



**ENERGY FOR
HUMANITY** —

Mind the Gap

**Closing the Gap Between the
Analysis and the Narrative**

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Executive Director
DECEMBER 2016**



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**GLOBAL
ELECTRICITY
GENERATION
IS RISING**



**AT ABOUT
ONE BRAZIL
EACH YEAR**

WHICH IS
**IMPROVING
THE LIVES OF
MILLIONS**



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How to solve

CLIMATE CHANGE

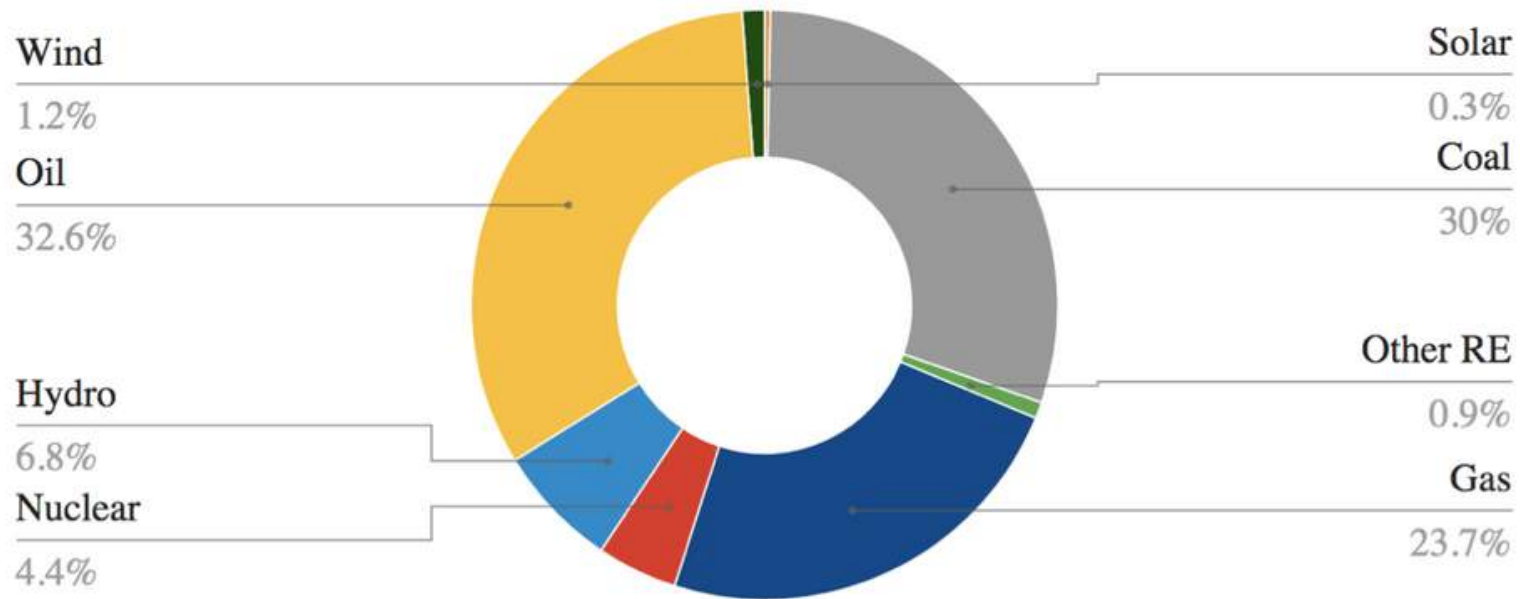
1. Clean Up Electricity
2. Electrify Everything
 - 2.a) Eliminate Waste



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Rise in Renewables v Rise in Demand

DESPITE IMPRESSIVE GROWTH, SOLAR AND WIND COMBINED PROVIDE JUST 1.5% OF TOTAL GLOBAL ENERGY.



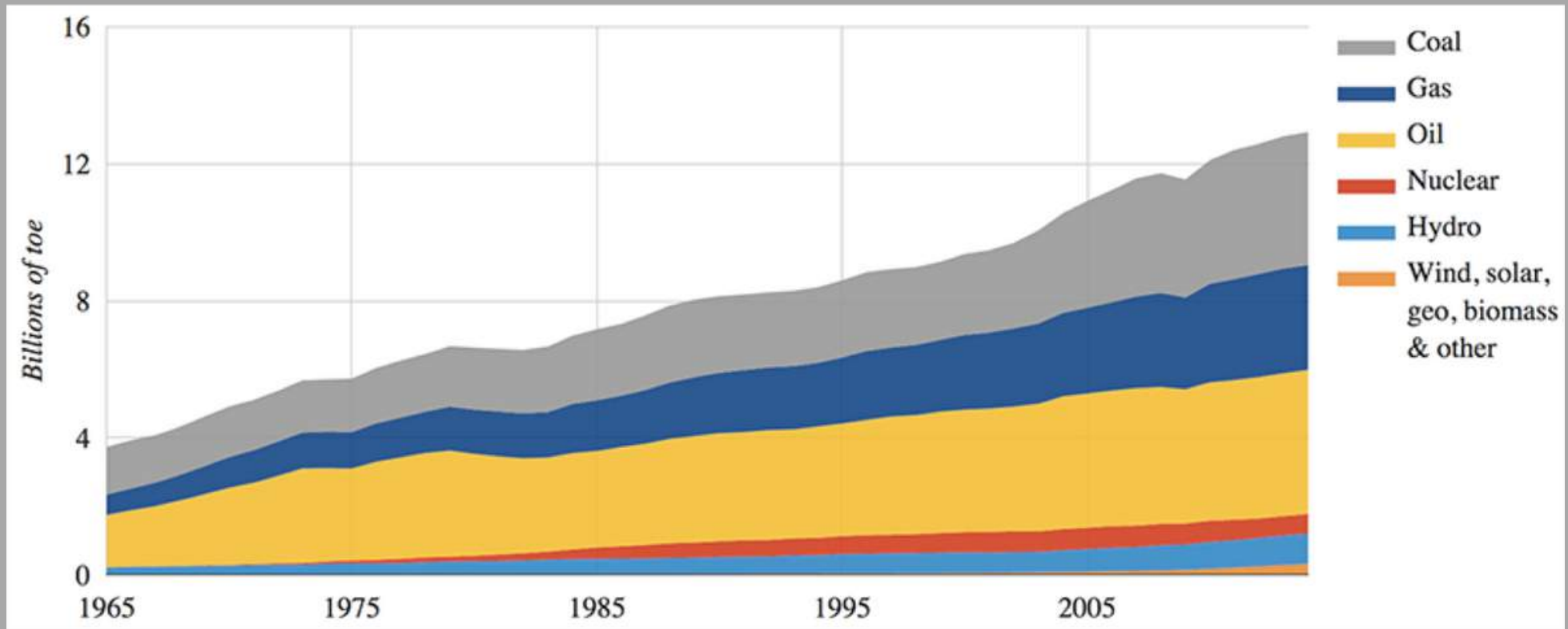
Shares of world demand met by different sources of energy in 2014.
Other RE includes geothermal, biomass, biofuels wave and tidal energy.

