



# BEAUTIFUL NUCLEAR

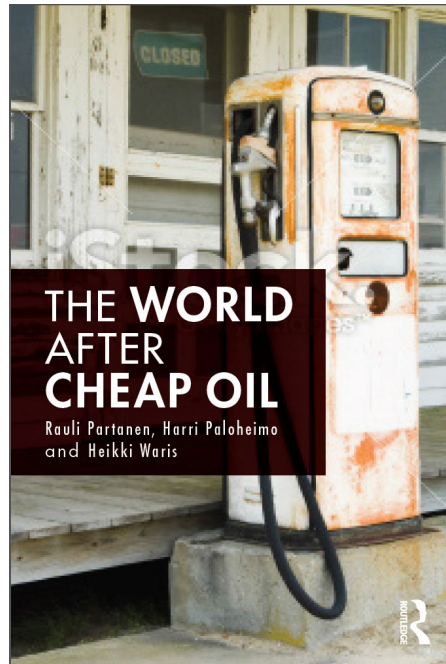
OSKARSHAMN, SWEDEN, CET 2022

THINKATOM

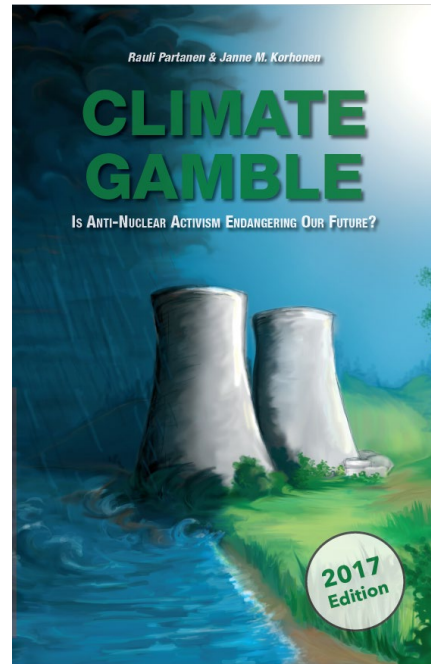


# RAULI WHO?

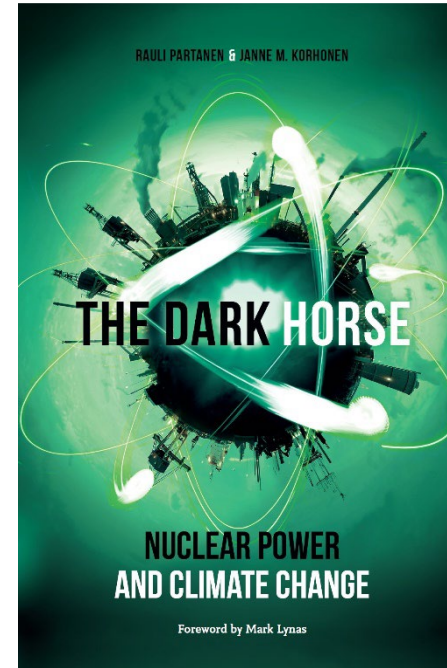
- 🌀 Science writer, analyst, and communicator
- 🌀 Environmental activist (Ecomodernist Society of Finland, RePlanet)
- 🌀 Co-founder & CEO of Think Atom



