

Hinkley Point : connections with Nuclear Weapons and Nuclear Security

Bath CND talk

Dr Ian Fairlie

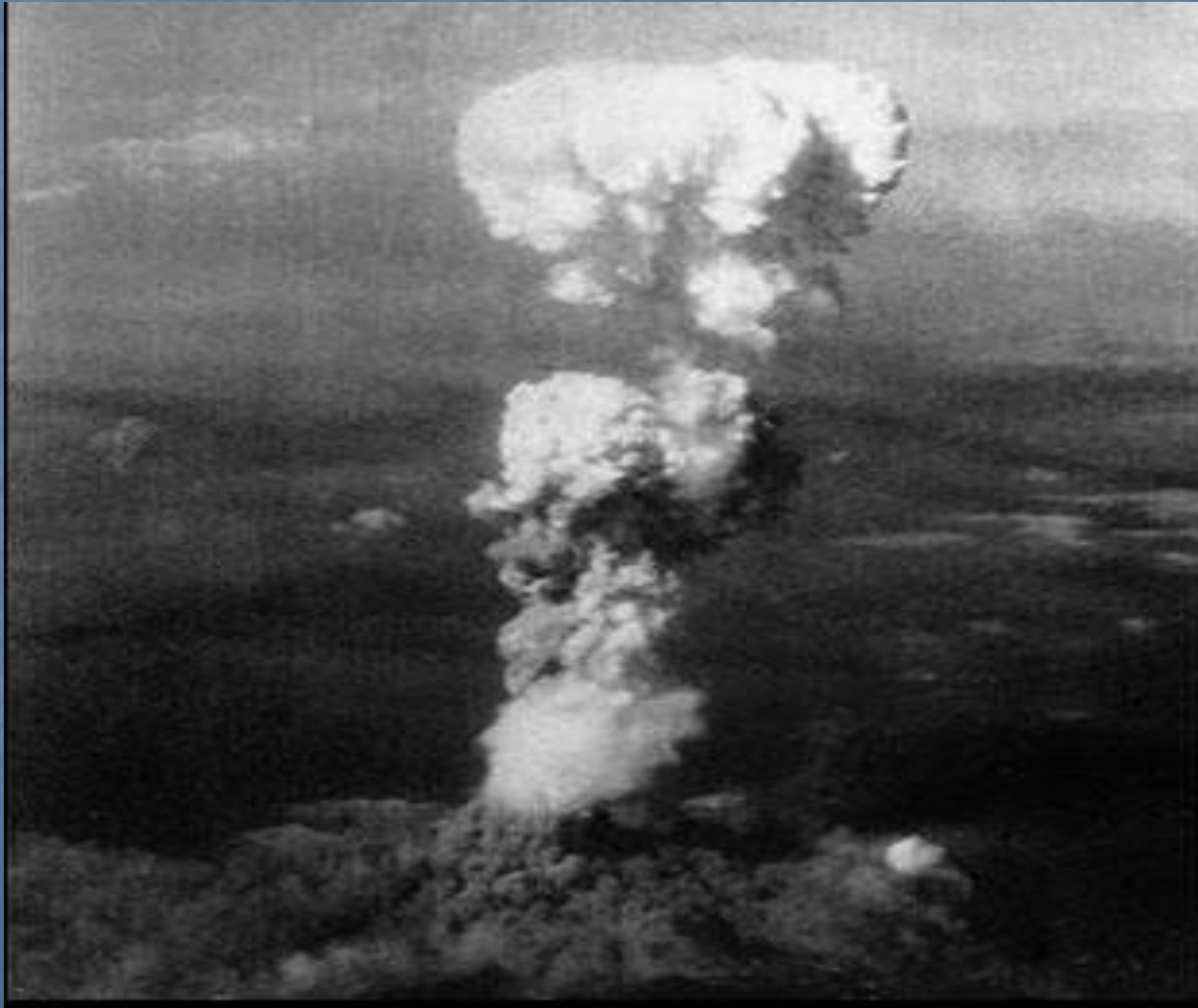
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I will talk about

1. Connections between civil/military nuclear
2. Status of Hinkley C nuclear power project
3. Security issues
4. Why we need to move to the Renewables

