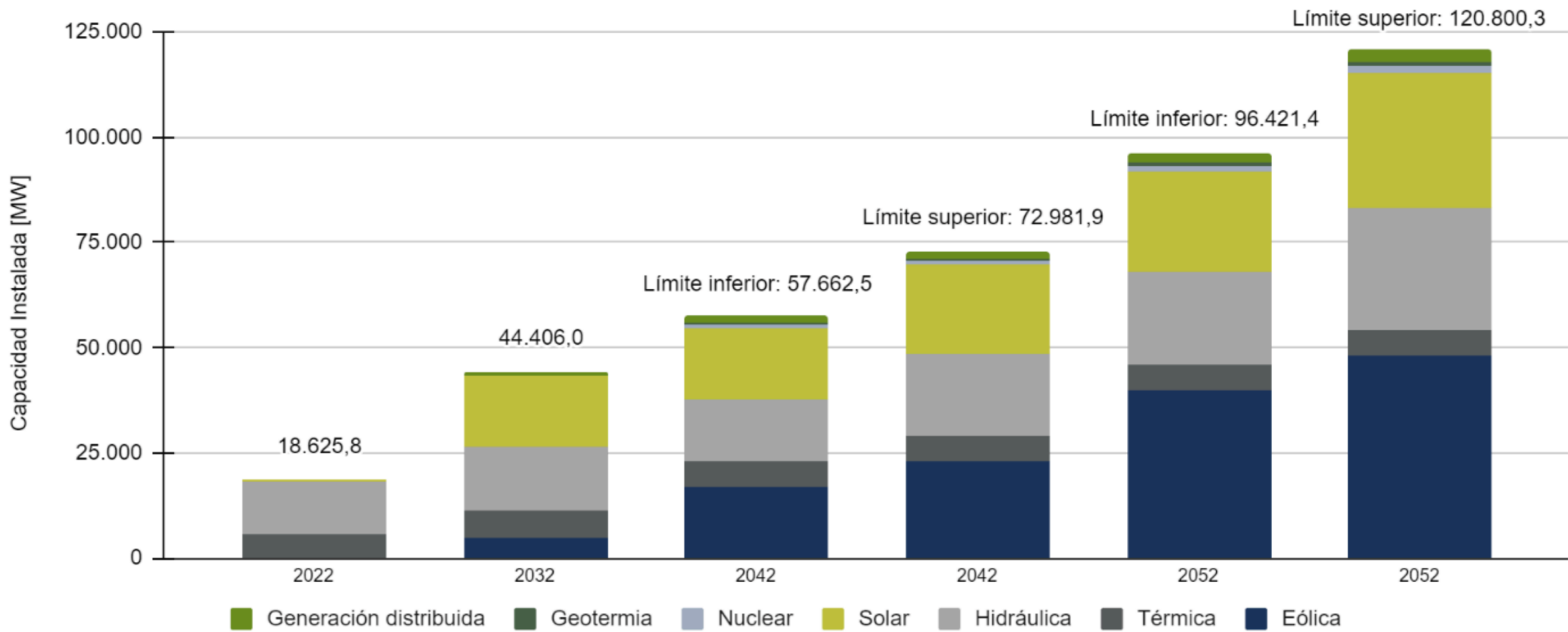


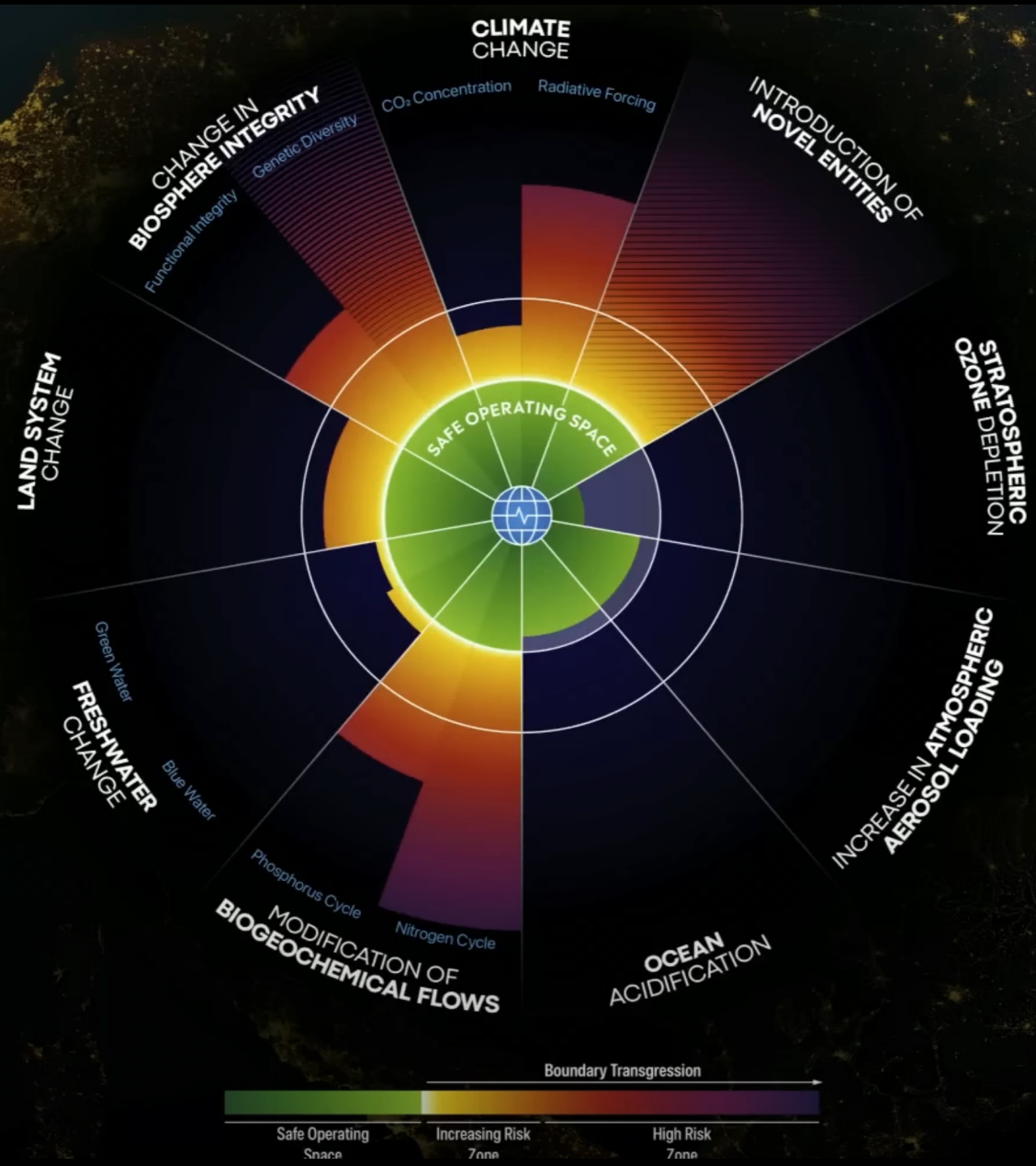
La transición