Source: BP Statistical Review of World Energy 2015. Chart by Carbon Brief.

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The Scale of the Challenge

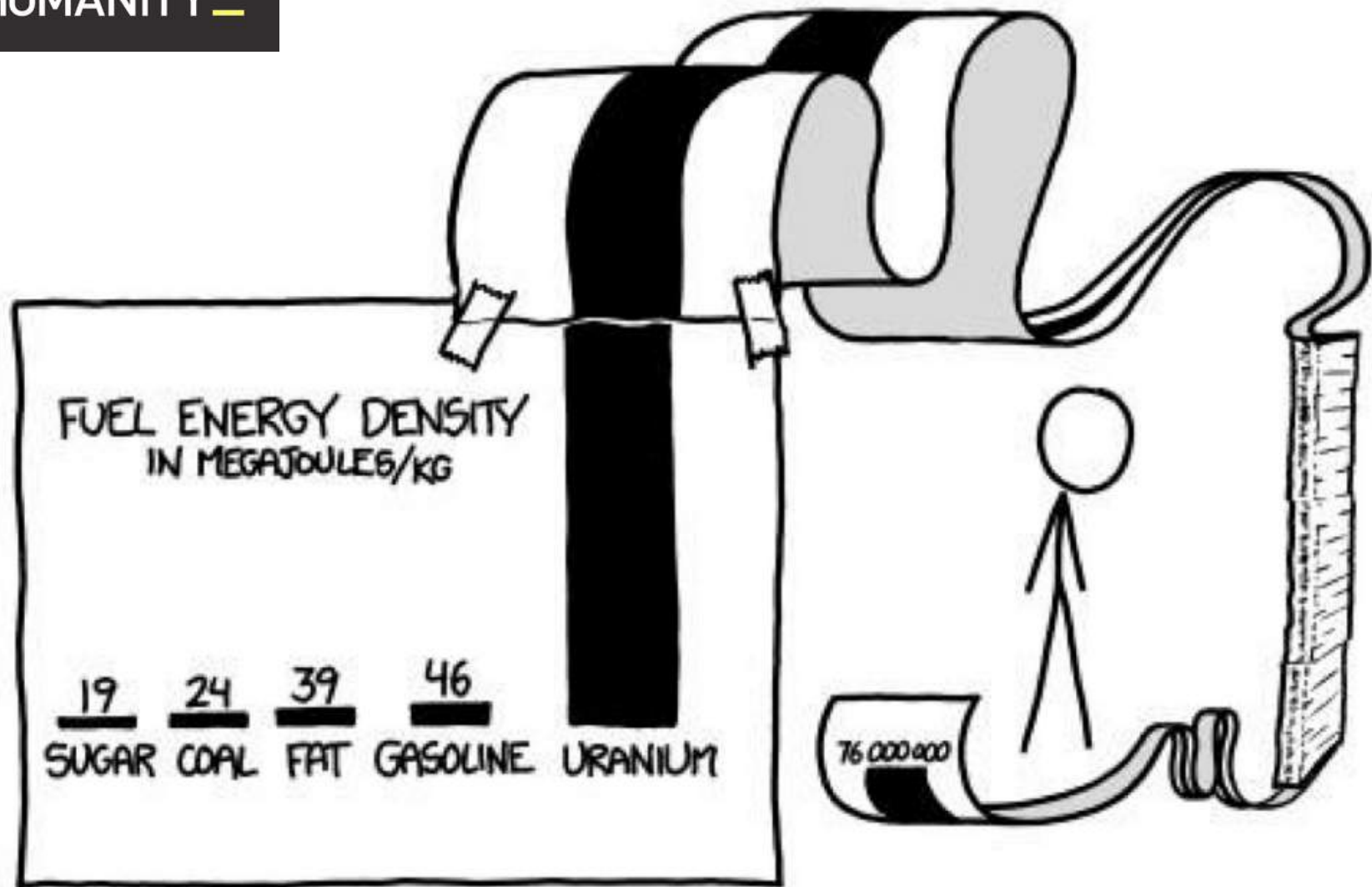
FOSSIL FUELS DOMINATE GLOBAL ENERGY SUPPLY, PROVIDING 85% OF THE TOTAL



World energy use by source, 1965-2014.

Source: BP Statistical Review of World Energy 2015. Chart by Carbon Brief.

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SCIENCE TIP: LOG SCALES ARE FOR QUITTERS WHO CAN'T
FIND ENOUGH PAPER TO MAKE THEIR POINT PROPERLY.



One person's total lifetime's volume of high level radioactive waste if they used nothing but nuclear energy for their whole life.