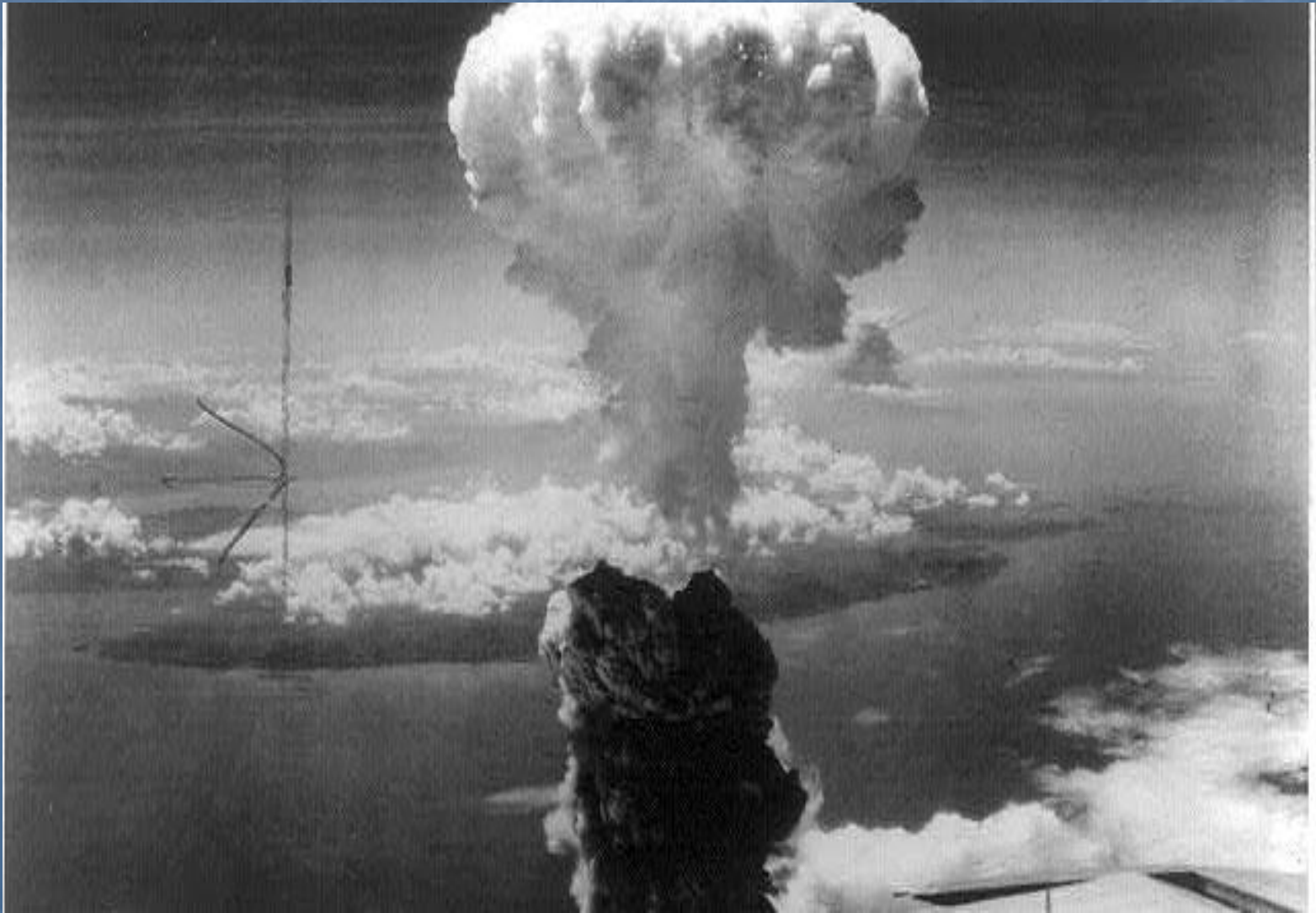
Hiroshima August 6 1945



Hiroshima late August 1945



Nagasaki August 9 1945



Nagasaki late August 1945



Connections - 1

All infrastructure for the bomb – is used for nuclear power

- Uranium ore mining, milling, refinery
- U-235 enrichment
- Uranium fuel manufacture
- Reprocessing to get fissile material