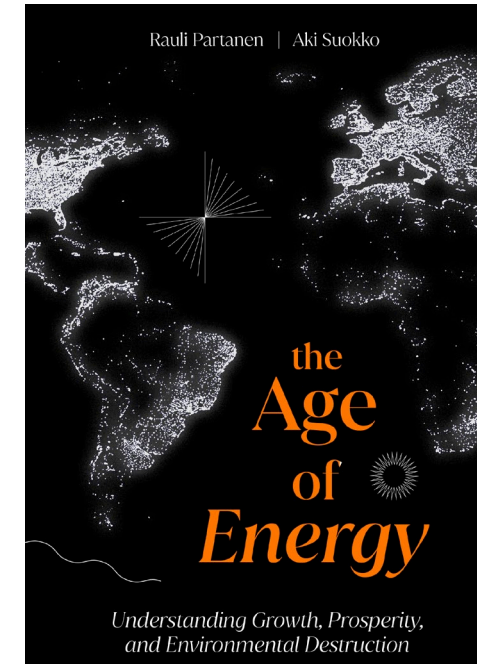
2014



2015



2020



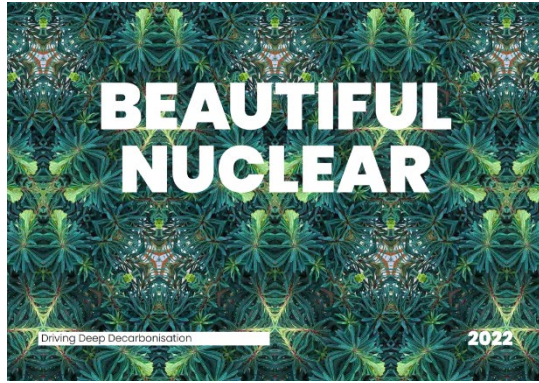
2022



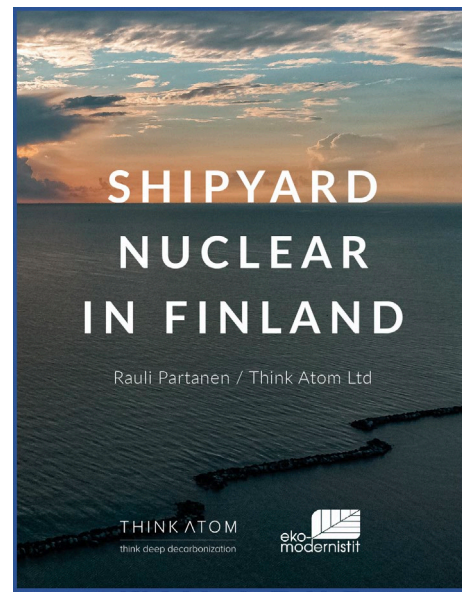
# THINK ATOM

A non-profit,  
independent  
think tank

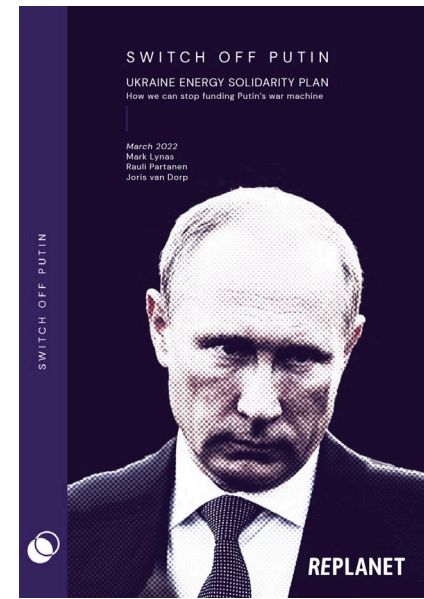
Thinkatom.net/publications



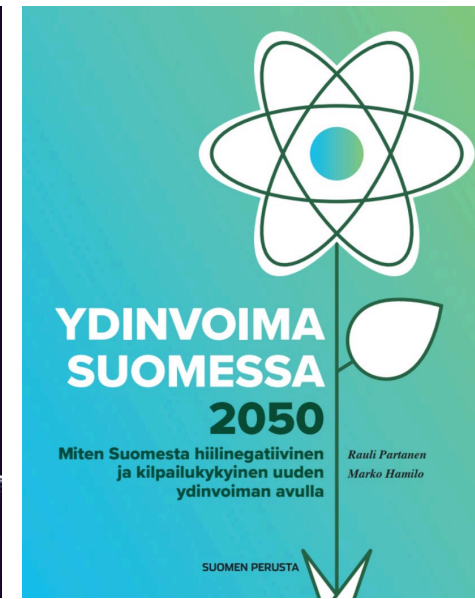
2022



