WORLD NUCLEAR UNIVERSITY

The World Nuclear Industry Today
November 2020, Online, Brazil

MZConsulting

The global nuclear industry: Current status and perspectives

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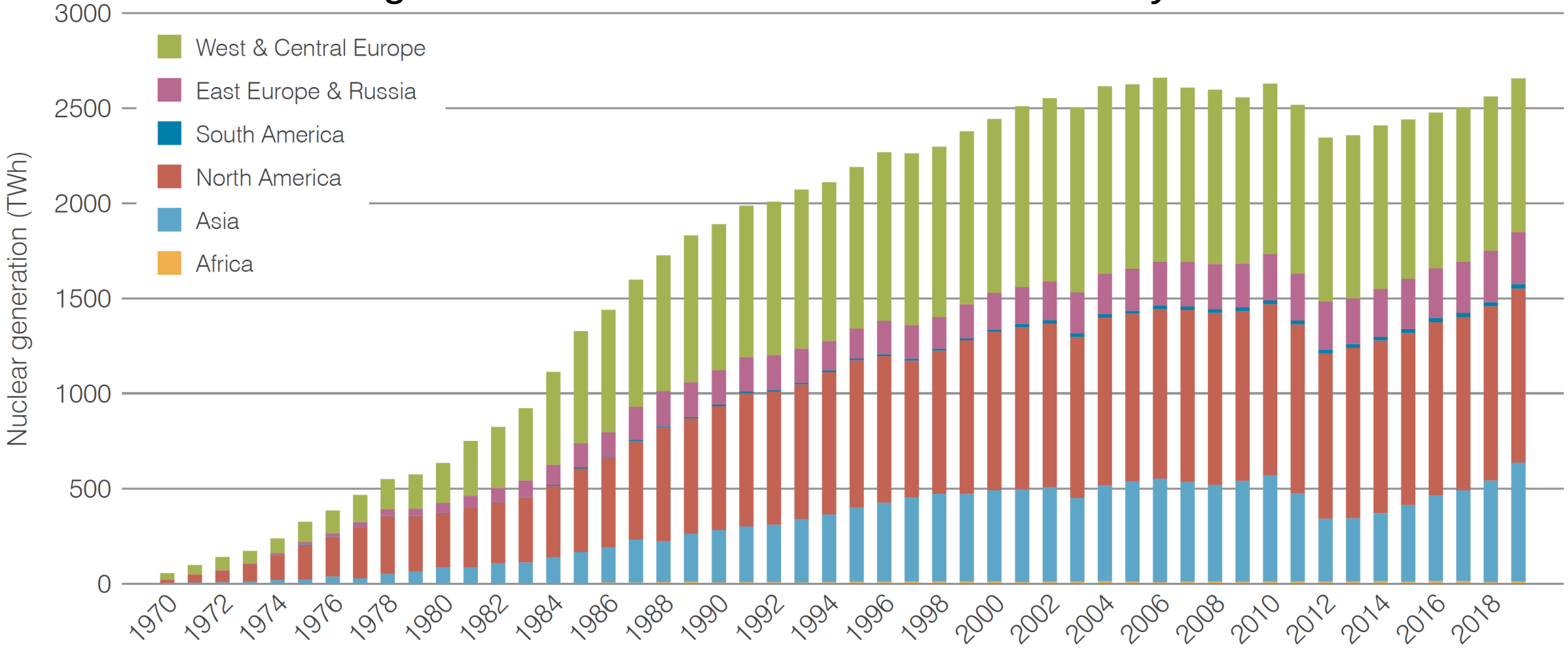
Global generation: 7th successive annual increase

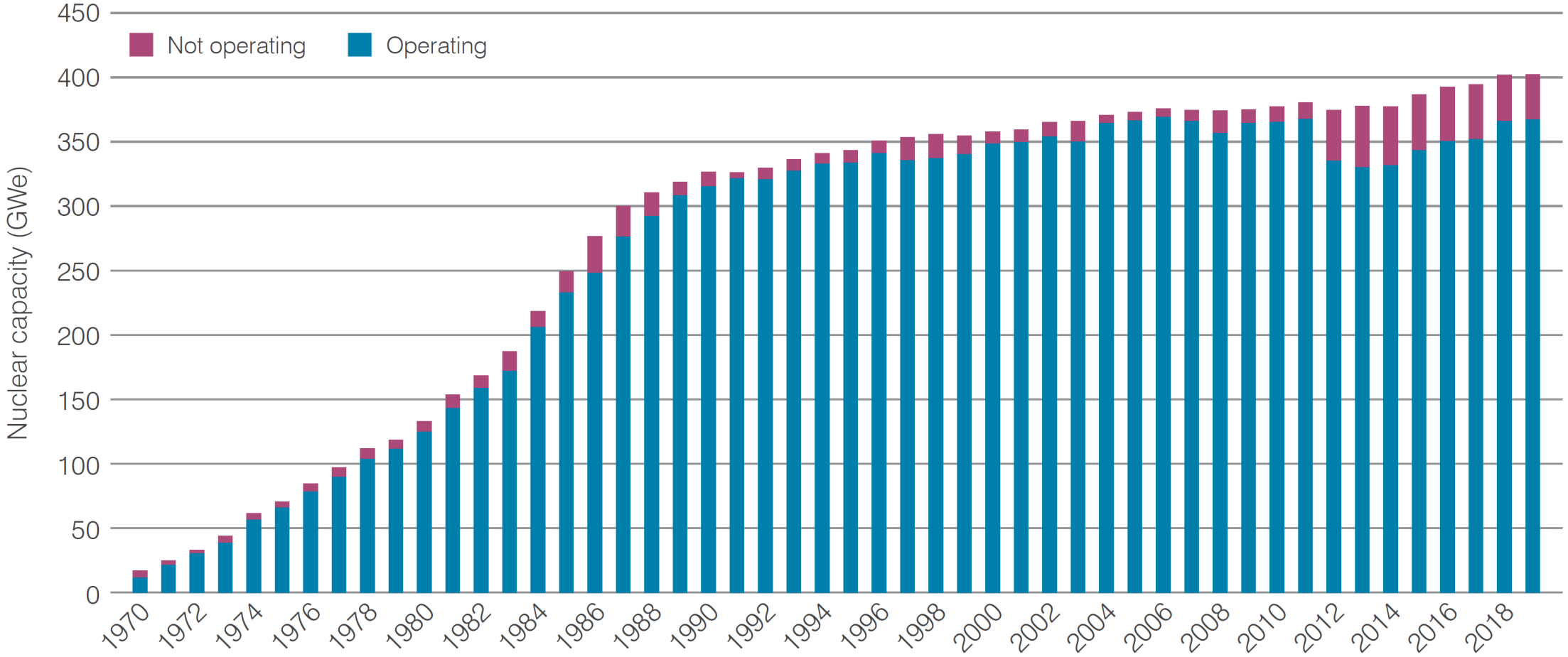
Nuclear reactors generated a total 2657 TWh of electricity in 2019



