

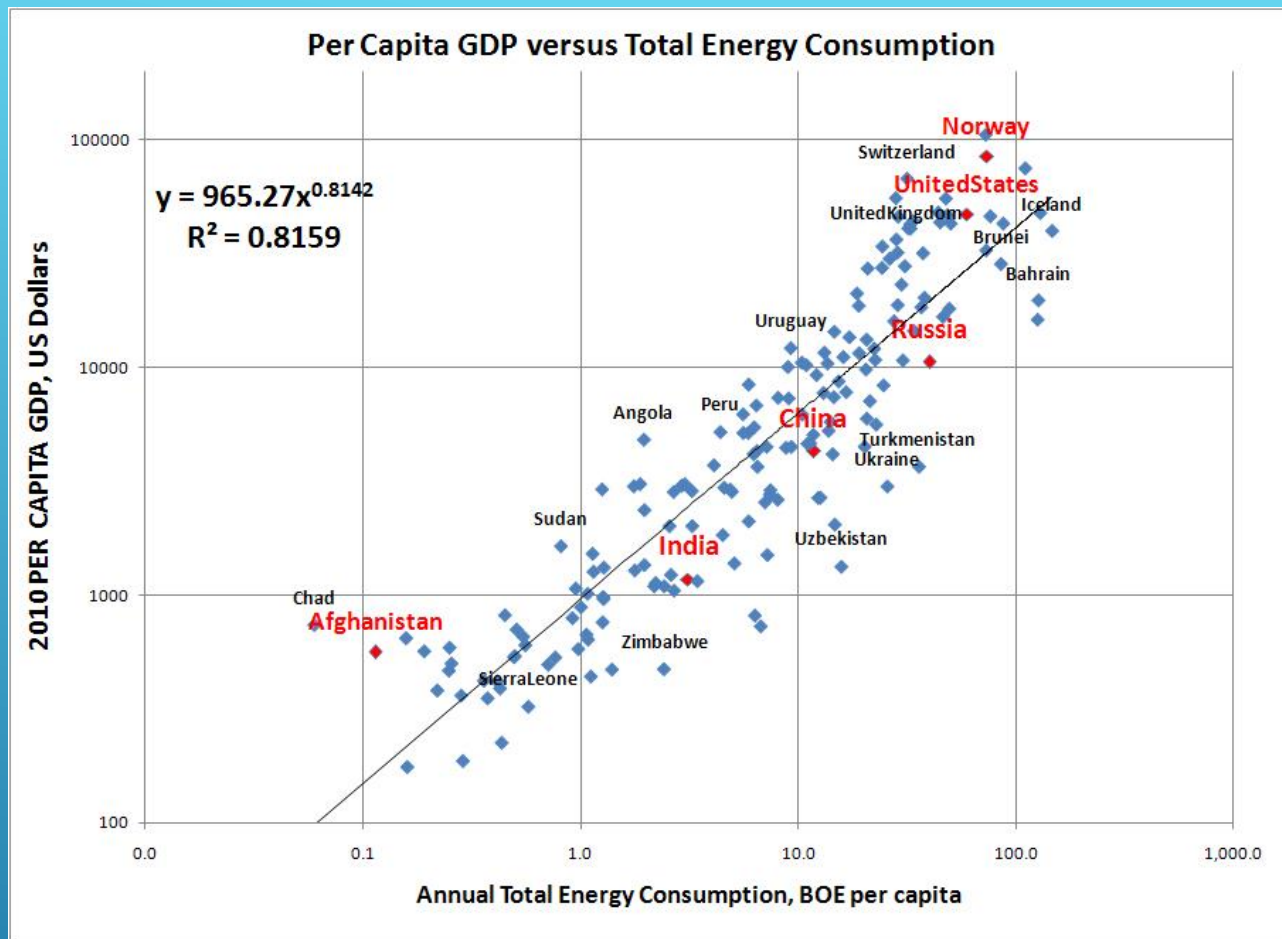
Are we really considering efficiency? A contrarian view

