

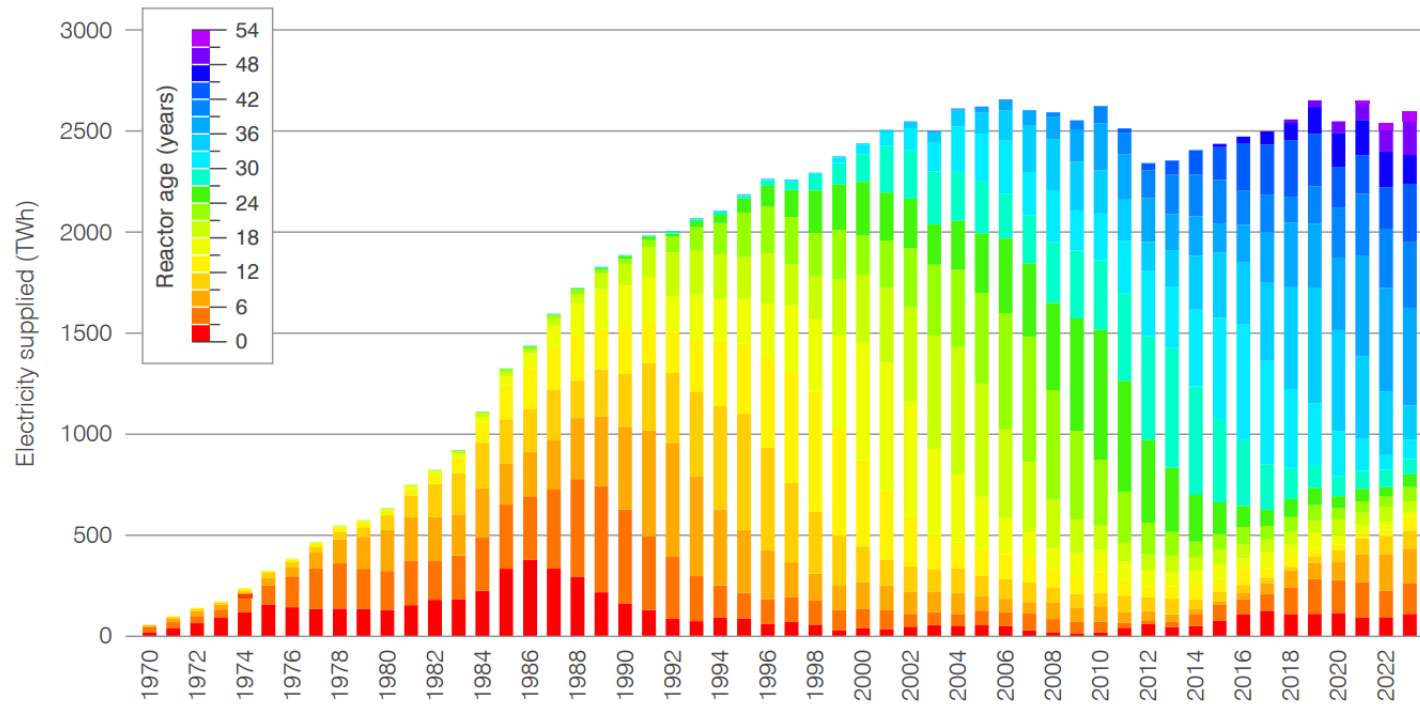
# THE FUTURE OF NUCLEAR ENERGY IN EUROPE AND THE WORLD, ITS DEVELOPMENT AND THE CURRENT SITUATION



