009
2010
2011
2012
2013
2014
2015


$/kilolumen
Millions
LED A-Type Cost
Total LED A-Type Bulb Installations
$180
$150
$120
$90
$60
$30
$0
240
200
160
120
80
40
0
2008
2009
2010
2011
2012
2013
2014
2015

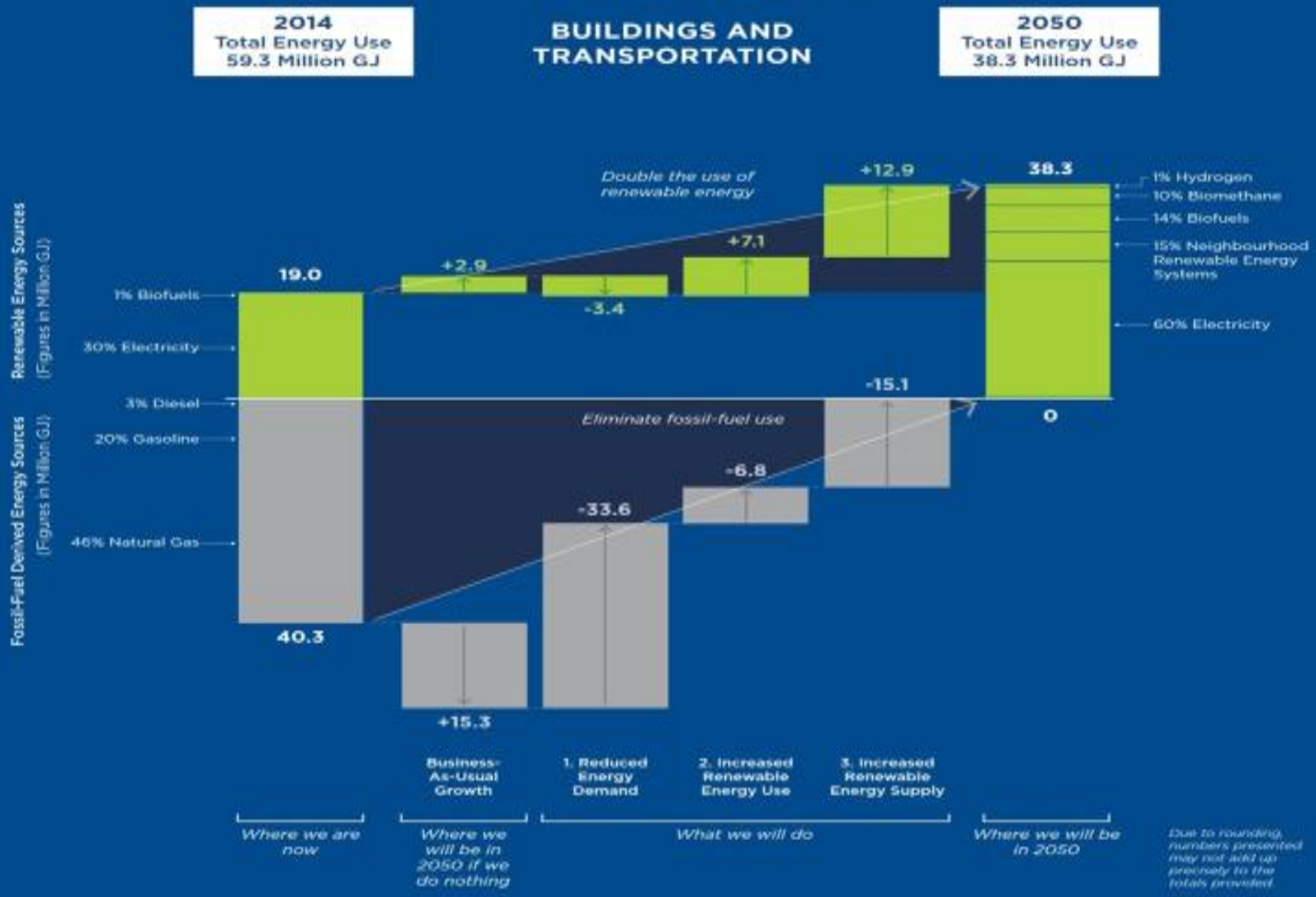

$/kWh
$1,200
$1,000
$800
$600
$400
$200
$0
Modeled Battery Costs
Cumulative EV Sales
420,000
350,000
280,000
210,000
140,000
70,000
0
2009
2010
2011
2012
2013
2014
2015


Cost Reductions Since 2008
2008
2009
2010
2011
2012
2013
2014
2015
0%
-20%
-40%
-60%
-80%
-100%
Land Based Wind (-41%)
Distributed PV (-54%)
Utility-Scale PV (-64%)
Modeled Battery Costs (-73%)
LED Bulbs (-94%)