PRESENTATION TO THE SOUTH AFRICAN ENERGY EFFICIENCY
CONFEDERATION

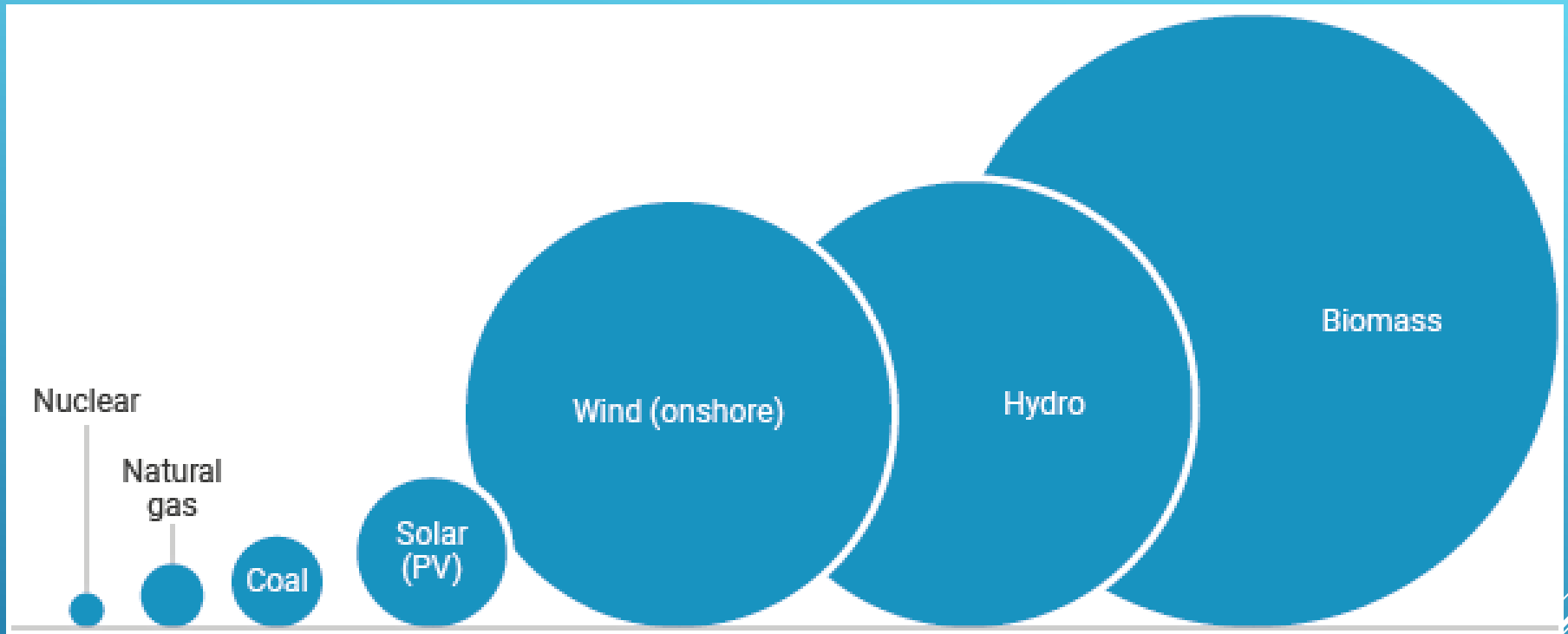
DAVID NICHOLLS
NOVEMBER 2020

- ▶ Abundant and reliable (low carbon) electricity for economic growth
- ▶ Efficient Use of Land
- ▶ Efficient Use of Finances
- ▶ Fastest Transition to Low Carbon
- ▶ Usefulness to the Economy
- ▶ Efficient Use of Resources
- ▶ Environmental & Health Impacts

WHAT ARE THE ISSUES?



ABUNDANT AND RELIABLE ELECTRICITY
FOR ECONOMIC GROWTH



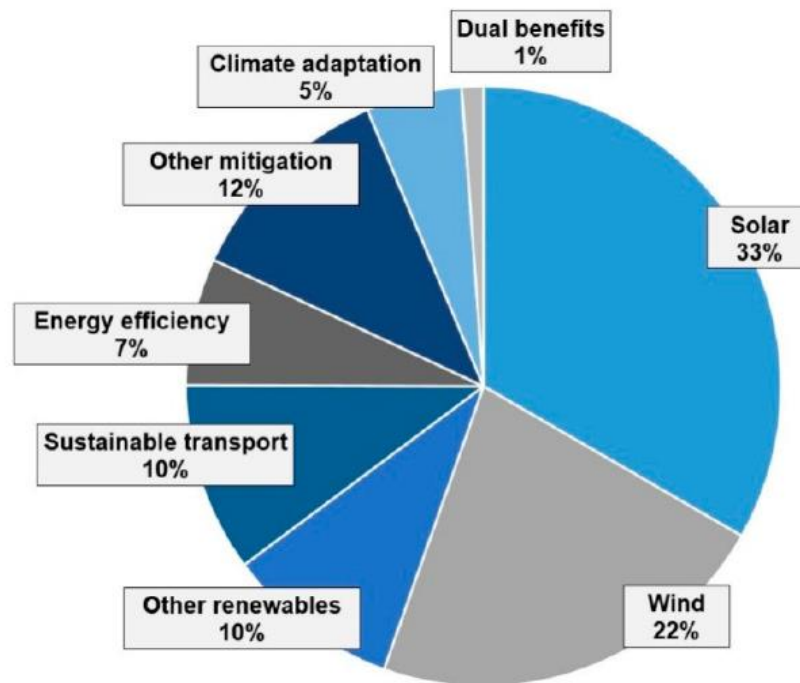
Relative land use (fuel mining and generating footprint) of electricity generation options per unit of electricity (source: Brook & Bradshaw, 2015)

EFFICIENT USE OF LAND

To replace Koeberg's production (<1km²) by wind turbines would require a corridor 5km wide and 300km long

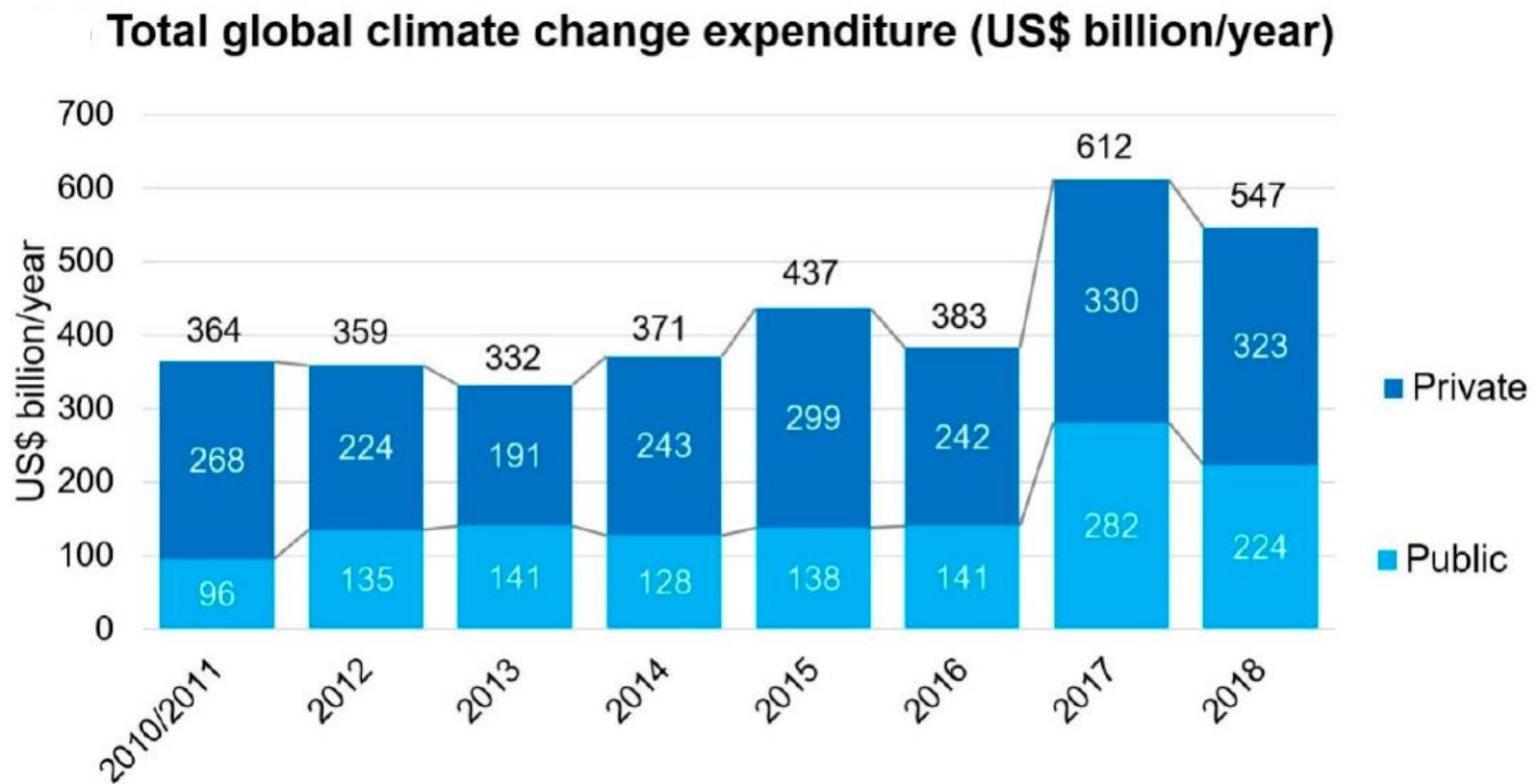
EFFICIENT USE OF FINANCES

Average global climate change expenditure (2011-2018)