Leslie Dewan, Transatomic Power

USING EXISTING WASTE



our reactor

CAN POWER
THE ENTIRE
WORLD FOR
72 YEARS

www.energyforhumanity.org

"LET'S CREATE ABUNDANT ENERGY AND A HEALTHY WORLD"
TRANSATOMIC POWER



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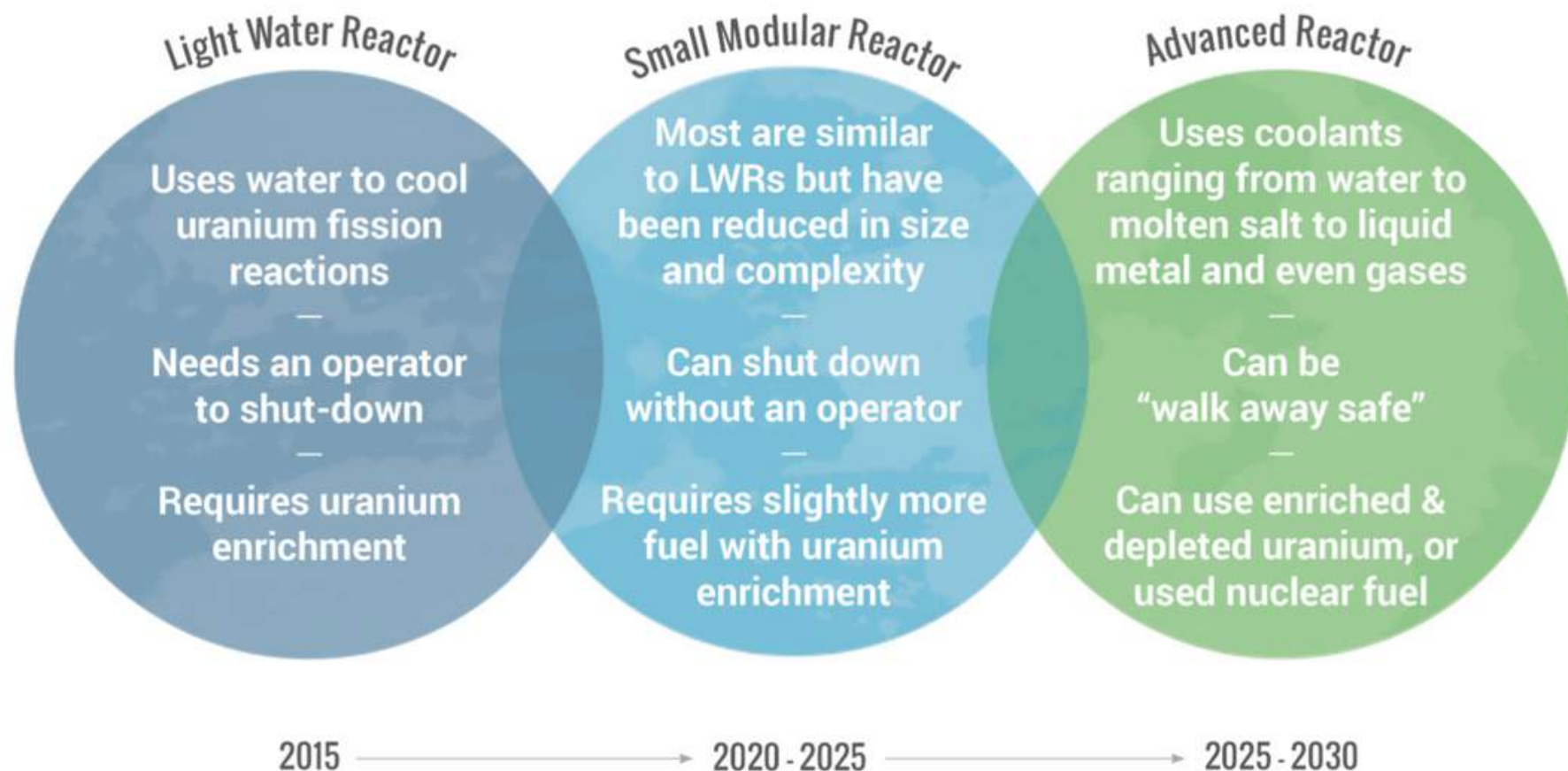


Introducing the Advanced Nuclear Industry





Nuclear's Continuing Evolution



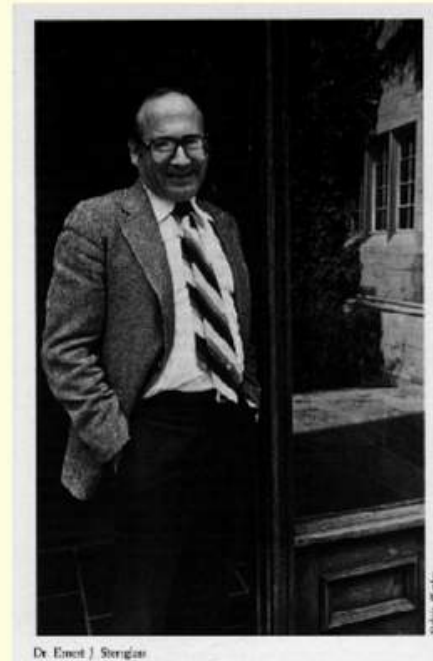




The Death of All Children, Esquire Magazine, Sept. 1969

“... I could not remain quiet about nuclear reactors. If I had, it would have been criminal on my part. Secrecy is the one way an open society can be controlled--namely by keeping things from the public.

“The military supports secrecy, and the military is behind the entire nuclear reactor program.”