# AGENDA

- GENERAL OVERVIEW

Figure 4. Total global nuclear electricity generation by age of reactor



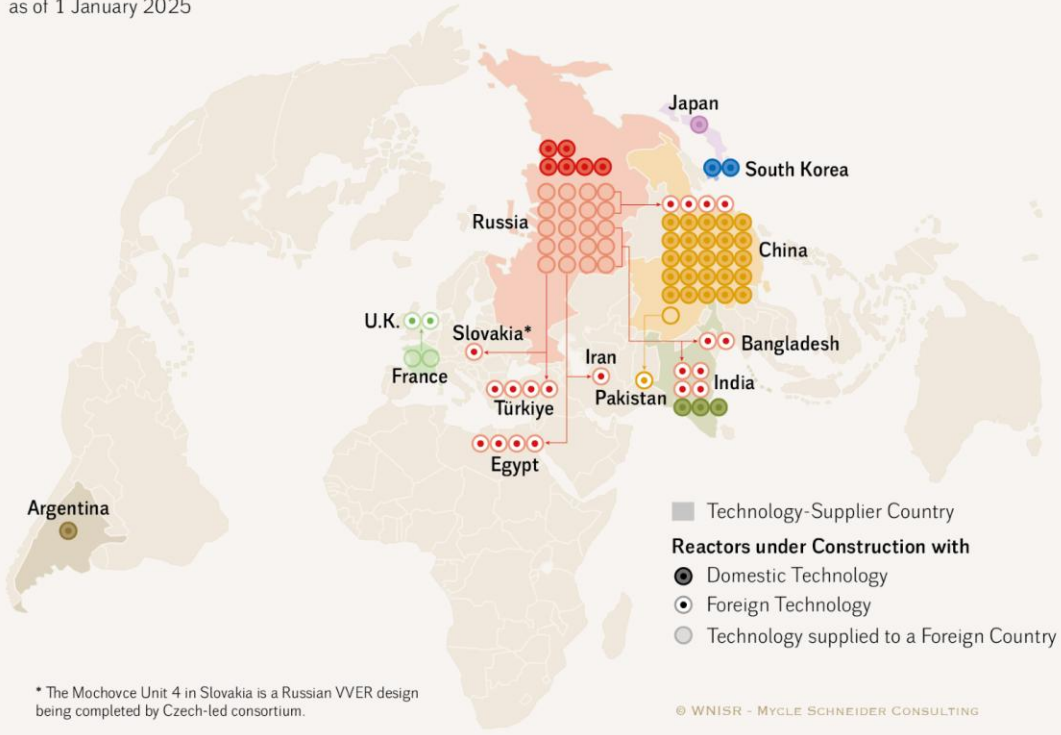
Source: World Nuclear Association, IAEA PRIS