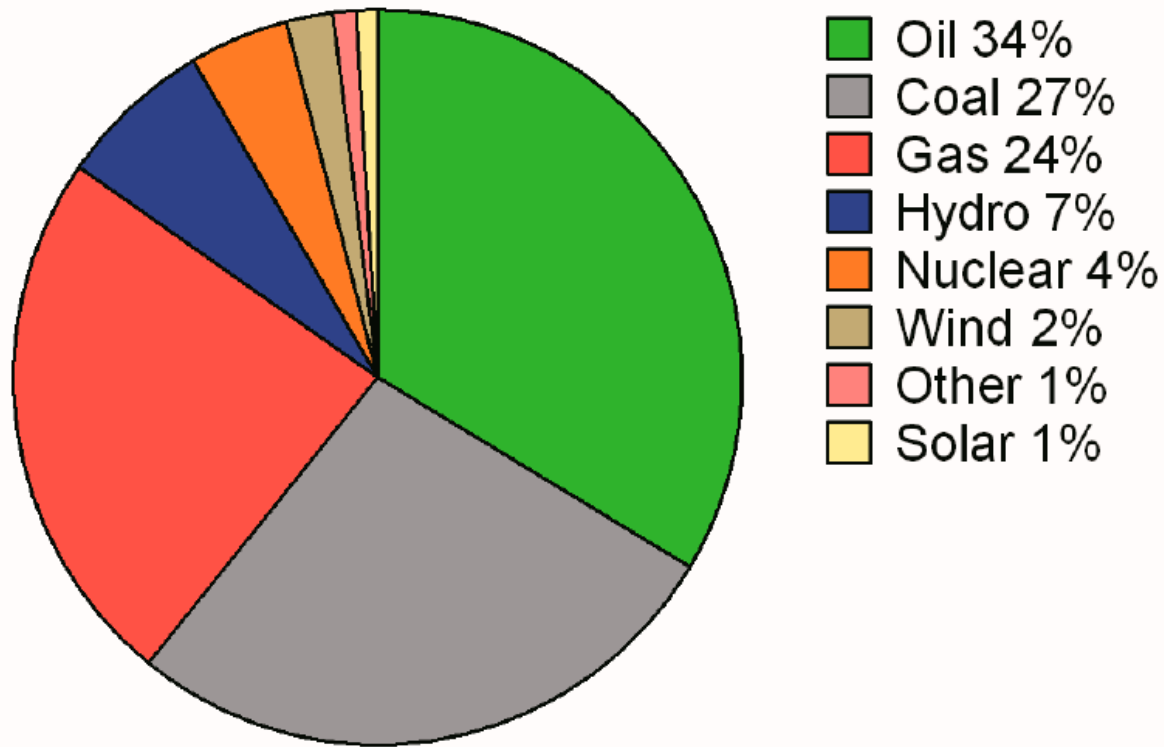
Source: Climate Policy Initiative's
Global Landscape of Climate Finance reports