RENEWABLE ENERGY STRATEGIES

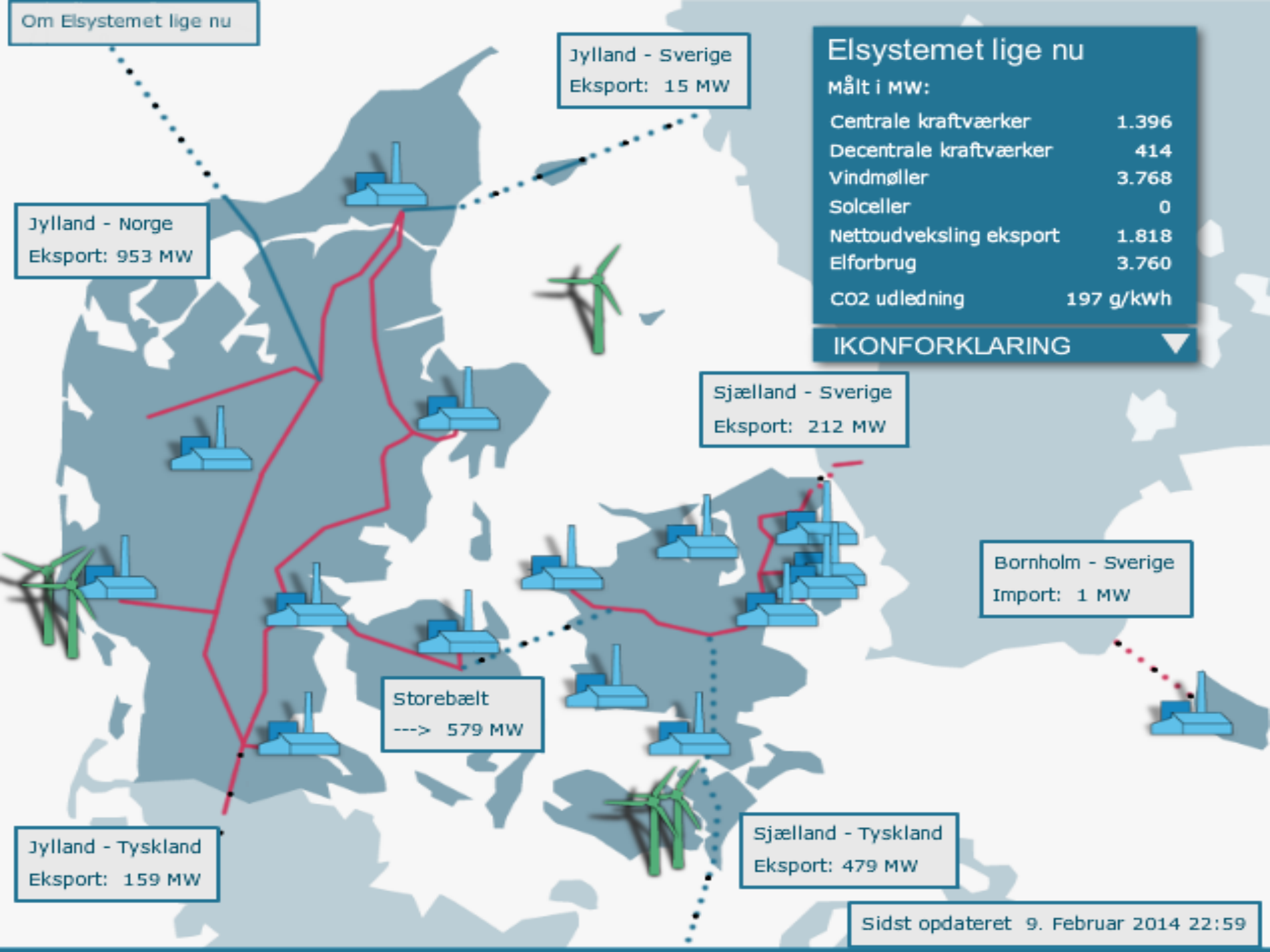
VANCOUVER

HOW VANCOUVER WILL GET TO 100% RENEWABLE ENERGY BY 2050



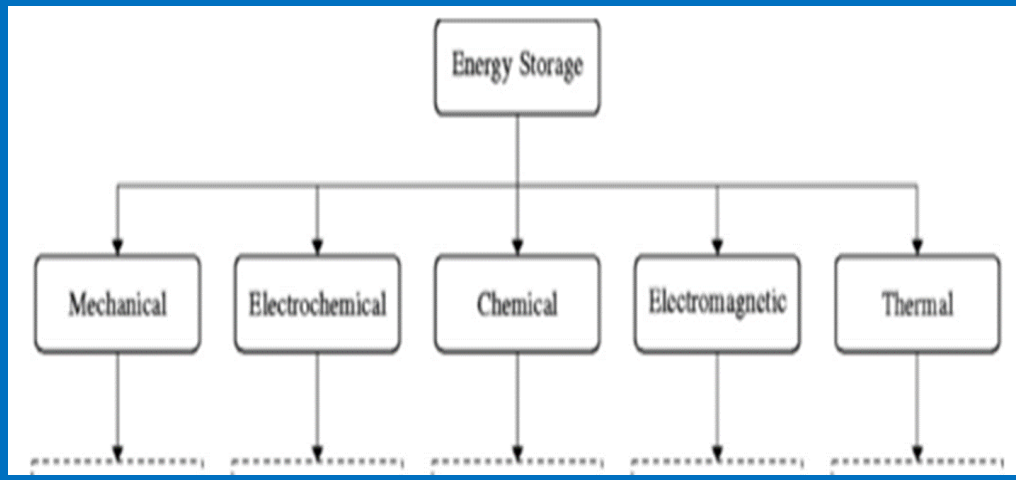

Sivil Toplum Diyaloğu
Powering Communities
Projesi


VAN TSO


Om Elsystemet lige nu
Jylland - Sverige
Eksport: 15 MW
Elsystemet lige nu
Målt i MW:
Centrale kraftværker 1.396
Decentrale kraftværker 414
Vindmøller 3.768
Solceller 0
Nettoudveksling eksport 1.818
Elforbrug 3.760
CO2 udledning 197 g/kWh
IKONFORKLARING
Jylland - Norge
Eksport: 953 MW
Sjælland - Sverige
Eksport: 212 MW
Bornholm - Sverige
Import: 1 MW
Storebælt
---> 579 MW
Jylland - Tyskland
Eksport: 159 MW
Sjælland - Tyskland
Eksport: 479 MW
Sidst opdateret 9. Februar 2014 22:59

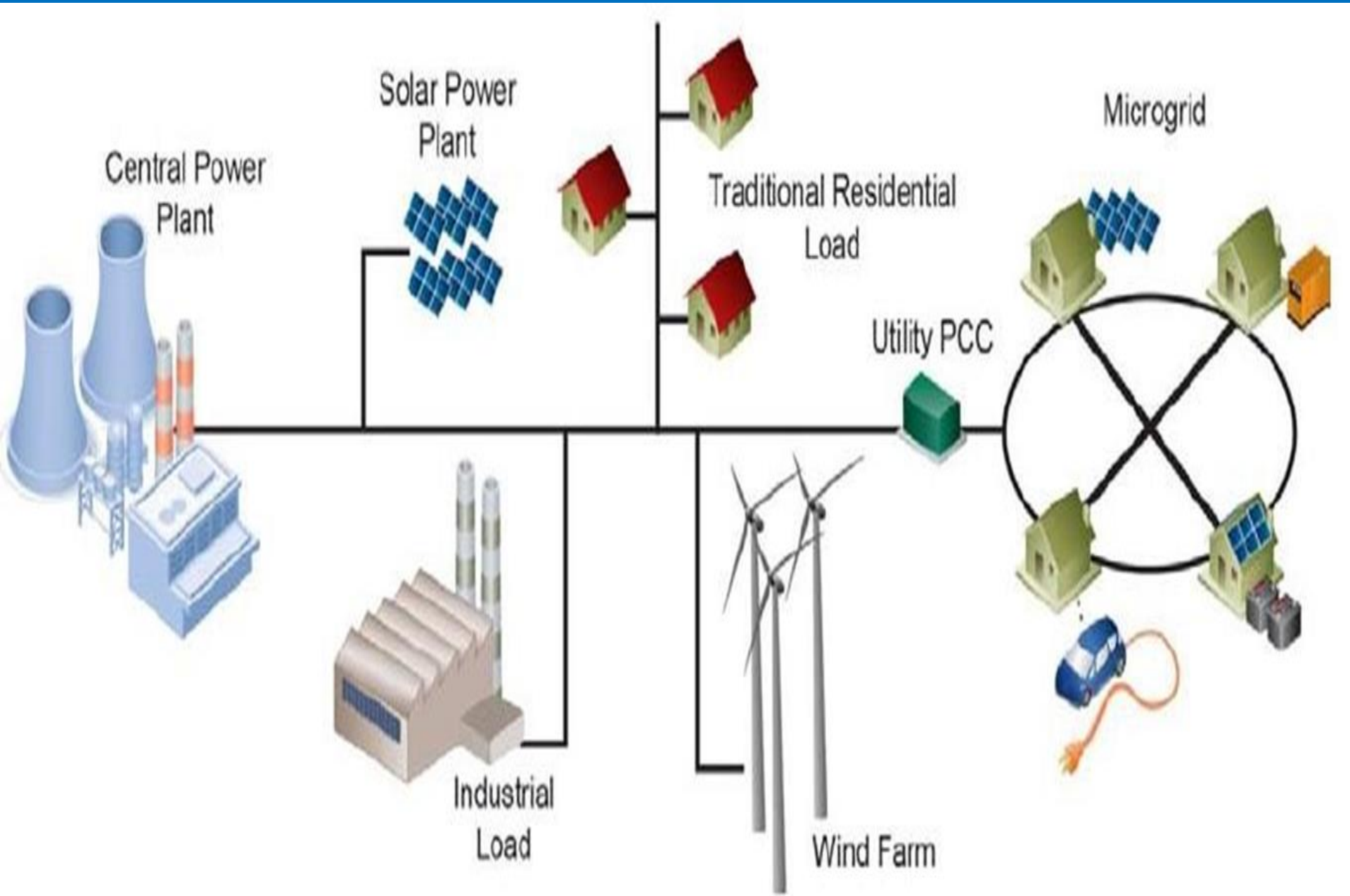
Energy Storage Systems

- **Batteries**
  - Regular & Flow Systems
- **Pressurized Systems**
  - Compressed Air
- **Kinetic Energy Storage**
  - Flywheels (*magnetic propulsion*)
- **Magnetic Energy Storage**
  - Superconductors, Inductors
- **Electric Energy Storage**
  - Supercapacitors

