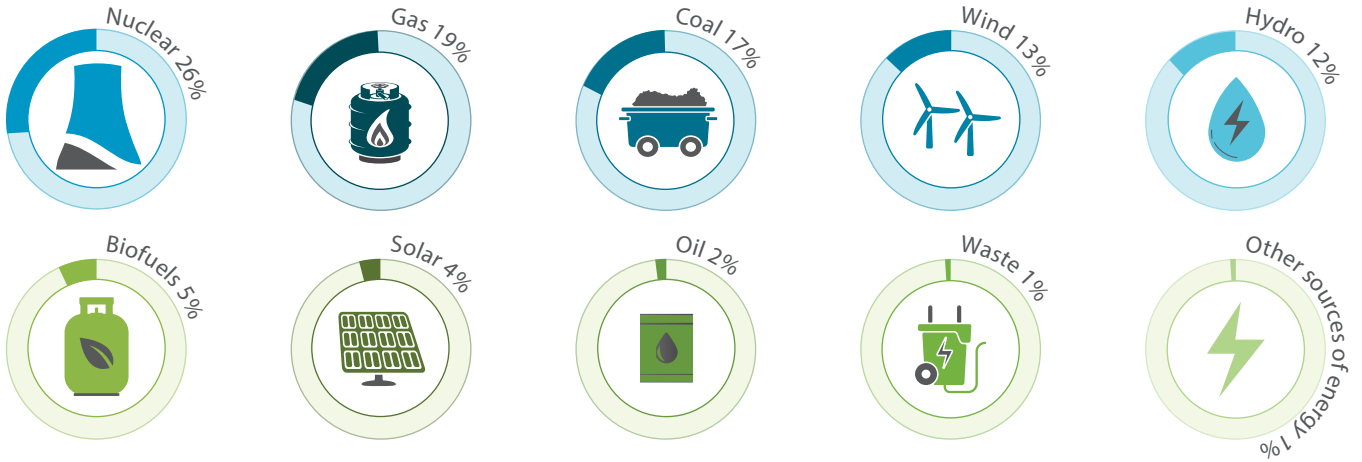


NUCLEAR INDUSTRY IN THE EU

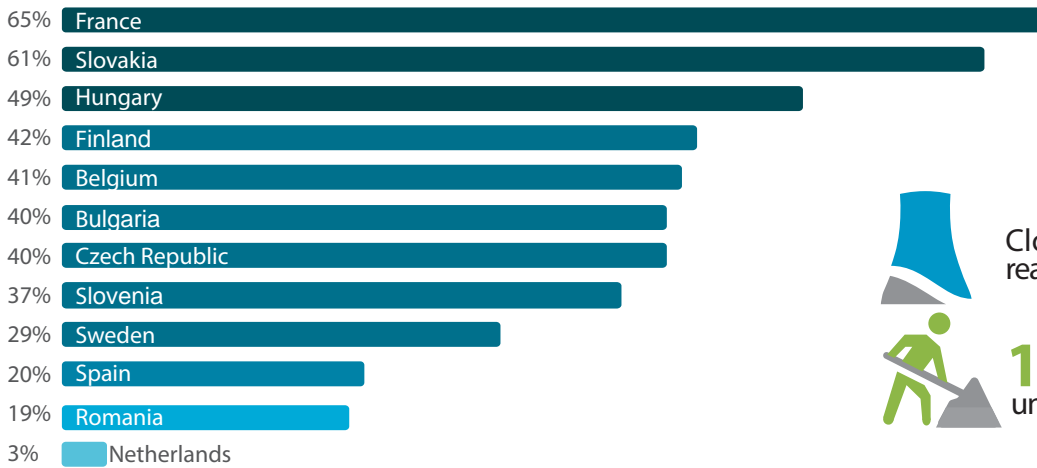
Generates 26 % of the EU's electricity

Electricity generation by technology (% in 2019)



© nucleareurope - Source: IEA

Generates electricity in 12 countries

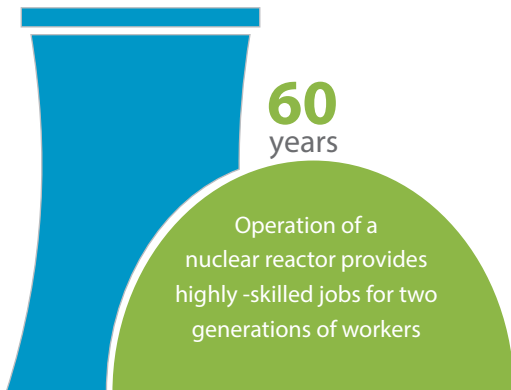


Close to **30** nuclear reactors planned

1 nuclear power plant under construction

© nucleareurope - Source: PRIS 2024

Creating jobs that drive employment and prosperity



© nucleareurope - Source: Deloitte 2019

The European nuclear industry supports

1 million jobs



The construction of one new reactor (EPR) in the EU generates up to

10,000

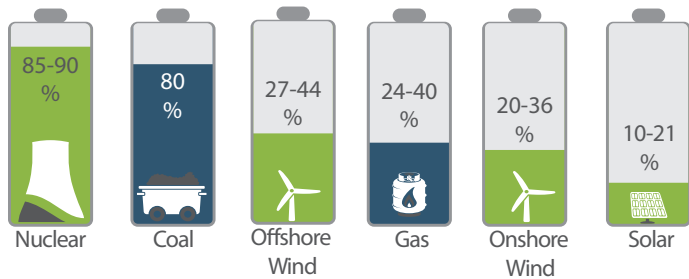
jobs in total



COMPETITIVENESS OF NUCLEAR ENERGY

Providing reliable energy...