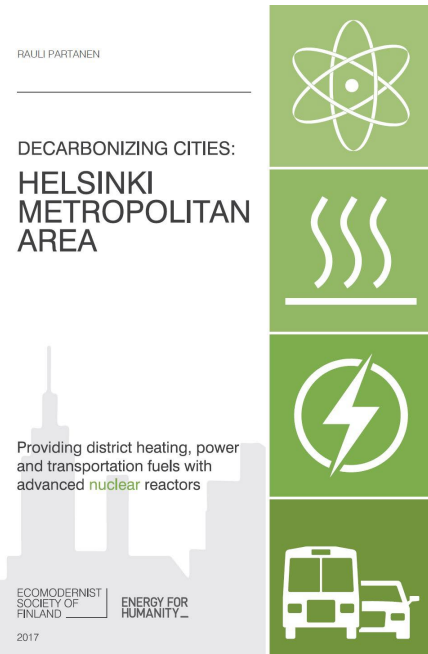
2022



2022



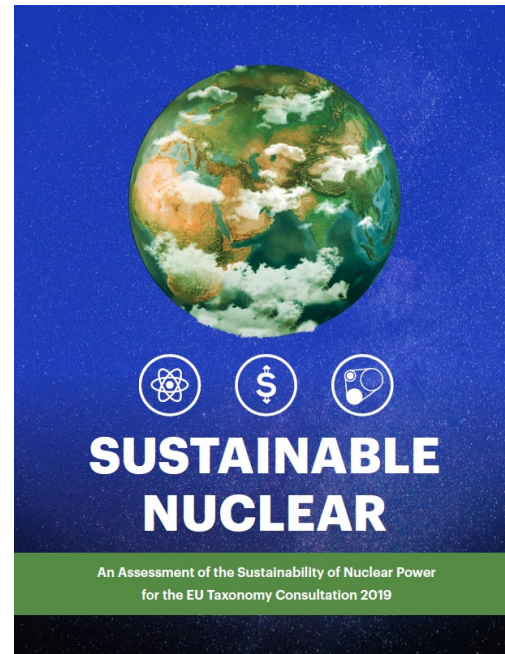
2021



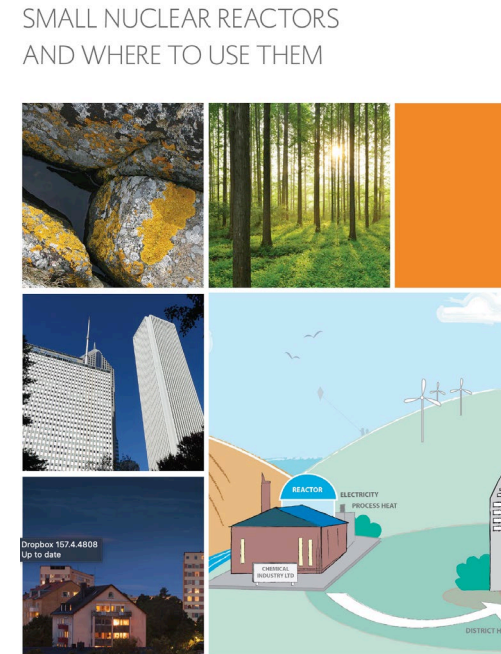
2017



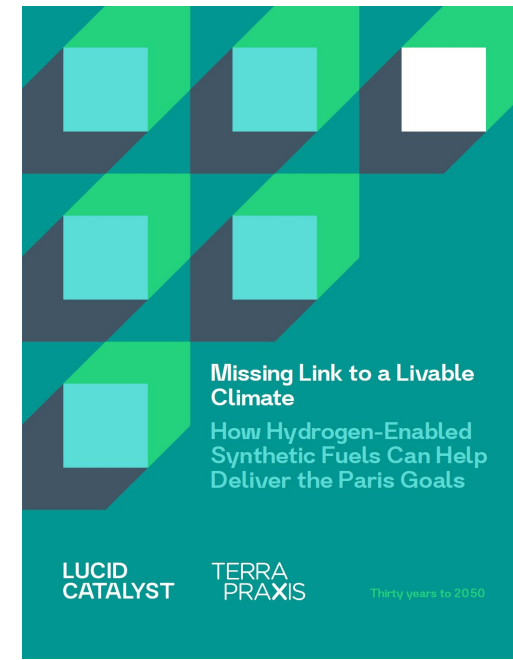
2019



2019

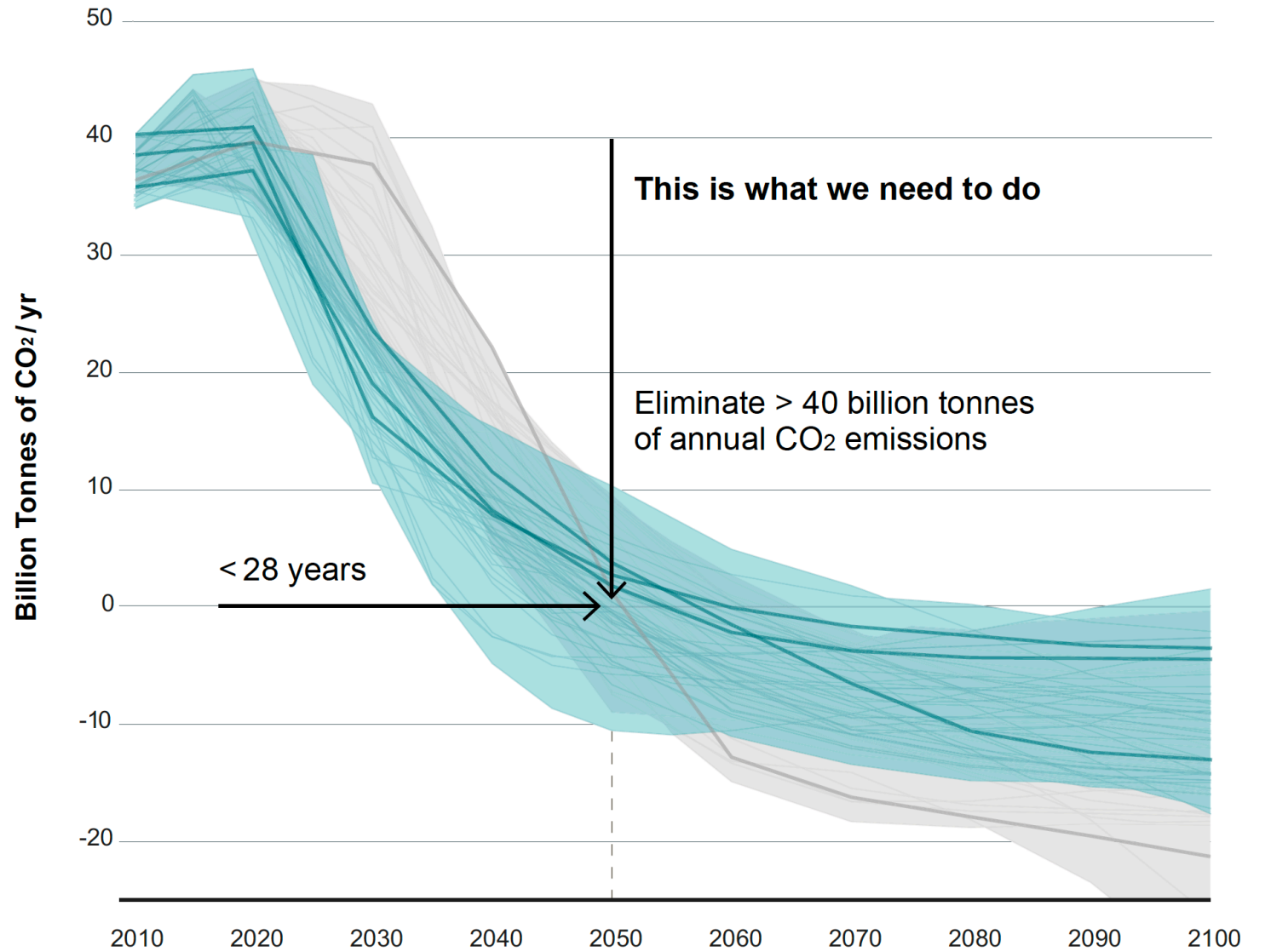


2020



2020

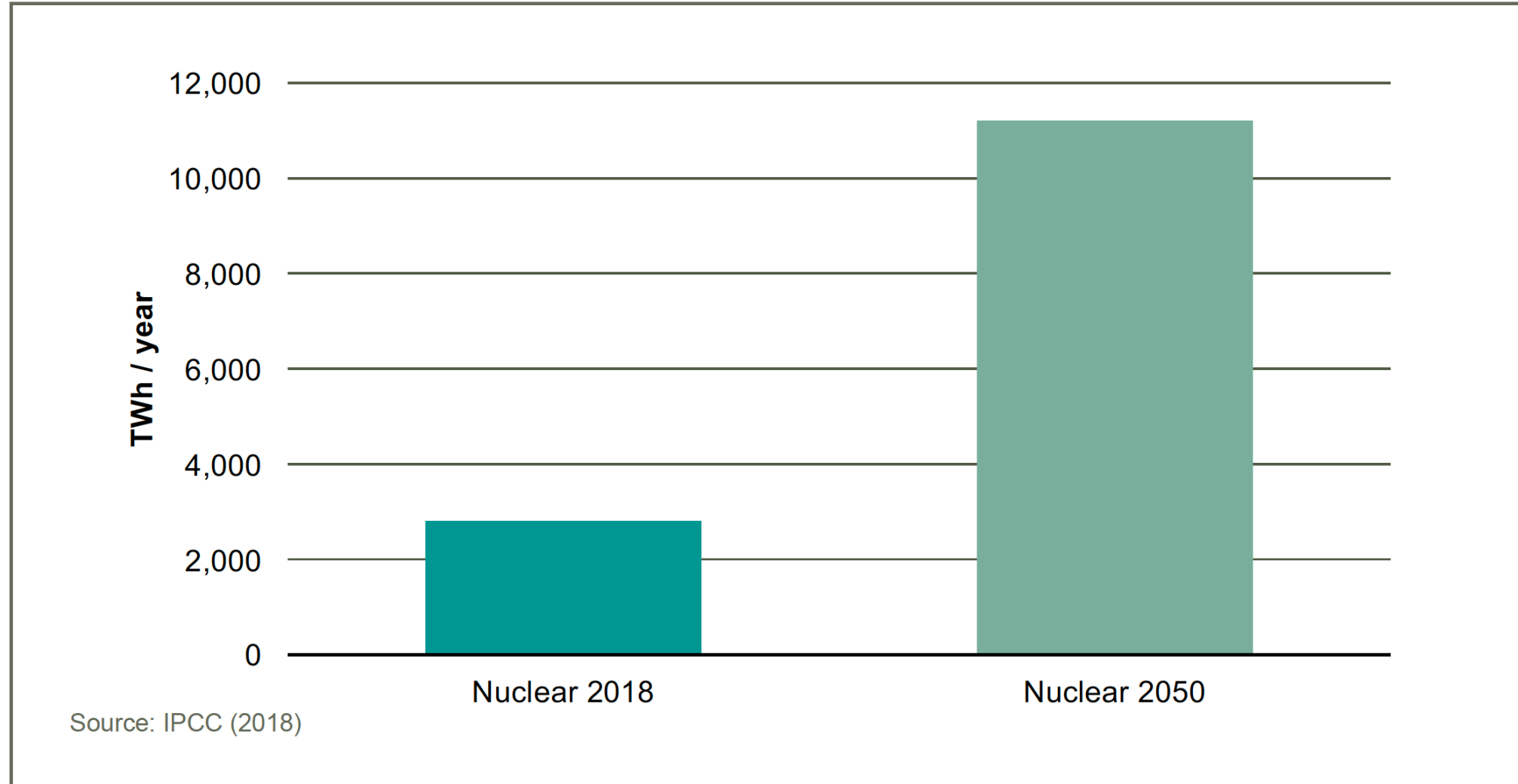
# Scale and Urgency



Source: IPCC (2018)

