

# World Nuclear Performance Report 2017 – Asia Edition



Helmut Engelbrecht, Jonathan Cobb

SIEW  
October 2017

# New nuclear reactors start-ups in 2016 and 2015 double the average for previous 25 years.

## 2016

### India

Kudankulam-2

### Pakistan

Chasnupp-3

### Russia

Novovoronezh 2-1

### South Korea

Shin-Kori-3

### USA

Watts Bar-2

### China

Changjiang-2

### China

Fangchenggang-2

### China

Fuqing-3

### China

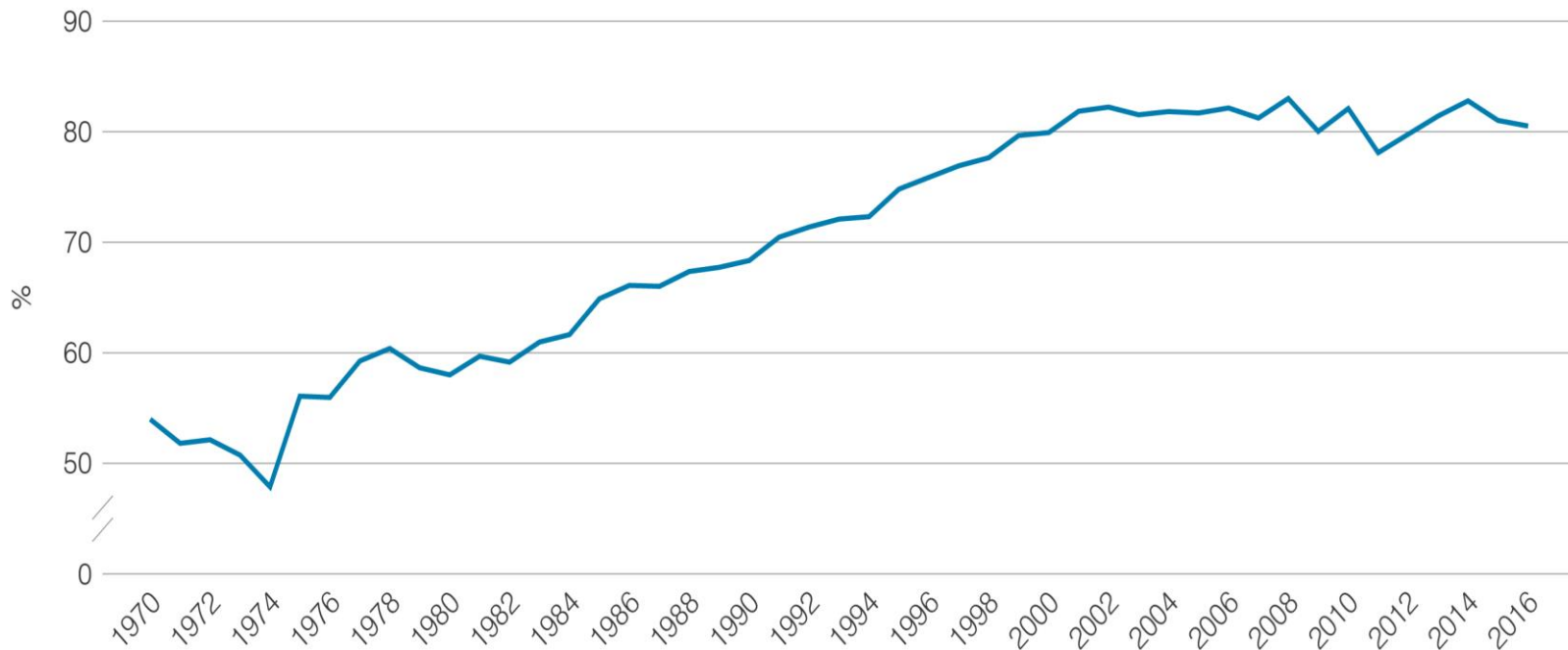
Hongyanhe-4

### China

Ningde-4

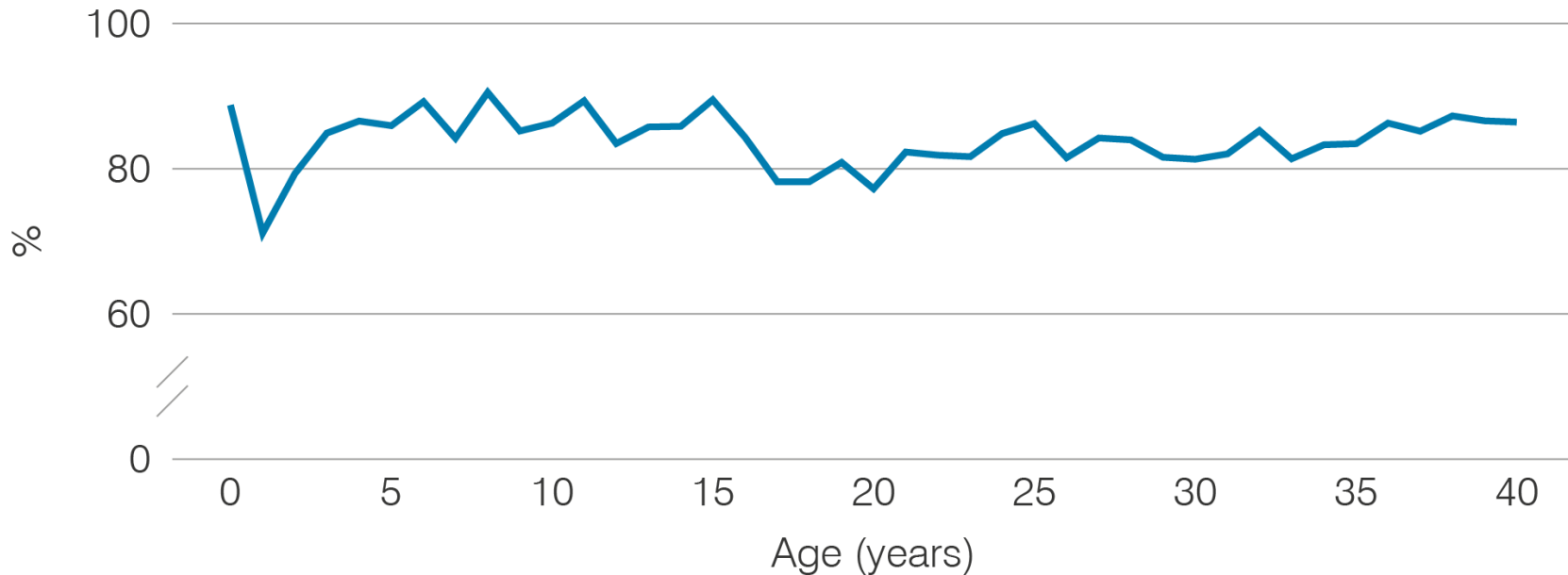