Energy performance*



*% of rated capacity factor

© nucleareurope - Source: ASSET project, "Technology pathways in decarbonisation scenarios", 2018

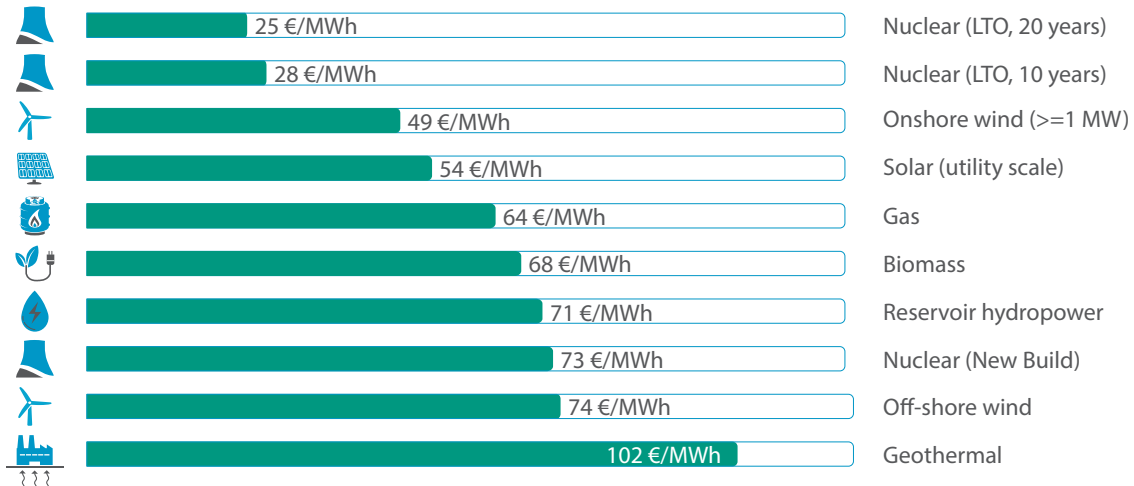
Nuclear produces electricity at full power
85 to > 90%
 of the time thus
 enhancing security of supply



© nucleareurope - Source: NEI 2012

...at prices you can afford

Comparison of median LCOE (levelized cost of electricity) for different technologies in Europe (7% discount rate)*



*LCOE metrics are not sufficient to characterize the competitiveness of different power generating technologies. A comparison should include system costs, i.e. networks and flexibility costs in addition to the sole production costs.

© nucleareurope - Source: IEA 2020

Contributing to the EU's economy

€94 bn

Direct impact



€357.4 bn

Indirect impact

€451.4 bn

GDP generated by the nuclear sector in the EU



1 GW of installed nuclear capacity generates...



€4 bn in EU GDP



Nearly 10,000 jobs in the EU economy



€3 bn annual household income in the EU



Nearly €1 bn annual public revenues in the EU



€9 bn annual investment throughout the EU



€0.15 bn annual EU trade surplus

© nucleareurope - Source: Deloitte 2019

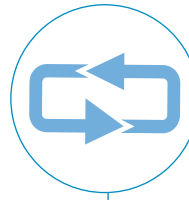
SECURITY OF ENERGY SUPPLY

Harnessing abundant natural resources



Identified resources of uranium are sufficient to support continued use and significant growth of nuclear for well over

120 years



New reactor designs and recycling fuel could increase this to

1,000s of years



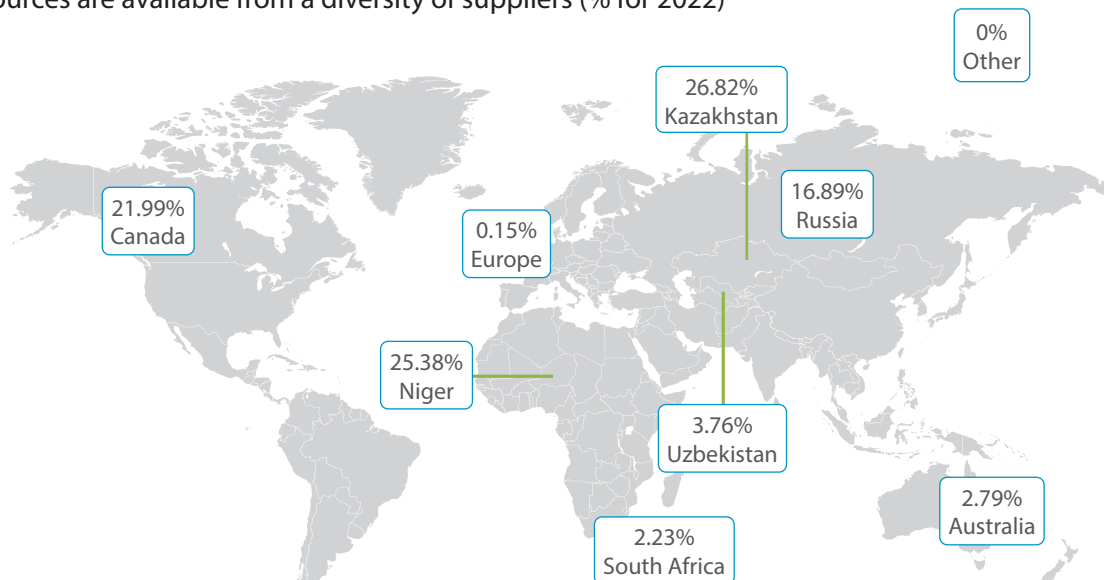
Additional exploitable resources would extend this to well over