Source: World Nuclear Association and IAEA Power Reactor Information Service (PRIS)

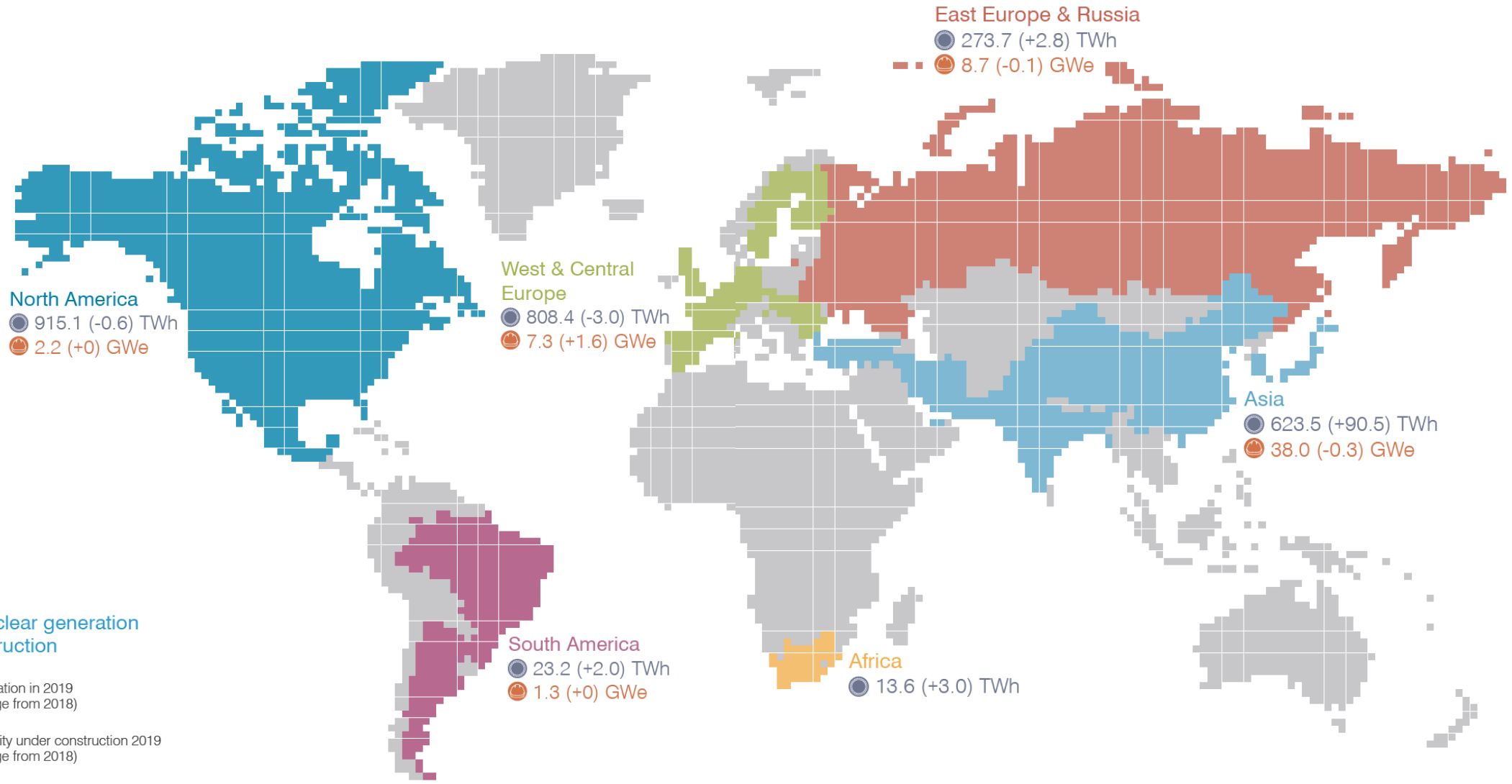
Global nuclear capacity (GWe)