GLOBAL  
ELECTRICITY  
GENERATION

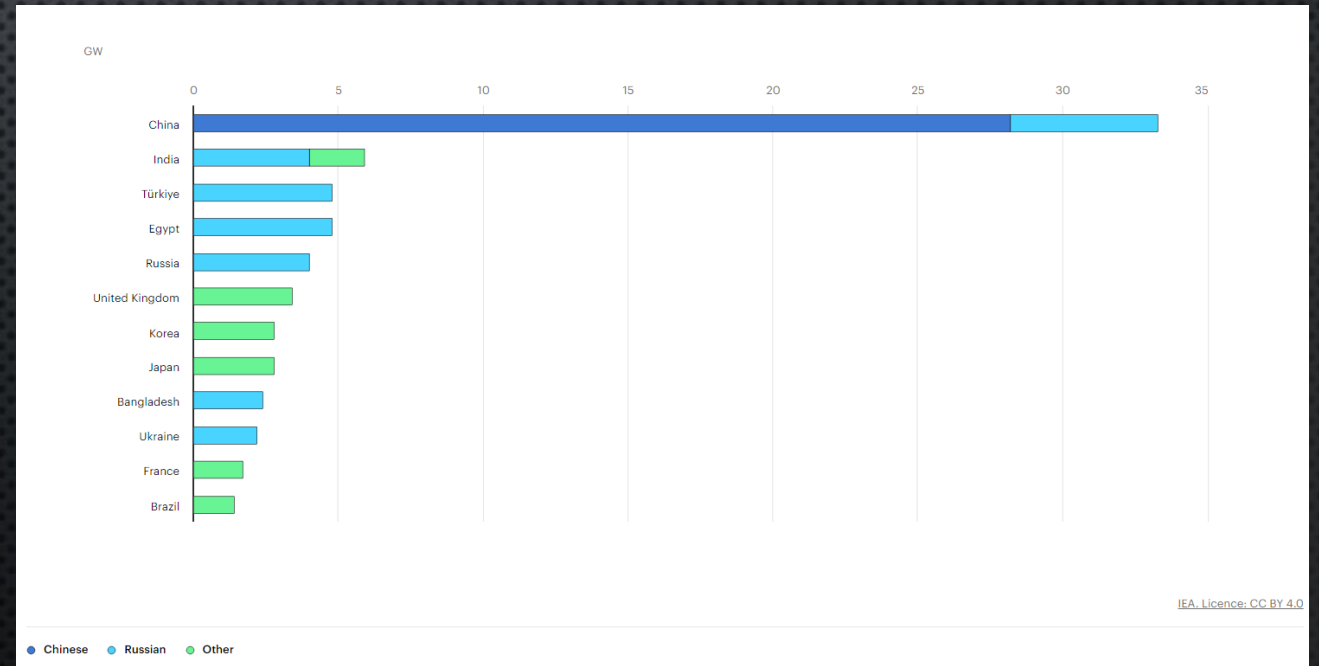


## Nuclear Power Reactors Under Construction in the World

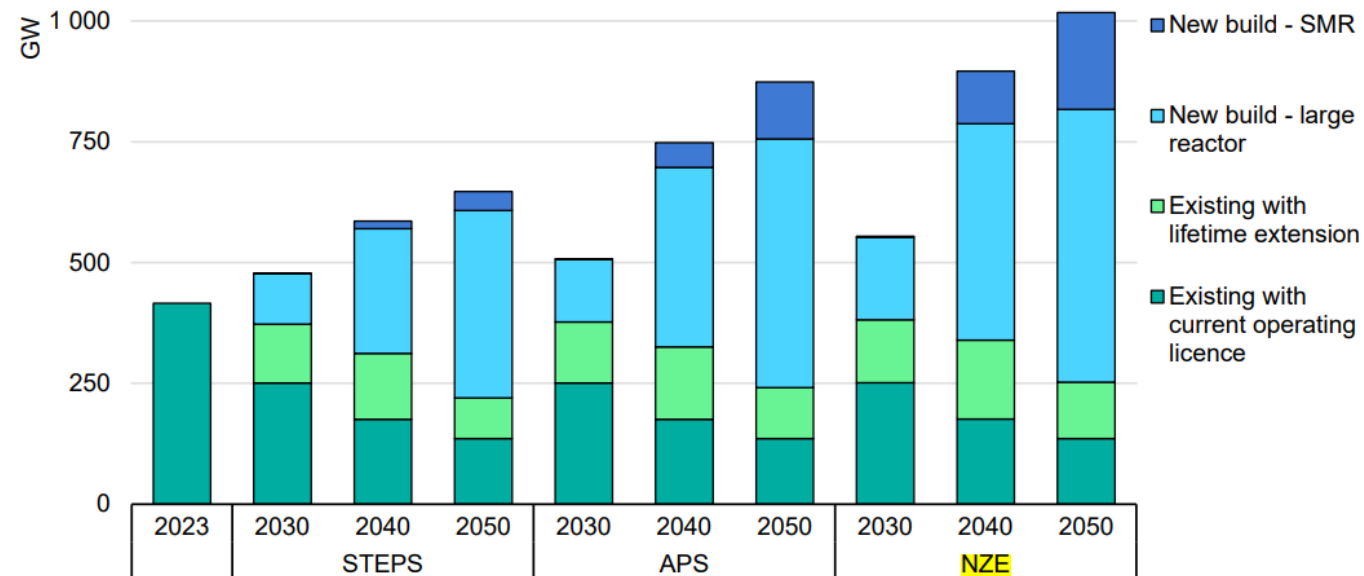
Units by Technology-Supplier Country and Construction Country  
as of 1 January 2025



## REACTORS UNDER CONSTRUCTION IN 2024



**Figure 2.3 Global nuclear power capacity by scenario and type, 2023-2050**



IEA. CC BY 4.0.

