

“You must never confuse faith that you will prevail in the end, which you can never afford to lose, with the discipline to confront the most brutal facts of your current reality, whatever they might be.”

James Stockdale



Congratulations – We have transformed the world!!

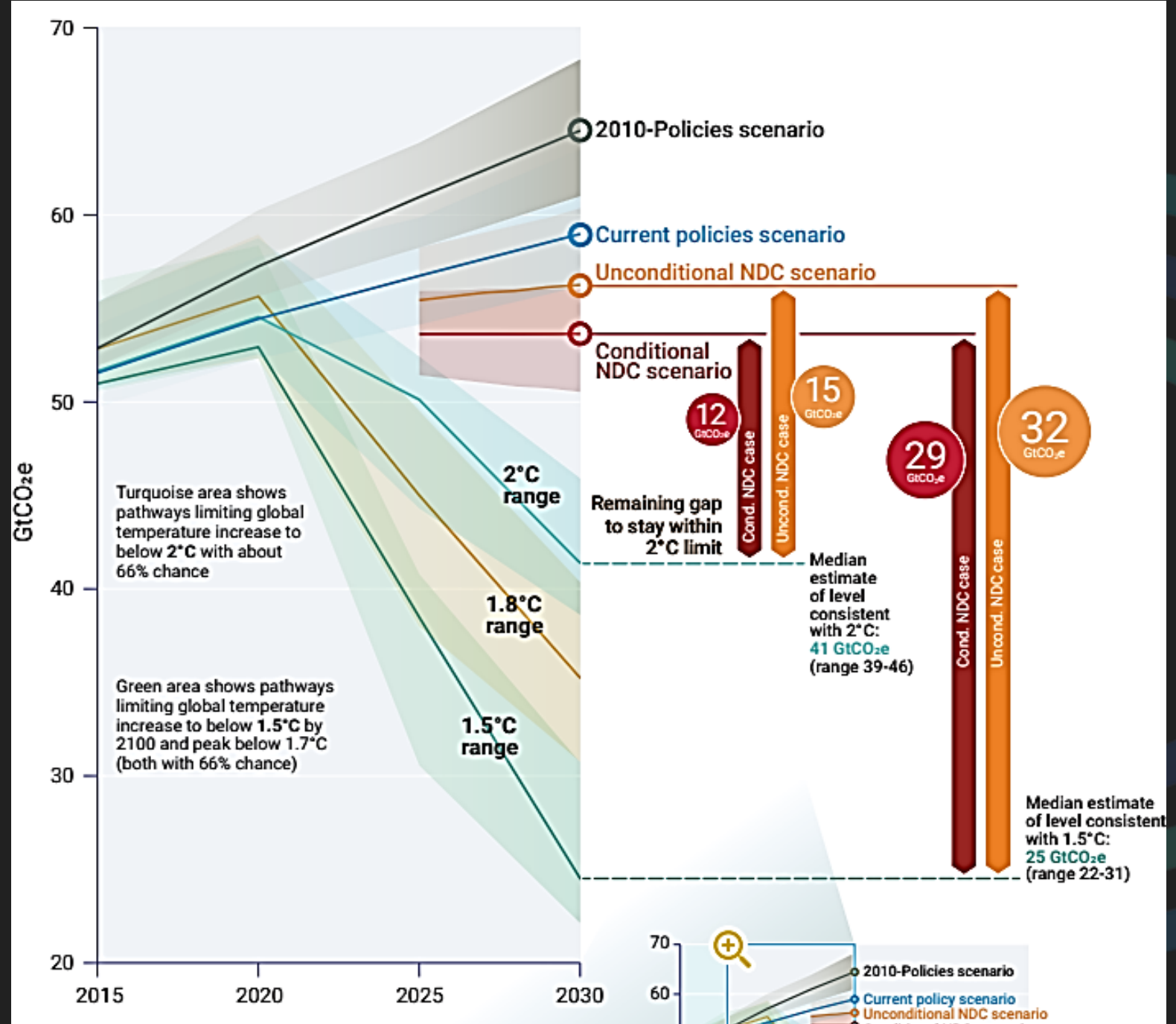


There is no Net Zero

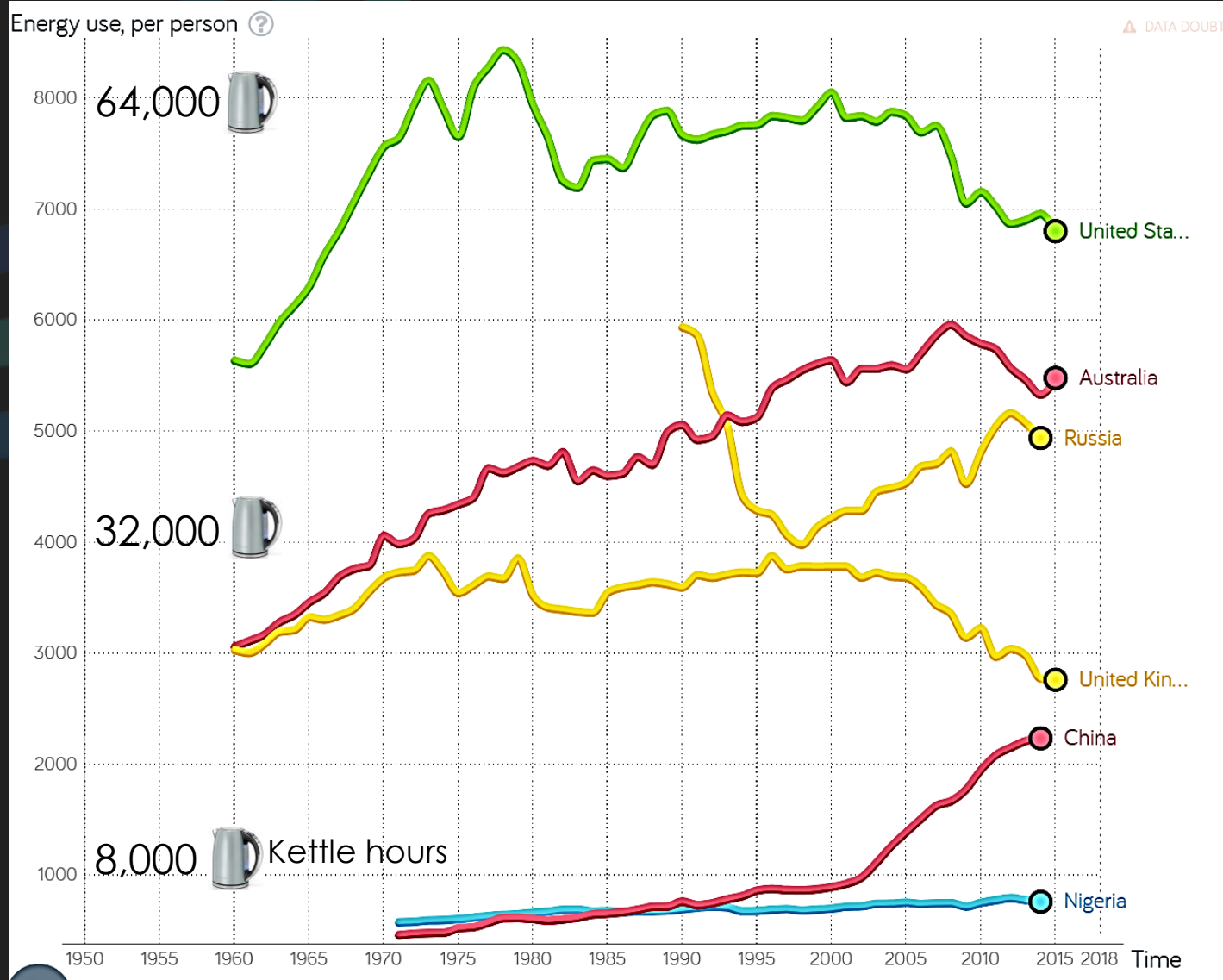
NDC: Nationally defined contributions

NDC stands for a Nationally Determined Contribution. For the Paris Agreement goals to be achieved, every country needs to play its part.

Because countries have different circumstances, resources and abilities, the agreement was designed so each country defines their own pledges, in terms of targets and contributions to the universal agreement. These country pledges are the NDCs.



Energy use per person Kg oil equivalent (koe)



tCO2e/capita (IEA Data)

- Qatar: 31.3
- UAE: 20.0
- Australia 15.3
- Canada: 15.2
- United States: 14.5
- South Africa 7.4
- China: 6.8
- United Kingdom 5.1
- France 4.4
- India 1.7
- Nigeria 0.65
- Chad 0.06

Innovation

The idea that innovation is a practice distinct from both science and technology is compelling.