In 2019 reactors totalling 402.3 GWe were classed as operable



Source: World Nuclear Association, IAEA PRIS

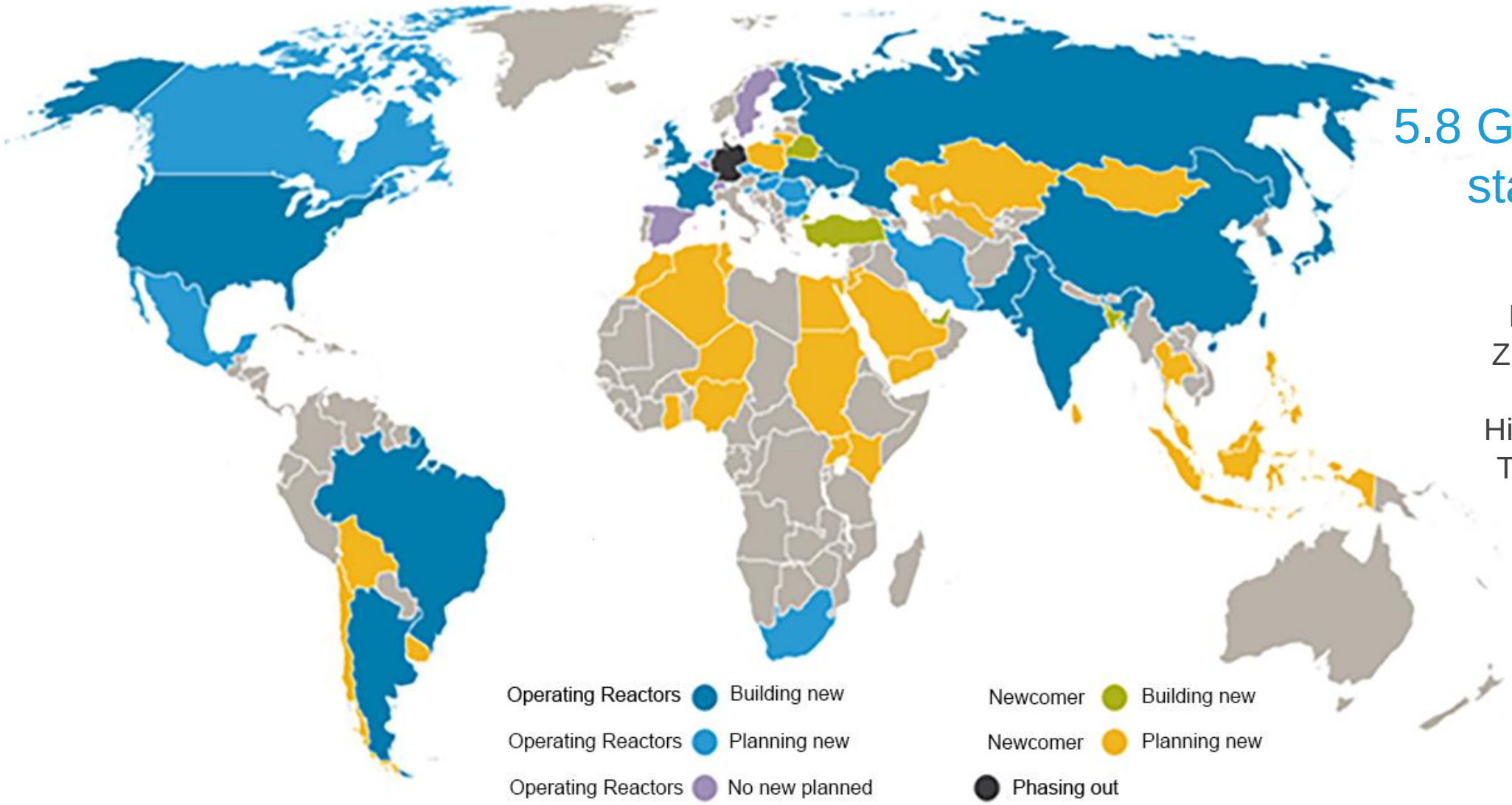
Regional Nuclear Developments 2019



New reactor grid connections in 2019

	Location	Net Capacity (MWe)
Yangjiang 6	China	1000
Taishan 2	China	1660
Shin Kori 4	South Korea	1418
Novovoronezh II-2	Russia	1101
Akademik Lomonosov 1	Russia	32
Akademik Lomonosov 2	Russia	32