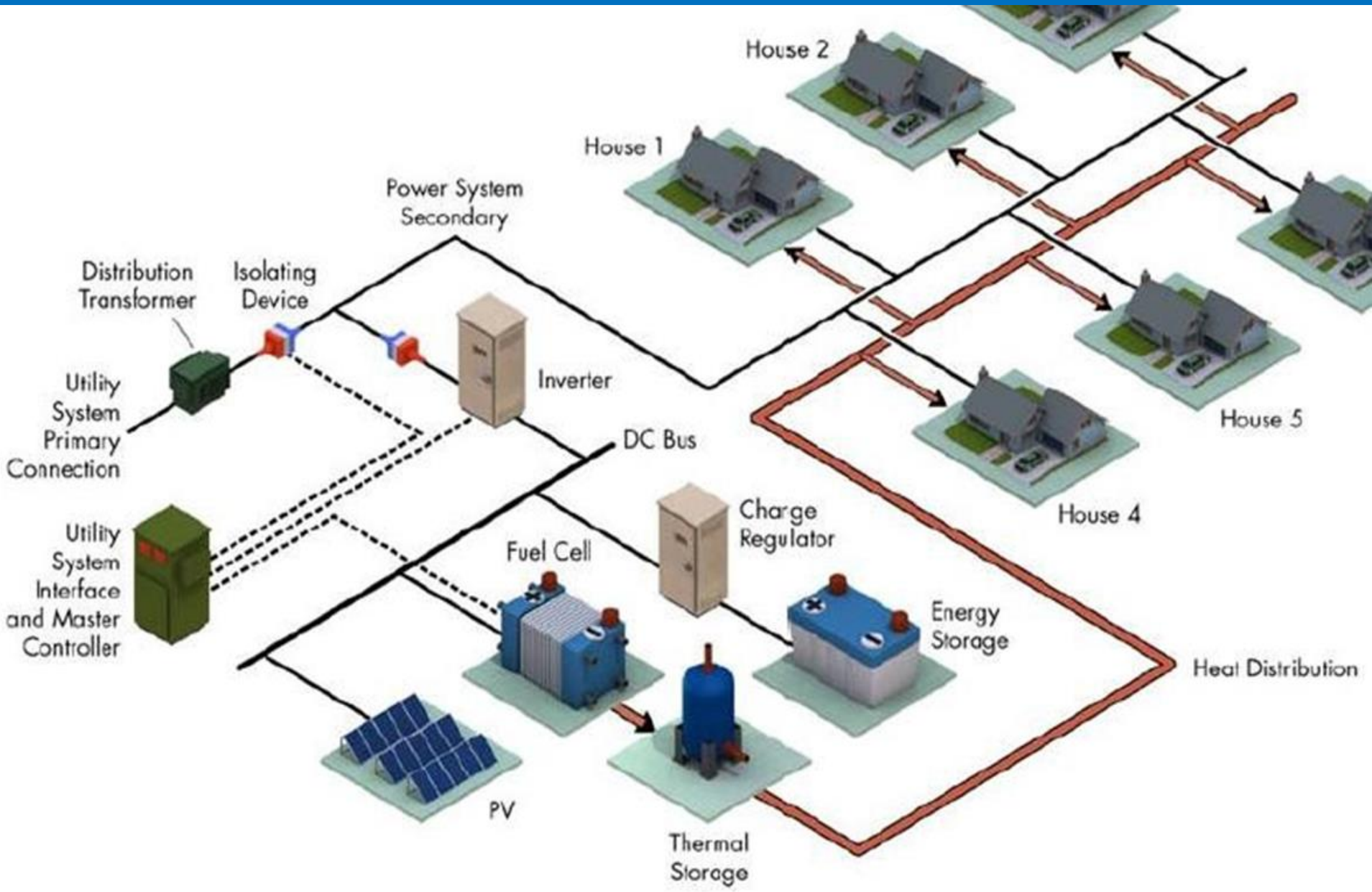


- **Gravitational Energy**
  - Pumped Hydro Station
- **Thermal Energy**
  - Phase Changing Materials
- **Chemical Energy**
  - Hydrogen Energy Storage