EFFICIENT USE OF FINANCES



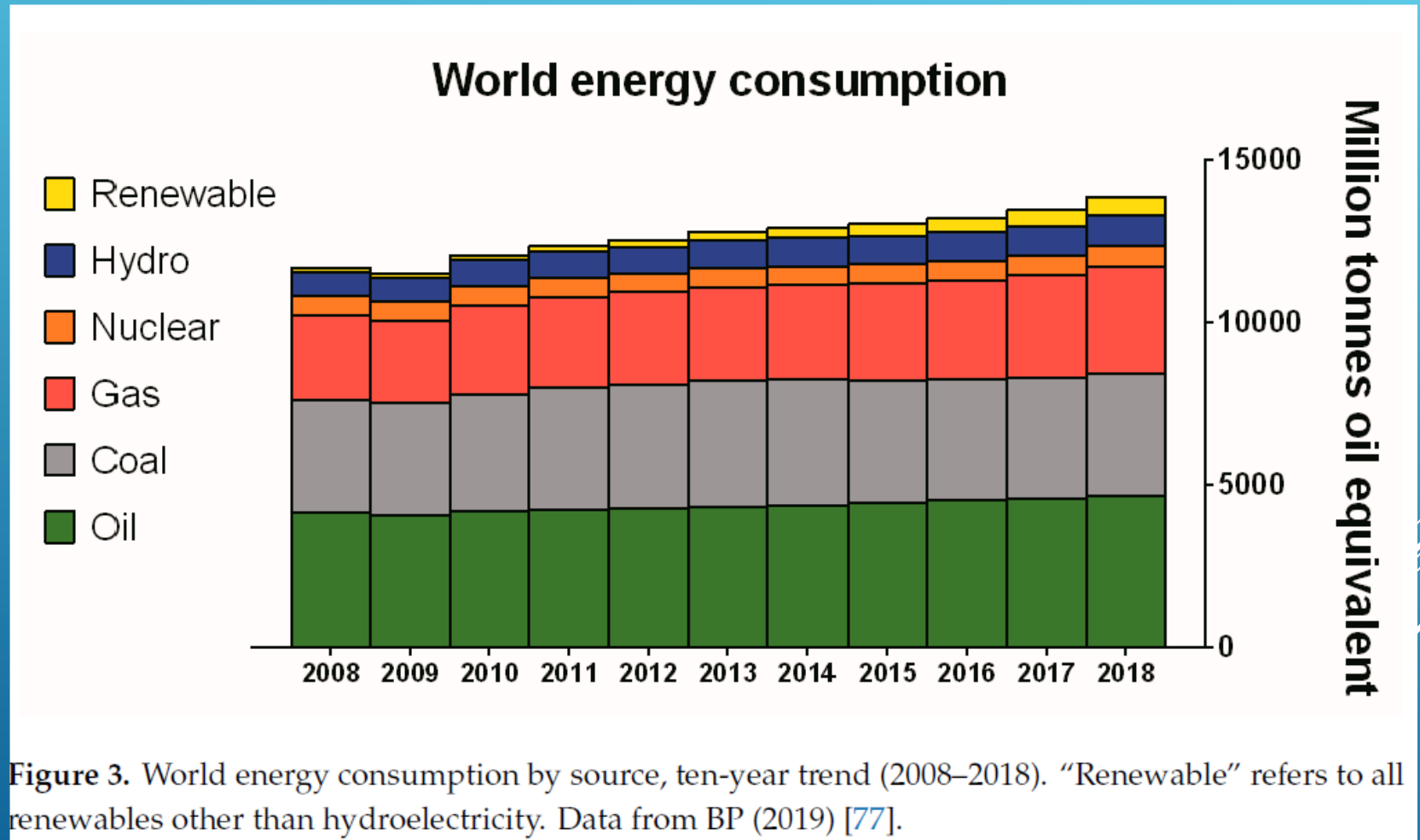
EFFICIENT USE OF FINANCES

World energy consumption 2018

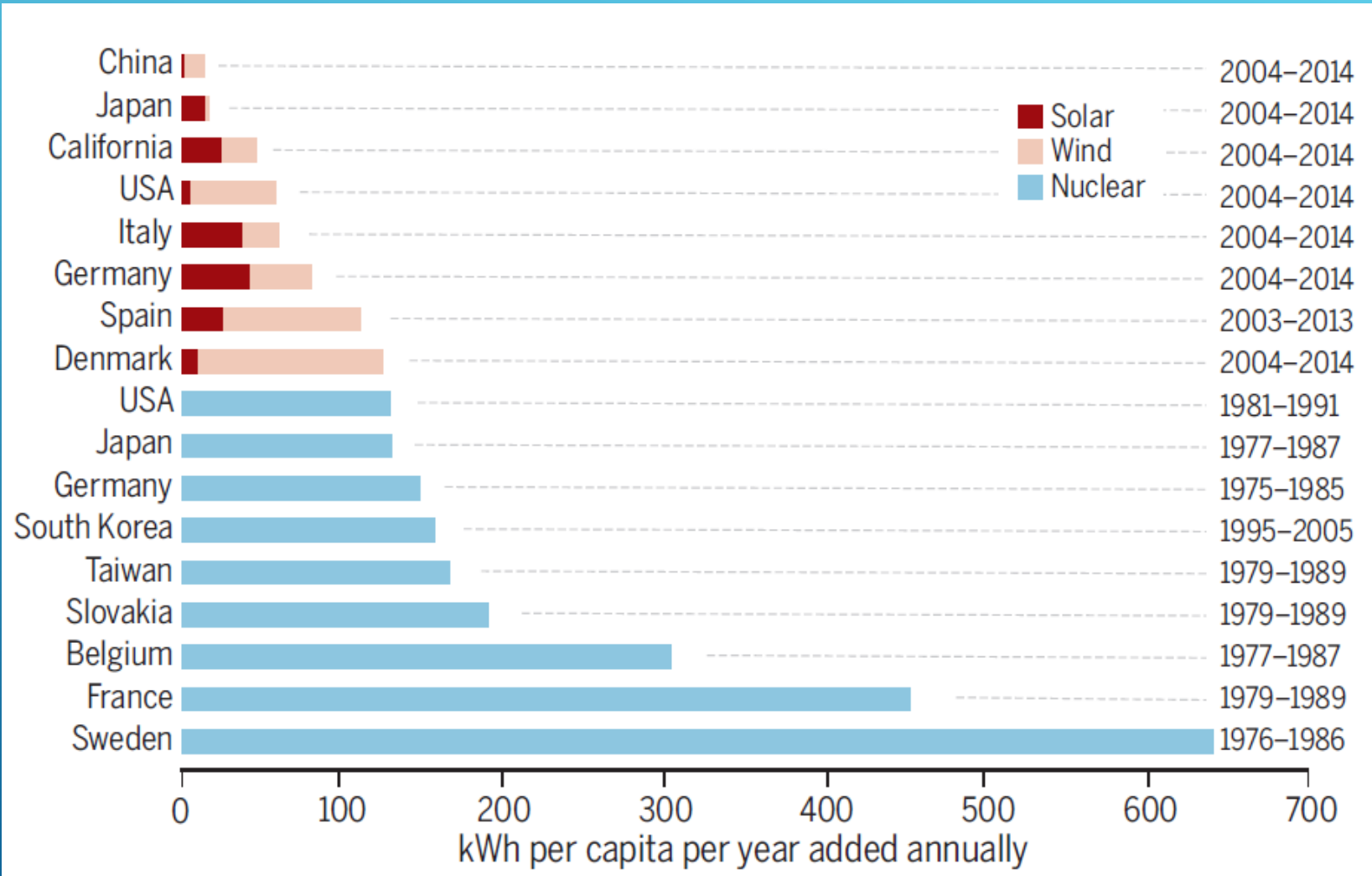


The \$3.4tn spent on climate change since 2011, if spent on NPPs, would have more than doubled the current nuclear capacity