# Global Capacity Factor



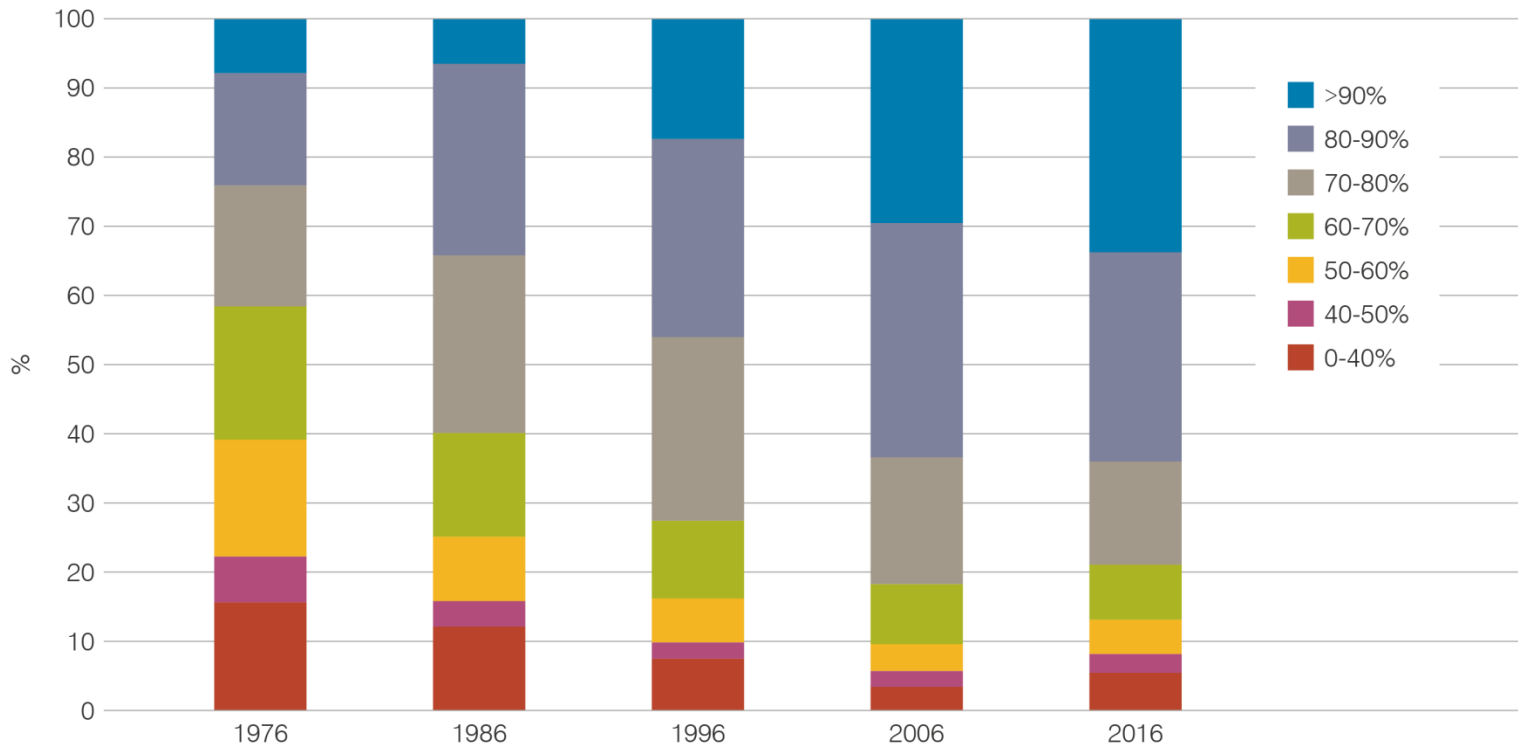
Source: World Nuclear Association, IAEA PRIS

# Median Capacity Factor by age 2007-2016



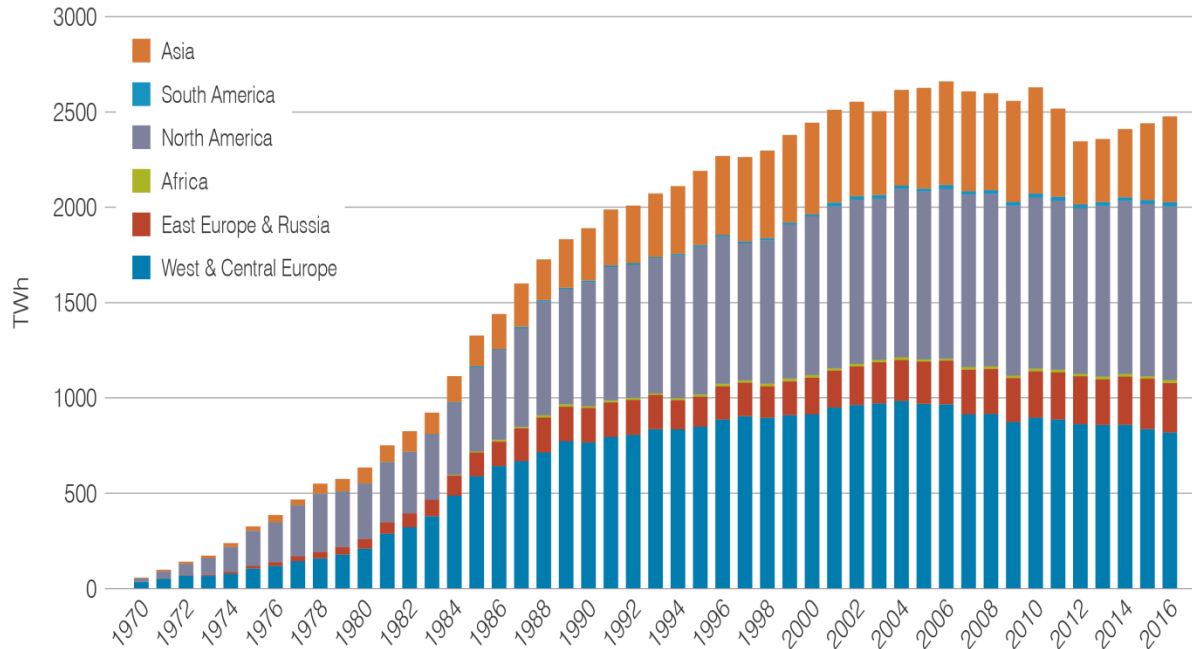
Source: World Nuclear Association, IAEA PRIS