Conventional Electricity Grid – Microgrid Systems

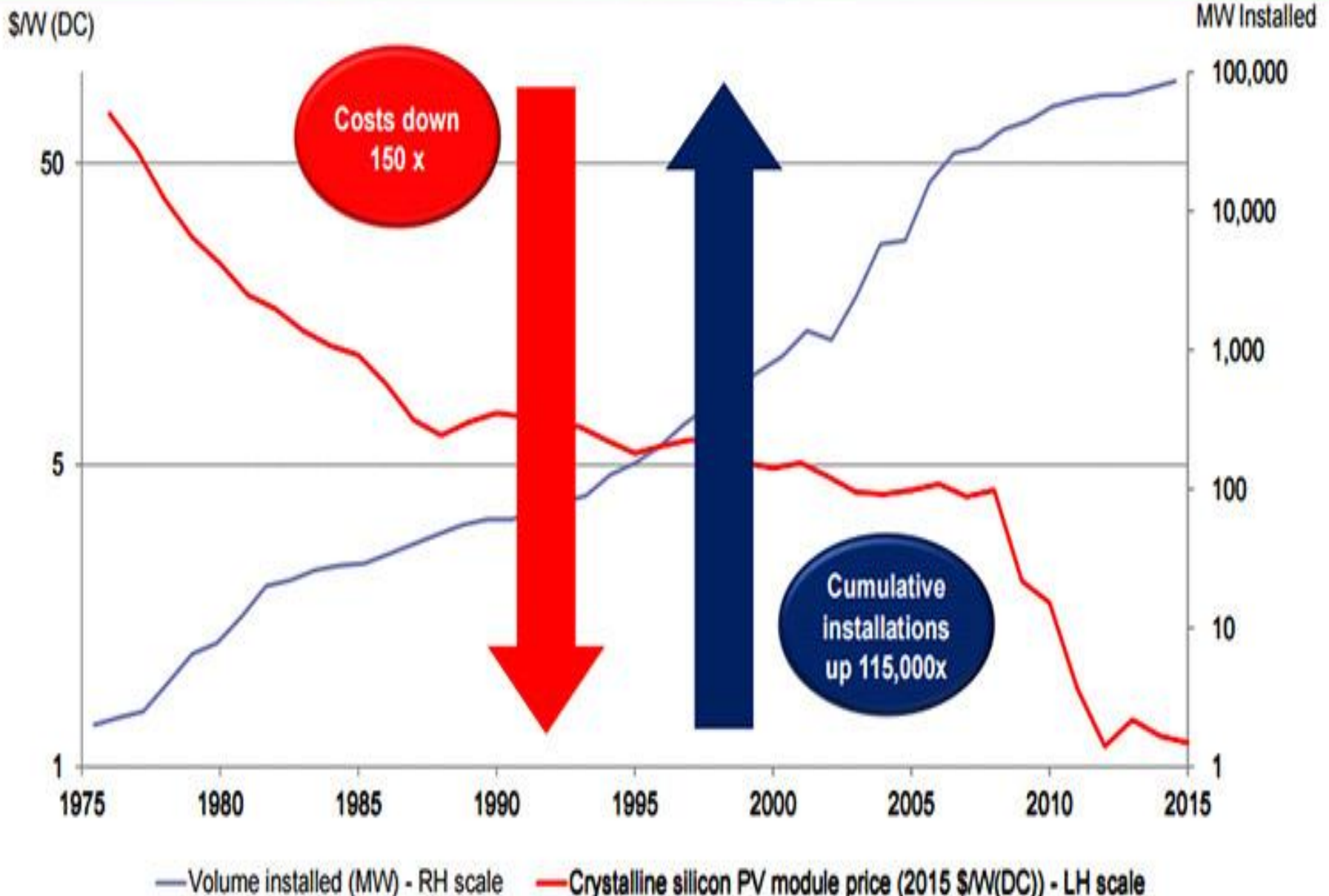


Community Microgrid System



ENERGY MIRACLE? SOLAR

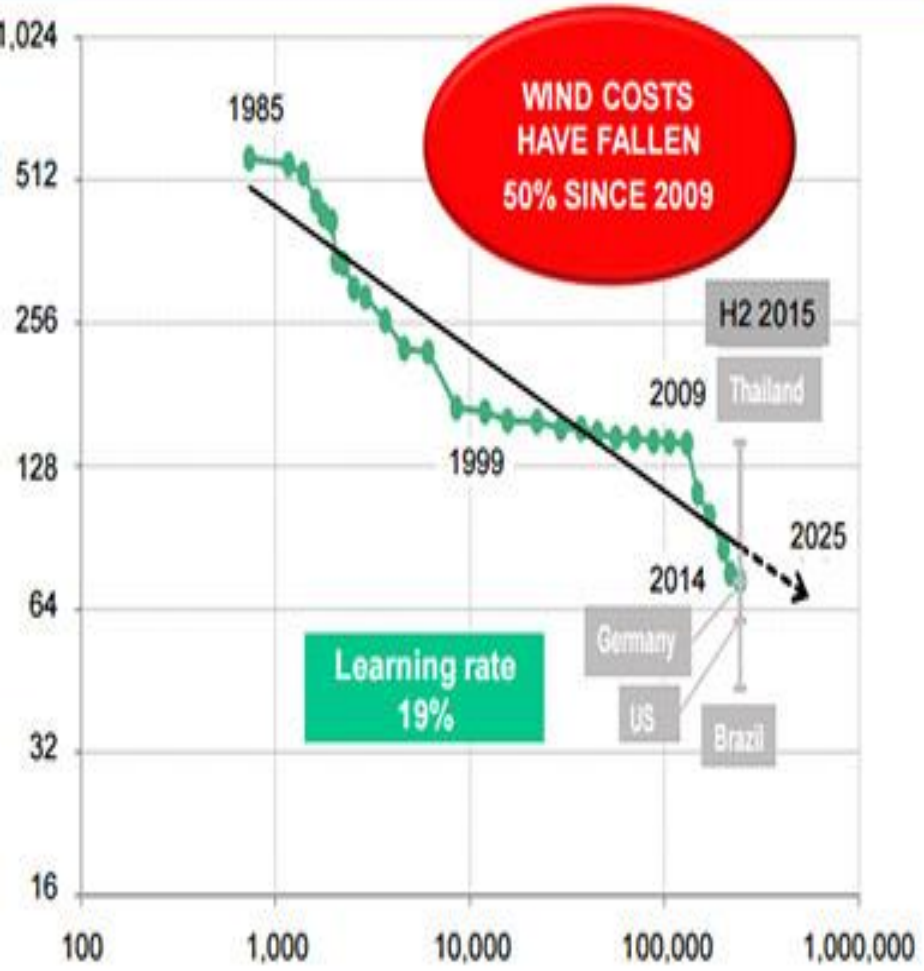
Bloomberg
NEW ENERGY FINANCE



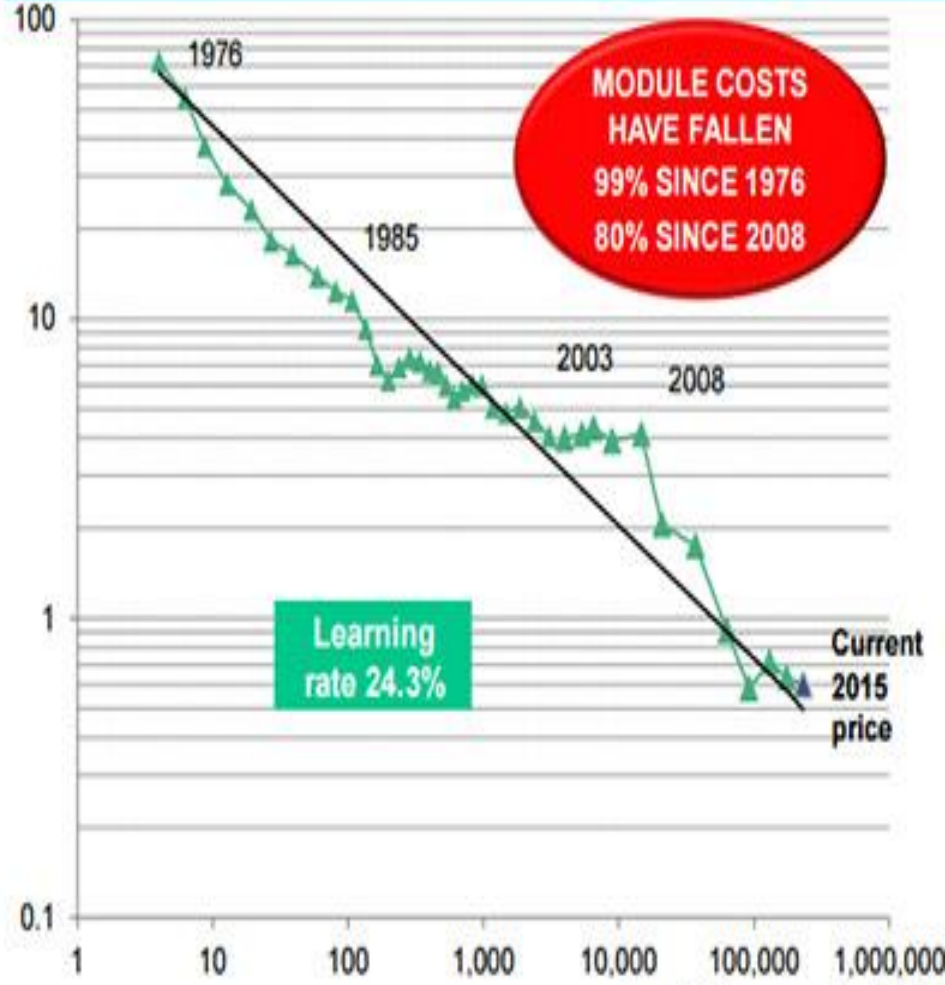
WIND AND SOLAR EXPERIENCE CURVES

Bloomberg NEW ENERGY FINANCE

ONSHORE WIND LEVELISED COST ($/MWh)



SOLAR PV MODULE COST ($/W)