Connections - 2

- fissile matter for warheads
- ie **Pu-239** and **U-235** comes from nuclear reactors or U-enrichment facilities
- trigger and reflector ie tritium **H-3**, comes from nuclear reactors
- reactors in nuclear-powered subs were developed into PWR reactors

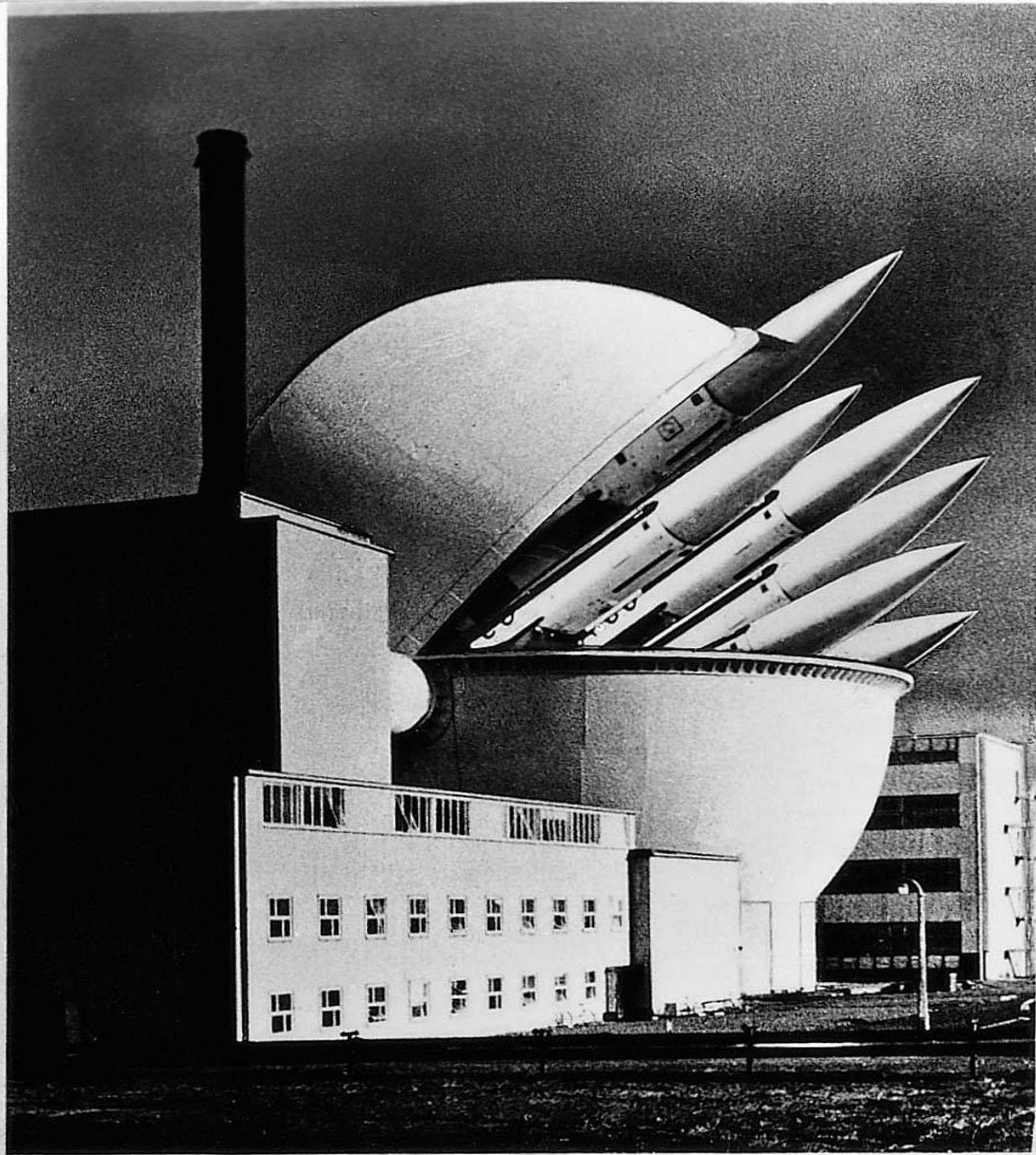
Connections - 3

Nuclear Weapons Proliferation

- Pakistan obtained its nuclear weapons from “peaceful” US nuclear power stations
- India obtained its nuclear weapons from “peaceful” Canadian nuclear power stations
- Iran? Saudi Arabia?