Figure 2. Projections of global net CO<sub>2</sub> emissions

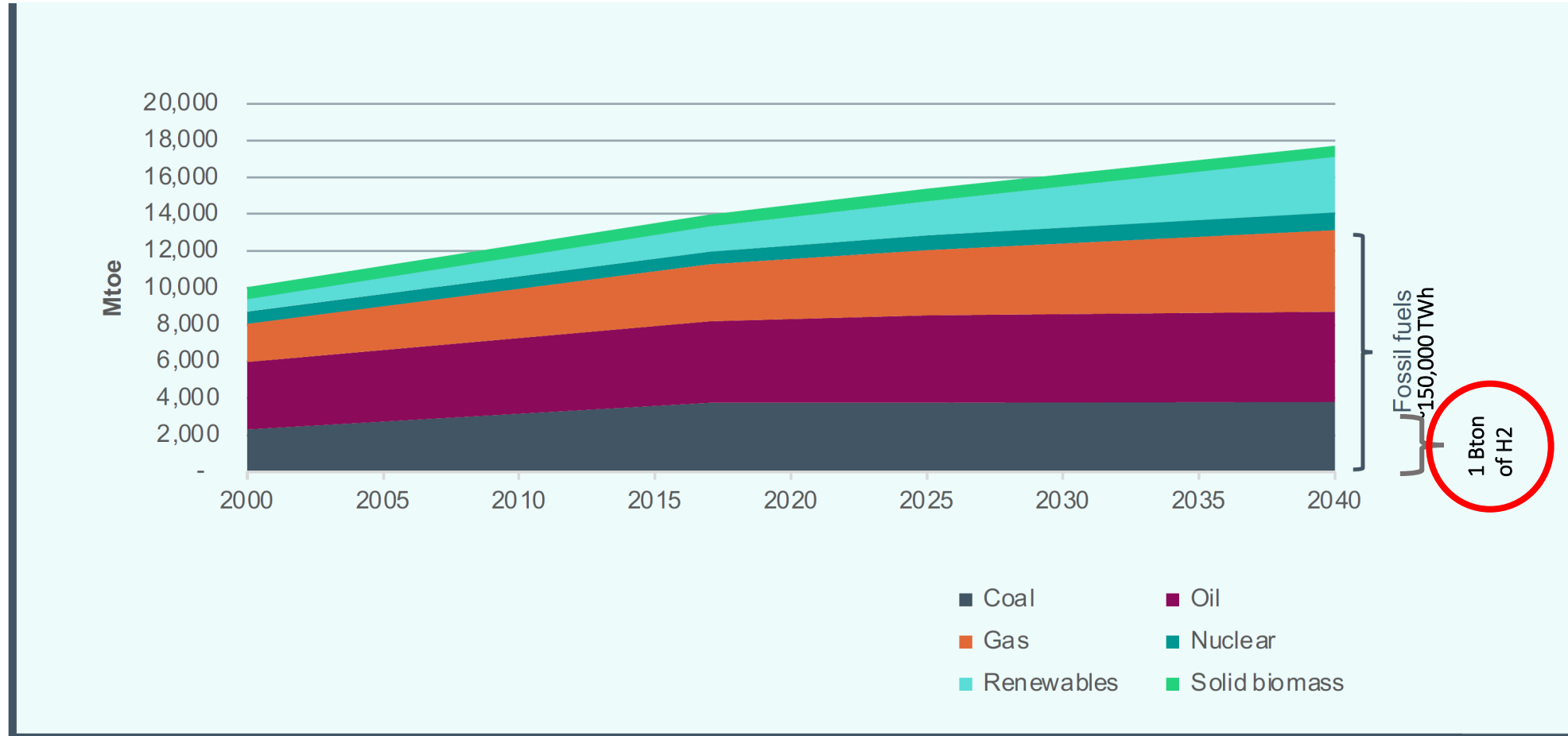
# IPCC on the need for more nuclear



Source: IPCC (2018)

Figure 6. Nuclear generation in 2018 v. 2050 (2050 is IPCC average of four main scenarios)

# THE GLOBAL GAP

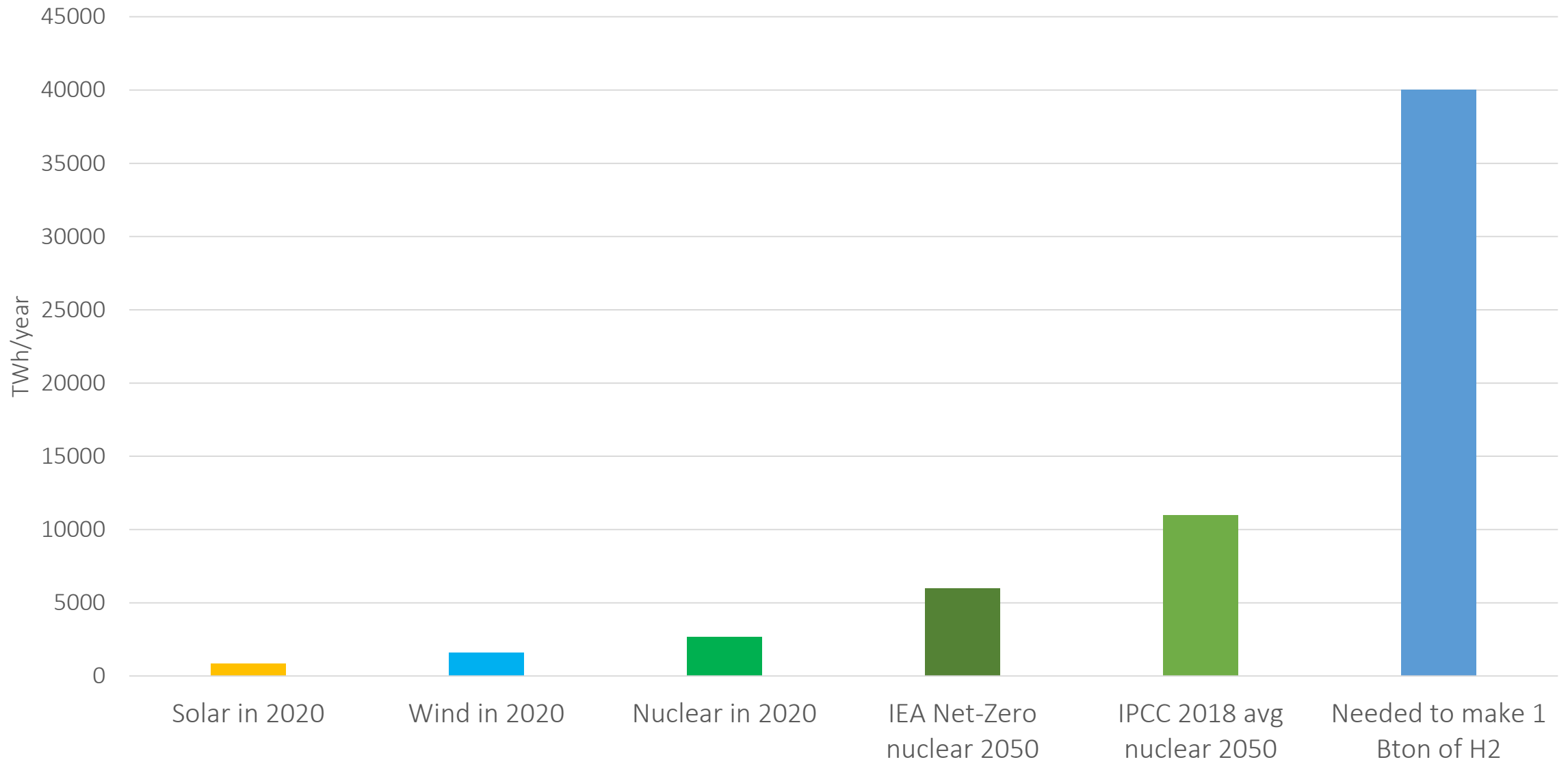


THINK ATOM

Graph: IEA 2019 & LucidCatalyst



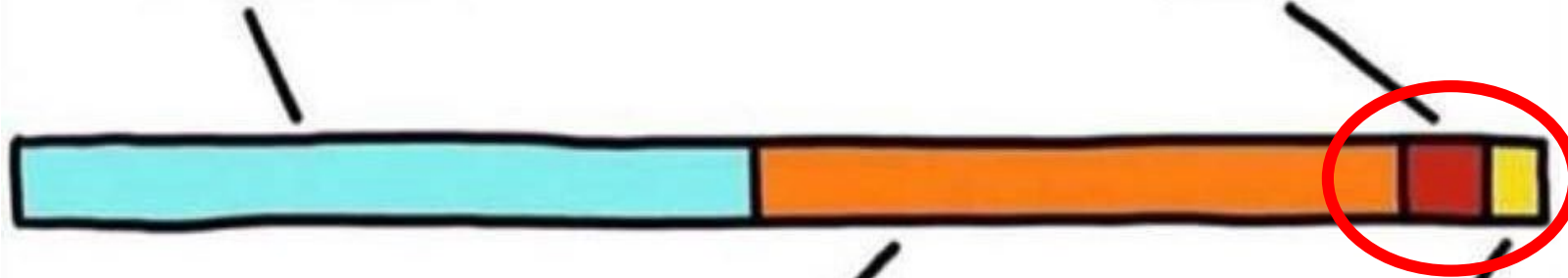
# IT'S ABOUT SCALE



# CLIMATE CHANGE A TIMELINE

@SEMI-RAD

"NUCLEAR POWER IS  
MORE DANGEROUS  
THAN FOSSIL FUELS"



WE ARE  
HERE...