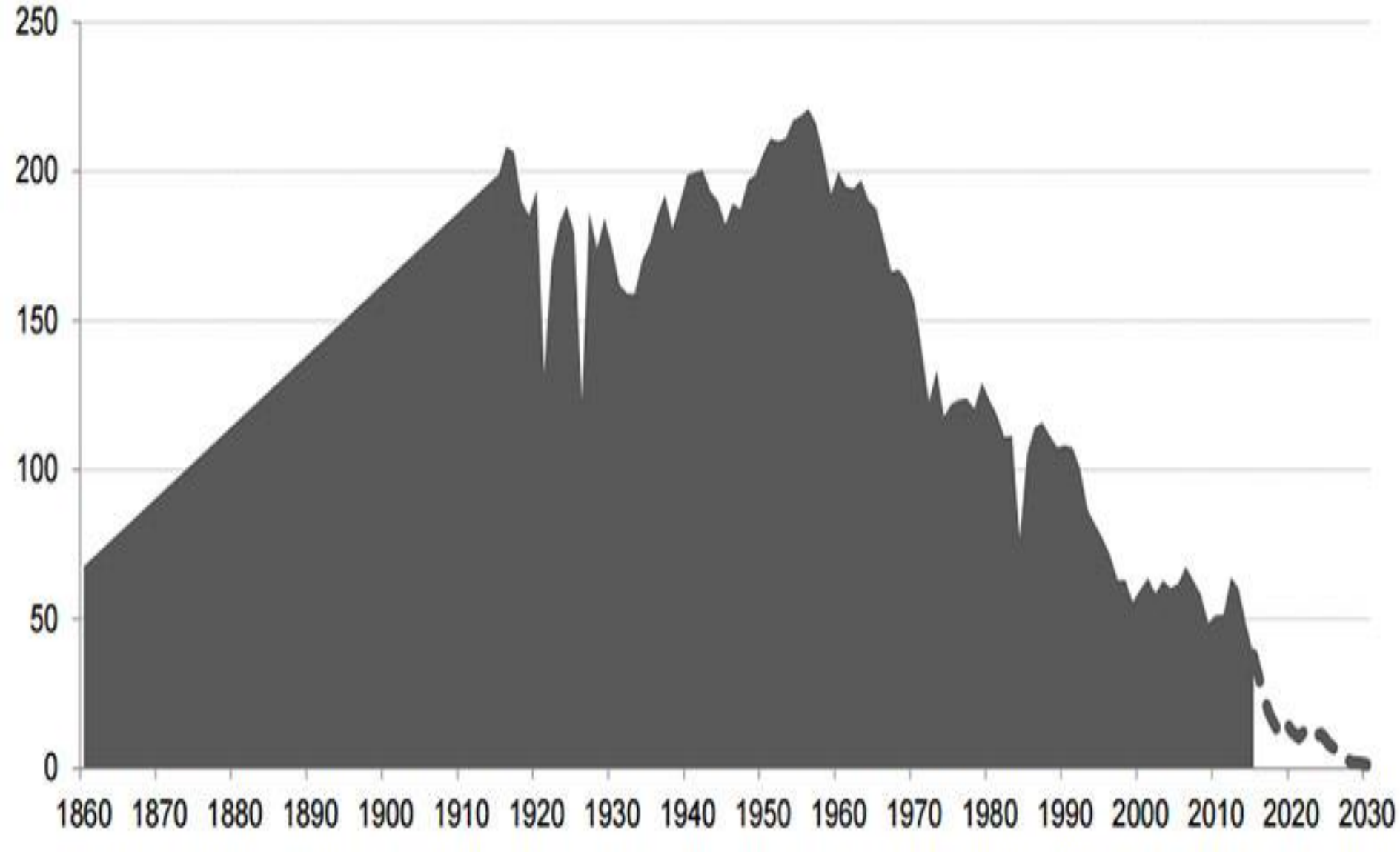
BENCHMARK THERMAL COAL PRICES

($/T REAL 2016$)

Bloomberg
NEW ENERGY FINANCE

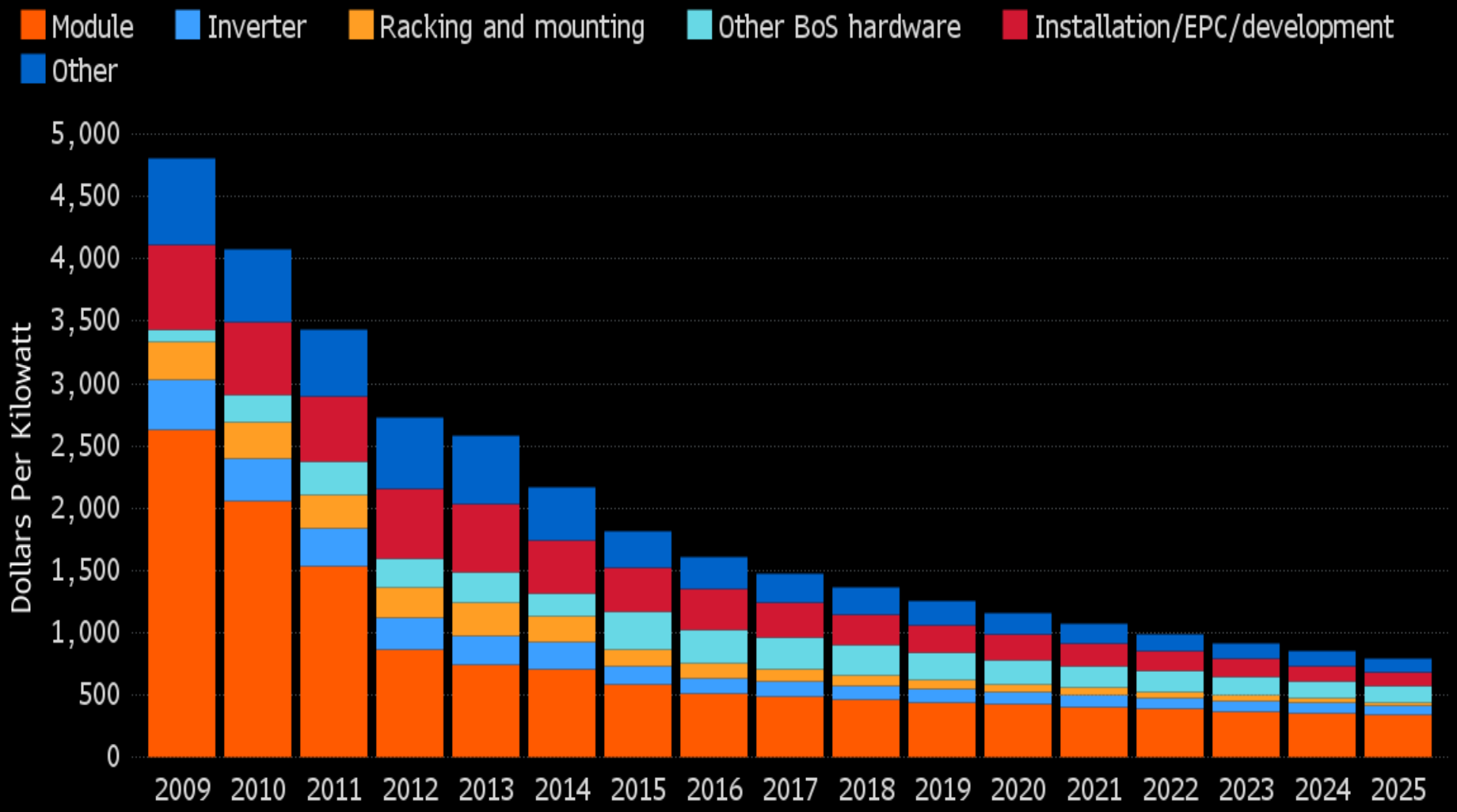
UK COAL DEMAND, 1860–2015
(MT/YR)