# Long-term trends in capacity factors



Source: World Nuclear Association, IAEA PRIS

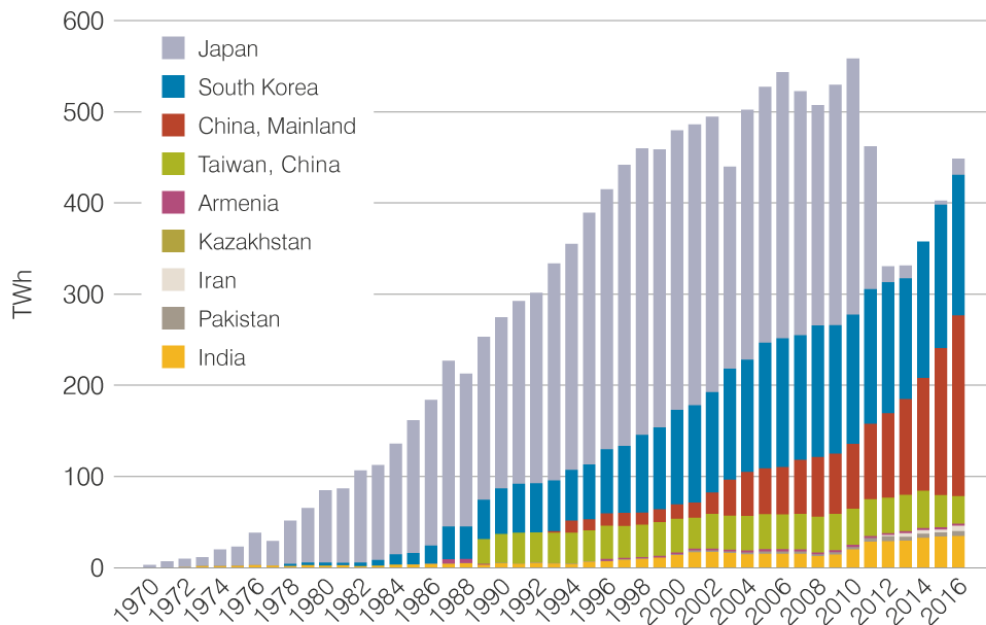
# Global Nuclear Electricity Production



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

- 448 operable reactors worldwide.
- 2476 TWh of nuclear generation, supplying 10% of global electricity.

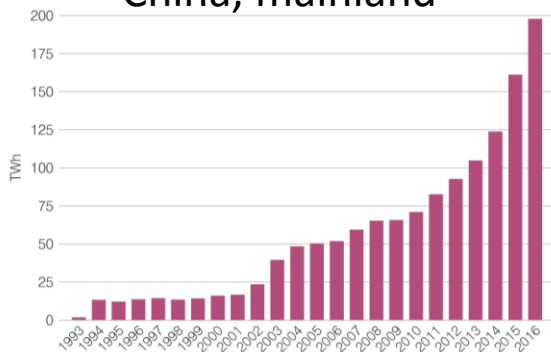
# Nuclear Generation in Asia



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

- 448 TWh, up 48 TWh from previous year.
- 18% of global nuclear generation.
- 137 operable reactors
  - This includes 42 reactors in Japan, four supplied electricity in 2016
- 35% increase in generation from 2012