"OK, IT IS NOT. BUT IT  
IS NOT PROFITABLE IN  
A LIBERALIZED ENERGY  
MARKET"

FUCK





# THREE LEVELS OF BEAUTIFUL

- Why nuclear is beautiful? (The facts)
  - Why say out loud that nuclear is beautiful? (To communicate emotions and values)
  - Why feel that nuclear is beautiful? (The purpose, mission and inspiration)
- 

Why nuclear is beautiful?

**“Nuclear is beautiful because its tiny land use and lifecycle footprint protects nature and delivers civilisation-scale, abundant clean energy.” - Kirsty Gogan**



# DO WE CARE ABOUT SUSTAINABLE DEVELOPMENT?

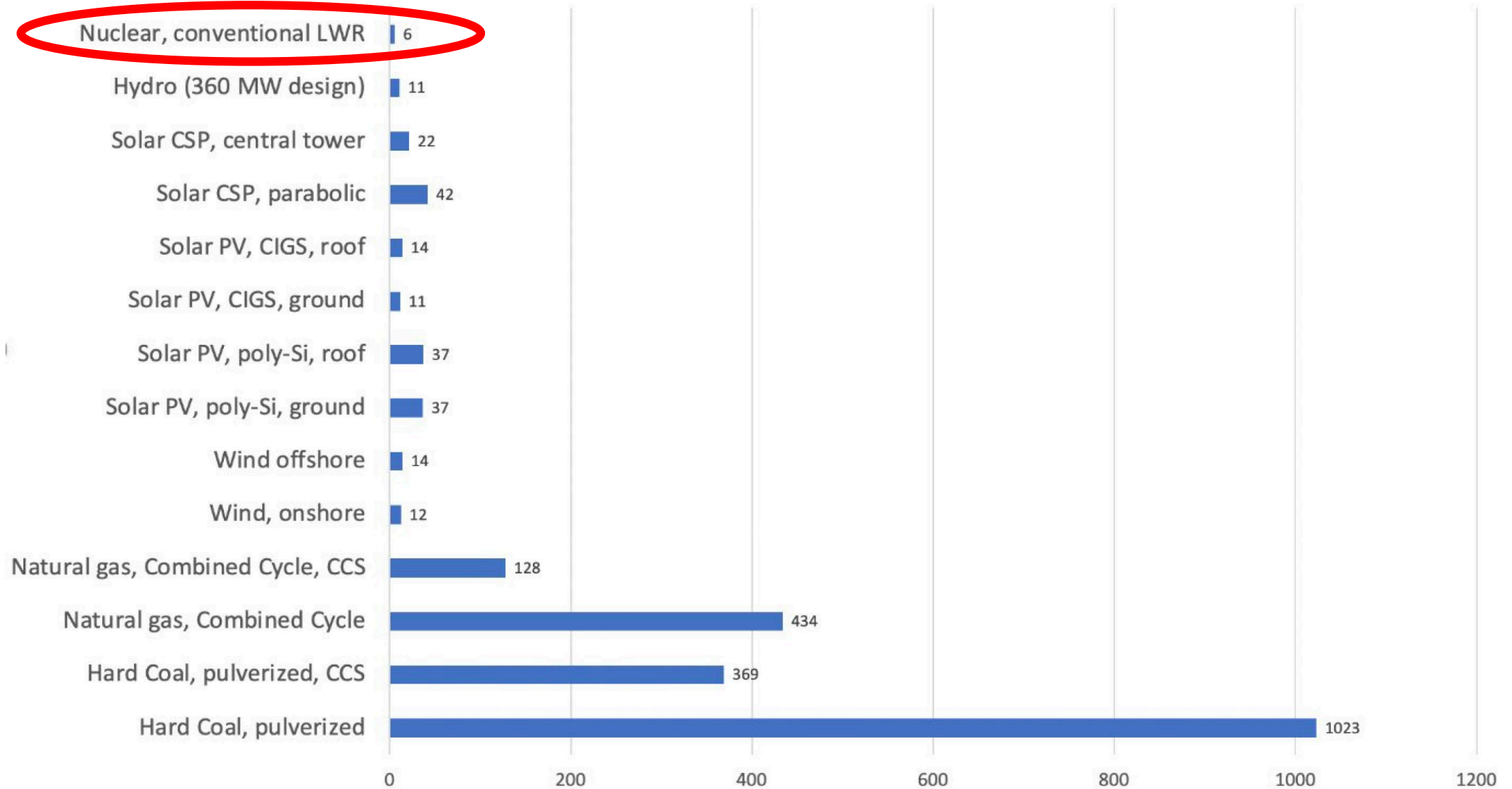
- Nuclear technology contributes to **EVERY SINGLE ONE** of the 17 UN Sustainable Development Goals