300 years

© nucleareurope - Source: *Uranium 2014: Resources, production and demand*, IAEA 2014

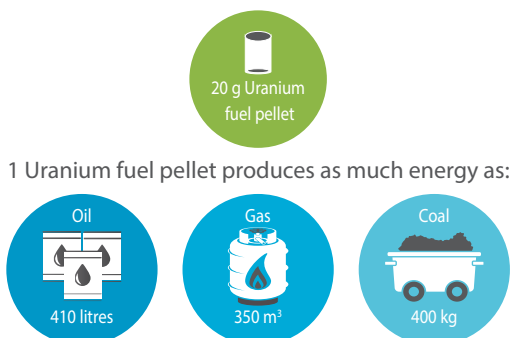
Who supplies uranium to the EU?

Uranium resources are available from a diversity of suppliers (% for 2022)



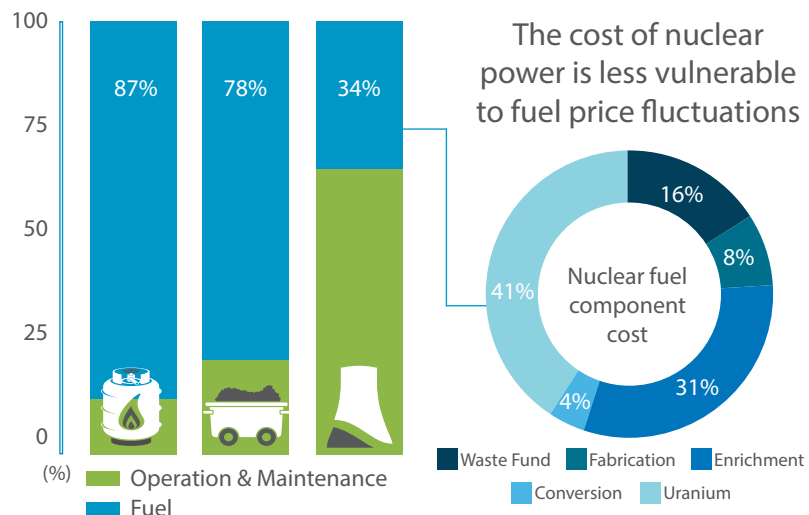
© nucleareurope - Source: EURATOM Supply Agency 2023

Providing an independent source of energy at a stable price



© nucleareurope - Source: OECD NEA 2023

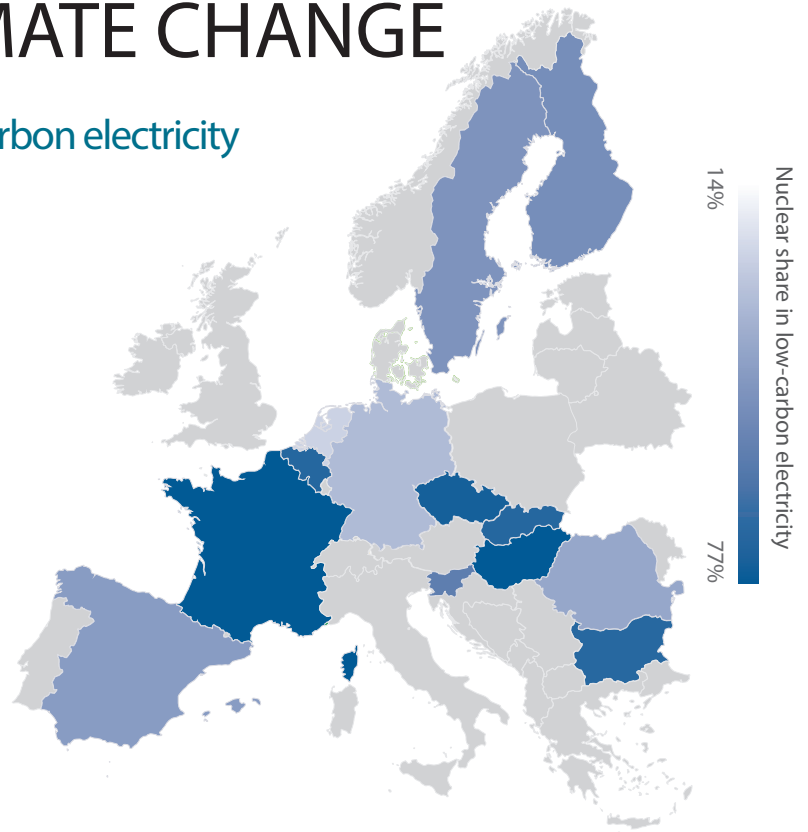
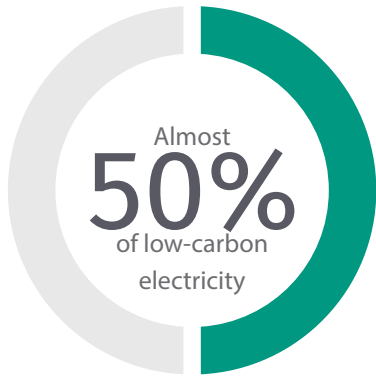
Breakdown of operating costs for nuclear, coal and gas generation