## China, mainland



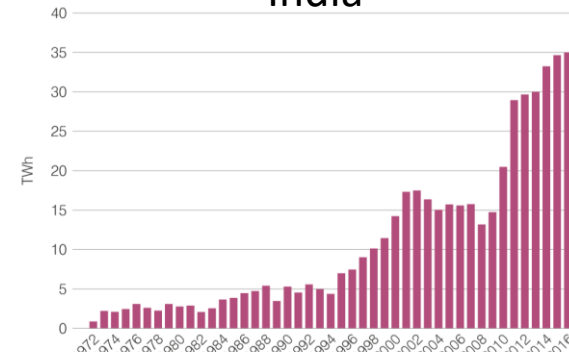
Source: World Nuclear Association, IAEA PRIS

## China, Taiwan



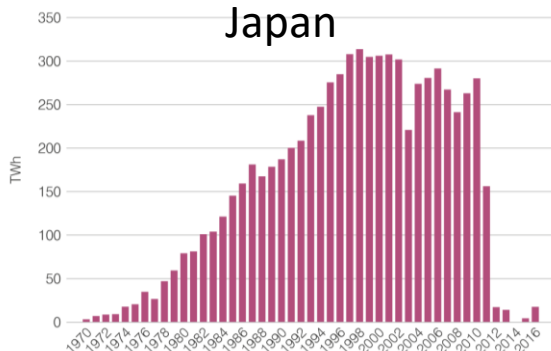
Source: World Nuclear Association, IAEA PRIS

## India



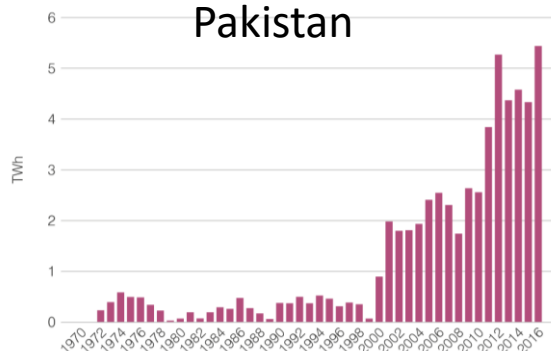
Source: World Nuclear Association, IAEA PRIS

## Japan



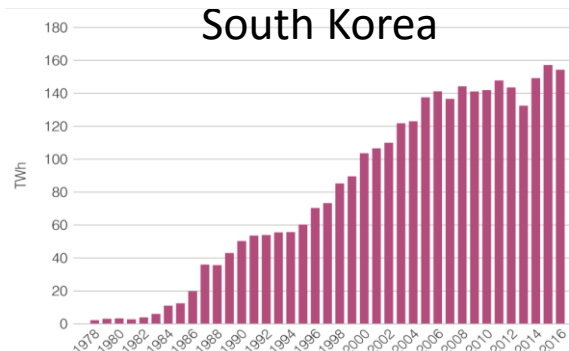
Source: World Nuclear Association, IAEA PRIS

## Pakistan



Source: World Nuclear Association, IAEA PRIS

## South Korea

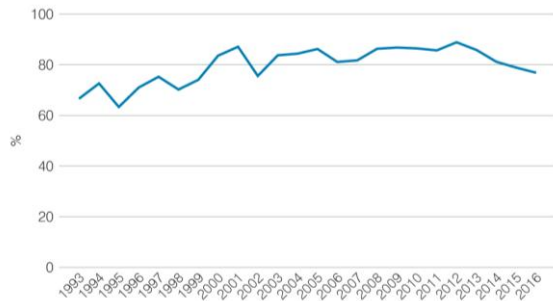


Source: World Nuclear Association, IAEA PRIS



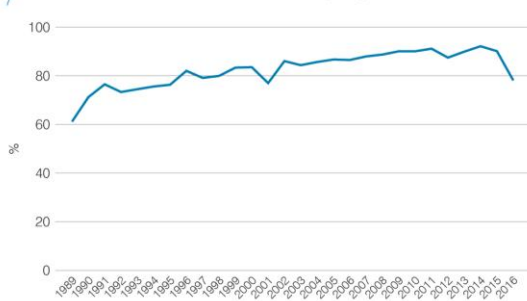
# Reactor Capacity Factor

## China, mainland



Source: World Nuclear Association, IAEA PRIS

## China, Taiwan



Source: World Nuclear Association, IAEA PRIS

## India



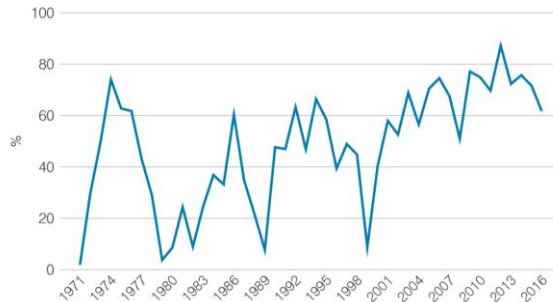
Source: World Nuclear Association, IAEA PRIS