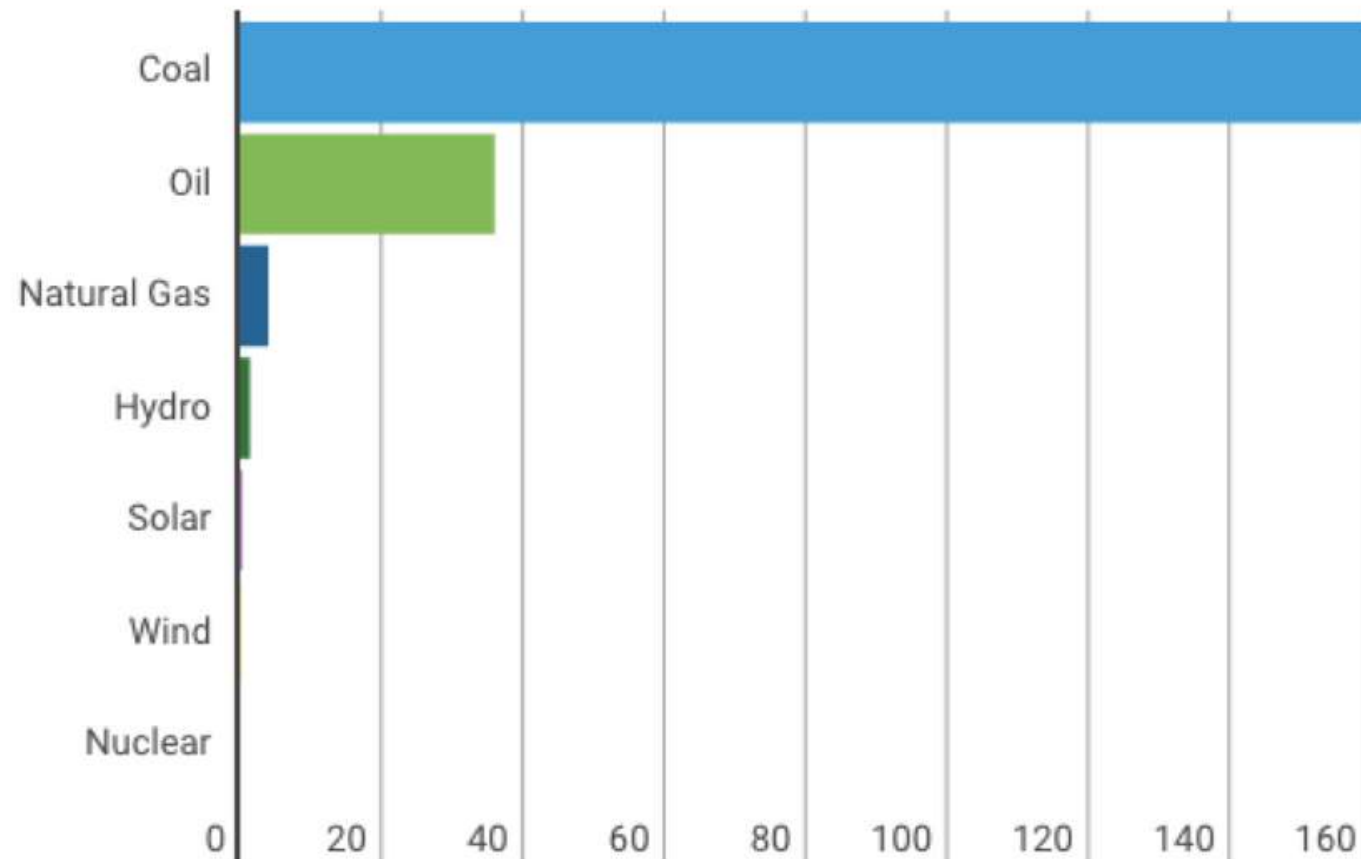


**NUCLEAR WITNESSES, INSIDERS SPEAK OUT:
DR. ERNEST J. STERNGLASS, PHYSICIST**



Nuclear: the safest Energy Source of All

Deaths per terawatt hour by energy source



Source: Nextbigfuture.com

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Death and illness

Cases of illness or death per terawatt hour of energy produced (Europe)

Coal

225

- Serious illness
- Death from pollution
- Death from accidents

Fine particles of ash from coal-burning power plants kill an estimated **3million** people around the world every year

The estimated total death toll (over decades) for Chernobyl is expected to be **4,000** to **33,000**

25

Nuclear

0.12

0.22

0.05

0.02

Accidents

Number of accidents at power stations in which five or more people died (1970 to 2008)