“Innovation is the successful commercialisation of technology that relies on systems integration across a multiplicity of skills, disciplines and public and private institutions” (Nightingale, 2014)



We need a paradigm shift

‘However, if the electric vehicle only is a substitute for the current car and we continue with a car-dominated mobility system, the low carbon and inclusive economy will still be far away’. (Schot and Steinmueller, 2018 p 1562 [1]).

[1] J. Schot and W. E. Steinmueller, “Three frames for innovation policy: R&D, systems of innovation and transformative change,” *Res. Policy*, vol. 47, no. 9, pp. 1554–1567, 2018, doi: 10.1016/j.respol.2018.08.011.



Decision criteria

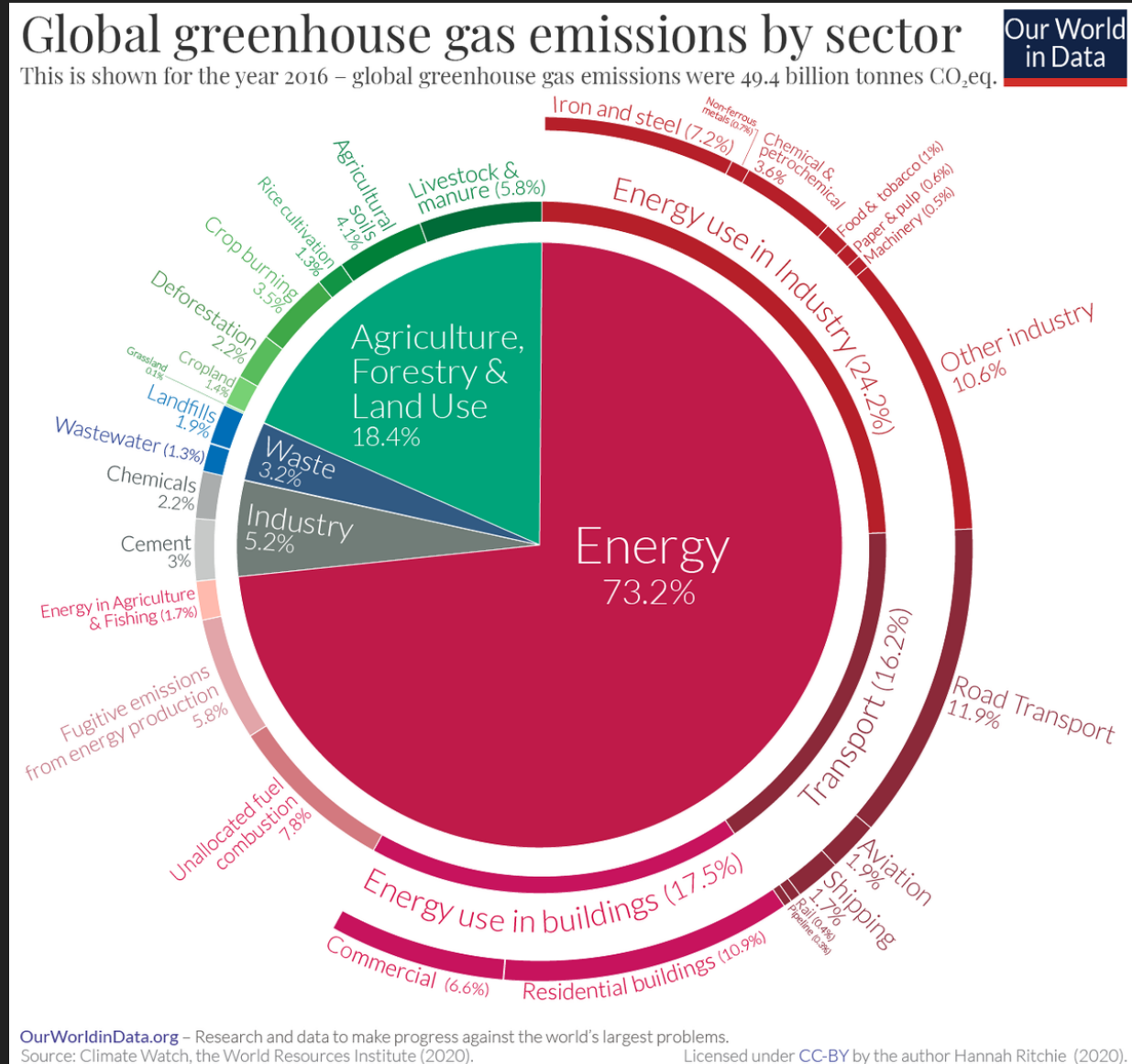
Does the human production of one unit of an economic good by method A utilize more of a resource's exergy than by method B?