EFFICIENT USE OF FINANCES



FASTEST TRANSITION TO LOW CARBON



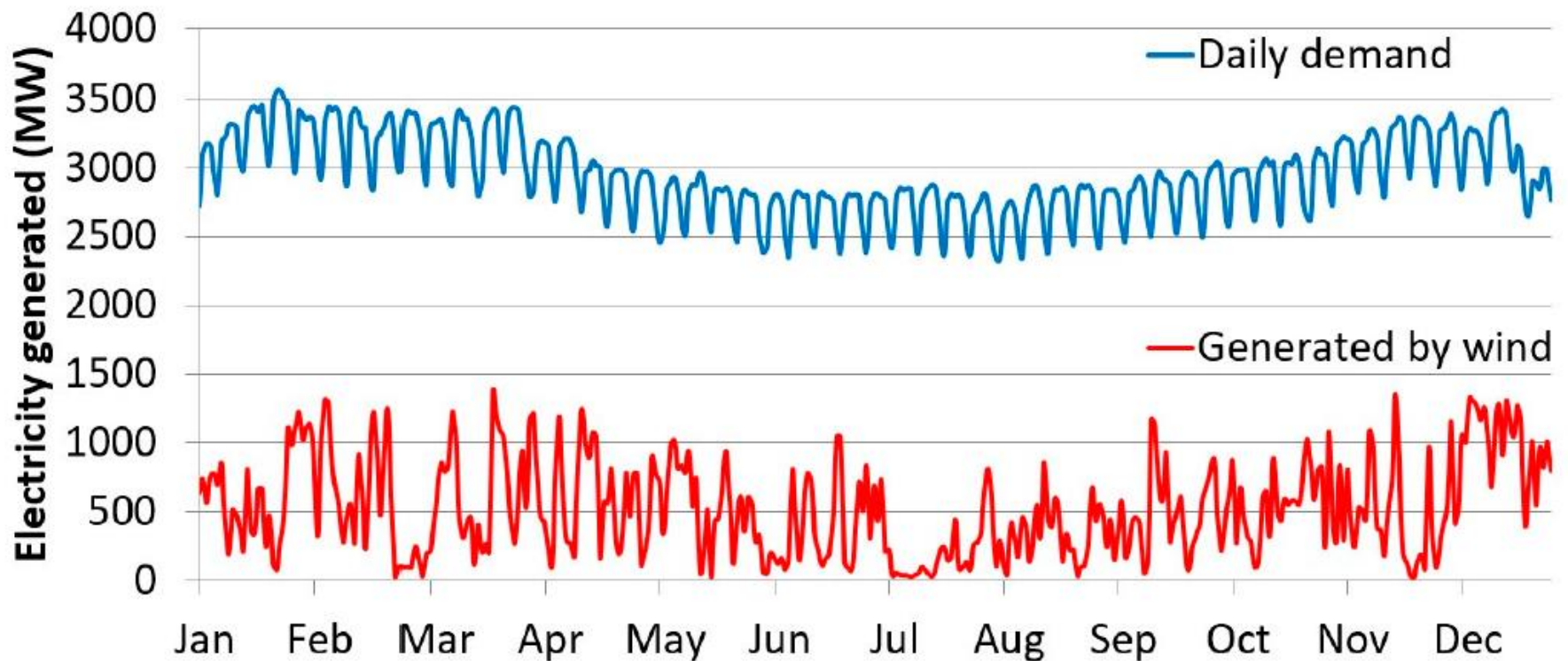
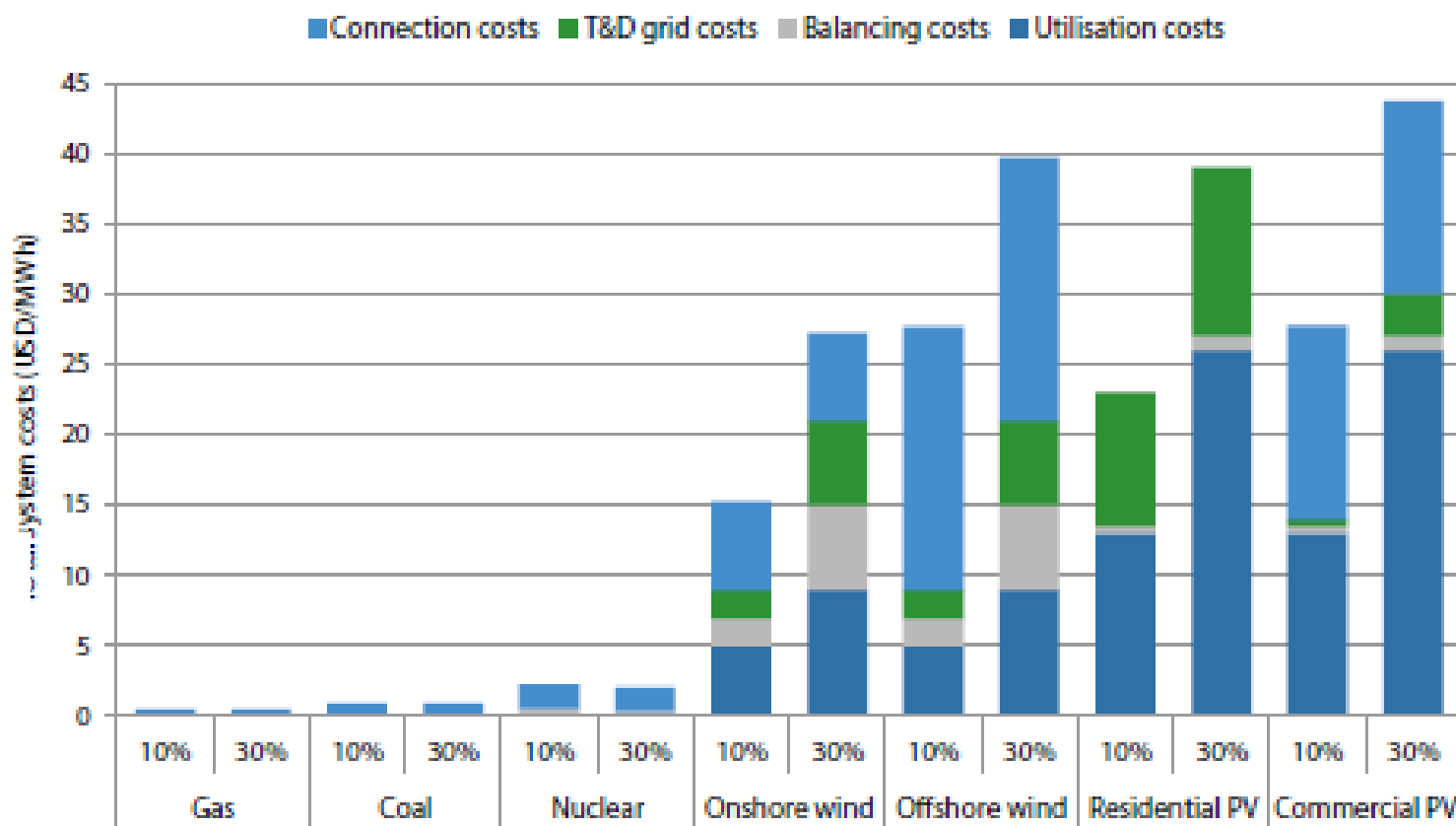


Figure 6. Annual variation in daily electricity demand (blue) and electricity generated by wind (red) Republic of Ireland, 2013. (Data from: time series downloaded from <http://www.eirgrid.com/> in January 2014.).