Coal

1,686

Oil

531

Gas

186

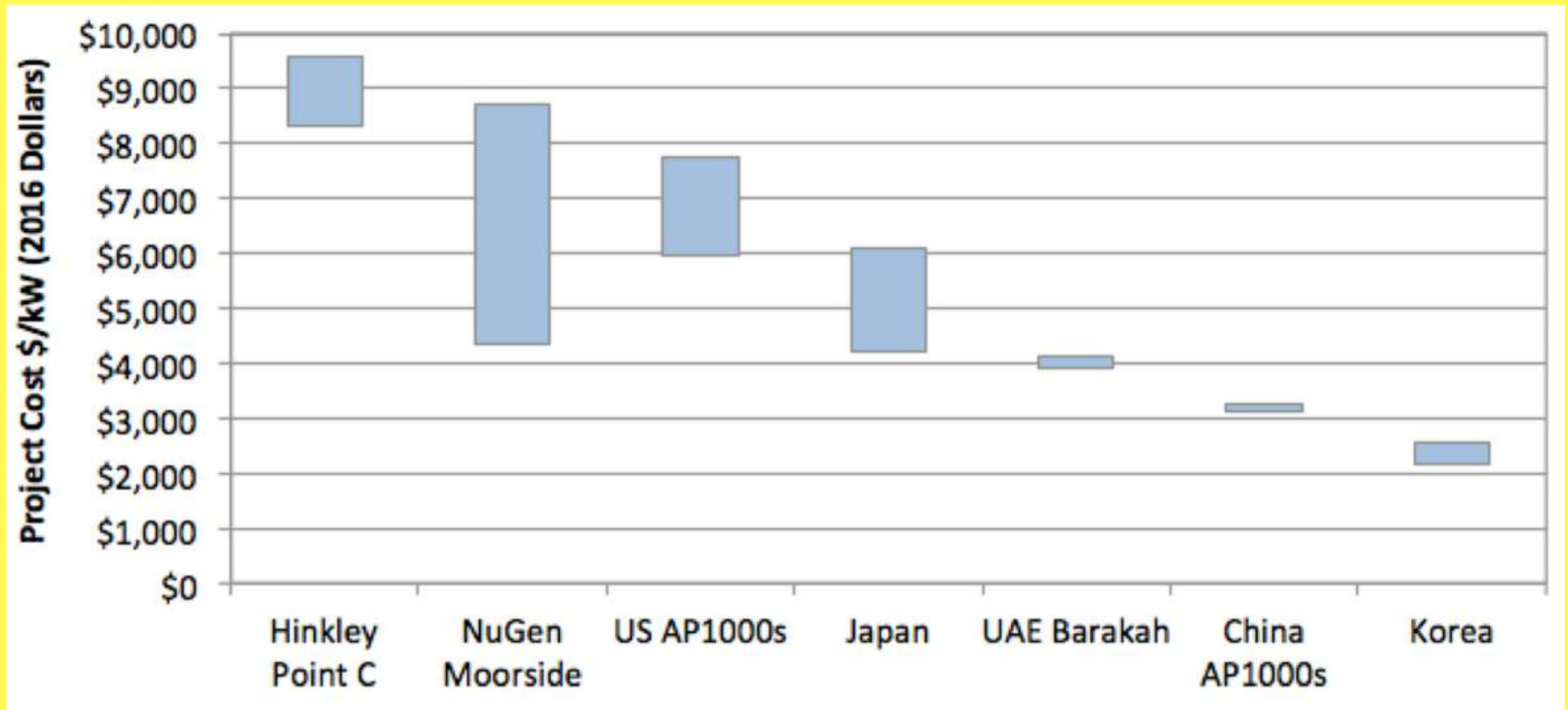
Nuclear



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Hydroelectricity:
In 1975, severe flooding caused about 30 hydroelectric dams in China to fail – killing an estimated **230,000** people

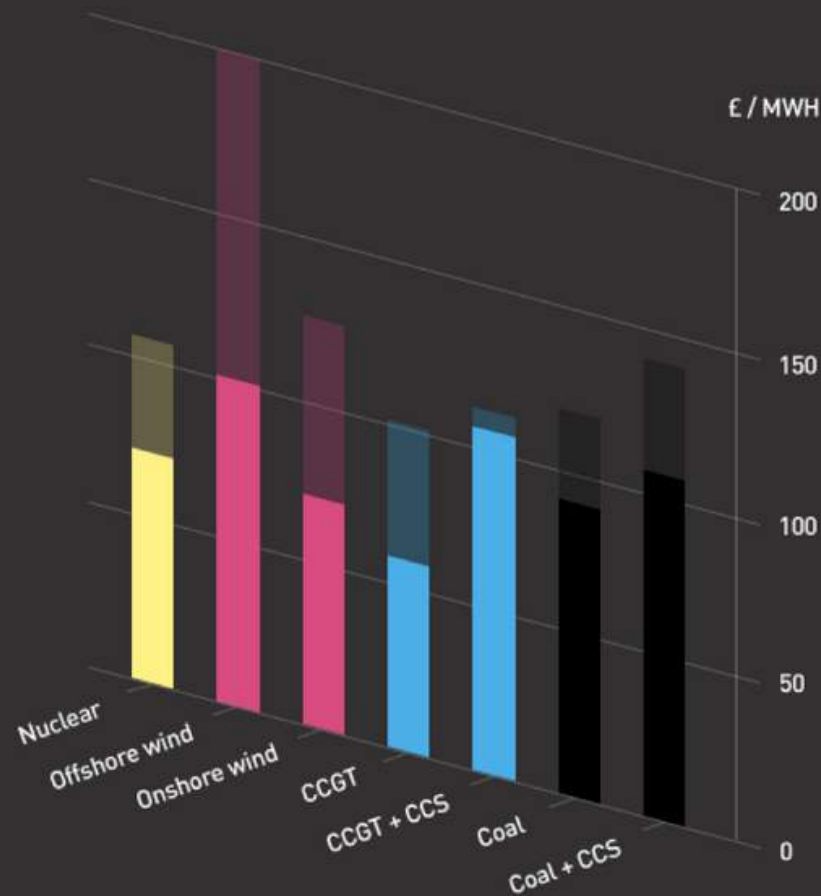
Nuclear construction costs differ widely around the world



THE COST OF ELECTRICITY

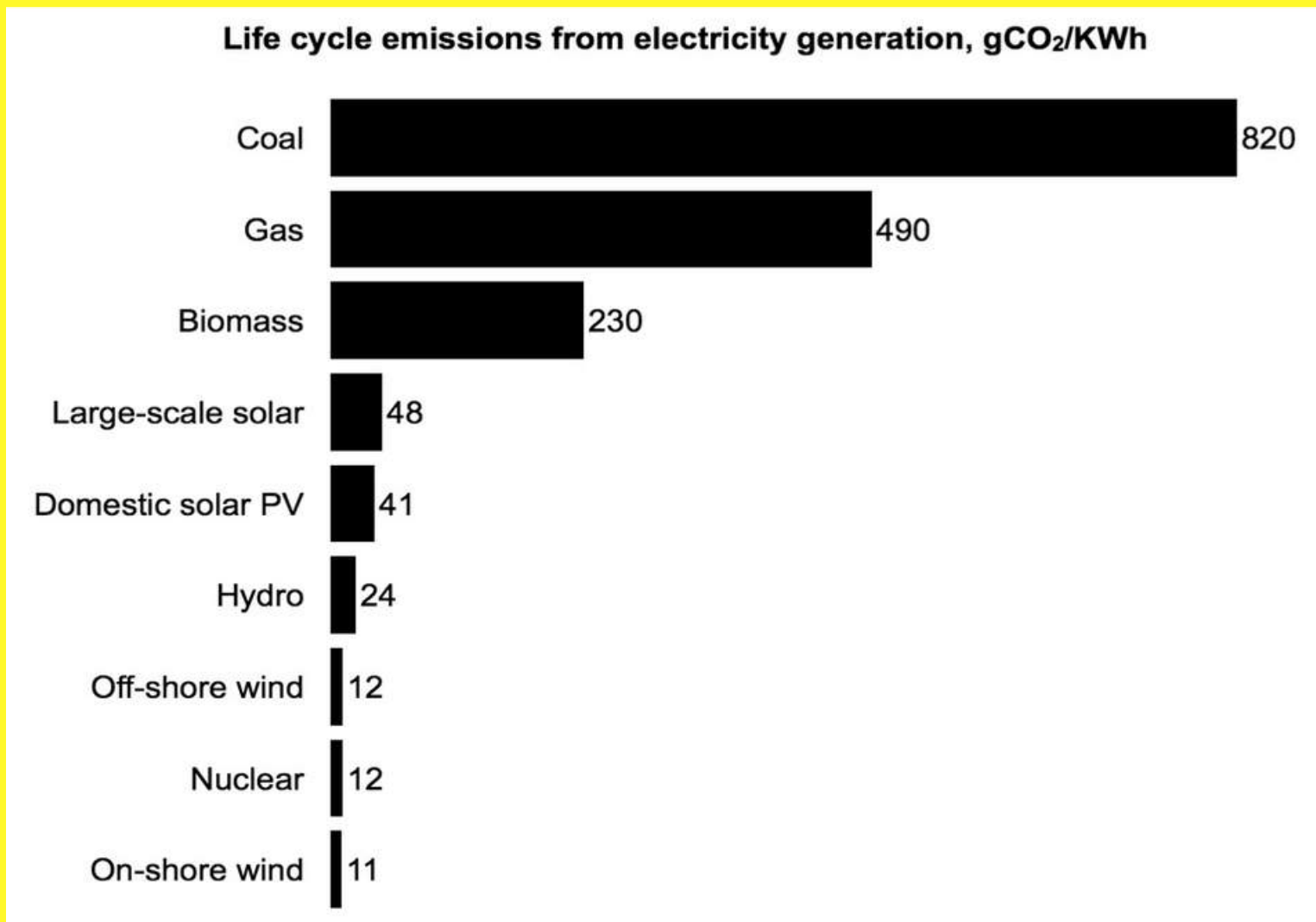
For large-scale electricity generation in the UK