## Japan



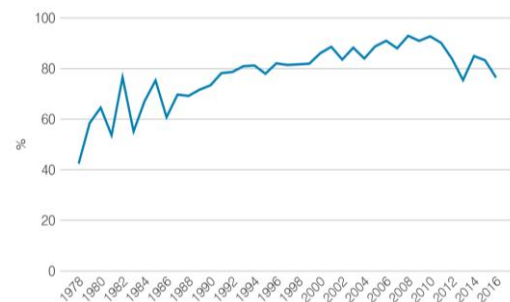
Source: World Nuclear Association, IAEA PRIS

## Pakistan



Source: World Nuclear Association, IAEA PRIS

## South Korea



Source: World Nuclear Association, IAEA PRIS

## Mainland China: 58GWe capacity by 2020

The government's stated long-term target, as outlined in its Energy Development Strategy Action Plan, 2014-2020, is for 58 GWe nuclear capacity by 2020, with 30 GWe more under construction. New approvals for construction are expected shortly.

## Taiwan, China: Negative nuclear policy, but no clear alternative

In August 2017 after the sudden interruption of fuel supply to a gas-fired power plant a power cut hit 6.7 million homes and businesses and cast a spotlight on nuclear policy, which has so far remained negative and oriented around avoiding the use of nuclear power without a clear alternative.

## India: Ten PHWR reactors by 2031

In July 2017, the country's Atomic Energy Minister said ten PHWR units will be built across the Gorakhpur, Chutka, Bhimpur, Mahi Banswara and Kaigaand sites, and will be operational by 2031.

# Regional Developments

## Iran: First reactor operational, work started on next unit

Iran's first nuclear power reactor at Bushehr achieved a capacity factor of 73%. Further reactors and desalination plants are planned for the Bushehr site and site works for construction of unit 2 started in March 2017.

## Japan: International and national experts call for restarts

The International Energy Agency, the Japanese Institute of Energy Economics, and the Japan Atomic Industry Forum have all called for a sustained effort to reinstate production from idled reactors, reiterating the essential role that nuclear power needs to play in enabling the country to meet its climate obligations.

## Pakistan: 8.8 GW additional capacity by 2030

At the opening of its latest reactor, Chashma 4, the prime minister reiterated the country's commitment to adding 8.8 GWe of nuclear capacity by 2030. 2.3 GWe is currently under construction.

## South Korea: Nuclear withdrawal risks loss of valuable energy supplier

In June 2017, President Moon Jae-In outlined his nuclear phase-out policy. In July 2017 an open letter to the president signed by 27 international scientists and conservationists said: “If South Korea withdraws from nuclear, the world risks losing a valuable supplier of cheap and abundant energy needed to lift humankind out of poverty and solve the climate crisis.”

## Turkey: Work starts on first reactor

Preparatory work on its first reactor at Akkuyu has started and plant construction is due to start late 2017/early 2018. Up to twelve units are planned at three sites.