energética y los límites planetarios



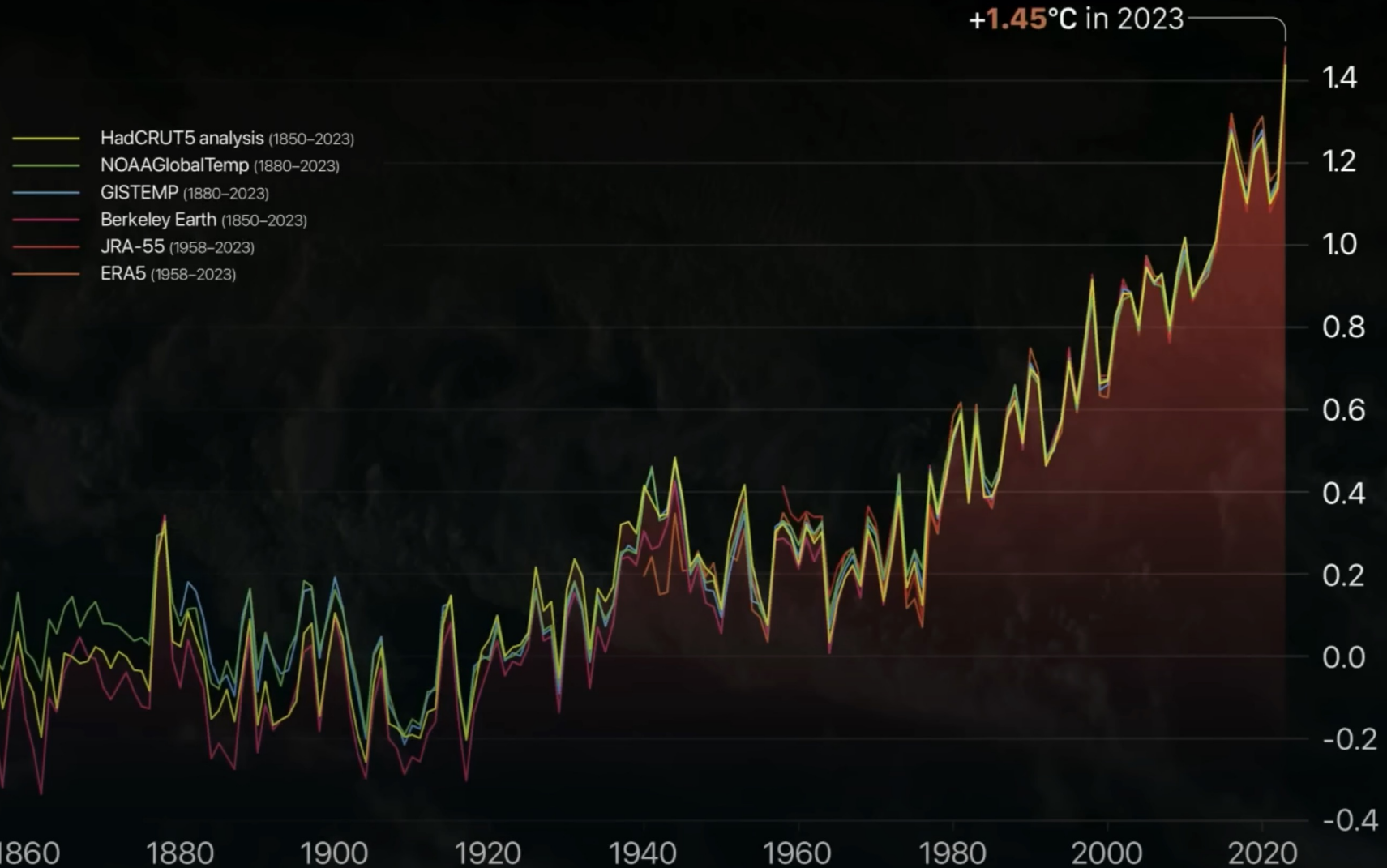