© nucleareurope - Source: World Nuclear Association 2017, Nuclear Energy Institute

NUCLEAR AND CLIMATE CHANGE

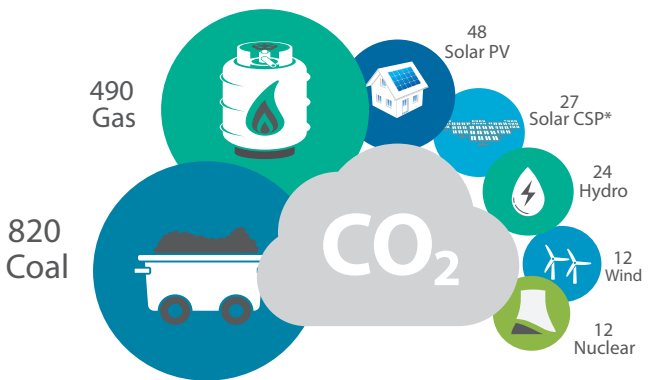
Generating almost half of the EU's low-carbon electricity



© nucleareurope - Source: Eurostat 2021

Contributing to the fight against climate change by avoiding CO₂, SO₂ and NO_x emissions

The amount of CO₂ emitted by nuclear energy is comparable to that of renewables.

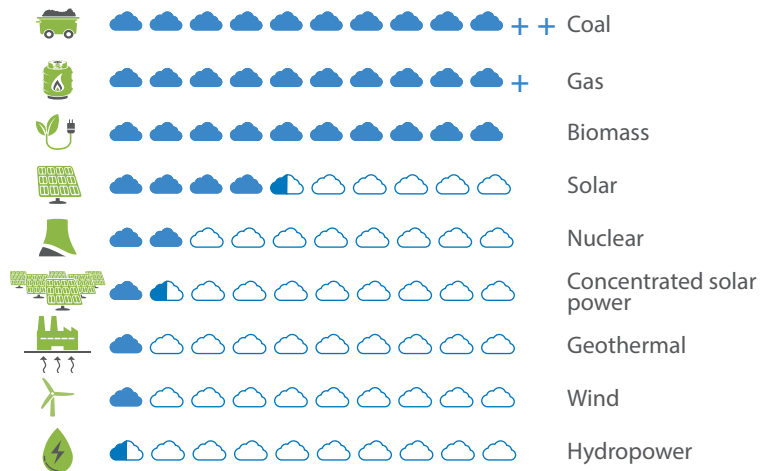


Comparison of average greenhouse gas emissions (grammes CO₂ eq/kWh)

*Concentrated Solar Power

© nucleareurope - Source: IPCC 2014

Average lifecycle SO₂ and NO_x emissions of different generation technologies



© nucleareurope - Source: Masanet et al. 2013

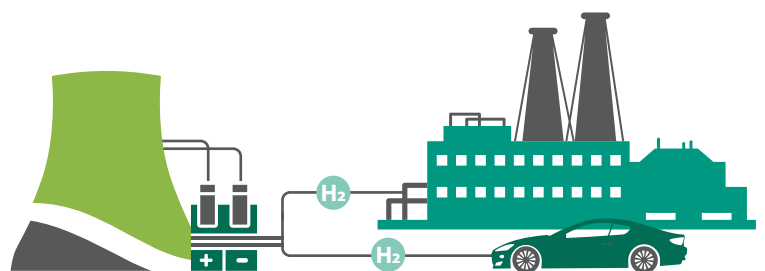
Hydrogen production

Hydrogen produced from nuclear is:



© nucleareurope

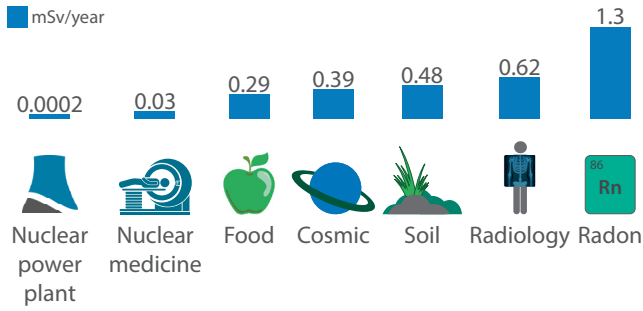
Nuclear-based hydrogen can help hard-to-decarbonise sectors reach their decarbonisation goals



NUCLEAR AND HEALTH

Protecting people from radiation

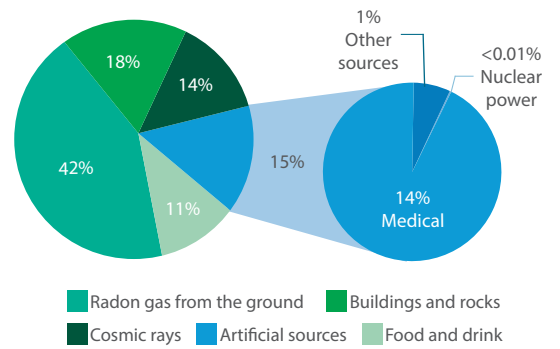
Average public exposure to radiation by sources*