Bloomberg
NEW ENERGY FINANCE



Solar Farm Costs Are Shrinking

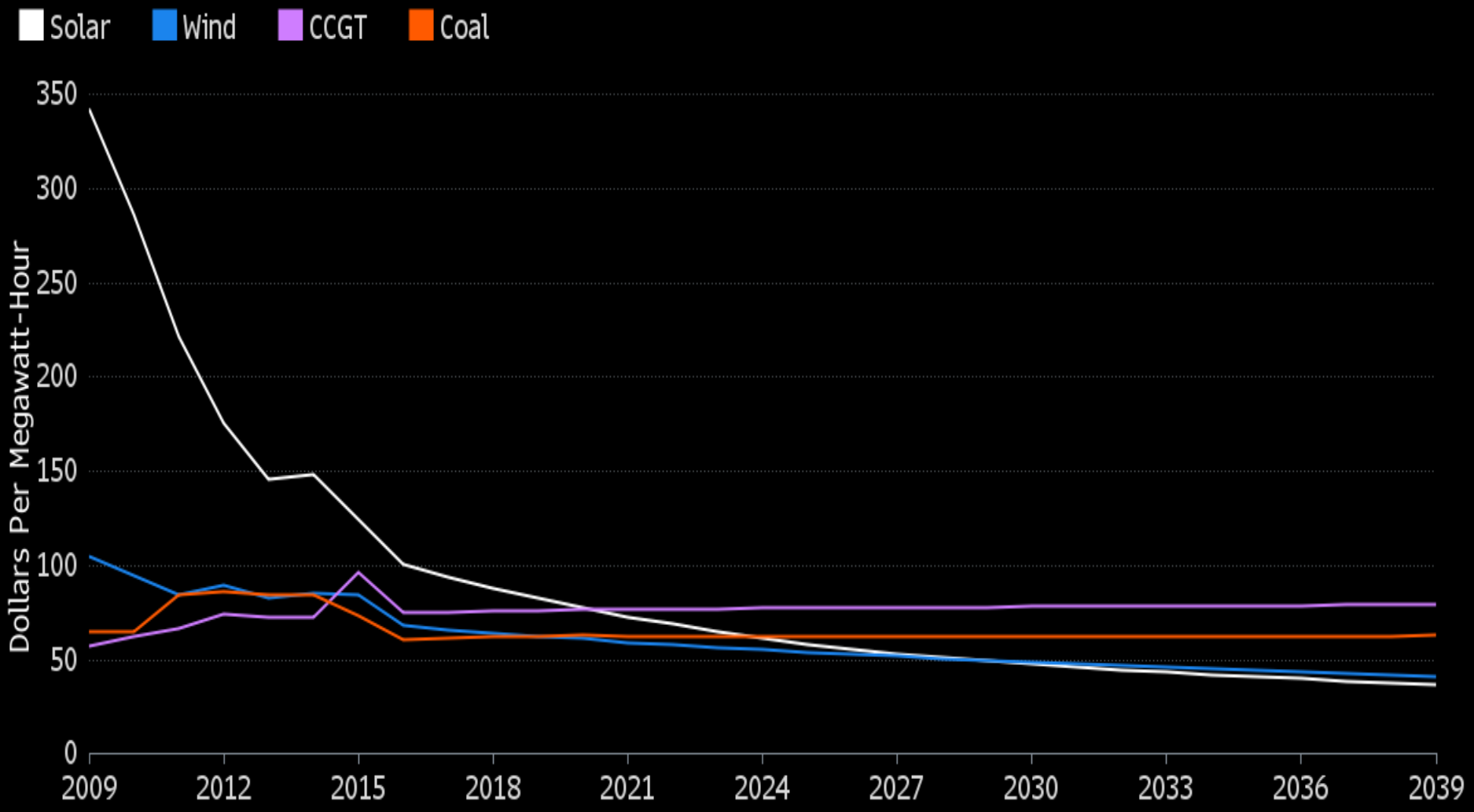
The global weighted average of a utility-scale solar project is set to fall by 84 percent



Source: IRENA analysis and Photon Consulting, 2016

Bloomberg

Solar May Beat Coal in A Decade



Source: Bloomberg New Energy Finance
Note: Price in real 2016 dollars

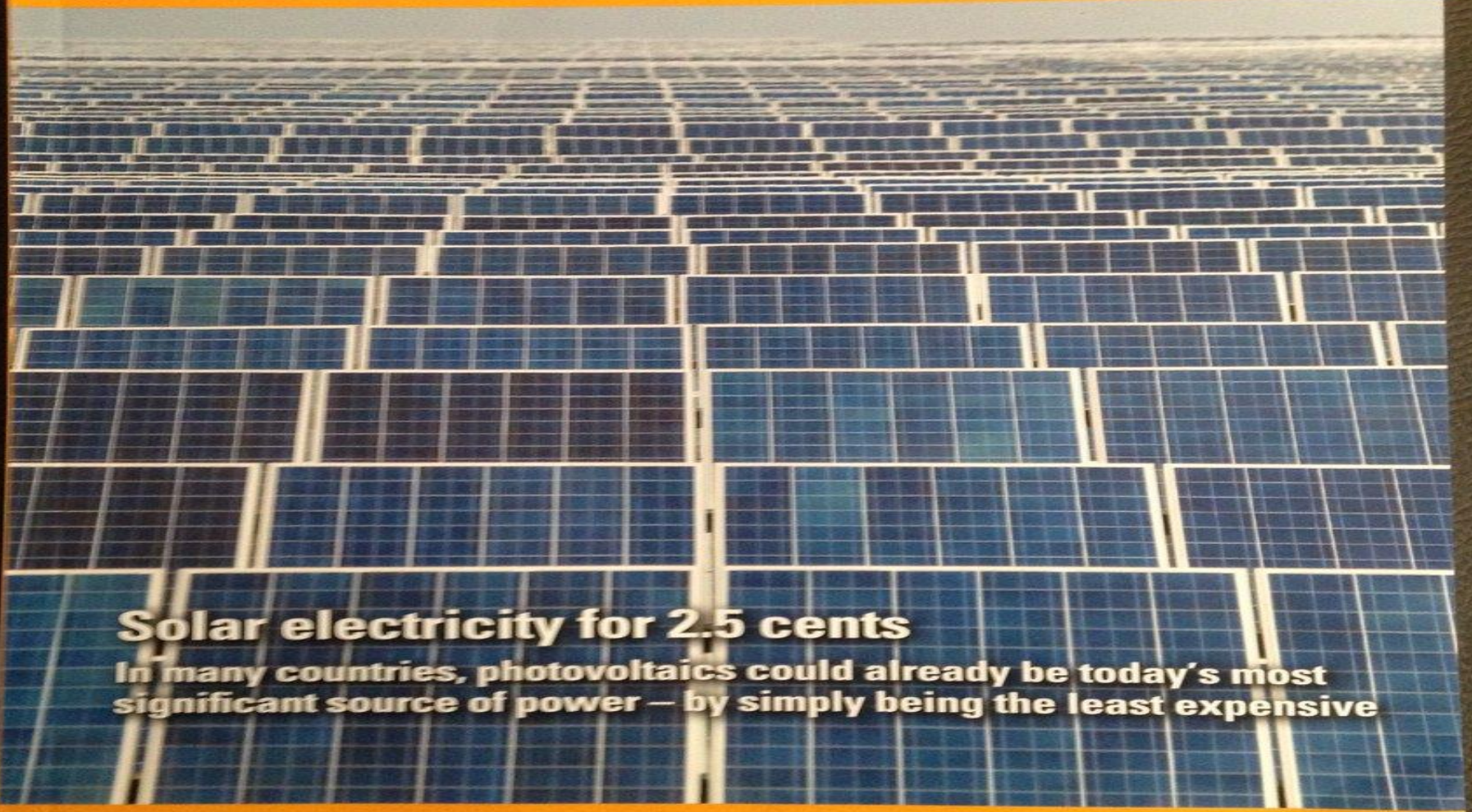
Bloomberg

www.photon.info

Photon International

The Solar Power Magazine

6-2016



Solar electricity for 2.5 cents

In many countries, photovoltaics could already be today's most significant source of power – by simply being the least expensive