■ Lower estimate
■ Upper estimate



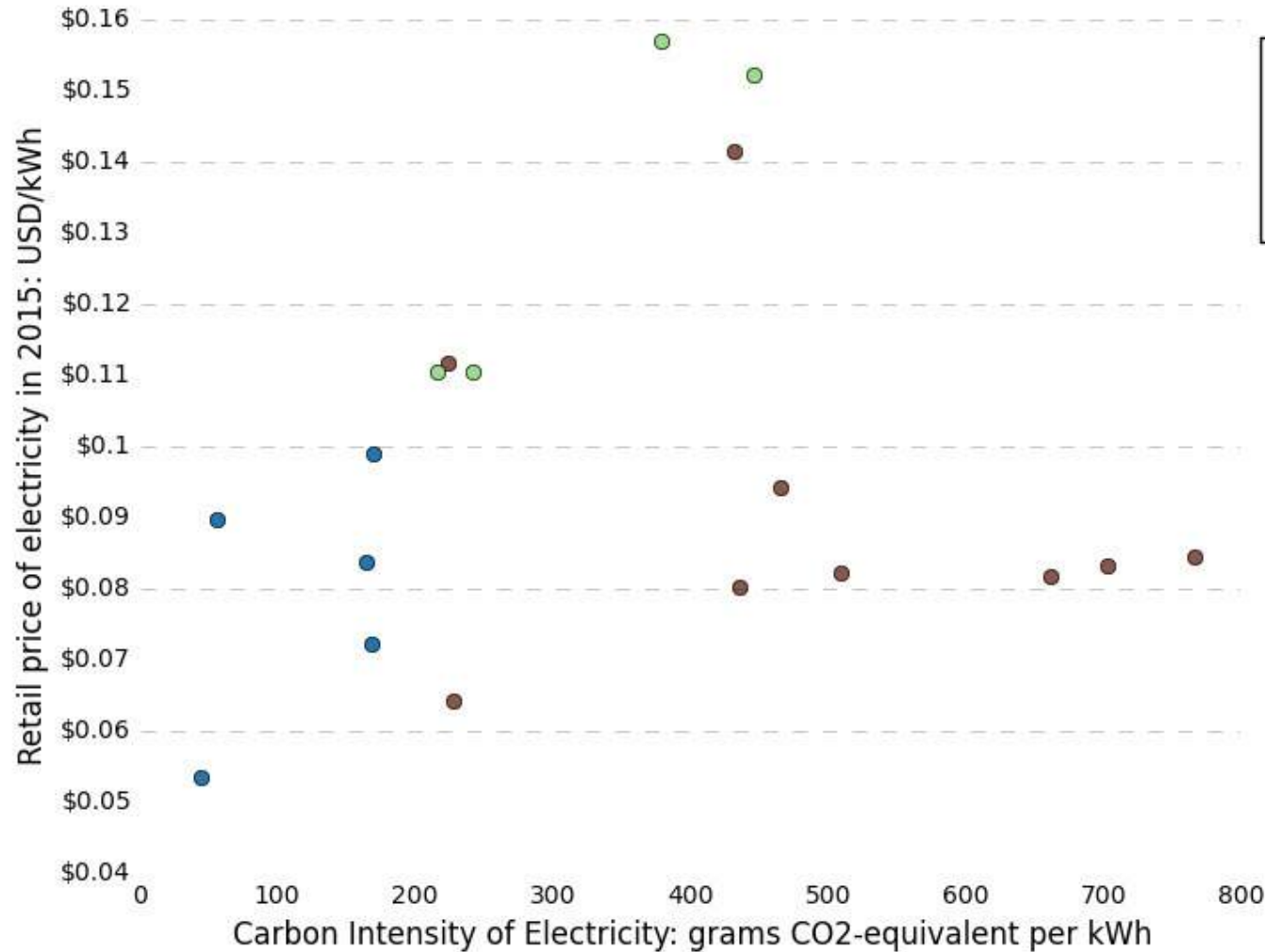
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Source: UK Energy Research Council: Presenting the Future: an assessment of future costs estimation methodologies in the electricity generation sector. Mott MacDonald 2010, Arup 2011, Mott MacDonald 2011, Parsons Brinckerhoff 2011, DECC 2012a, DECC 2013b, Poyry 2013.



Source: Intergovernmental Panel on Climate Change. (Nuclear includes uranium mining, enrichment and fuel fabrication, plant construction, use, decommissioning and long-term waste management.)