* Rounded estimations of the effective dose to a person in a year (world average)

© nucleareurope - Source: UNEP, "Radiation effects and sources", 2016

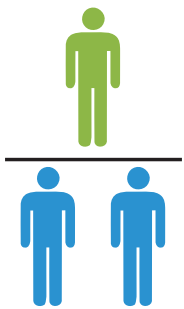
Background Radiation



© nucleareurope - Source: World Nuclear Association 2017

Saving people with nuclear medicine

Radiation and radioactive isotopes are used in the diagnosis and treatment of disease



1 person out of 2 will benefit from nuclear medicine during their life



Diagnosis

Chest X-ray, abdominal scan, cardiovascular imaging

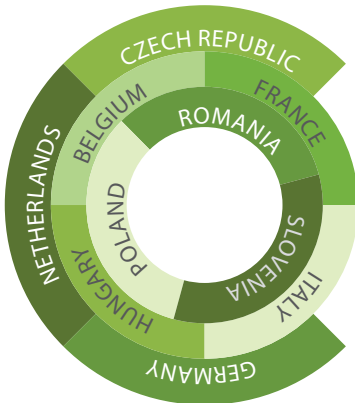
Treatment

Nearly half of cancer patients receive nuclear treatment

© nucleareurope - Source: Belgian Nuclear Forum

Radioactive isotope production in the EU

Countries operating isotope production reactors in the EU



© nucleareurope - Source: RRDB 2022

6 nuclear research reactors provide about **95%** of the world's Mo-99 or Lu-177 production. **4** of them are in the EU.

The most frequently used radioisotope is Technetium-99m for which the EU is the...



Largest producer (>60% of the global production)



Second largest consumer (20% of global consumption)

© nucleareurope - Source: EURATOM Supply Agency 2019 and Nuclear Medicine Europe

RADIOACTIVE NUCLEAR WASTE

Sources of radioactive waste



Nuclear Power Plants



Industry



Hospitals



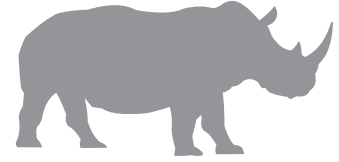
Research centres



Universities etc...

On average, each year one person generates:

1.36 tonnes of total waste



270 kg

Municipal solid waste



54 kg

Hazardous waste



54 g

Radioactive waste



© nucleareurope - Source: OECD/NEA 2015 & The World Bank 'What a Waste 2.0' 2018

Types of radioactive waste and their distribution per category (2016)



Very low level waste (VLLW)

E.g., concrete



Low level waste (LLW)

E.g., scrap metal



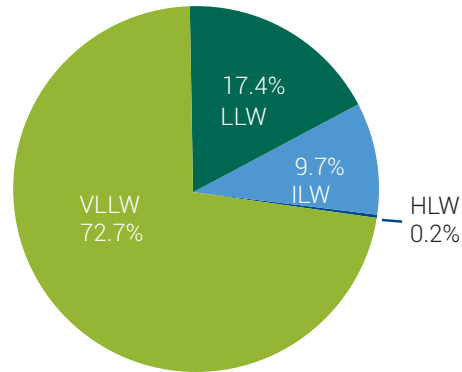
Intermediate level waste (ILW)

E.g., nuclear reactor components



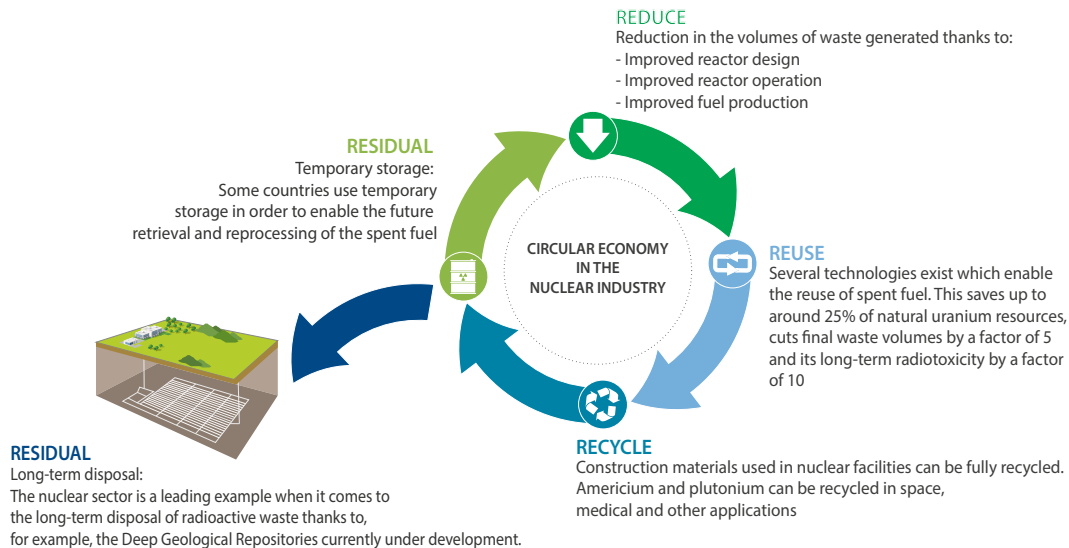
High level waste (HLW)