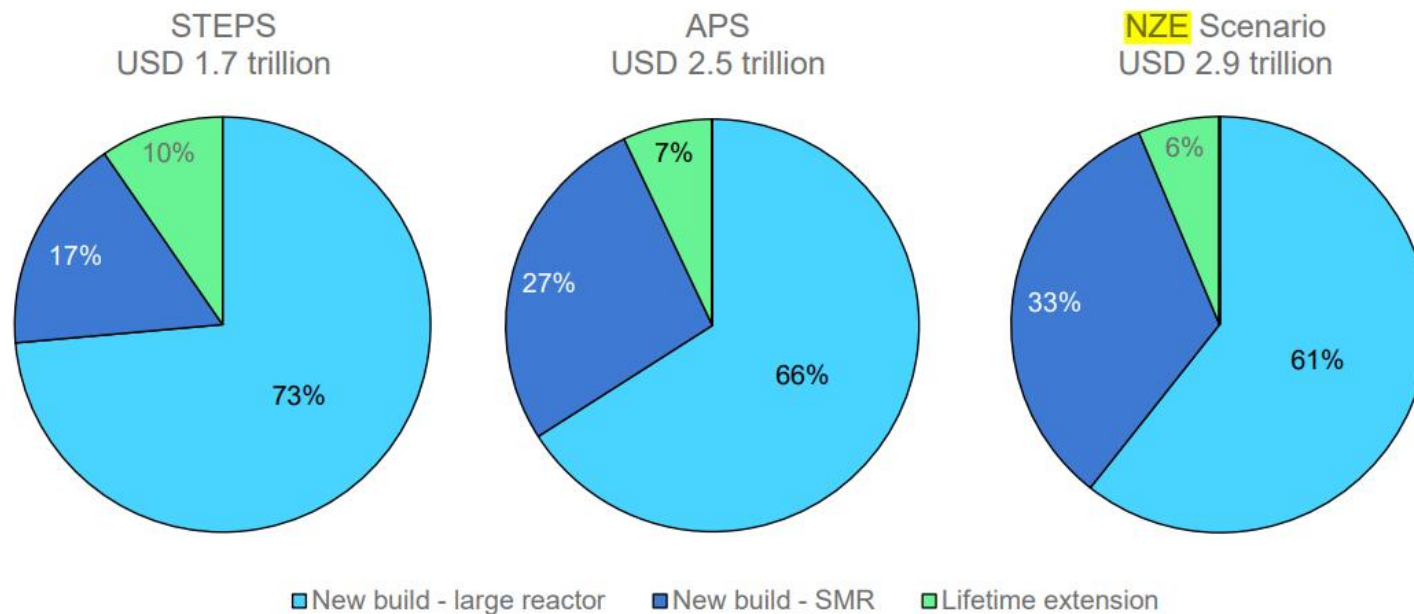
Notes: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; NZE = Net Zero Emissions by 2050 Scenario; SMR = small modular reactor.

Source: IEA analysis based on IEA (2024), [World Energy Outlook 2024](#).