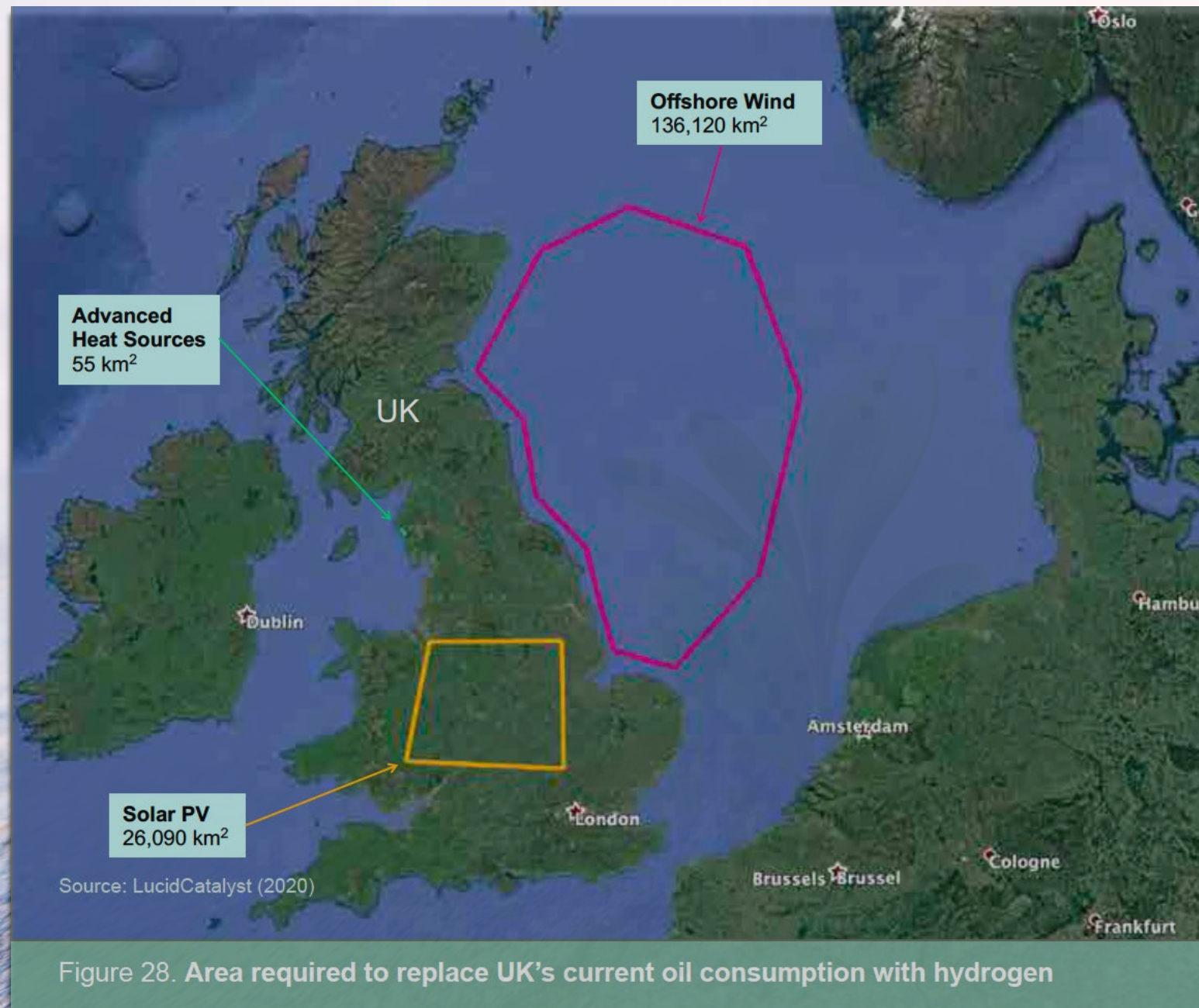
# NUCLEAR IS THE LOWEST CARBON

Lifecycle emissions, Europe 2020, gCO<sub>2</sub>-eq/kWh.

Data: UNECE 2021







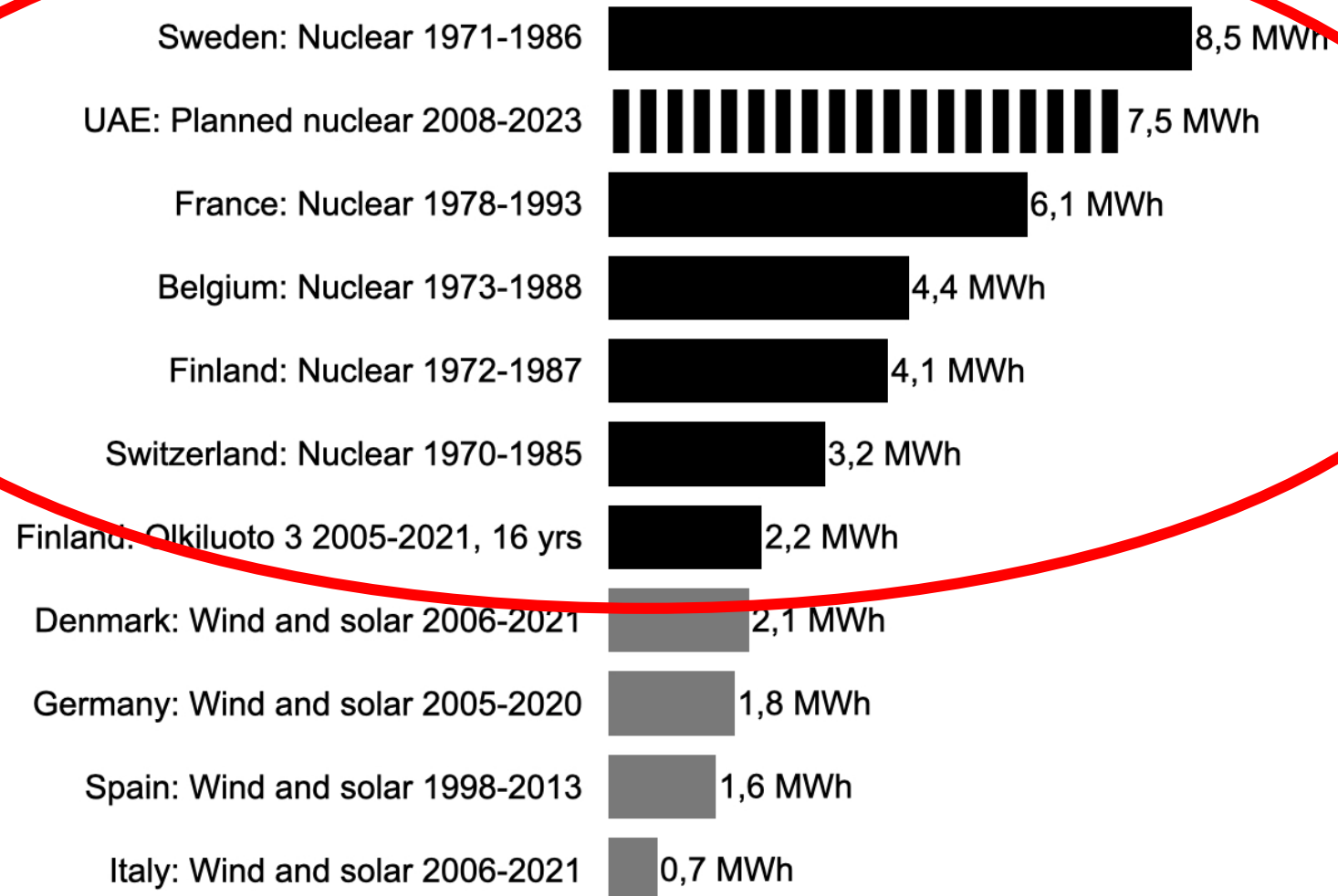
NUCLEAR HAS THE  
SMALLEST  
ENVIRONMENTAL  
FOOTPRINT

Figure 28. Area required to replace UK's current oil consumption with hydrogen

“No other carbon-neutral electricity source has been expanded anywhere near as fast as nuclear.”