Exergy: Destruction of useful resource, so that it cannot be used again.

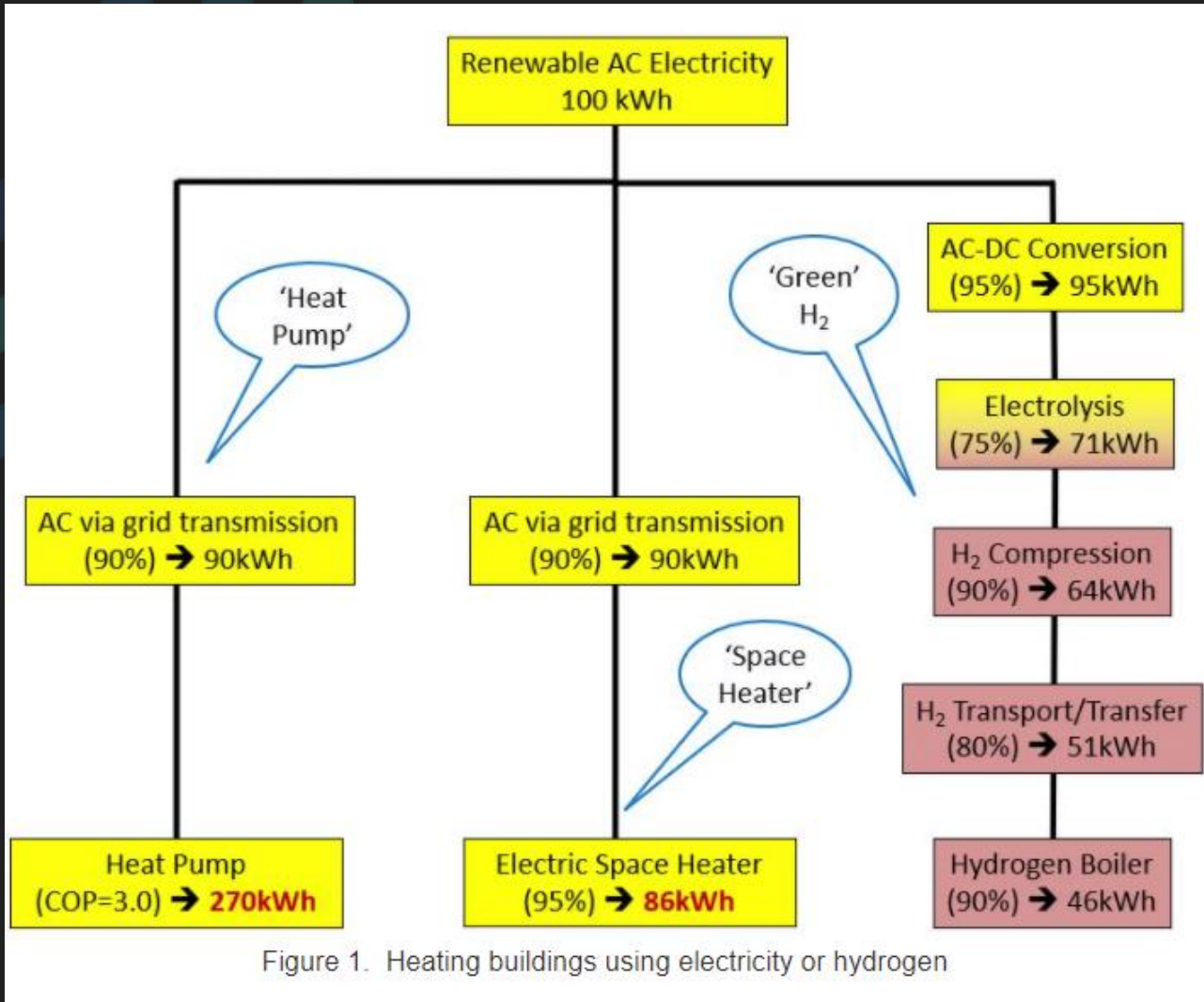


Decision Criteria

- Decarbonisation must be at scale and meaningful.
- Spend the money where it matters.
- Projects need to be shovel ready.
- Projects should be part of a an integrated holistic system that maximises efficiency and minimises exergy destruction.
- **As little energy as possible to do the job.**



Challenge



- Minimise cost
- Minimise energy losses
- Minimal exergy destruction
- Minimise energy poverty