New construction and new countries

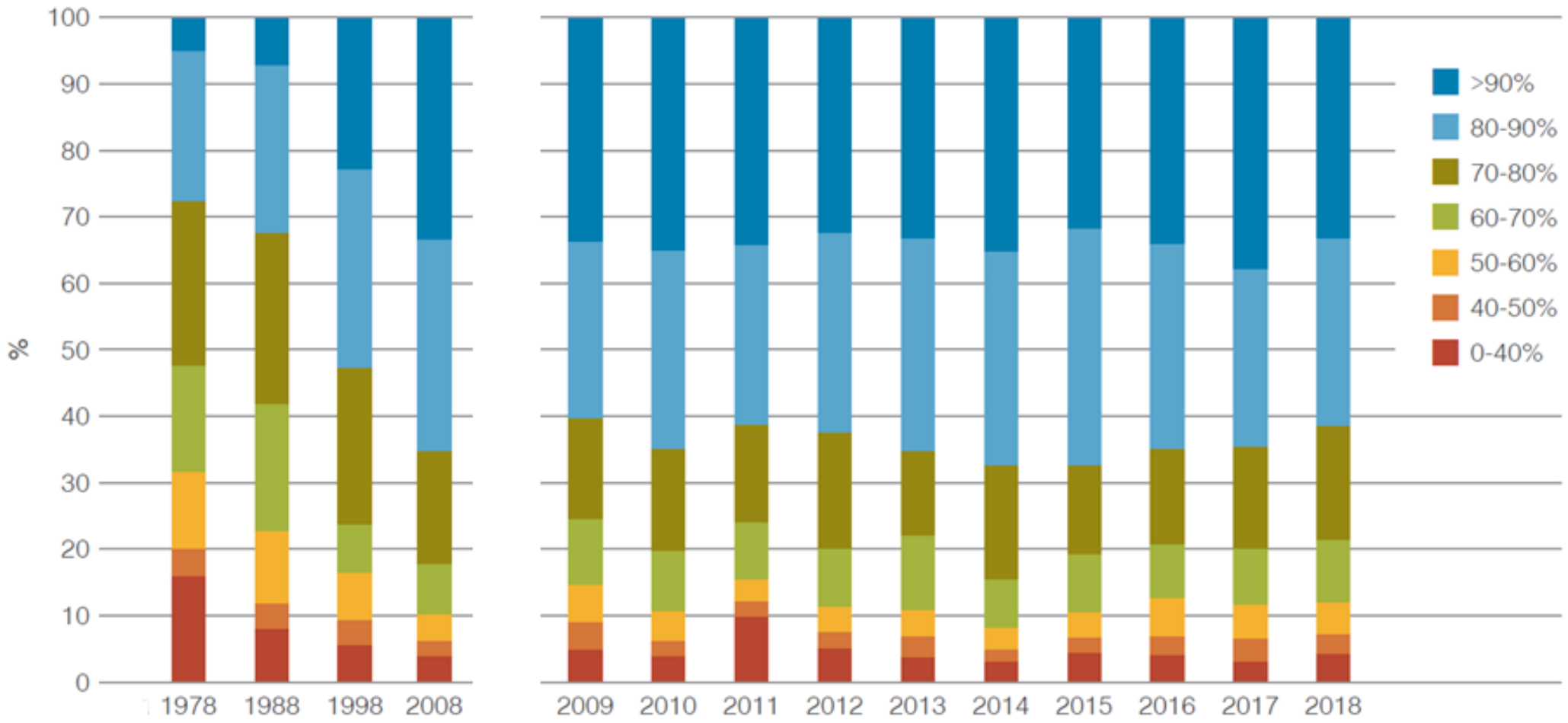


5.8 GWe construction started in 2019

Kursk II-2, **Russia**
Zhangzhou 1, **China**
Bushehr 2, **Iran**
Hinkley Point C 2, **UK**
Taipingling 1, **China**

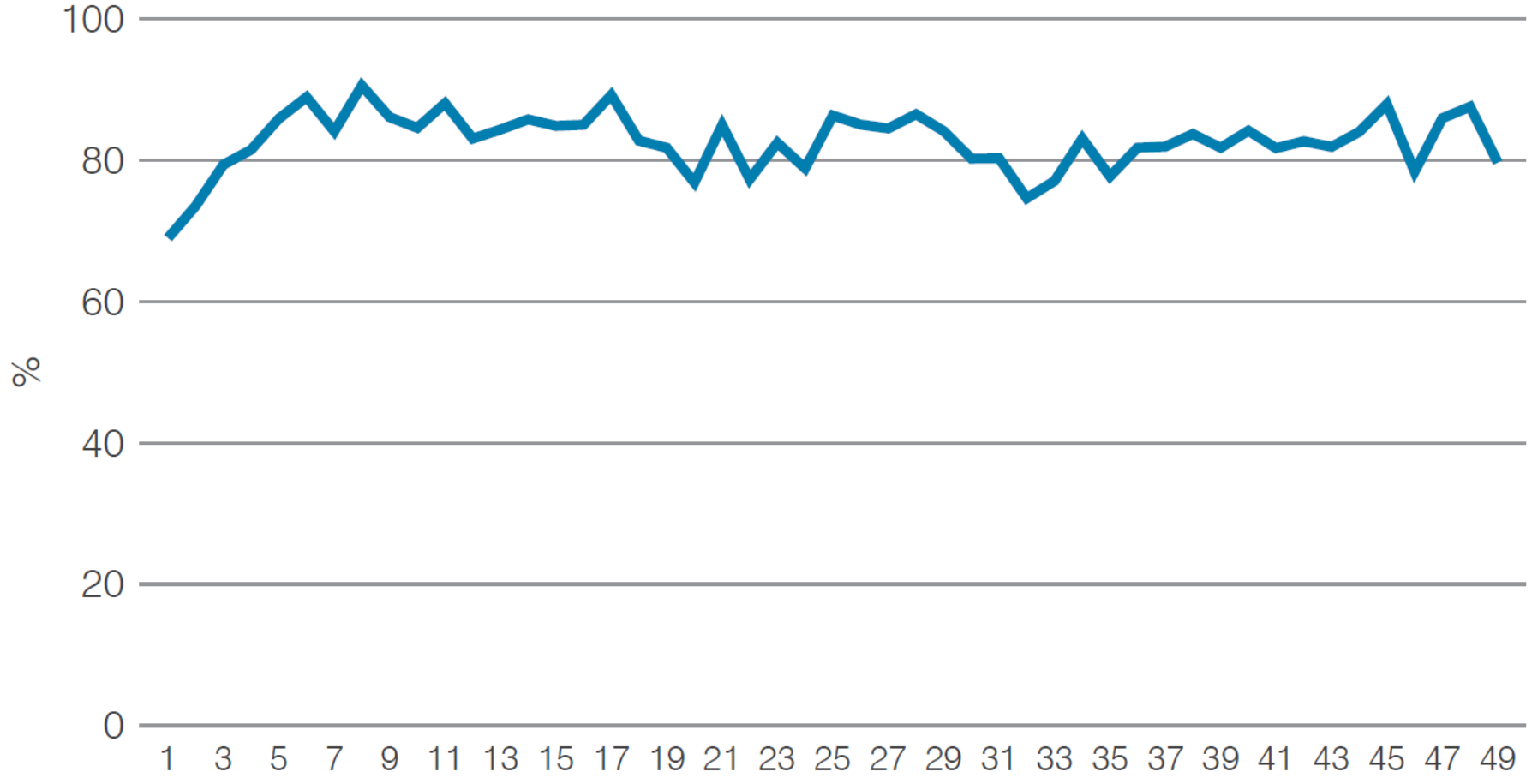
High levels of construction: 52 reactors