E.g., by-product of fuel reprocessing



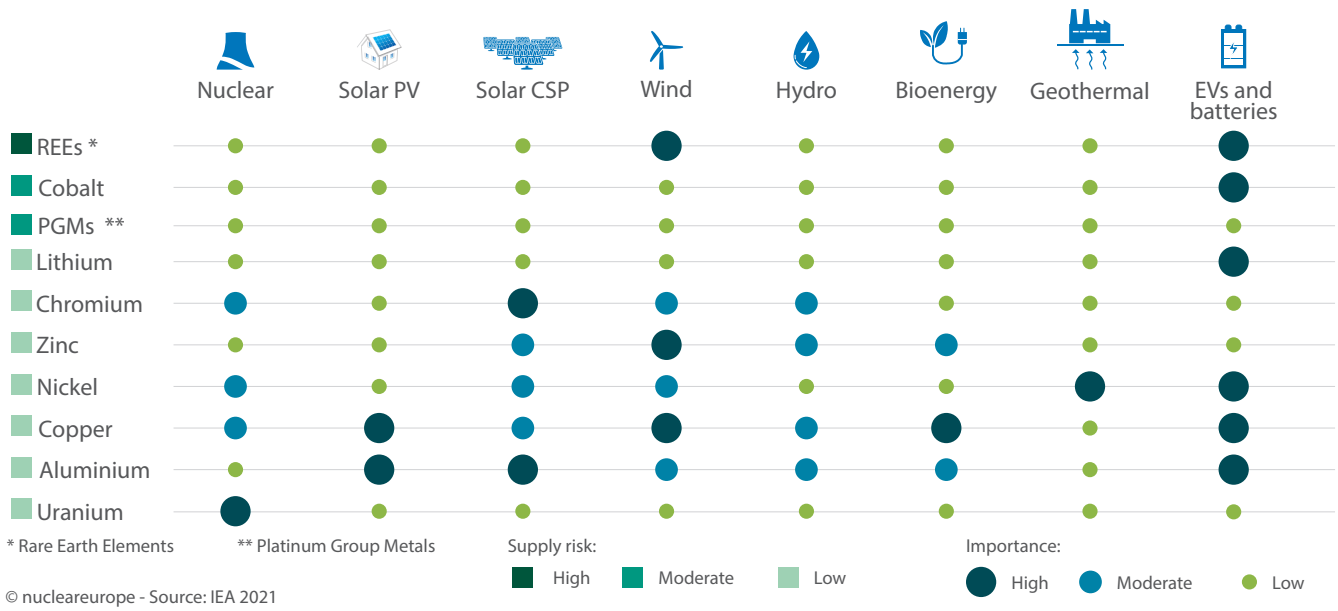
© nucleareurope - Source: 2016, Report from the Commission to the Council and the European Parliament on progress of implementation of Council Directive 2011/70/EURATOM and an inventory of radioactive waste and spent fuel present in the Community's territory and the future prospects

Applying a circular economy approach to radioactive waste

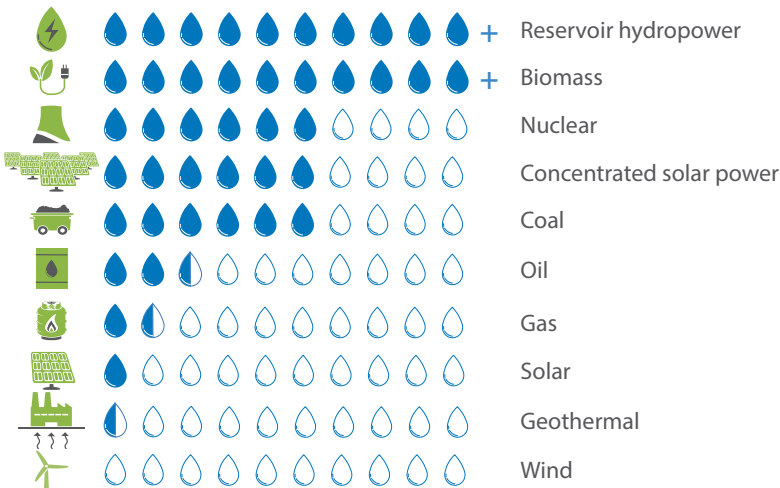


SUSTAINABILITY OF NUCLEAR

Raw materials use



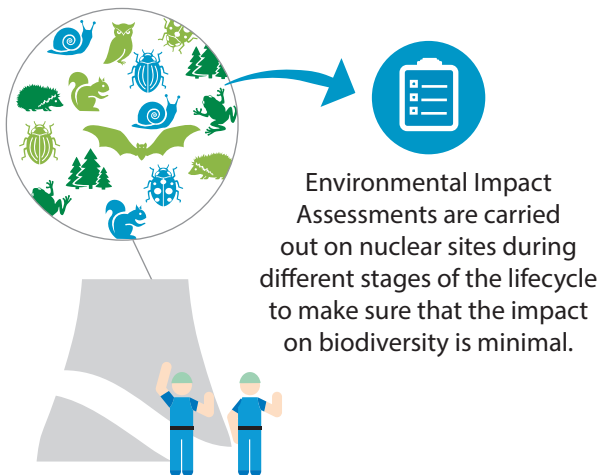
Water use



Issues related to water consumption and potential thermal pollution of nuclear energy must be appropriately handled during the site selection, facility design and plant operation phases. Issues related to thermal pollution do not affect nuclear power plants located on coasts, that use seawater for cooling.