USEFULNESS TO THE ECONOMY?

“HIDDEN” COST TO THE ECONOMY?

Figure ES.3: **Grid-level system costs of selected generation technologies for shares of 10% and 30% of VRE generation**



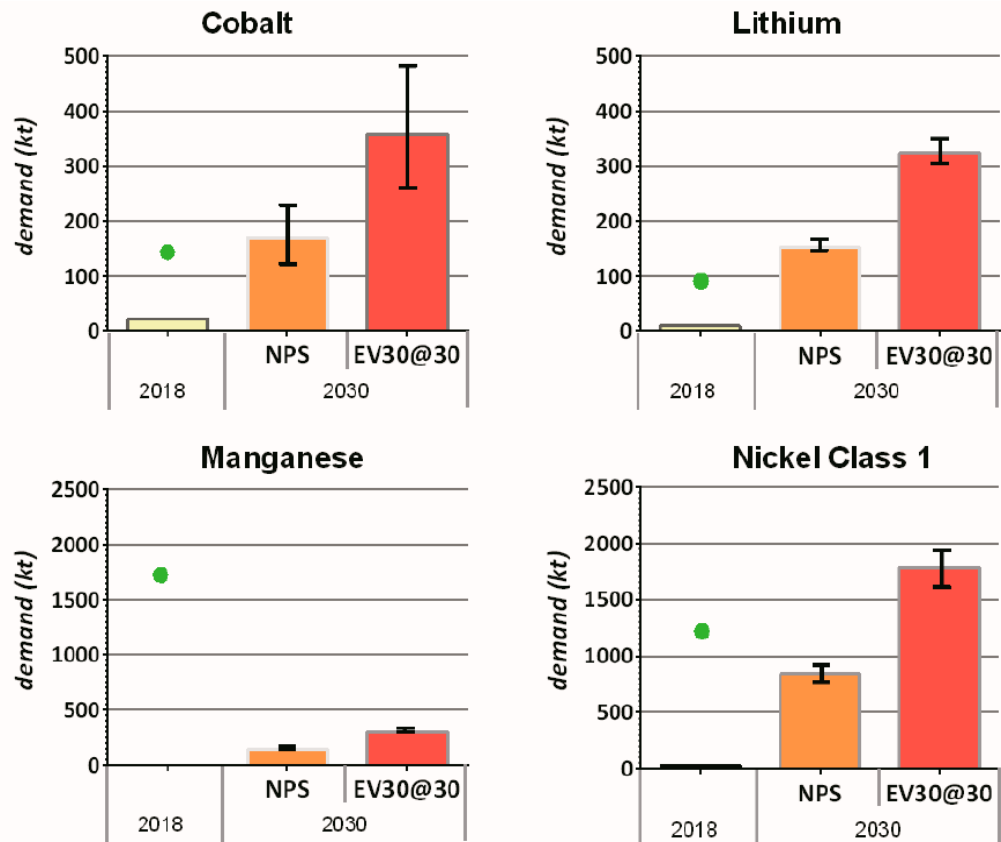
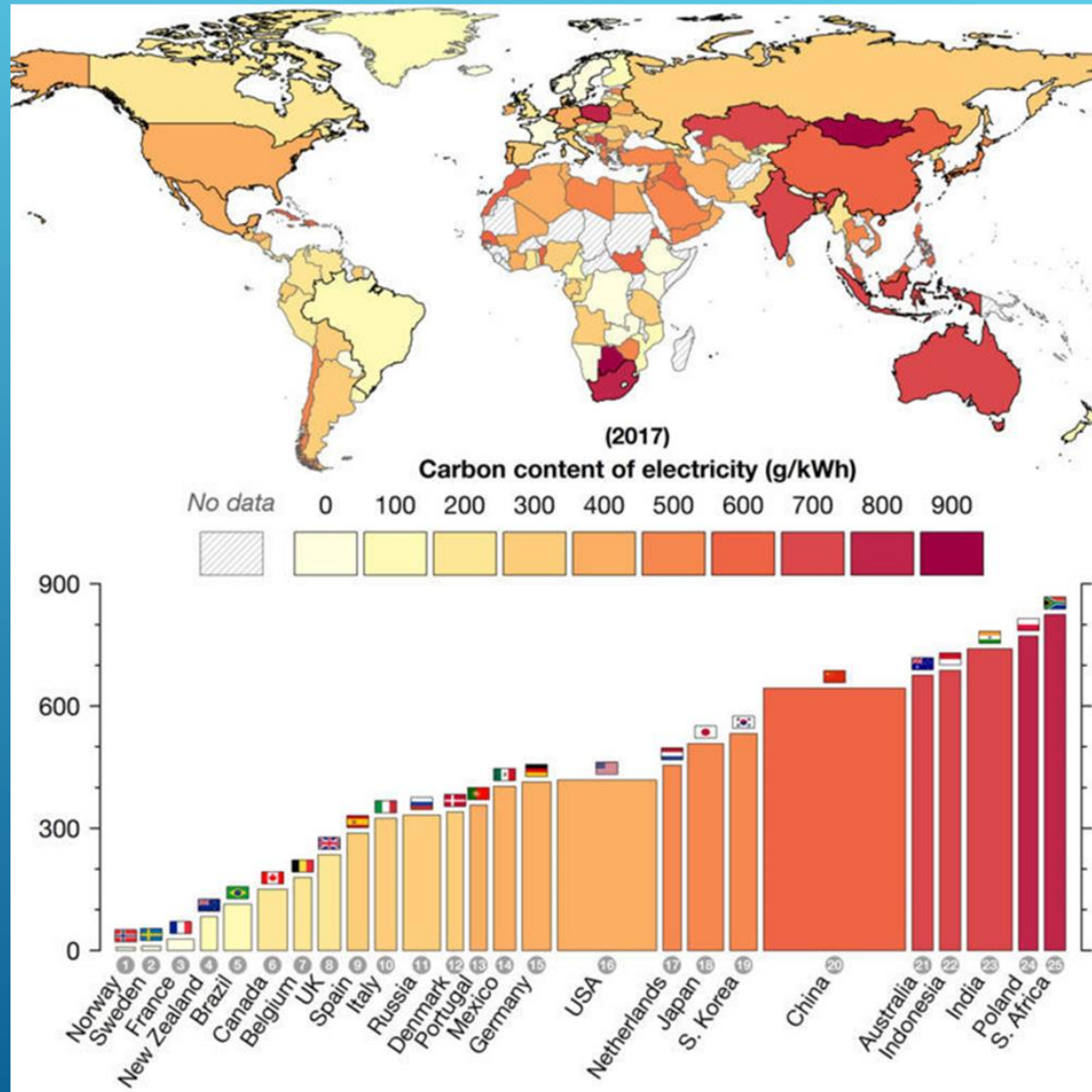


Figure 9. Increased annual demand for materials for batteries from deployment of electric vehicles by scenario, 2018–2030. Green dots indicate current supply. NPS = New Policies Scenario. EV30@30 = 30% sales share for EVs by 2030. (Adapted from Figure 7 of IEA, 2019) [116].