Capacity factor trends:
Improving performance of operating reactors



Source: World Nuclear Association, IAEA PRIS

Reactors perform well over entire lifetime: Mean capacity factor by age (2014-2018)



Source: World Nuclear Association. IAEA PRIS

Reactors reaching 50 years of operation this year

Beznau 1, Switzerland

Ginna, USA

Nine Mile Point 1, USA

Tarapur 1, India

Tarapur 2, India

New build new countries

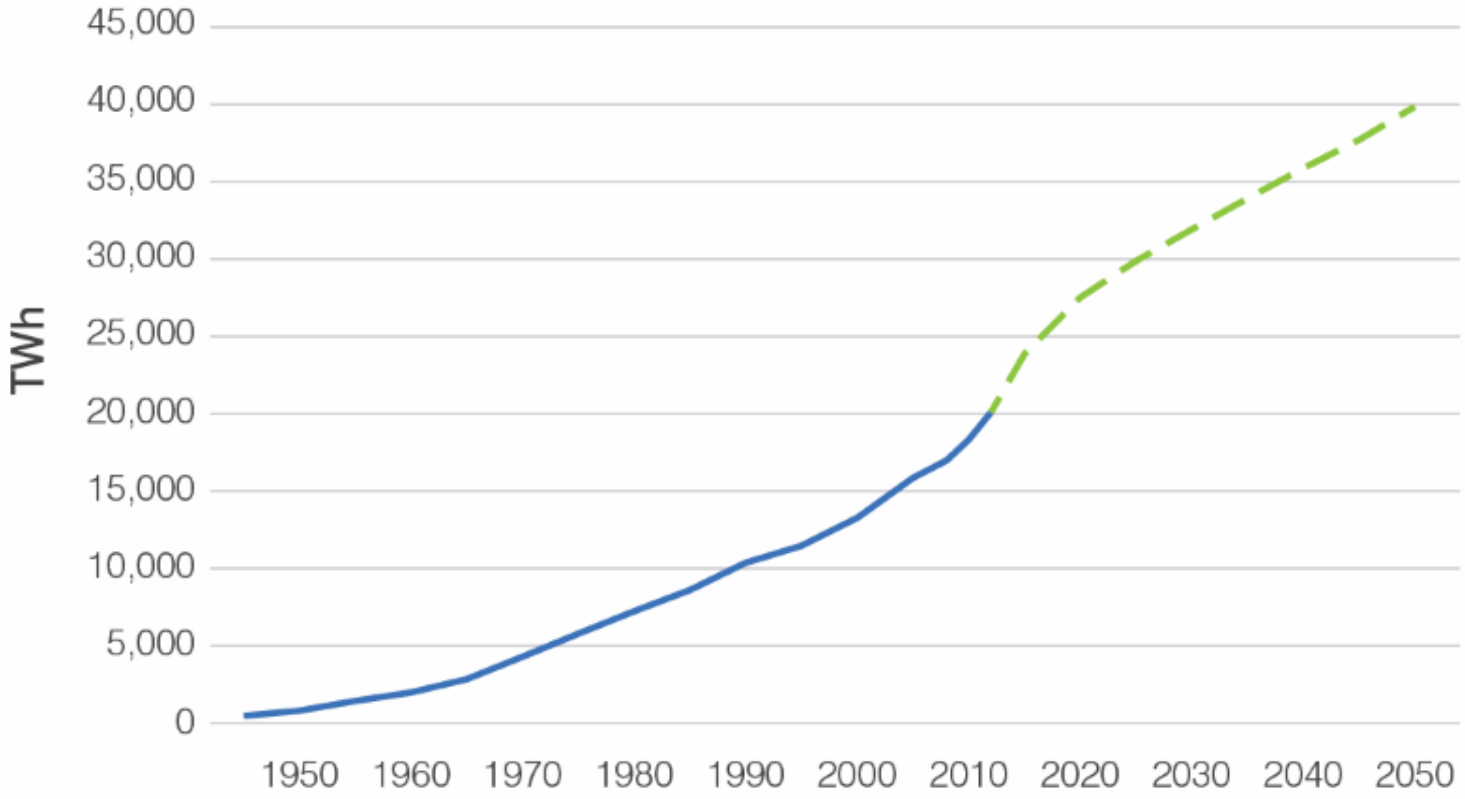

Barakah - UAE


Rooppur - Bangladesh


Ostrovets - Belarus