Connections - 4

- at birth, umbilically linked
- two sides of the same coin
- no such thing as a “peaceful” atom
- “Atoms for Peace” was and is misleading
- Ie Manhattan Project continues to this day



Hinkley Point



Proposed plant



Proposed Hinkley Point C?

- first planned in 2005
- completed ONR safety review in 2012
- concrete first poured in Dec 2018
- Will not start before 2027 if at all
- severe criticisms by NAO, OBR, NIC
- £50 billion cost to elec consumers - NAO
- seriously behind schedule; over budget
- ominous quiet in media/government
- Brexit??

The Spectator Feb 22, 2014

“Why has Britain signed up for the world’s most expensive power station?”

MPs owe it to taxpayers to throw out the Hinkley Point deal

<http://www.spectator.co.uk/features/9141142/why-has-britain-signed-up-for-the-worlds-most-expensive-power-station/>

Criticisms of Hinkley C Deal

<p>The Energy Secy had let EdF “take the British Government for a ride” over the “ludicrously high” subsidy deal to fund the proposed £20 billion Hinkley nuclear plant</p>	<p>Lord Lawson, former Chancellor</p>	<p>The Times 8th Nov 2013 http://www.thetimes.co.uk/tto/business/industries/utilities/article3916199.ece</p>
<p>“Flabbergasted... we are frankly staggered.... Hinkley will be the most expensive power station in the world”</p>	<p>Peter Atherton, Mulu Sun at Liberum Capital</p>	<p>http://tinyurl.com/lfacr3c 30th Oct 20</p>
<p>“..we could be staring at a truly astronomical cost by the end of the contract. ‘The government surely can't be that dumb,’ comments one City analyst. One assumes not.”</p>	<p>Nils Pratley Guardian columnist</p>	<p>http://tinyurl.com/ot3uhuv Guardian 18th Oct</p>
<p>"When City analysts tell you a contract is 'economically insane', it's time to admit that you might have got it wrong.”</p>	<p>Caroline Lucas MP</p>	<p>http://tinyurl.com/ncfv9ph Guardian 30th Oct</p>
<p>"The Brits are crazy ... How can one build new nuclear plants when all the world understood, or should have understood, that Fukushima was not an exception but part of the industry.”</p>	<p>Claudia Roth, deputy speaker of German Bundestag</p>	<p>http://tinyurl.com/pcptd6m Guardian 31st Oct</p>

Many Problems with HPC

1. Financial
2. Technical
3. Legal
4. Brexit

Massive Costs

- HPC construction costs extremely high --- £24.5 billion in 2014 and rising
- no-one willing to finance HPC, except French/Chinese Governments
- Chinese Gov't is silent: no enthusiasm?
- If Flamanville not in service by end 2020, further loan guarantees will not be given.
- No guarantees, no Hinkley C.

EDF – in dire financial straits

- €37 billion = existing debt
- needs €16+ billion to build Hinkley C
- needs €100 billion refurbish French reactors
- needs €75 billion decommission the rest
- **total = €228 billion +**
- plus € gazillion debt from AREVA (Orano)
- trying to sell off its assets
- only propped up by French Government

Technical Problems at Flamanville

- French nuclear regulator, ASN, found "very serious" issues
- reactor pressure vessel domes by Le Creusot are faulty and need to be replaced
- multiple faults in crucial safety valves
- recent serious welding faults x 8

Orano will test to destruction one of the EPR domes destined for HPC.

Brexit ?