EFFICIENT USE OF RESOURCES

ELECTRIC CAR EXAMPLE

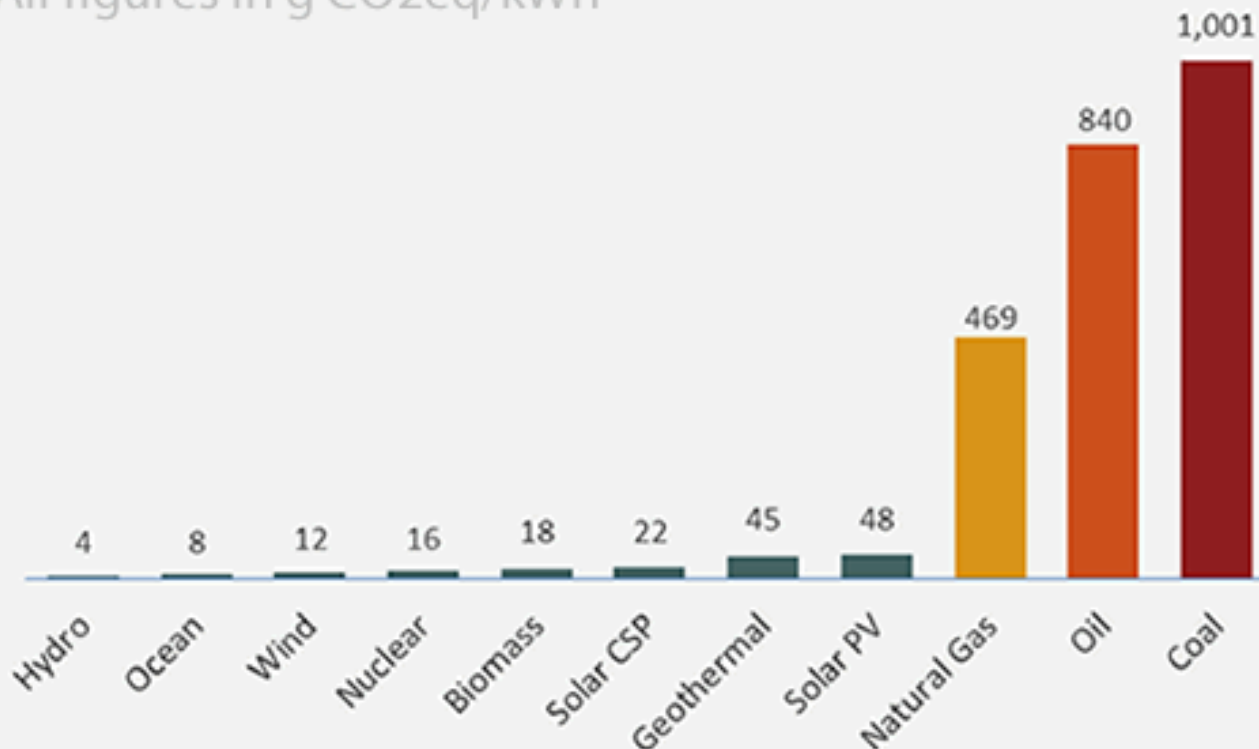
CLIMATE CHANGE IMPACT



CLIMATE CHANGE IMPACT

The Carbon Intensity of Electricity Generation

All figures in g CO₂eq/kWh



Note: Data is the 50th percentile for each technology from a meta study of more than 50 papers
Source: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation

shrinkthatfootprint.com

IMPACT OF NATURAL GAS LEAKAGE

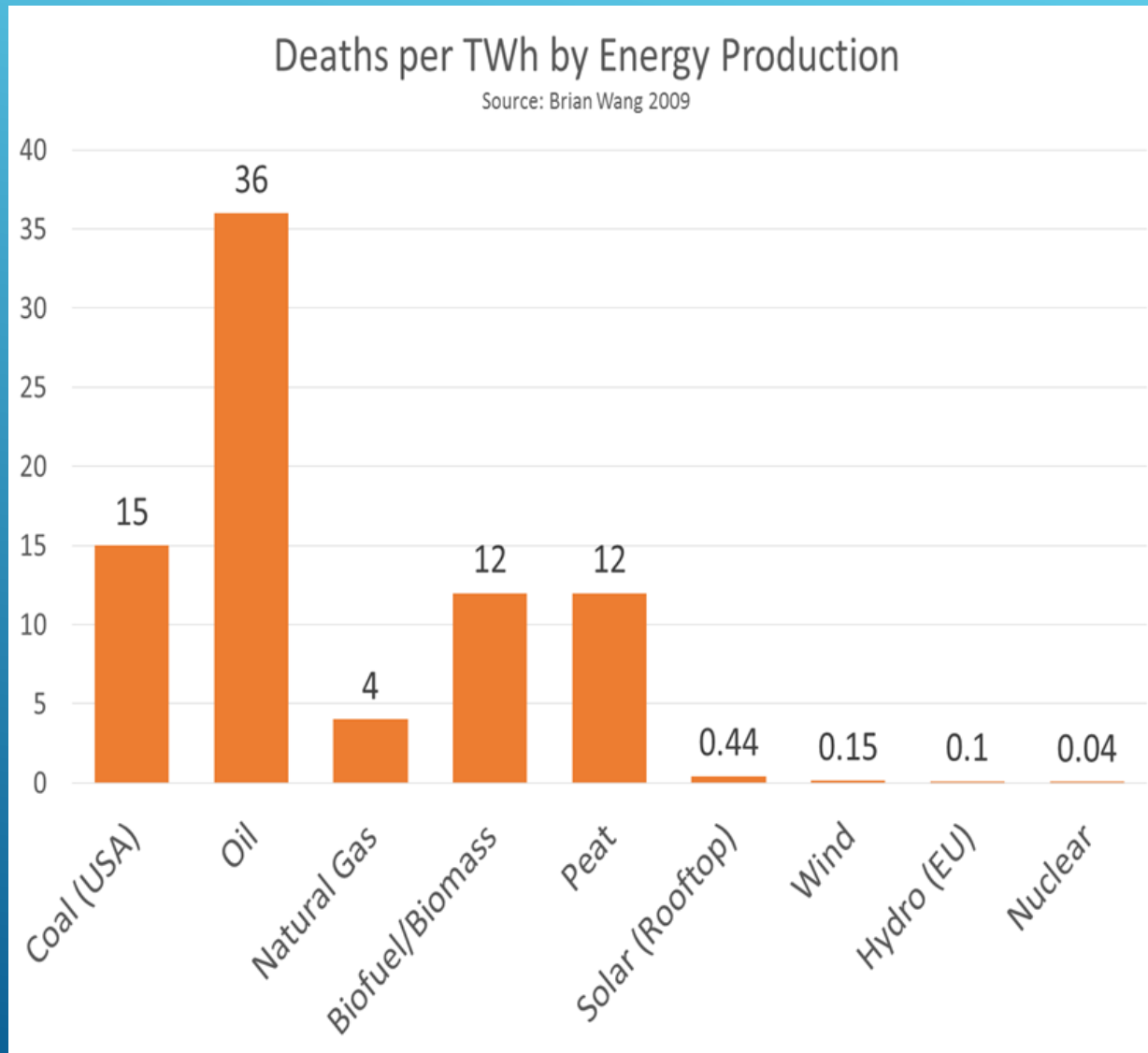
Gas leakage rates for methane which equals CHG emissions of the replaced fuel in 20- or 100-year timescale.