## United Arab Emirates: First unit to start in 2018

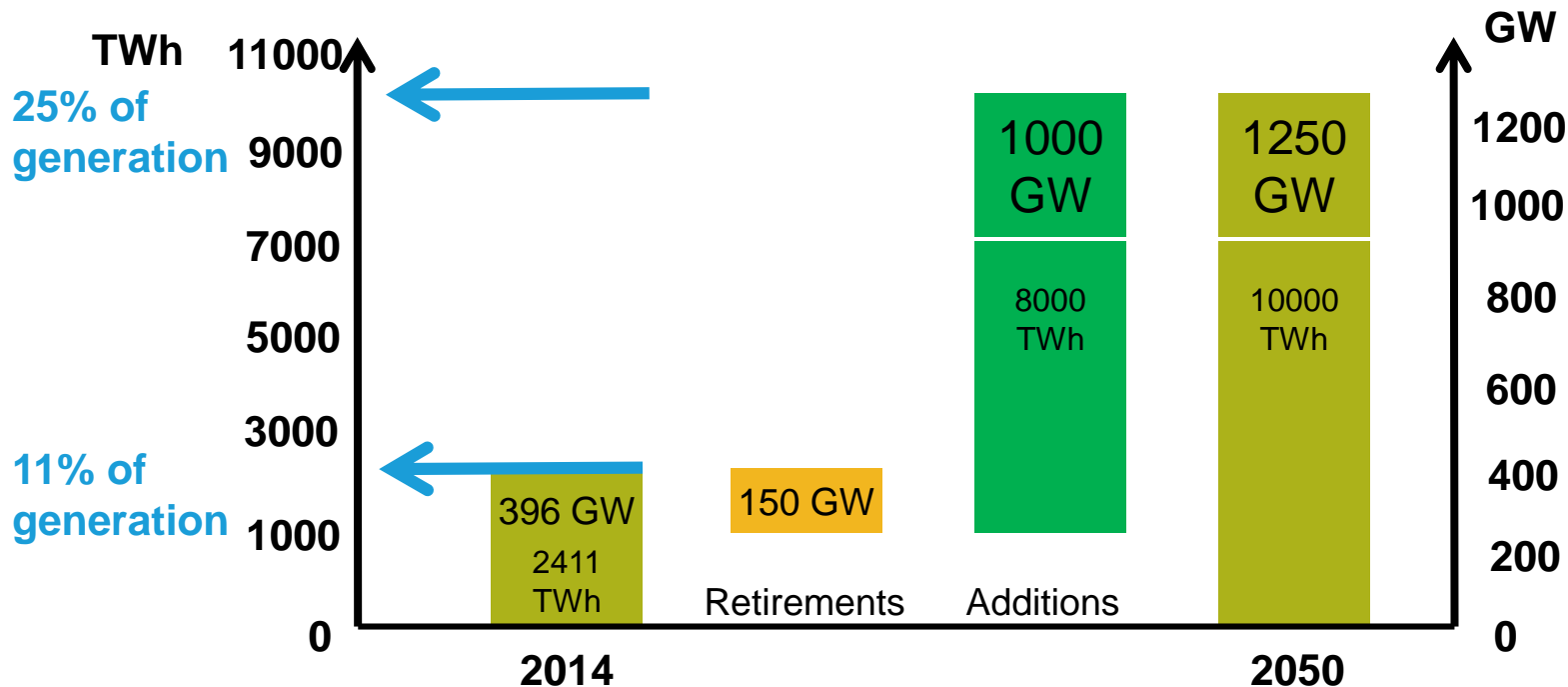
Unit 1 of Barakah is over 96% complete and is expected to start in 2018, the first of four reactors on target to start by 2020.

## Reactors under construction, planned & proposed in Asia

Under Construction	Number	Capacity (MWe)
China, mainland	20	22006
China, Taiwan	2	2700
India	6	4350
Japan	2	2756
Pakistan	2	2322
South Korea	3	4200
UAE	4	5600

Planned & Proposed	Number	Capacity (MWe)
Bangladesh	2	2400
Indonesia	5	4030
Jordan	2	2000
Kazakhstan	3	1800
Malaysia	2	2000
Saudi Arabia	16	17000
Thailand	5	5000
Turkey	12	14300
Vietnam	10	11900

# Nuclear energy should deliver more: Harmony goal is 1000 GW



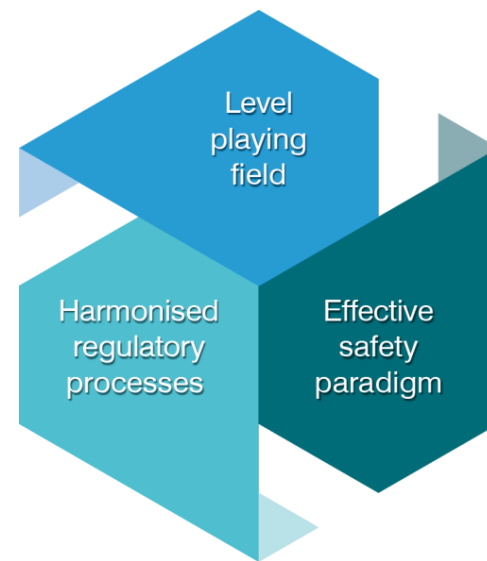
Source: World Nuclear Association. Growth required for nuclear energy to supply 25% of electricity in 2050 under demand forecast of two-degree scenario (see IEA, 2015, Energy Technology Perspectives 2015).  
Assumption: 91% capacity factor