GLOBAL  
NUCLEAR  
POWER  
CAPACITY  
PROJECTION



**Figure 2.2 Cumulative investment in nuclear energy by scenario and type, 2024-2050**



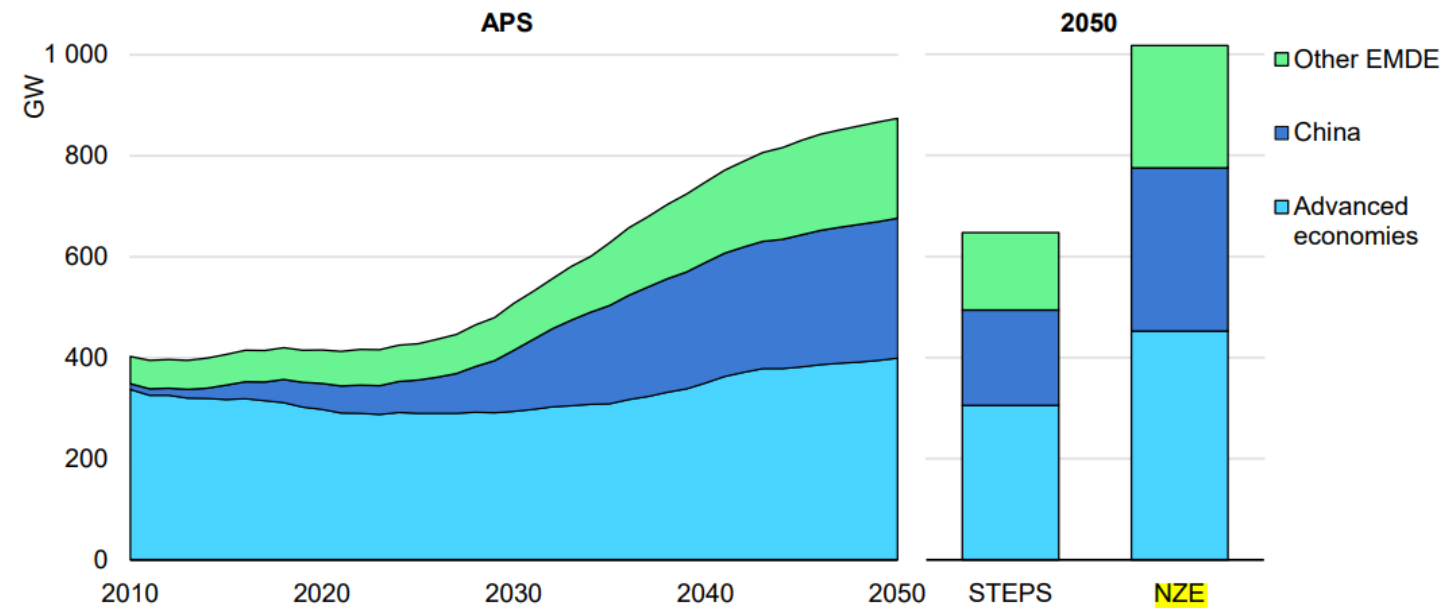
IEA. CC BY 4.0.

Notes: Investment is in 2023 dollars. STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; NZE = Net Zero Emissions by 2050; SMR = small modular reactor.

Source: IEA analysis based on IEA (2024), [World Energy Outlook 2024](#).

CUMULATIVE  
INVESTMENT  
IN NUCLEAR  
ENERGY  
PROJECTION

**Figure 2.5 Nuclear power capacity by scenario and region, 2010-2050**



IEA. CC BY 4.0.

Notes: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; **NZE** = Net Zero Emissions by 2050 Scenario; Other EMDE = Emerging market and developing economies excluding China.