Biodiversity impact and land use



Land required by different energy sources to match the amount of electricity produced by a 1,800 MW nuclear power plant.

437 km²

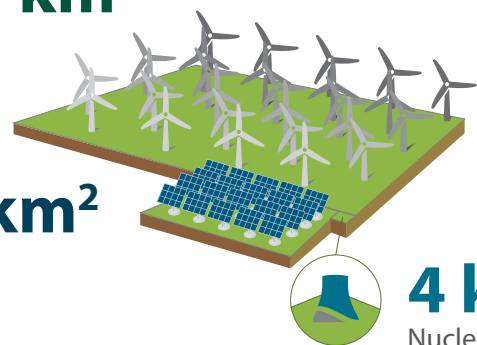
Wind

56 km²

Solar

4 km²

Nuclear

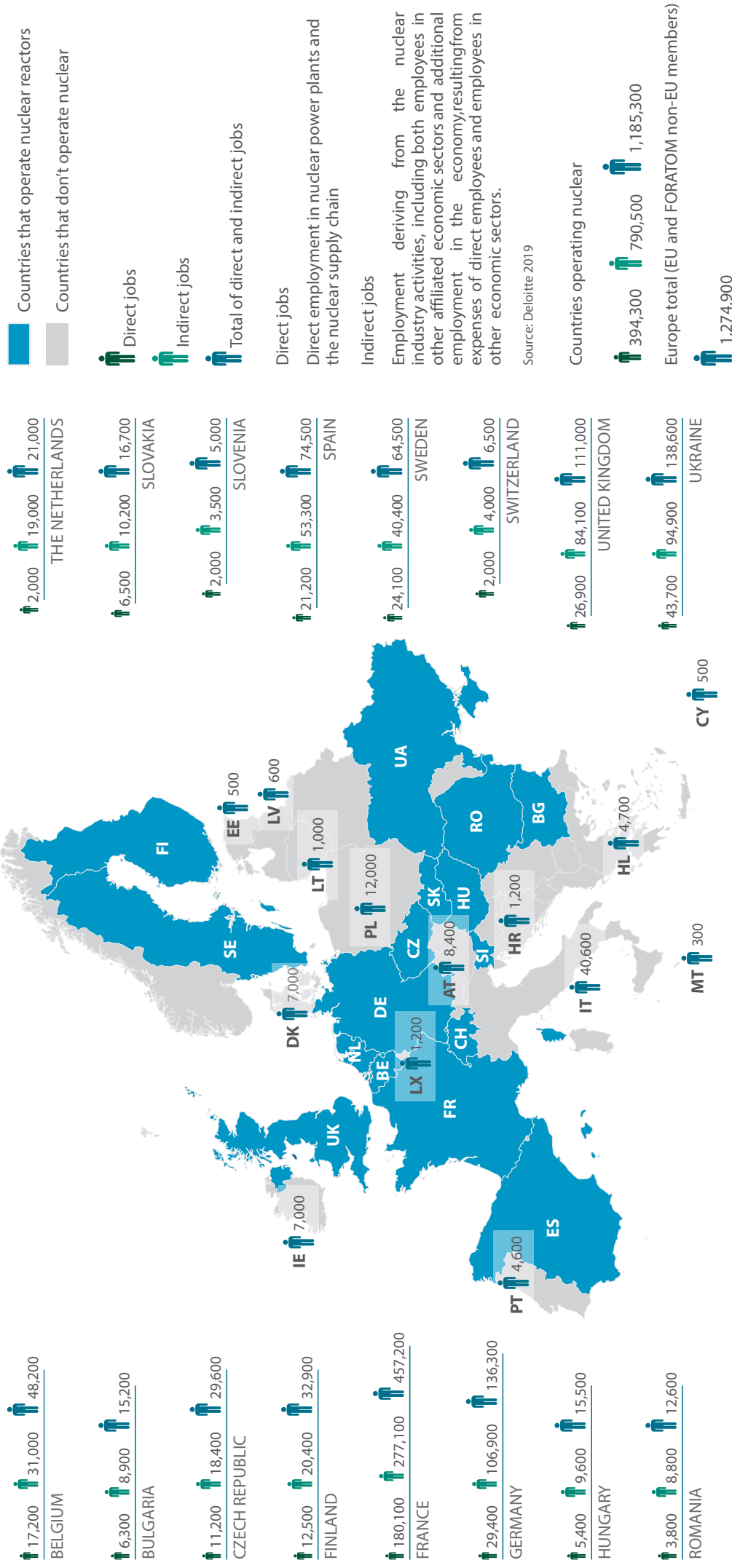


© nucleareurope - Source: European Commission - JRC 2021

© nucleareurope - Source: Entergy Arkansas, Inc.