- EDF warned Brexit could increase " costs of essential new infrastructure developments and could delay their delivery". Times 27 Jan 2017
- "Exiting Euratom—The UK's Withdrawal from Euratom", Nuclear Industry Association, 3 May 2017
- fear an abrupt exit will lead to a cliff edge potentially causing major disruption to business across the whole nuclear fuel system

Security Issues

1. Target for terrorist attacks?
2. Chinese Government control over part of UK electricity
3. China's General Nuclear Power Group (CGN) is controlled by China's nuclear weapons agency (CGC)

Chinese Government Spying

US DEPARTMENT OF DEFENSE (DOD): Annual Report to Congress: Military and Security Developments Involving the People's Republic of China US DoD report to Congress, May 2, 2019

https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf

NEW YORK TIMES: Perlroth, Nicole, David E. Sanger and Scott Shane, How Chinese Spies Got the N.S.A.'s Hacking Tools, and Used Them for Attacks, New York Times, May 7, 2019. <https://www.nytimes.com/2019/05/06/us/politics/china-hacking-cyber.html>.

SYMANTEC: Buckeye: Espionage Outfit Used Equation Group Tools Prior to Shadow Brokers Leak, Threat Intelligence blog, Symantec Corporation, May 6, 2019.

<https://www.symantec.com/blogs/threat-intelligence/buckeye-windows-zero-day-exploit>.