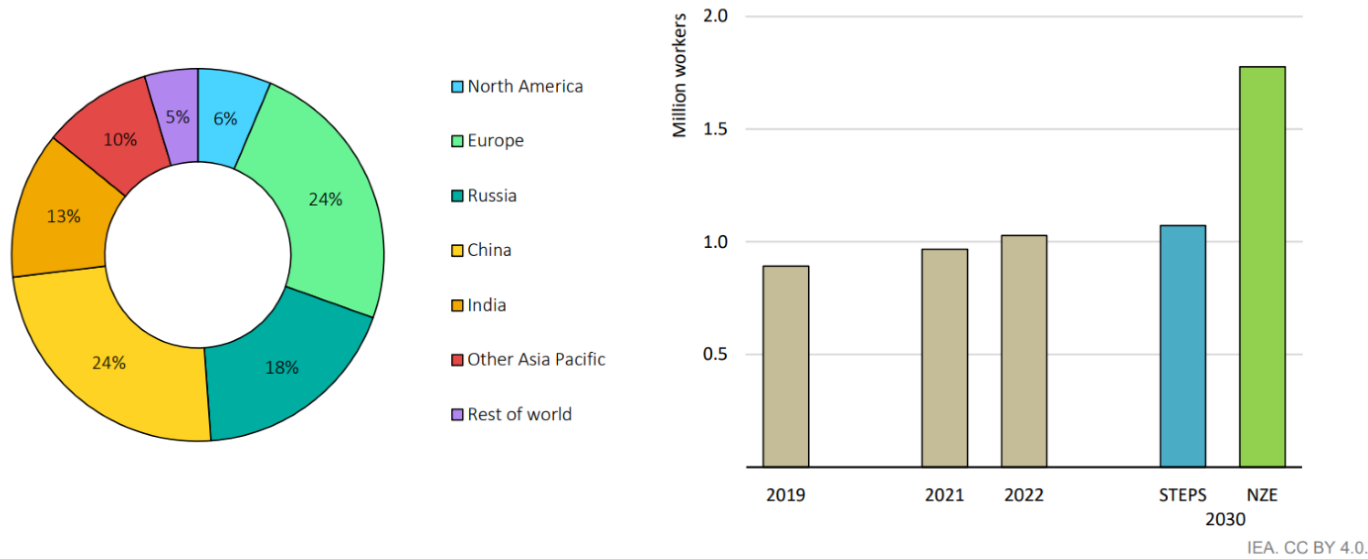
Source: IEA analysis based on IEA (2024), [World Energy Outlook 2024](#).

NUCLEAR  
POWER  
CAPACITY  
BY REGIONS



# Nuclear power employment is dominated by a handful of countries with well-established nuclear energy programmes and firms

Employment in nuclear power by region in 2022 and by scenario in 2030

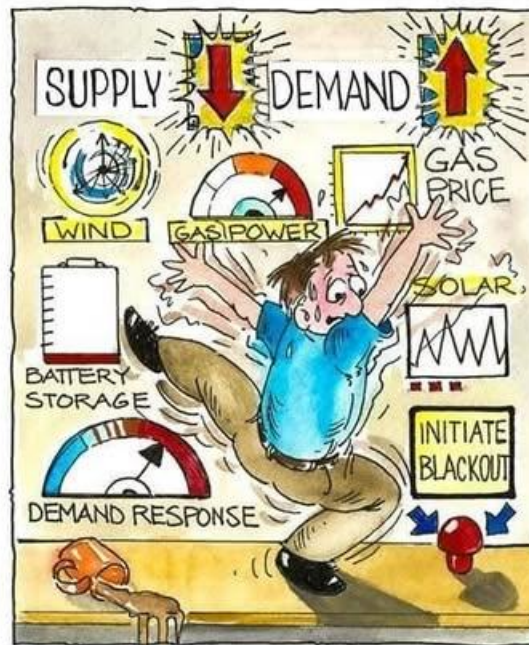


# NUCLEAR WORKFORCE

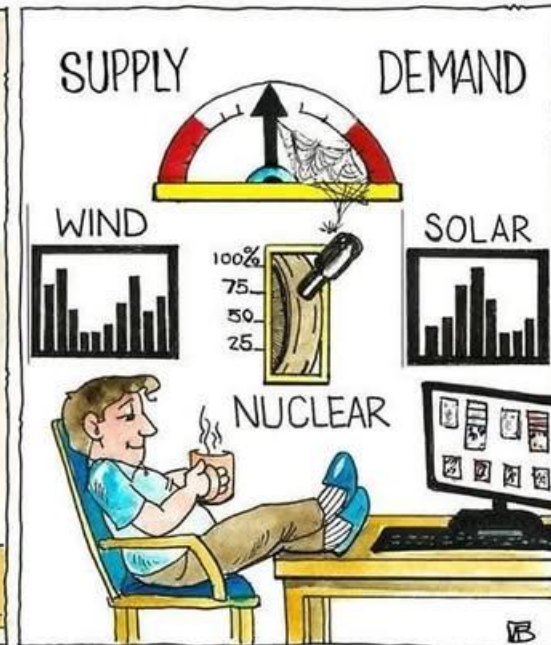


EUROPE

"CONTROL ROOM – POWER GRID OPERATIONS"