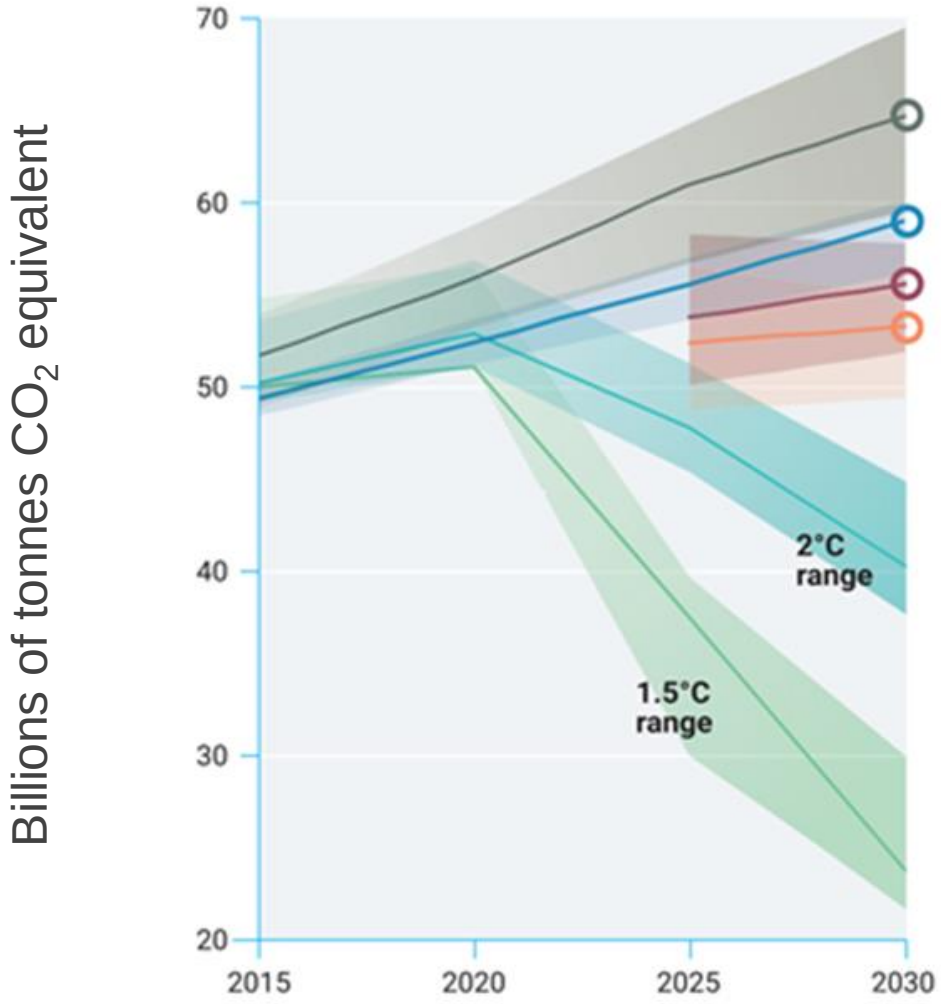

Akkuyu - Turkey

Demand for electricity continues to rise and must be met cleanly



Source: 1945-1979, IEA databases and analysis
1980-2012, Energy Information Administration
2013-2050, IEA Energy Technology Perspectives 2015

More serious and urgent action is required on climate



Business as usual

Where current climate commitments take us

Where we need to be

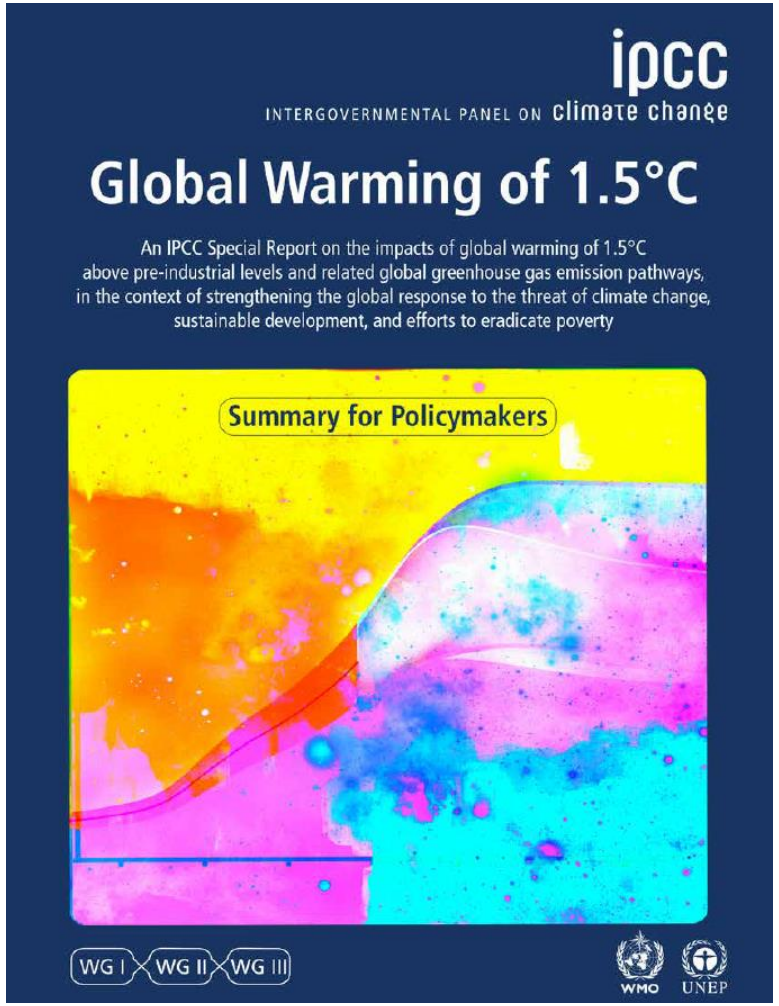
Adapted from Emissions Gap Report 2018, UN Environment