US DOD Report 2019

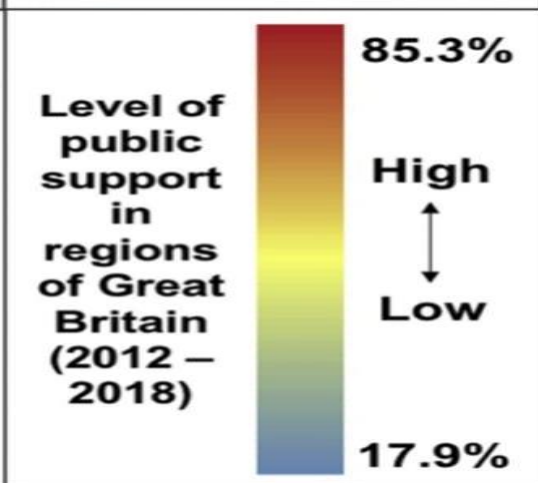
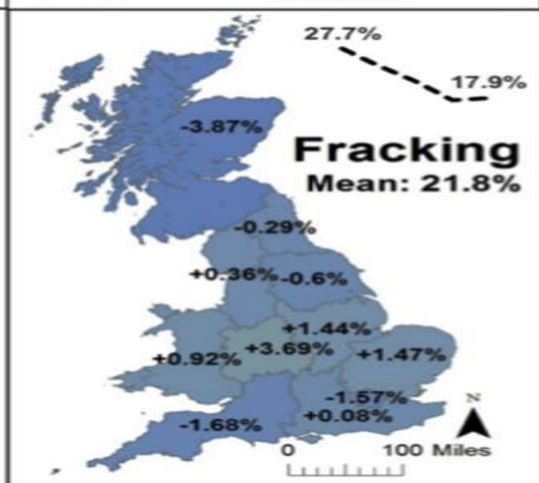
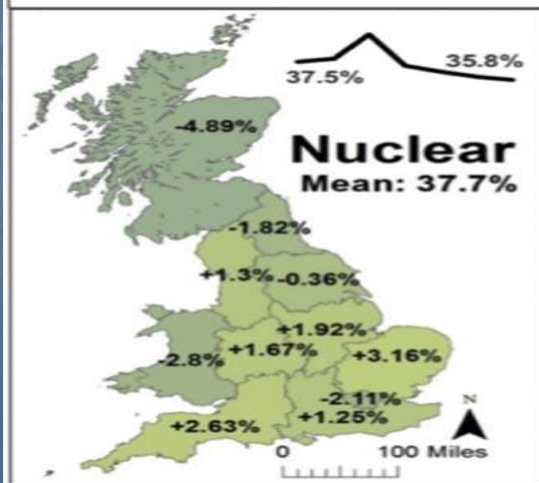
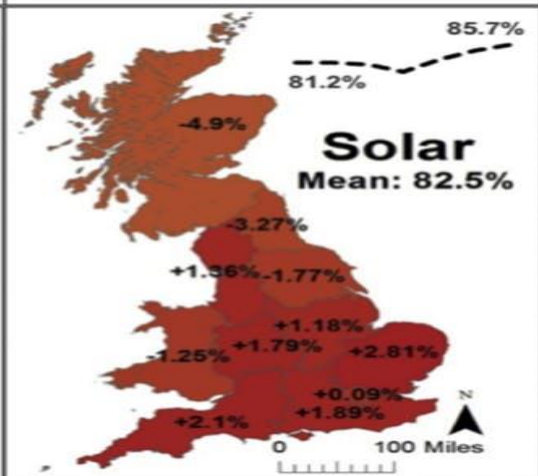
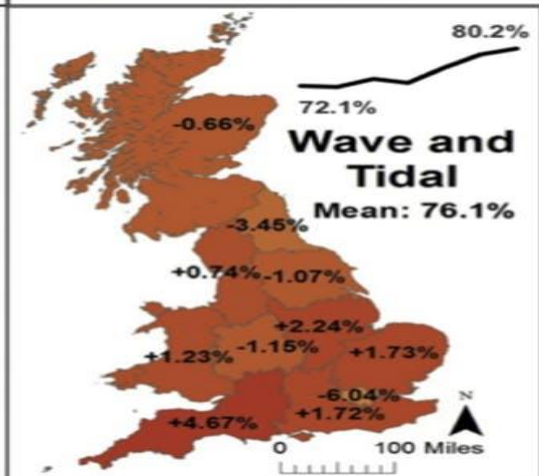
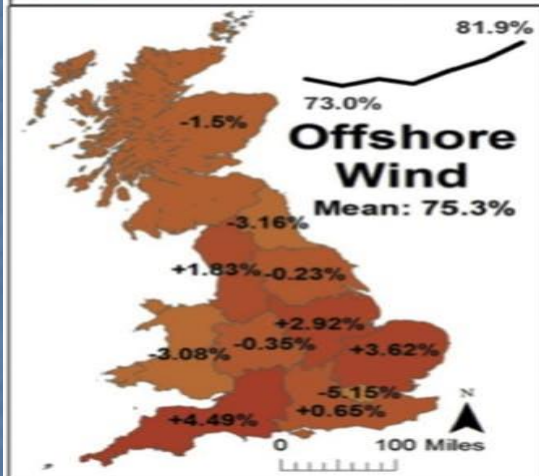
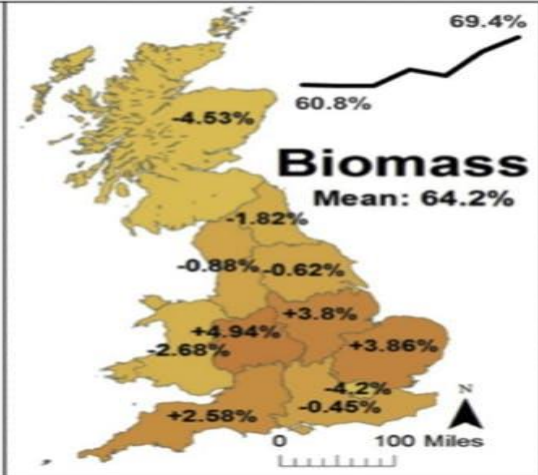
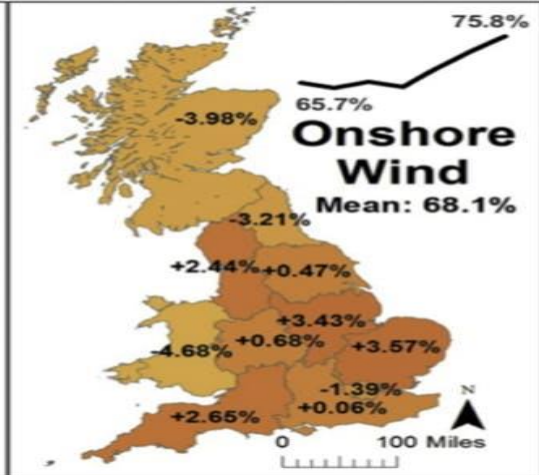
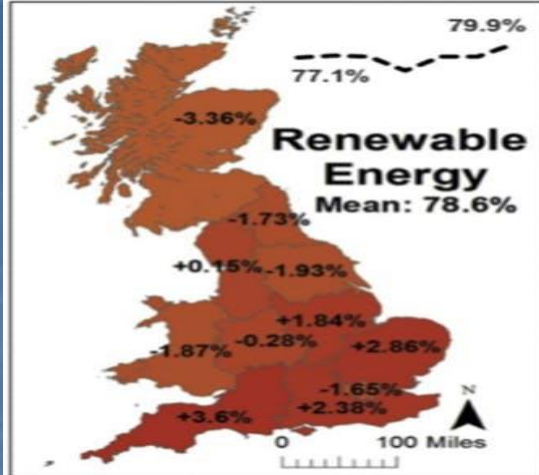
PLA "Its EW strategy emphasizes **suppressing, degrading, disrupting, or deceiving enemy electronic equipment**. Potential EW victims include... adversary computer and information systems." (p 64)