# The global nuclear industry: identify barriers, engage in dialog, develop key actions

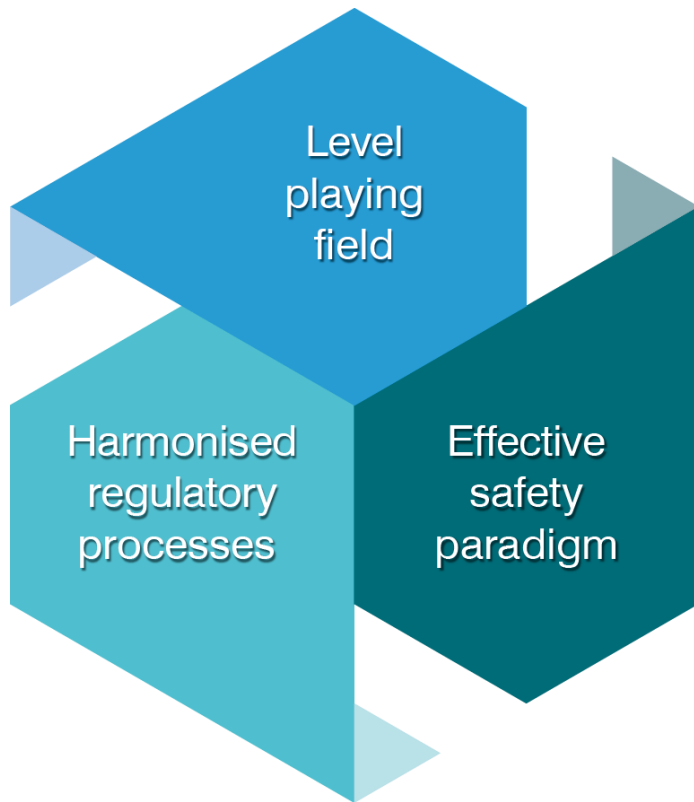
Establish a **level playing field** for all low-carbon energy technologies, valuing not only health and environmental qualities, but also reliability and grid system costs.

Ensure **harmonized regulatory processes** to provide a more internationally consistent, efficient and predictable nuclear licensing regime, to facilitate significant growth of nuclear capacity, without compromising safety and security.

Create an **effective safety paradigm** where the health, environmental and safety benefits of nuclear are valued when compared with other energy sources, by focusing on increasing genuine public wellbeing whilst ensuring high safety standards are met.



# Harmony goal

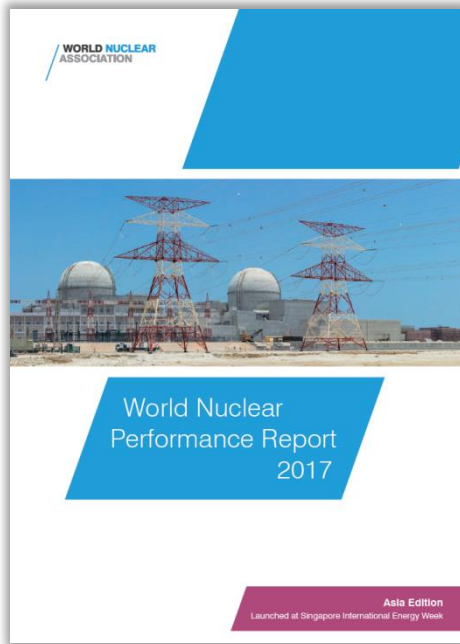


1000 gigawatt new nuclear capacity by 2050

25% of electricity supply 2050

Nuclear energy to deliver reliable, affordable and clean electricity





The Asia Edition of the World Nuclear Performance Report 2017 is available online, along with high resolution graphics for reproduction.

<http://world-nuclear.org/our-association/publications/online-reports/world-nuclear-performance-report-asia-edition-2017.aspx>