The world has a growing need for clean energy

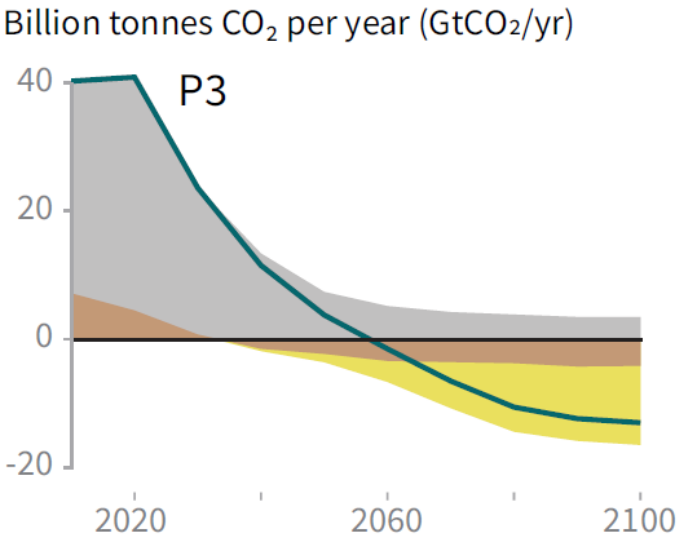
Almost 1 billion people live without electricity

7 million people die each year due to air pollution

IPCC identify pathway to emissions reduction to limit climate change to 1.5°C



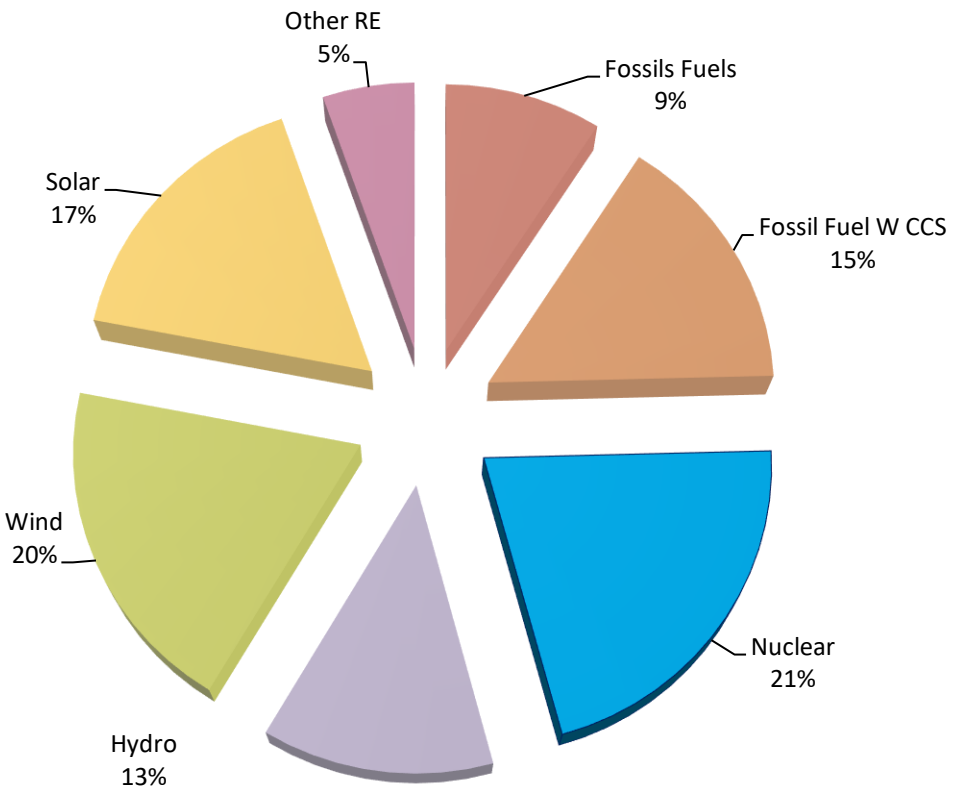
- Nuclear increases by average of 2.5 times by 2050 in the 89 scenarios reviewed by the IPCC.
- In IPPC's own P3 middle-of-the-road scenario nuclear increases to five times current level.



P3: A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

Nuclear essential in UN-supported Deep Decarbonization Pathways project

- Study of 16 of the largest GHG-emitting countries
- Nuclear largest source of electricity at 21% in 2050
- Additional 1053 GW nuclear capacity required by 2050



Electricity Generation

Source: Deep Decarbonization Pathways Project (2016)
UN Sustainable Development Solutions Network (SDSN) and the Institute for Sustainable Development and International Relations