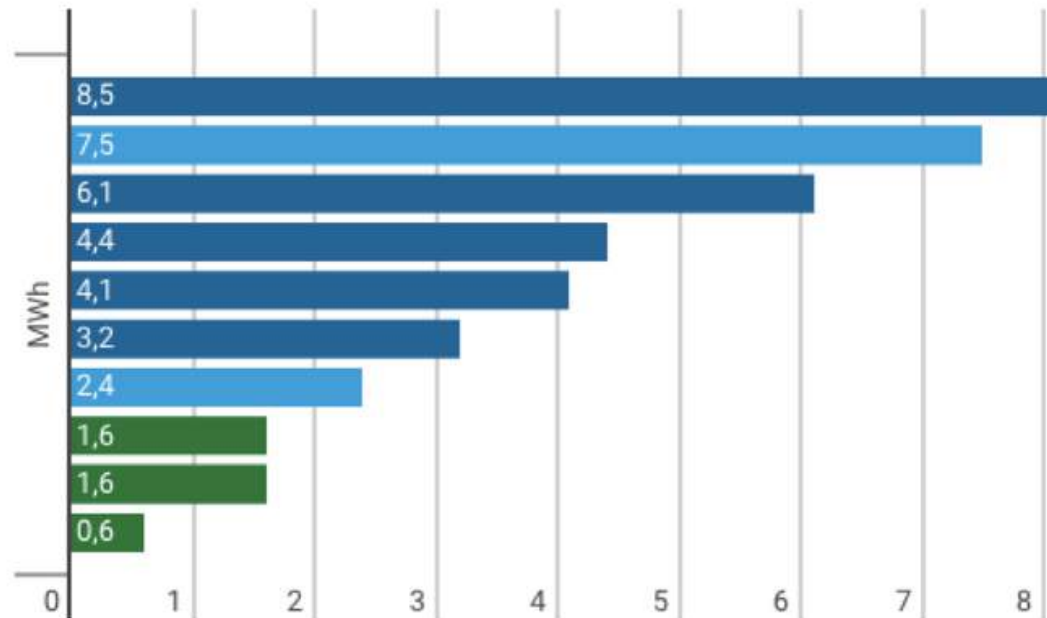
Carbon intensity of electricity versus price



Sources: Emissions estimates from the 5th Assessment of the IPCC, Annex III
 Grid electricity composition from The Shift Project Data Portal
 Electricity prices report by Statista

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

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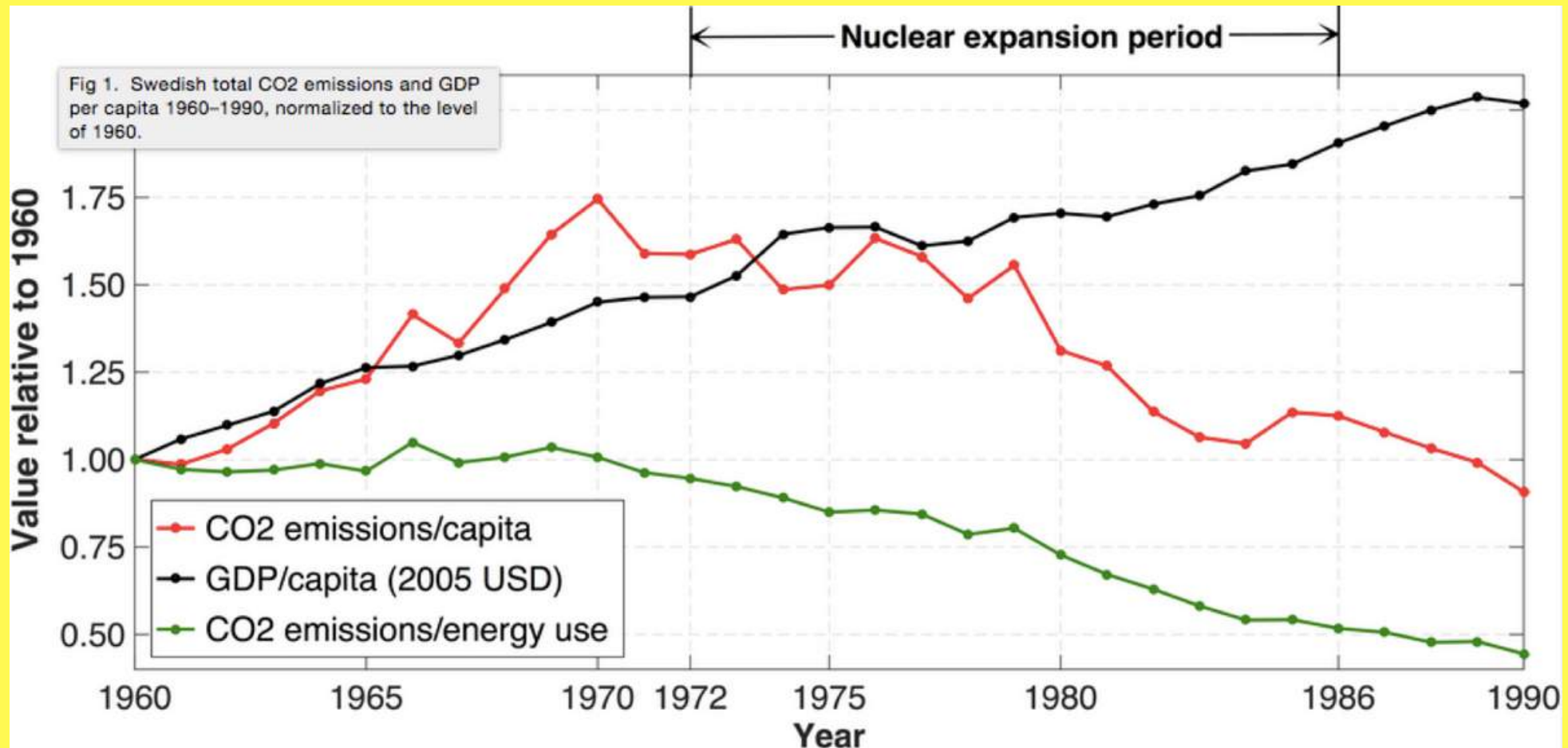