Usage	Fuel to replace	20-year	100-year
Heat	Coal	2.20%	5.80%
Heat	Heavy/bunker oil	1.20%	3.40%
Electricity	Coal	4.00%	10.00%
Shipping	Bunker fuel	1.20%	3.40%

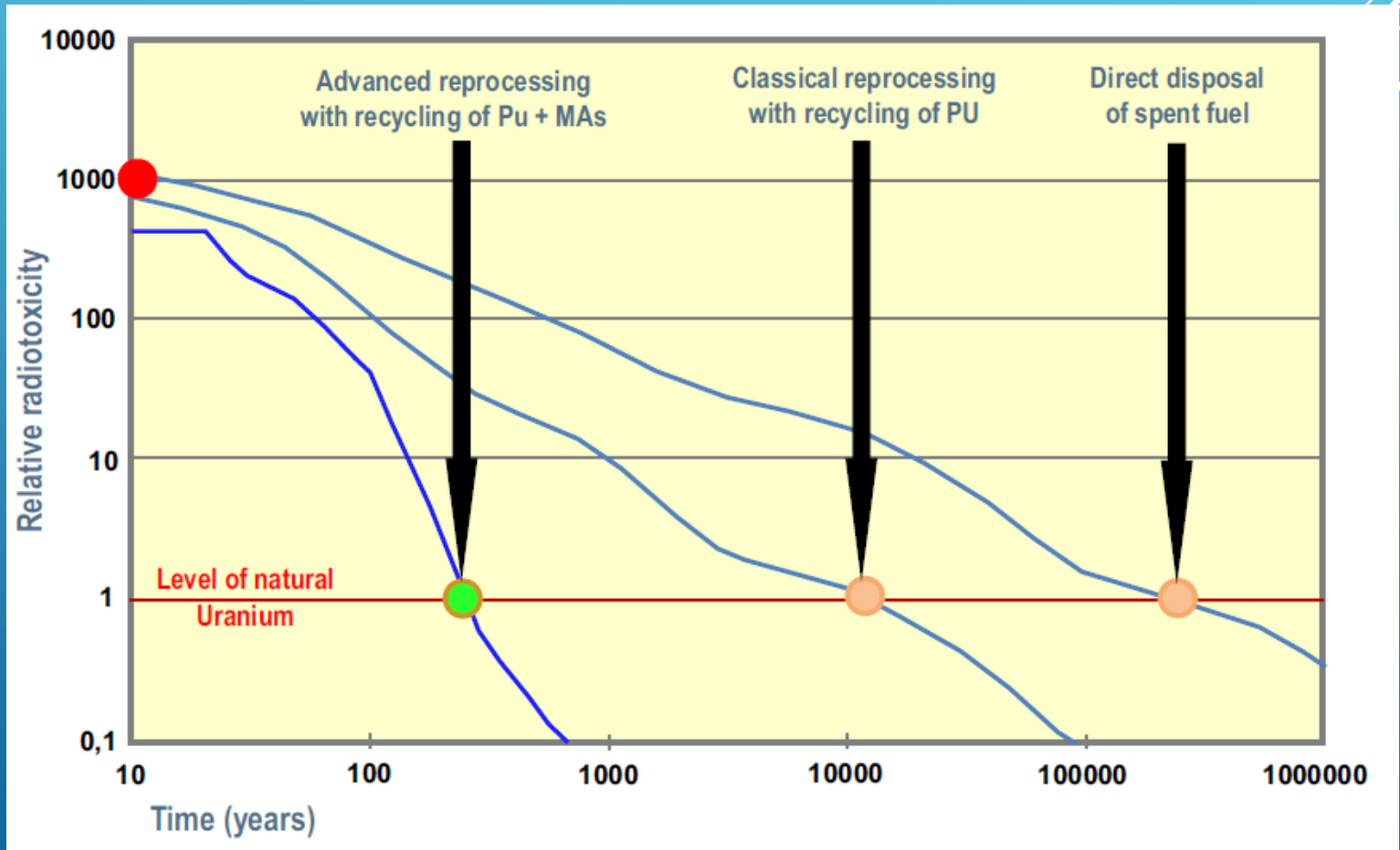
US natural gas production has an average leak rate of 2.3%

New marine engines can have a design gas leakage of 2.5% to 4.3%,

HEALTH IMPACT



Longevity of Nuclear Waste



ARE WE LOOKING FOR AN EFFICIENT SOLUTION OR A “POLITICALLY CORRECT” ONE?

“The Nuclear Energy campaign stands in opposition to the procurement and development of new nuclear power. The construction of a new nuclear plant would mean fewer renewable technologies to be deployed, as well as their delay. The intended outcome of this campaign is to increase the share of renewables to South Africa’s energy mix.”

<https://earthlife.org.za/campaign-nuclear-energy/>