to constrain an adversary's actions by targeting network-based ...**commercial activities**." (p 64)

"The 2017 National Intelligence Law requires **Chinese companies to support, provide assistance, and cooperate in China's national intelligence work, wherever they operate**." (p 101)

Which direction to go?

- Globally, in last decade, >30 GW **nuclear** closed, 80 GW **wind** + 80 GW **solar** thermal has been installed
- Germany, Switzerland, Italy, Japan all exiting from nuclear



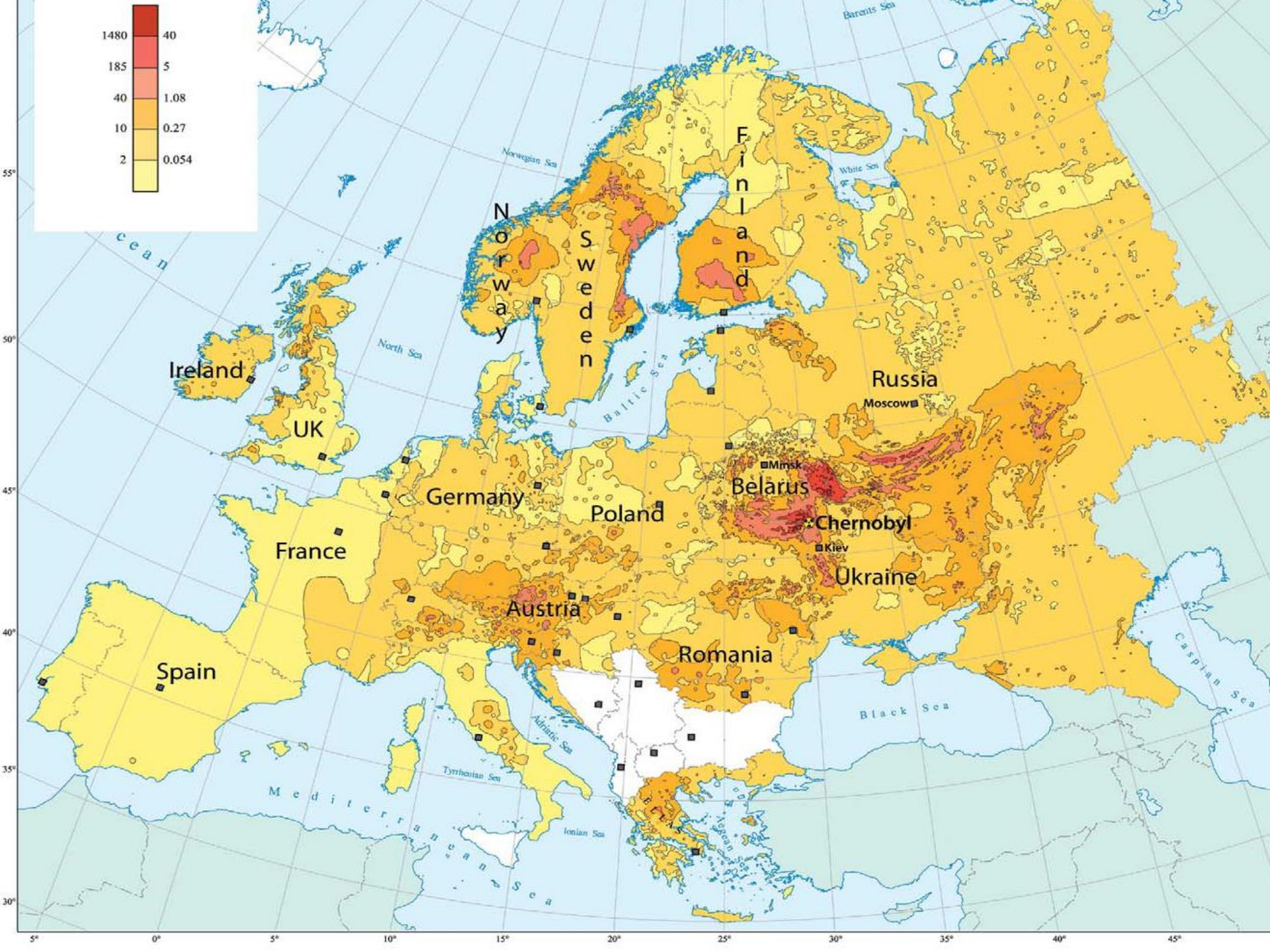
Technology	Capacity/configuration/fuel	Average gCO ₂ /kWh)
Hydroelectric	3.1MW, reservoir	10
Biogas	Anaerobic digestion	11
Solar thermal	80MW, parabolic trough	13
Biomass	Waste wood steam turbine	31
Wind	Various types	34
Geothermal	80 MW, hot dry rock	38
Biomass	Short rotation forestry reciprocating engine	41
Solar PV	Various types	50
Nuclear	Various reactor types	66
Natural gas	Various combined cycle turbines	443
Fracking	CC turbines using fuel from fracking	492
Fuel cell	Hydrogen from gas reforming	664
Diesel	Various generator and turbine types	778
Coal	Various generator types with scrubbing	960