- Sweden: Nuclear 1971 - 1986
- UEA: Planned nuclear 2005 - 2020
- France: Nuclear 1978 - 1993
- Belgium: Nuclear 1973 - 1988
- Finland: Nuclear 1972 - 1987
- Switzerland: Nuclear 1970 - 1985
- Olkiluoto 3 alone 2005 - 2020
- Denmark: Wind and solar 1998 - 2013
- Spain: Wind and solar 1998 - 2013
- Italy: Wind and solar 1998 - 2013

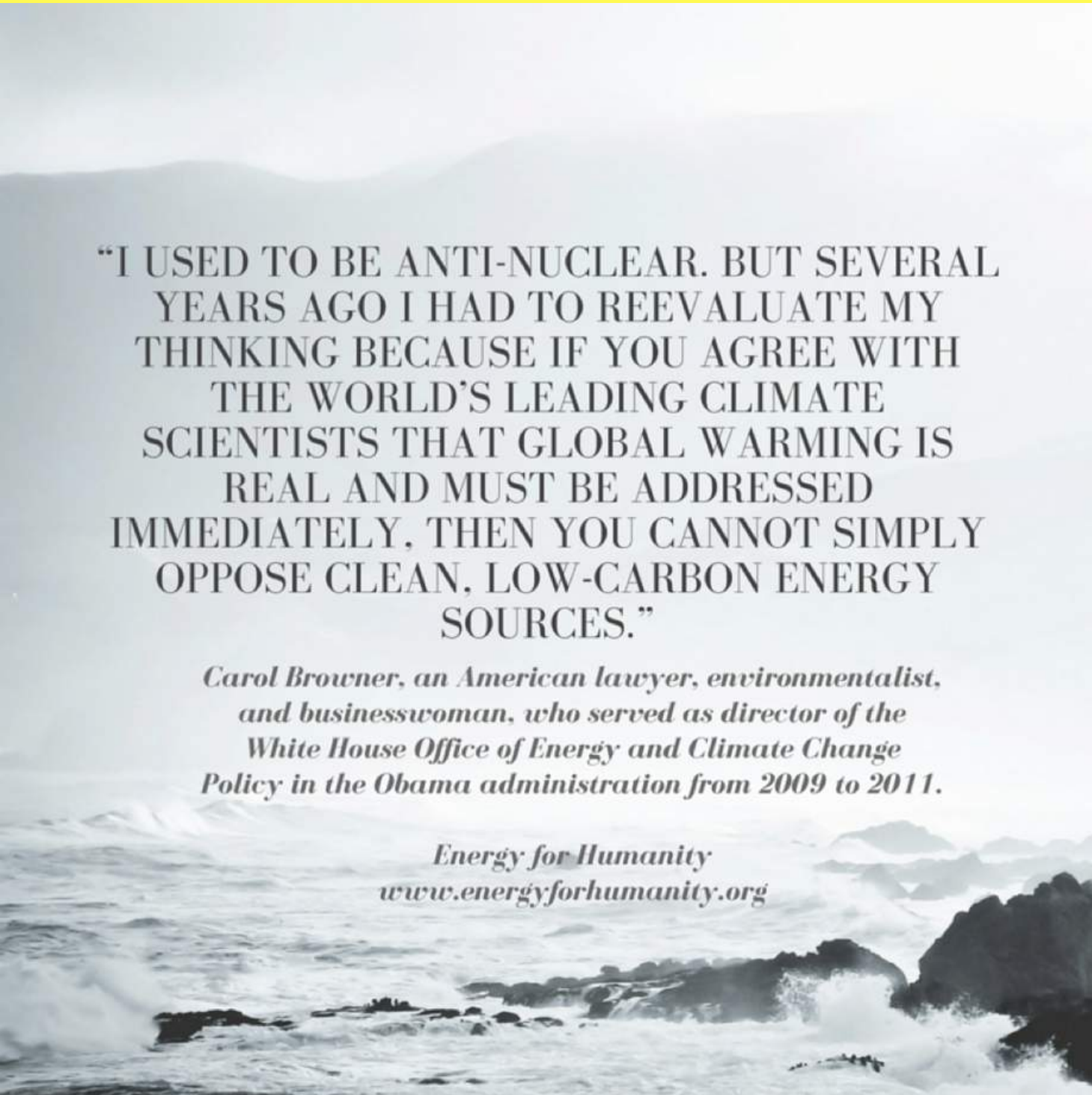
Record rates of adding low-carbon energy relative to population. Source: BP Statistical Review 2014.

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

Barry Brook and Staffan Qvist



What can we learn from the Swedish energy transition? No renewable energy technology or energy efficiency approach has ever been implemented on a scale or pace which has resulted in the magnitude of reductions in CO2 emissions that is needed to avert catastrophic climate change. Real world experience shows that a replacement of current fossil fuel electricity by nuclear at a pace which might limit the more severe effects of climate change is technologically and industrially possible. Whether this will happen depends primarily on political will, strategic economic planning and public acceptance.



“I USED TO BE ANTI-NUCLEAR. BUT SEVERAL
YEARS AGO I HAD TO REEVALUATE MY
THINKING BECAUSE IF YOU AGREE WITH
THE WORLD’S LEADING CLIMATE
SCIENTISTS THAT GLOBAL WARMING IS
REAL AND MUST BE ADDRESSED
IMMEDIATELY, THEN YOU CANNOT SIMPLY
OPPOSE CLEAN, LOW-CARBON ENERGY
SOURCES.”

*Carol Browner, an American lawyer, environmentalist,
and businesswoman, who served as director of the
White House Office of Energy and Climate Change
Policy in the Obama administration from 2009 to 2011.*

*Energy for Humanity
www.energyforhumanity.org*

To limit the world's temperature increase below 2°C in 2050 90% of the world's electricity must be low-carbon by 2050.



Source: World Energy Outlook 2014
International Energy Agency

THANK YOU

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