Barry Brook & Staffan Qvist

**Best increase in electricity generation per capita over 15-year period**





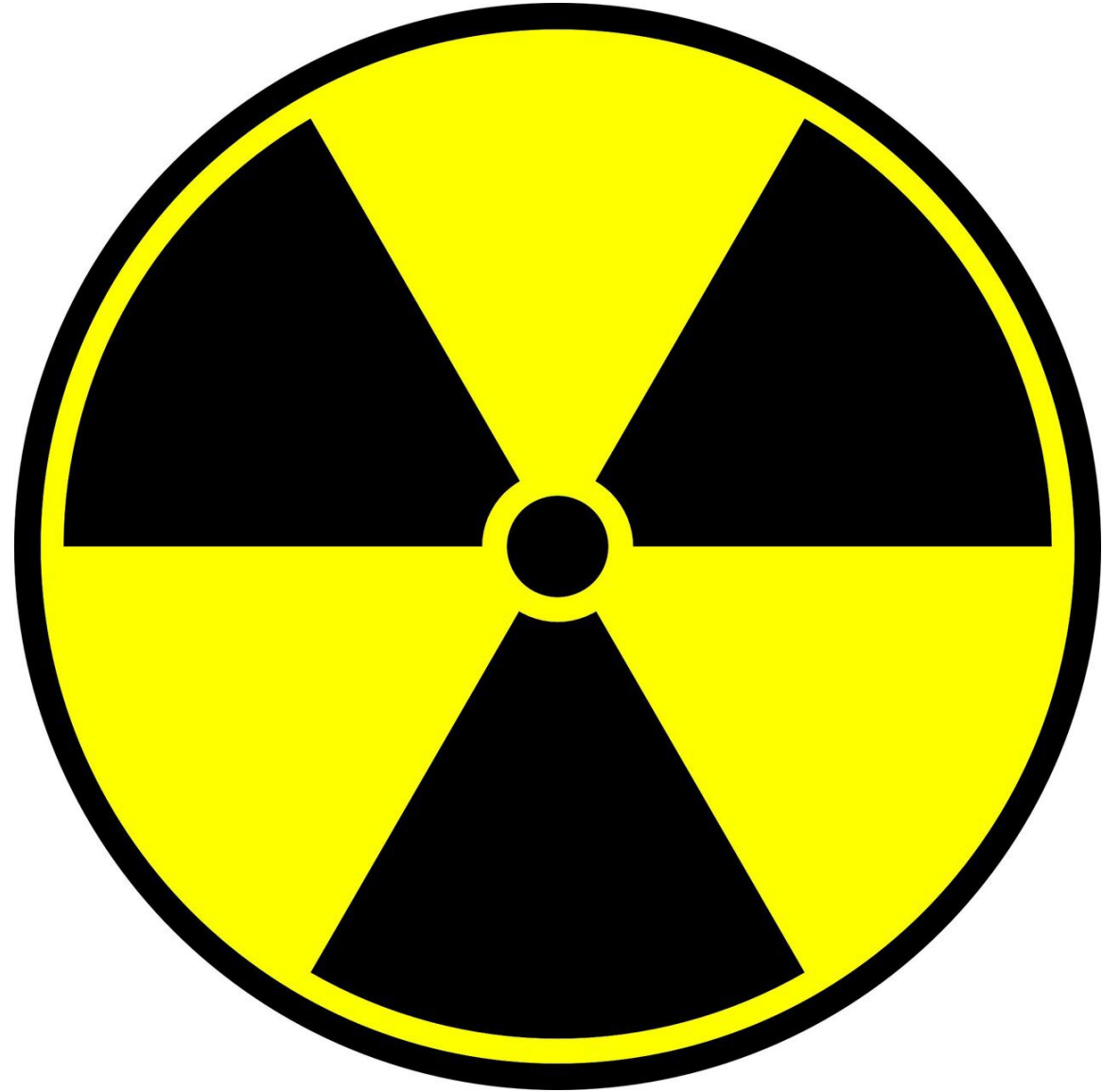
## The Clean Energy Transition Plan

- 1 / Expand clean electricity generation as quickly as possible**
- 2 / Repower most coal plants with advanced heat sources**
- 3 / Convert remaining liquid fuel use to carbon-neutral fuels**
- 4 / Replace natural gas for industry and heat**
- 5 / Massively increase investment in clean electricity generation and clean e-fuels production to support global energy access, especially in Africa**

Nuclear is great for all of these goals!

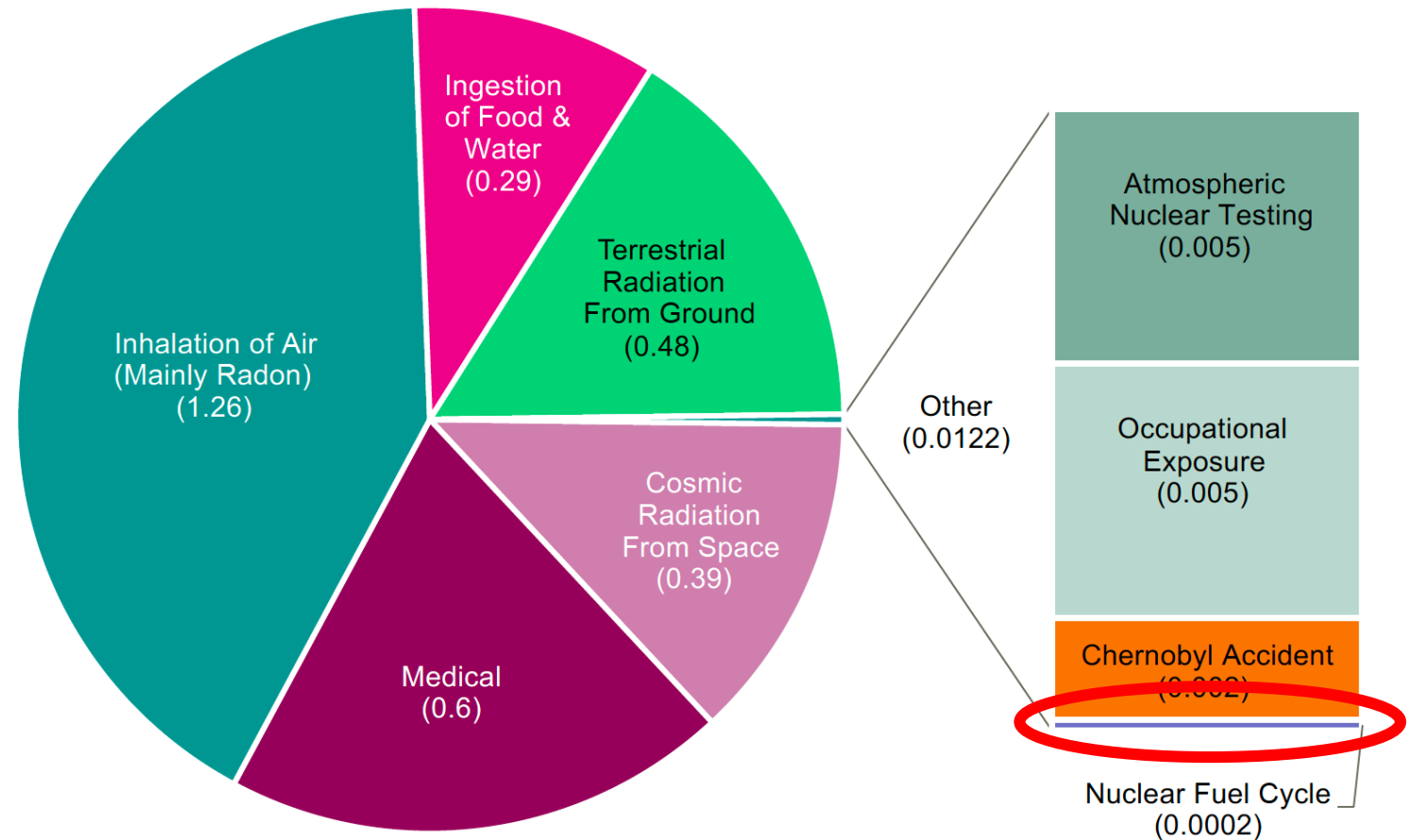


# THE WORRIES



# WHAT ABOUT RADIATION?

- The industry and our society has utterly failed to communicate the scale of the matter.