Harmony: a goal for the nuclear community

25% of electricity supply by 2050

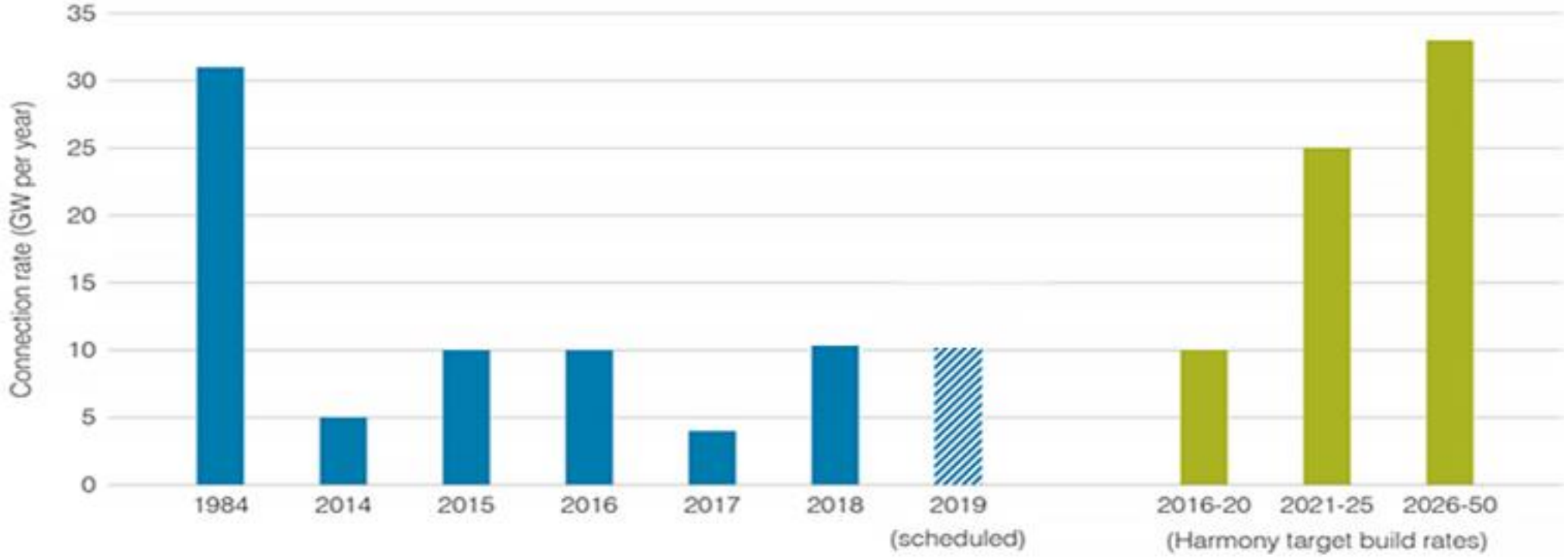
1000 gigawatt new nuclear capacity by 2050

To help meet the growing demand for a clean and reliable low-carbon mix.

Harmony programme 2016-2050
Cumulative 1000 GW new nuclear capacity to 2050

Construction rate doubled from trend of less than 5GW/y to 10GW/y

Then we need to triple from today's level



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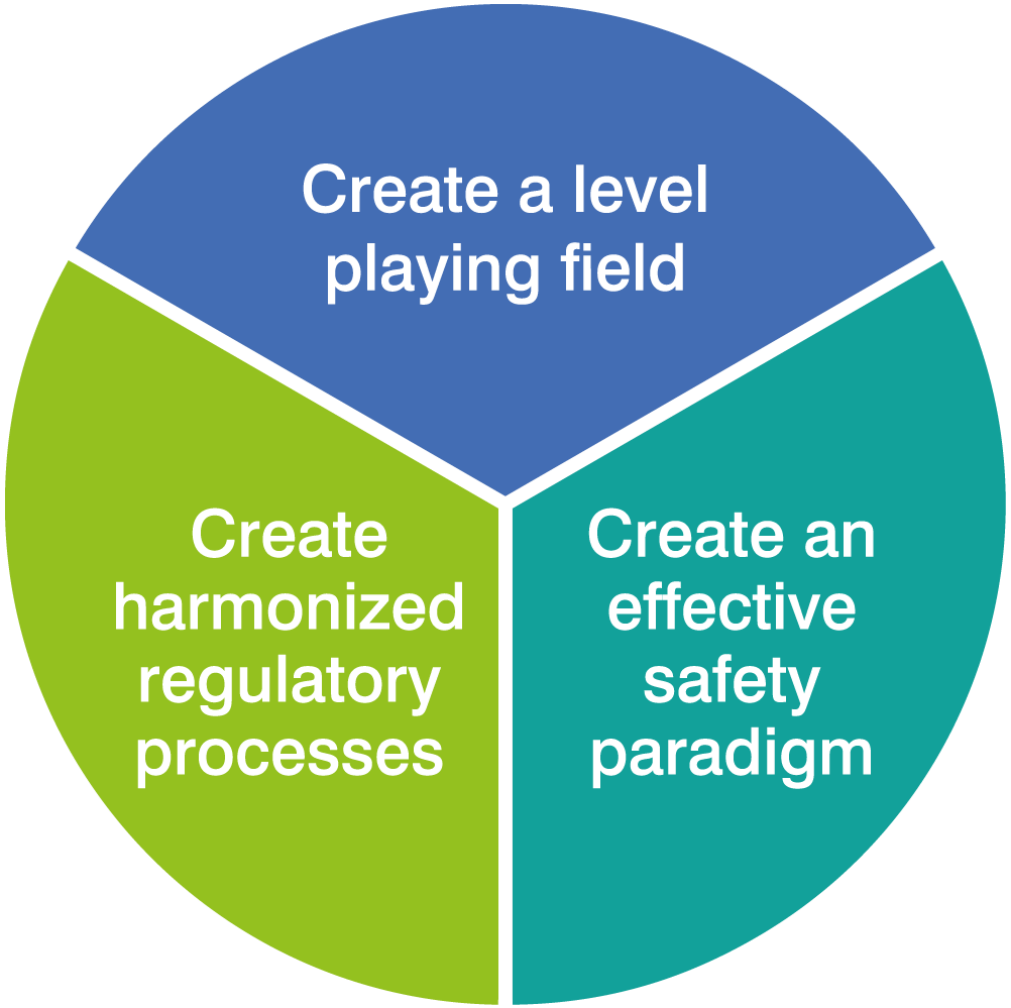
Harmony Programme

The Harmony programme provides a framework for action, helping industry reach out to key stakeholders so that barriers to growth can be removed.



Nuclear innovations for further decarbonization

SMRs and floating nuclear power plants for local or remote communities

High temperature gas reactors for industrial heat

Clean electricity or H2 to decarbonize transport

Fast reactors and fusion for extended fuel utilization

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"There is no sustainable energy future in the absence of nuclear energy."

Fatih Birol,
Executive Director,
International Energy Agency

Thank You!

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