"ENERGIEWENDE"



"NUCLEAR AND RENEWABLES"

# CHANGING OPINIONS

- NUCLEAR ALLIANCE
- ABANDONING OR POSTPONING PHASE OUTS
- RECONSIDERING POLICIES
- POSITIVE SIGNS FROM GERMANY
- A LOT OF INTEREST IN SMRs
- KEY ISSUE REMAINS PRACTICAL RECOGNITION OF NUCLEAR AS NECESSARY FOR DECARBONISATION



- **FRANCE** PLANS TO BUILD 6 + 8 REACTORS; FLAMANVILLE OPERATIONAL; COURT OF AUDITORS EXPRESSED DOUBTS ABOUT EDFs ABILITY TO DELIVER THE PROJECT
- **GB** ANNOUNCED £14.2BN FOR SIZEWELL C AS WELL AS £2.5 BILLION FOR A ROLLS-ROYCE SMR
- **SWEDEN** PASSED BILL ON STATE AID FOR NEW REACTORS — LOANS AND CFD FOR UP TO 5000 MWE
- **NETHERLANDS** FINISHED FEASIBILITY STUDY FOR THEIR REACTOR AND NOW IS IN THE PROCESS OF SELECTING LOCATION
- **POLAND - EC** OPENED IN-DEPTH STATE AID INVESTIGATION INTO POLISH SUPPORT FOR NUCLEAR POWER PLANT
- **BULGARIA** PREPARING KOZLODUY 7&8 NPP
- **ROMANIA** SIGNED CONTRACT FOR CERNAVODA, WORK ON NUSCALE PROJECT CONTINUES AS WELL WITH FEED CONTRACT SIGNED AS WELL
- **PAKS II** IS WAITING TO START POURING FIRST CONCRETE
- **BELGIUM** — POSTPONED PHASE OUT BY 10 YEARS, **DENMARK** AND **ITALY** LOOKING INTO NUCLEAR TECHNOLOGIES;
- QUESTIONS ABOUT SPAIN AND GERMAN POLICIES REMAIN

# USA AND CANADA





- TRUMP SIGNED NUMBER OF **EOs** – AIMED AT CHANGING REGULATIONS AND OVERALL STRENGTHENING OF NUCLEAR INDUSTRY INCLUDING DEVELOPMENT OF LARGE REACTORS AND SMRs, **DOE** UNDERMINED BY **DOGE**
- VOGTLE 3 & 4 OPERATIONAL IN 2023 & 2024; MATURED DESIGN
- DOW AND X-ENERGY SUBMITTED CONSTRUCTION PERMIT APPLICATION
- GEH BWRX300 SMR – DARLINGTON (KANADA) SMR 300 MWE; ADDITIONAL CANDU UNITS UP TO 6 PROPOSED AS WELL
  - OPG RECEIVED A LICENCE TO CONSTRUCT THE FIRST OF FOUR PLANNED BWRX-300s AT DARLINGTON FROM THE CANADIAN NUCLEAR SAFETY COMMISSION,
  - US TVA CONNECTED TO THE BWRX300 SMR PROGRAM
- **MICROSOFT** SIGNED A DEAL WITH **CONSTELLATION** TO HELP IT RESTART A UNIT OF ITS THREE MILE ISLAND NUCLEAR PLANT – PPA FOR CCA. 100\$/MWH