Source: United Nations Scientific Committee on the Effects of Atomic Radiation (2008)

Units: millisieverts

Figure 32. Sources of global radiation, average annual dose from all sources



# ...AND SPENT FUEL?

---

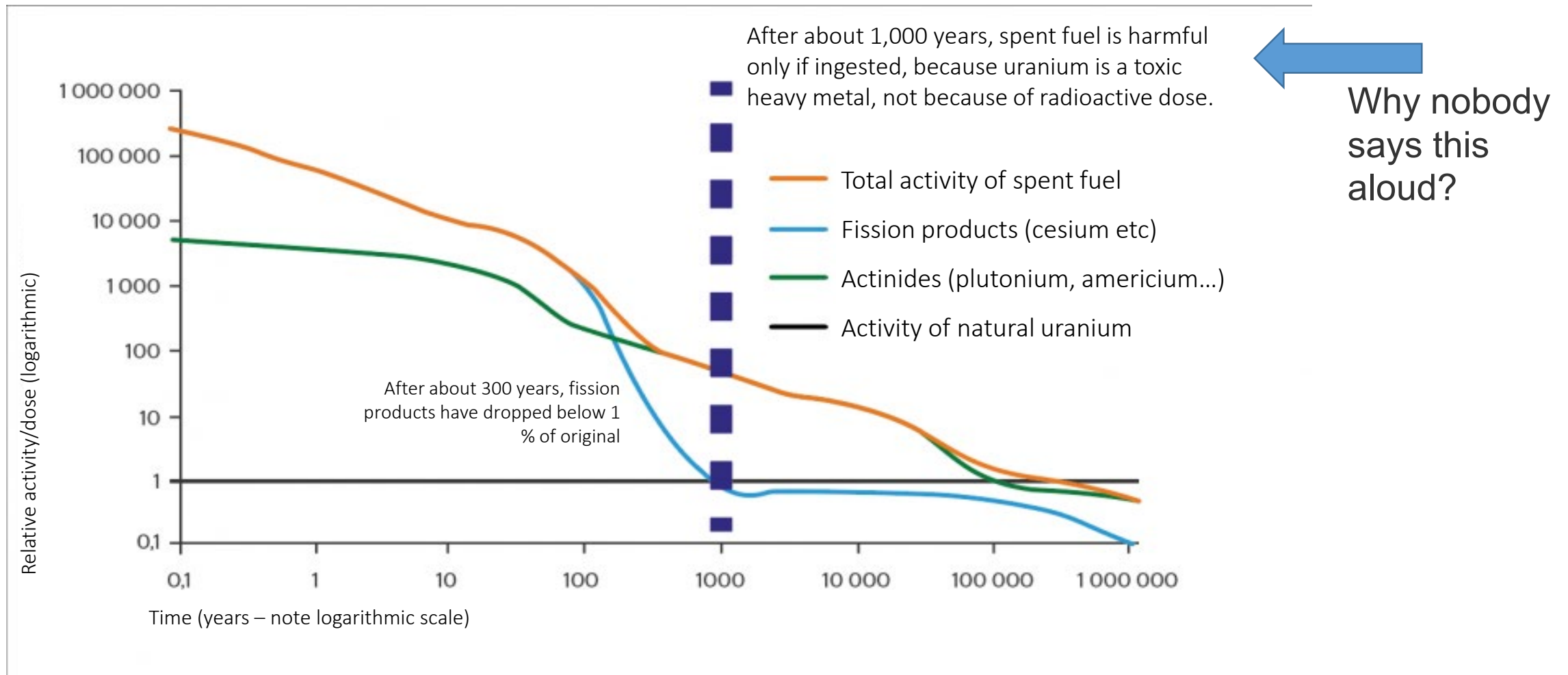
- Spent fuel is so well managed that it has never hurt anyone.
- It gets less harmful with time.
- Deep geological storage has a safety margin of roughly one million times:
  - Worst-case scenario, max dose: 0.00018 mSv/year\*
  - Threshold for health hazard:  
100+ mSv / year




\* Based on Onkalo Deep Repository's environmental assessment.

[http://www.posiva.fi/files/3195/Posiva\\_2012-10.pdf](http://www.posiva.fi/files/3195/Posiva_2012-10.pdf)

# GOING SCIENTIFIC ON SPENT FUEL...





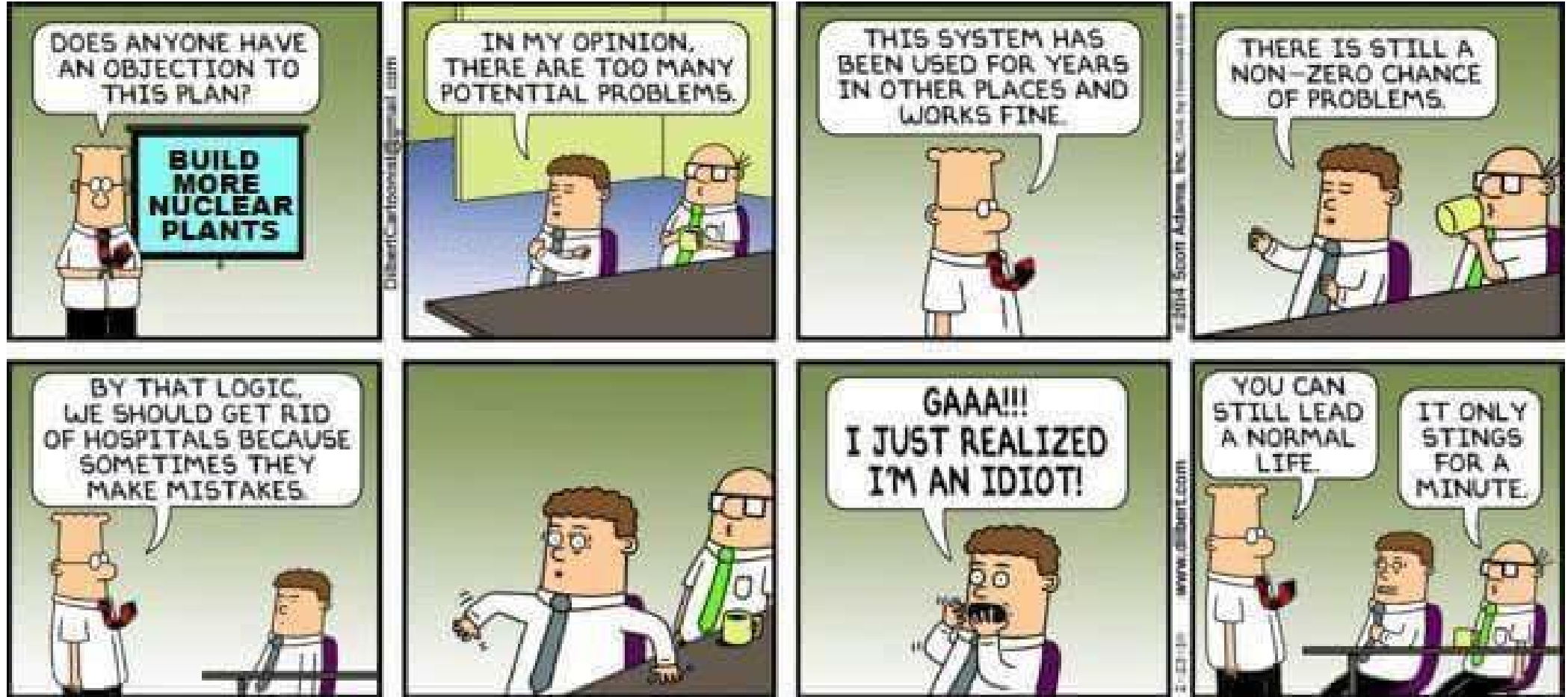


“I think we’re going to look back and ask ourselves how did we let at least five million people die from air pollution every year? It’s totally obscene.”

Isabelle Boemeke, isodope; science communicator



Climate is a big challenge.  
Nuclear is a big, beautiful solution.



THINK ATOM

THANK YOU.

think deep decarbonization

RAULI PARTANEN