Inverters
Google's competition, the »Little Box Challenge«, causes friction

Cost advantages
A study verifies the markedly lower production costs enjoyed by Chinese manufacturers

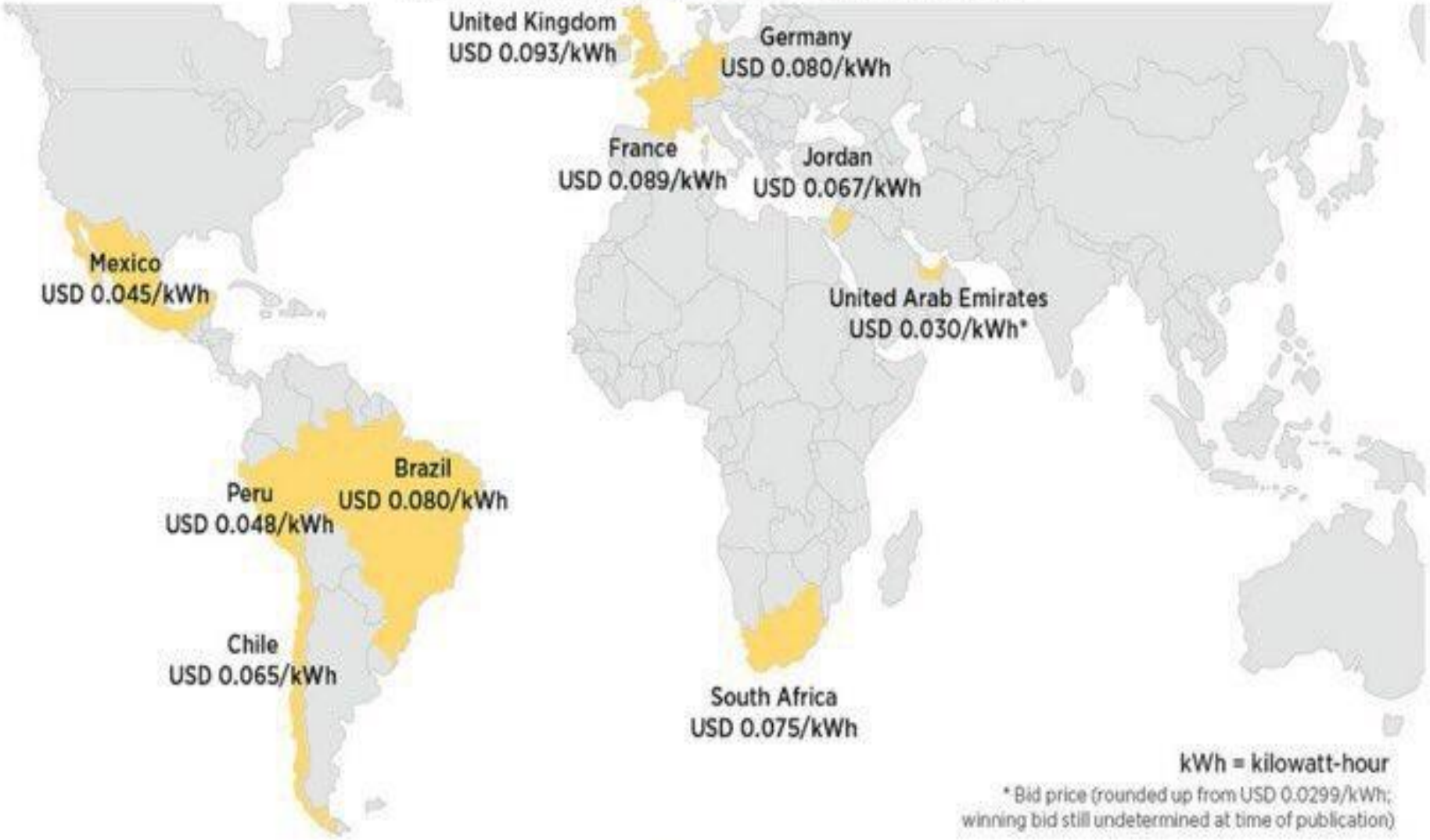
Learning curve
New analyses of historical prices shed doubts on old certainties

SunEdison
The solar group's insolvency took no-one by surprise

SUMMER OF SOLAR #SummerofSolar

IRENA

Prices of utility-scale solar PV in key markets



kWh = kilowatt-hour

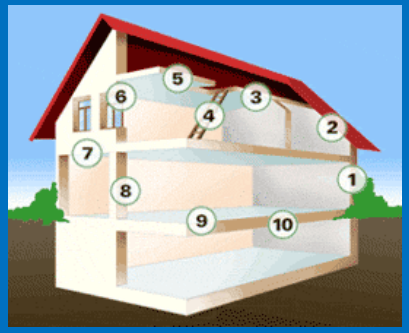
* Bid price (rounded up from USD 0.0299/kWh; winning bid still undetermined at time of publication)

„Energiewende“: A triple approach
100 measures in the three areas

1. **Renewable energy sources**:
- Rapid, continuous expansion
- Cost-efficient and environmentally friendly

2. **Future grids**:
- Flexible and powerful
- Integration of electricity from renewable sources

3. **Efficiency**:
- Reduce energy consumption
- Ensure efficiency



100% Renewable Energy is POSSIBLE

27-29 June 2013, İstanbul

IRENEC 2013

INTERNATIONAL 100 % RENEWABLE ENERGY CONFERENCE AND EXHIBITION

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, political aspects of transition to 100% Renewable Energy and build the courses to realize this vision in industry, architecture, transportation, local communities and training.

Following the paths to be set out in the conclusions of IRENEC2012, the global challenge to transform totaly the existing energy network for a 100% renewable energy future shall be the main theme of the topics of IRENEC2013.

Contacts:
info@irenec2013.com
www.irenec2013.com
T. +90 533 395 5809

TRANSITION TO 100% RENEWABLE ENERGY IS THE ONLY SOLUTION

EUROSOLAR Turkey, the Turkish Section of the European Association for Renewable Energy, once again brings you the annual **International 100% Renewable Energy Conference (IRENEC 2014)**. As per the vision of the Association, **IRENEC** provides an international platform for the sharing of knowledge and ideas regarding the technical, economic, and political aspects of the transition to 100% Renewable Energy and for building the networks to realize this vision through industry, architecture, transportation, local communities and training.