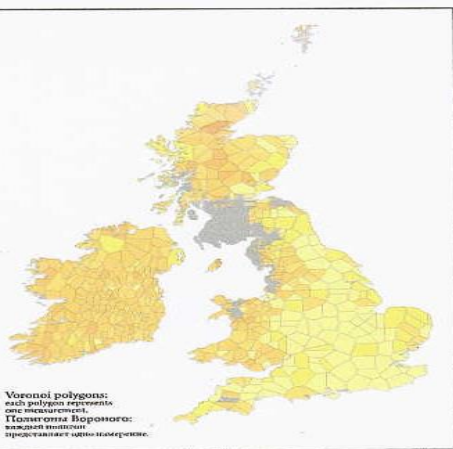
Conclusions

- small contribution to CO₂ reduction
- cheaper, more cost effective, quicker, safer, more popular options

= Renewables and Energy Efficiency

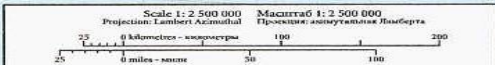






Voronoi polygons:
each polygon represents
one measurement.
Полигоны Вороного:
каждый полигон
представляет одно измерение.

14°



Declining Chinese interest in UK nuclear

"It is not clear China wants to go ahead; [they] increasingly realise that the Hinkley design is a dead end, as costs escalate and delays grow." Ridley, M. *Britain's energy policy keeps picking losers*, Times 31st July 2017 <https://www.thetimes.co.uk/edition/comment/britain-s-energy-policy-keeps-picking-losers-v2ctn5pcb>
Kidd, S. *Nuclear in China – why the slowdown?* Nuclear Engineering International 10th August 2017 <http://www.neimagazine.com/opinion/opinionnuclear-in-china-why-the-slowdown-5896525/>

EDF Finances

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Hinkley -EDF

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South Korea

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Hitachi GE

Hitachi scrambles to divest UK nuclear risks after Toshiba fiasco, Nikkei Asian Review 9th June 2017 <https://asia.nikkei.com/Business/Companies/Hitachi-scrambles-to-divest-UK-nuclear-risks-after-Toshiba-fiasco>
Roche, P. *ABWRs – one of the least reliable reactors in the world*, nuClear News No.77 September 2015 <http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo77.pdf>

Renewables

...just keep getting cheaper. See Gandolfi, A. *The Wind and Solar Boom*, Goldman Sachs, July 2017 <http://www.goldmansachs.com/our-thinking/pages/alberto-gandolfi-wind-and-solar-boom.html>