EUROPE-WIDE JOBS MAP

The civil nuclear industry supports around 1,3 million jobs in Europe (EU and nucleareurope non-EU members)



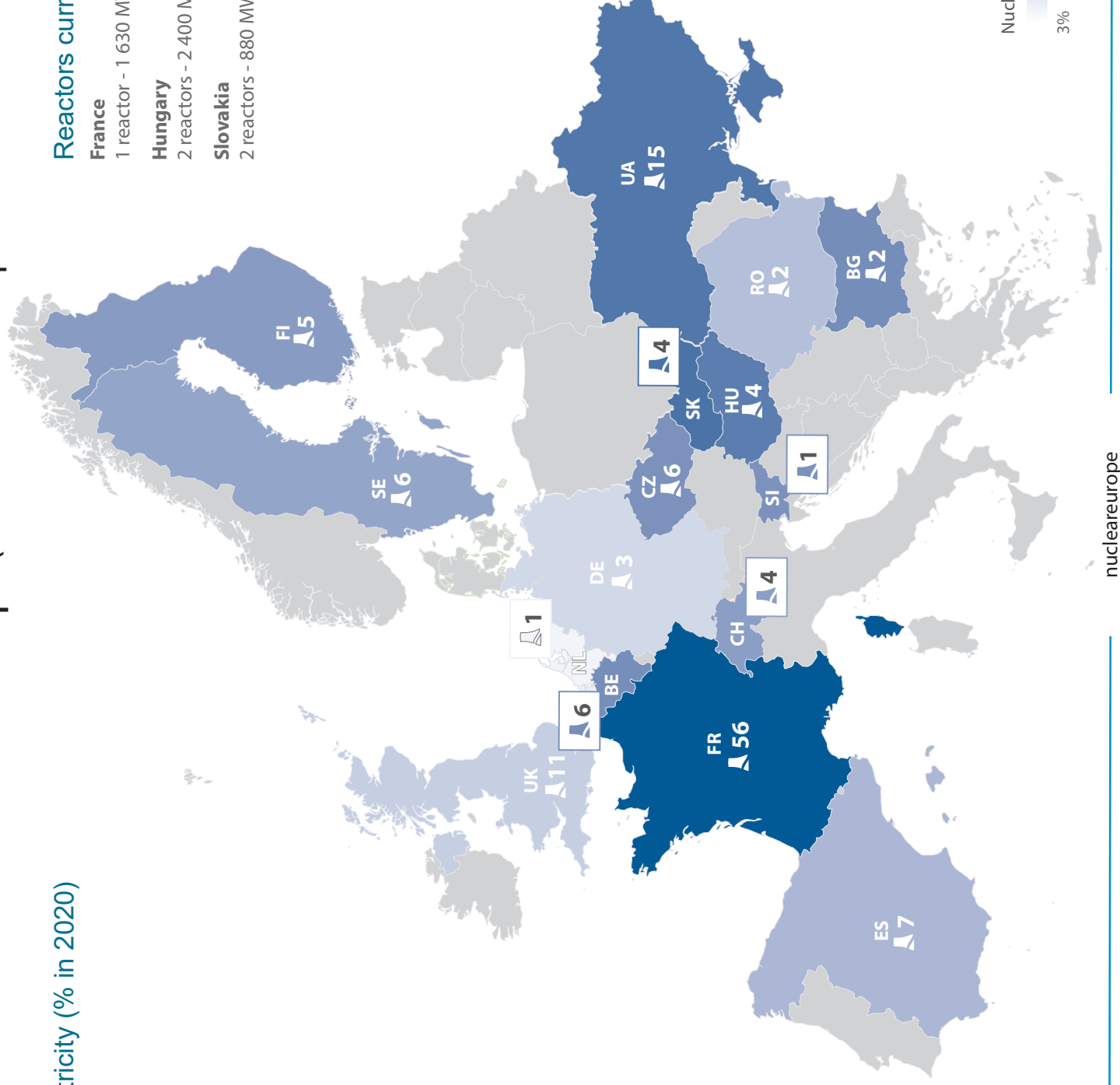
133 Operational nuclear reactors in Europe (EU and nucleareurope non-EU members)

Nuclear share of electricity (% in 2020)

70% France	56 reactors - 61 370 MW
53% Slovakia	4 reactors - 1 865 MW
51% Ukraine	15 reactors - 13 107 MW
48% Hungary	4 reactors - 1 916 MW
40% Bulgaria	2 reactors - 2 006 MW
39% Belgium	6 reactors - 4 936 MW
37% Czech Republic	6 reactors - 3 934 MW
37% Slovenia	1 reactor - 688 MW
33% Finland	5 reactors - 4 394 MW
32% Switzerland	4 reactors - 2 960 MW
29% Sweden	6 reactors - 6 885 MW
22% Spain	7 reactors - 7 121 MW
19% Romania	2 reactors - 1 300 MW
14% UK	11 reactors - 6 848 MW
11% Germany	3 reactors - 4 055 MW
3% Netherlands	1 reactor - 485 MW

Reactors currently under construction

France	1 reactor - 1 630 MW
UK	2 reactors - 3 260 MW
Hungary	2 reactors - 2 400 MW
Ukraine	2 reactors - 2 070 MW
Slovakia	2 reactors - 880 MW



Nuclear share of electricity

3%

70%



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