Following on the direction laid out in the conclusions of last year's Conference, the main theme of **IRENEC 2014** is the global challenge of transforming the existing energy network to enable a 100% renewable energy future.

We are looking forward to the pleasure of meeting you at **IRENEC 2014**

26-28 JUNE 2014 TURKEY

EUROSOLAR Turkey

www.eurosolar.org.tr

Renewable Energy for Equity, Freedom, Peace and Local Employment

25-27 JUNE 2015 TURKEY

EUROSOLAR Turkey, the Turkish Section of the European Association for Renewable Energy, once again brings you the annual **International 100% Renewable Energy Conference (IRENEC 2015)**. As per the vision of the Association, **IRENEC** provides an international platform for the sharing of knowledge and ideas regarding the technical, economic, and political aspects of the transition to 100% Renewable Energy and for building the networks to realize this vision through industry, architecture, transportation, local communities and training.

Following on the direction laid out in the conclusions of last year's Conference, the main theme of **IRENEC 2015** is the global challenge of transforming the existing energy network to enable a 100% renewable energy future.

We are looking forward to the pleasure of meeting you at **IRENEC 2015**

IRENEC 2016

IRENEC

6th INTERNATIONAL
100% RENEWABLE ENERGY CONFERENCE

Transition to Ecological and Democratic Societies Using 100% Renewable Community Power

26-28 MAY 2016 TURKEY

Transition of communities, islands, countries and regions to 100% Renewable Energy (RE) can be realized only by the local, national and regional governments which are on the solution side.

The green solution in the energy field is the achievement of 100% renewable energy target by the integration of the energy end-use efficiency, smart grids and storage of the renewable energy using the best available technologies

Energy-Economy-Ecology decision making models and Internalization of Externalities are required to plan the future energy systems with the technologies of the future and to eliminate the dislocation of obsolete technologies from one market to another in our global living space.

Renewable Energy Association of Turkey (EUROSOLAR Turkey), once again brings you the annual International 100% Renewable Energy Conference (IRENEC 2016).

As per the vision of the Association, IRENEC conferences provide an international platform for the sharing of knowledge and ideas regarding the technical, economic, and political aspects of the transition to 100% Renewable Energy and for building the networks to realize this vision through industry, architecture, transportation, local communities and training.

We are looking forward to the pleasure of meeting you at IRENEC 2016

Renewable Energy Association of Turkey

EUROSOLAR Turkey

IRENEC

IRENEC 2017

7th INTERNATIONAL 100% RENEWABLE ENERGY CONFERENCE

www.irenec.org

How to Speed-up the Global Transition to 100% Renewable Energy?

Transition of communities, islands, countries and regions to 100% Renewable Energy (RE) can be realized only by the local, national and regional governments which are on the solution side.

The green solution in the energy field is the achievement of 100% renewable energy target by the integration of the energy end-use efficiency, smart grids and storage of the renewable energy using the best available technologies

Energy-Economy-Ecology decision making models and Internalization of Externalities are required to plan the future energy systems with the technologies of the future and to eliminate the dislocation of obsolete technologies from one market to another in our global living space.

Renewable Energy Association of Turkey (EUROSOLAR Turkey), once again brings you the annual International 100% Renewable Energy Conference (IRENEC 2017). As per the vision of the Association, IRENEC conferences provide an international platform for the sharing of knowledge and ideas regarding the technical, economic, and political aspects of the transition to 100% Renewable Energy and for building the networks to realize this vision through industry, architecture, transportation, local communities and training.

We are looking forward to the pleasure of meeting you at **IRENEC 2017**

İstanbul'un Altın İlçesi
MALTEPE BELEDİYESİ
www.maltepe.bel.tr

Maltepe Municipality
Türkan Saylan
Cultural Center

Renewable Energy Assocation of Turkey

EUROSOLAR Turkey

We would like to invite the public officials, representatives of business and industrial organizations, academicians, teachers and students, NGO representatives to

IRENEC 2018

8TH INTERNATIONAL 100% RENEWABLE ENERGY CONFERENCE

on 7-10 MAY 2018

MALTEPE TÜRKAN SAYLAN CULTURAL CENTER
İSTANBUL TURKEY

TO GET INFORMED ABOUT AND TO TAKE PART IN SHAPING TURKEY'S RENEWABLE ENERGY FUTURE.

LET'S MEET TOGETHER TO

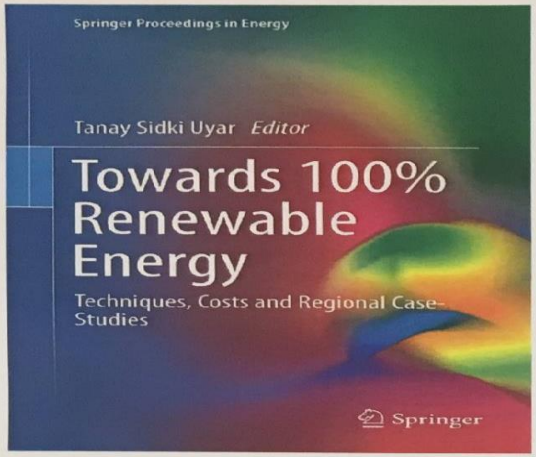
- get informed about the global and local implementations and technologic developments in the field of the renewable energy.
- to set the roadmap for the transition to renewable energy in cities and countries.
- join the workshops where we will discuss the challenges and solutions about the transition to renewable energy in our country.
- cooperate in order to adopt the conference results into real life.
- identify the roles and responsibilities of the individuals, decision makers, academic institutions, cooperatives and local authorities in the global transition to 100% renewable energy on the basis of community power principle.

RENEWABLE ENERGY ASSOCIATION

EUROSOLAR Turkey

İstanbul'un Altın İlçesi MALTEPE BELEDİYESİ www.maltepe.bel.tr

www.irenec.org • www.eurosolar.org.tr • www.poweringcommunities.org



1st ed. 2017, X, 453 p. 221 illus., 161 illus. in color.

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Tanay Sidki Uyar (Ed.)

Towards 100% Renewable Energy

Techniques, Costs and Regional Case-Studies

Series: Springer Proceedings in Energy

This volume collects papers presented at the International 100% Renewable Energy Conferences (IRENEC) from 2011 to 2015. Given the time span, the chapters have been updated to ensure they are timely, and pertinent. These proceedings are the outcome of an international group of research scientists and experts contributing to energy solutions within their research, development, and implementation. This book is aimed at researchers and decision makers who are working on problems and issues within energy efficiency. Tables, graphs, and diagrams accompany the text promoting100% renewable energy asthesolution in solidarity with energy end-use efficiency and renewable energy storage. In this manner, Towards 100% Renewable Energyoffers leaders considering the transition from fossil problems to alternative solutions new food for thought and incentives for action.

Status, Requirements and Strategic Planning for Speeding up the Global Transition to 100% Renewable Energy

IRENEC 2019

9TH INTERNATIONAL 100% RENEWABLE ENERGY CONFERENCE

24-26 APRIL 2019

Renewable Energy Revolution with Community Power requires active contribution of all stakeholders and support from Decision Makers taking part on the solution side.

No more blackouts anywhere in the world with wind, water, bio-energy, geothermal and sunlight providing stable 100 % clean renewable power for the World.

All cities of the world to go to 100% Renewable Energy by 2050 for Equity, Freedom, Peace and Local Employment

Join us and build up your happiness on energy democracy.

Let's be together on April 24-26, 2019

RENEWABLE ENERGY ASSOCIATION

EUROSOLAR Turkey

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