# ASIA AND THE REST





- THERE ARE ABOUT 145 OPERABLE NUCLEAR POWER REACTORS, AROUND 45 UNDER CONSTRUCTION AND FIRM PLANS TO BUILD ABOUT AN ADDITIONAL 60. MANY MORE ARE PROPOSED
- **CHINA** IS A LEADER WITH 32 UNDER CONSTRUCTION AND 44 PLANNED
- **JAPAN** IS SLOWLY CHANGING THE STANCE, 33 OPERABLE REACTORS (31.7 GWe) THOUGH MANY OF THESE ARE TEMPORARILY SHUTDOWN, 2 UNDER CONSTRUCTION (2.8 GWe). AIM IS AT LEAST 20 % BY 2030 (DOWN FROM 30 % PRIOR TO FUKUSHIMA)
- **INDIA** 24 OPERABLE REACTORS (8.1 GWe), 6 UNDER CONSTRUCTION (5.2 GWe), 14 PLANNED (9.4 GWe).
- **SOUTH KOREA** 26 OPERABLE REACTORS (25.8 GWe), 3 UNDER CONSTRUCTION (4.2 GWe), 1 PLANNED (1.4 GWe)\*.
- **UZBEKISTAN** 6 RITM-200N (55 MWe) REACTORS – PREPARATION STARTED THIS YEAR; **KAZAKHSTAN** 2 PLANNED REACTORS (2.4 GWe); **PAKISTAN** - 6 OPERABLE REACTORS (3.3 GWe), 1 UNDER CONSTRUCTION (1.2 GWe).
- **TURKEY 4 AKKUYU** REACTORS UNDER CONSTRUCTION (4,8 GWe). 8 REACTORS PROPOSED (9,6 GWe)
- **EGYPT** EL-DABAA NUCLEAR POWER PLANT WILL CONSIST OF FOUR VVER-1200 UNITS, 4.8 GWe TOTAL.
- **UAE** – BARRAKAH WAS FINISHED IN 2024

|            | Power Reactors Operable | Power Reactors Under Construction | Power Reactors Planned | Research Reactors Operable | Other Stages of the Fuel Cycle |
|------------|-------------------------|-----------------------------------|------------------------|----------------------------|--------------------------------|
| Australia  |                         |                                   |                        | 1                          | UM                             |
| Bangladesh |                         | 2                                 |                        | 1                          |                                |
| China      | 58                      | 32                                | 44                     | 16                         | UM, C, E, FF                   |
| India      | 24                      | 6                                 | 14                     | 5                          | UM, FF, R, WM                  |
| Indonesia  |                         |                                   |                        | 3                          | FF                             |
| Japan      | 33                      | 2                                 |                        | 3                          | C, E, FF, R, WM                |
| Kazakhstan |                         |                                   | 2                      | 4                          | UM                             |
| S. Korea   | 26                      | 3                                 | 1                      | 2                          | C, FF                          |
| N. Korea   |                         |                                   |                        | 1                          | C?,FF?,R                       |
| Malaysia   |                         |                                   |                        | 1                          |                                |
| Pakistan   | 6                       | 1                                 |                        | 2                          | UM, E, FF                      |
| Uzbekistan |                         |                                   | 6                      |                            | UM                             |
| Vietnam    |                         |                                   |                        | 1                          |                                |
| Total      | 147                     | 44                                | 66                     | 40                         |                                |



## Who in Africa is ready for nuclear power?



| Ready by 2030         | Potentially Ready by 2030                                 | Potentially Ready by 2050 | No ranking due to conflict                  |
|-----------------------|---|---------------------------|---|
| Egypt<br>South Africa | Ghana<br>Uganda<br>Morocco<br>Kenya<br>Algeria<br>Tunisia | Rwanda<br>+12 more        | Nigeria<br>Sudan<br>Burkina Faso<br>+8 more |

Source: [Global Market for Advanced Nuclear Map](#), Energy for Growth Hub & Third Way, 2024