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PhD© MSc Mphil M.D



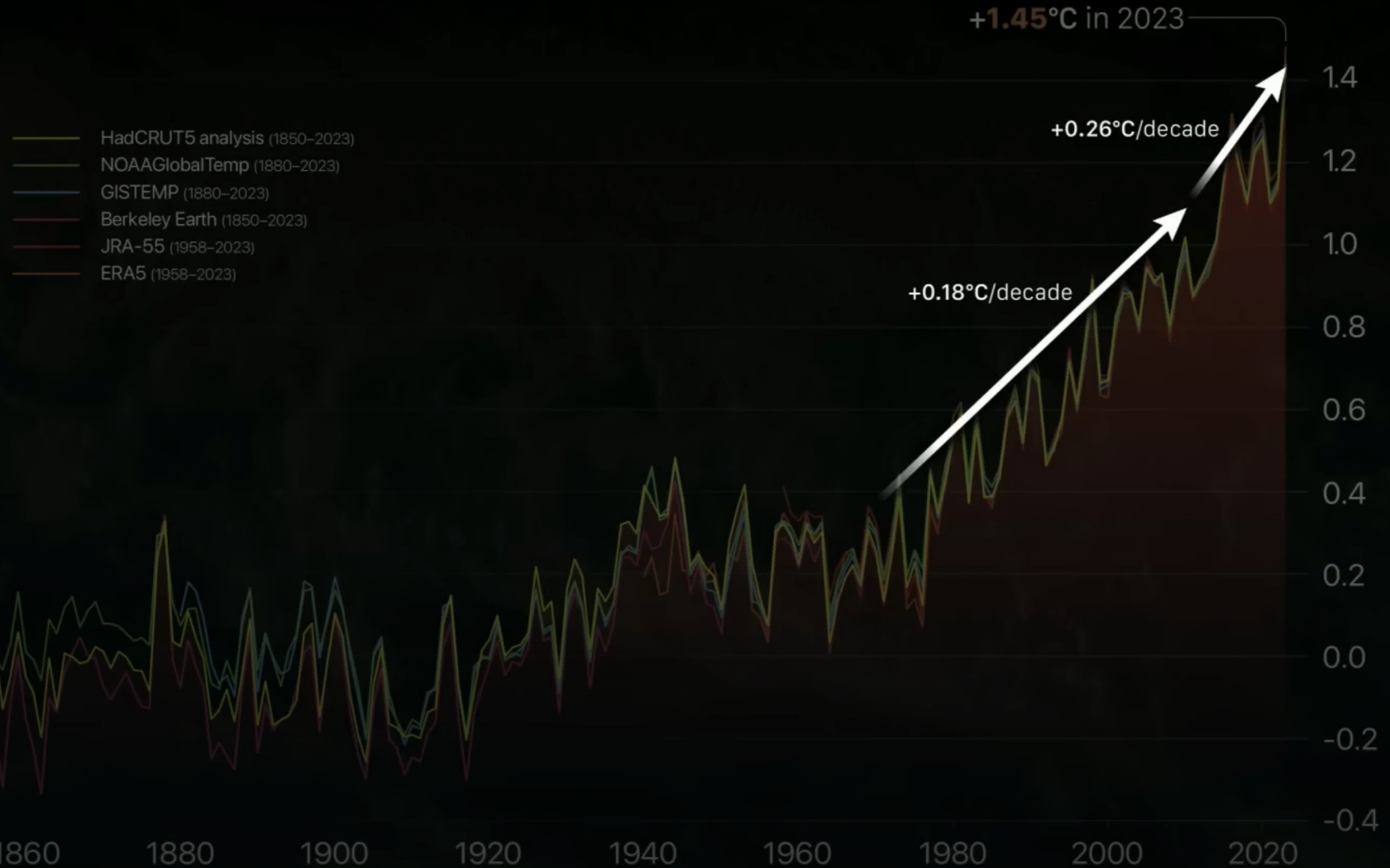




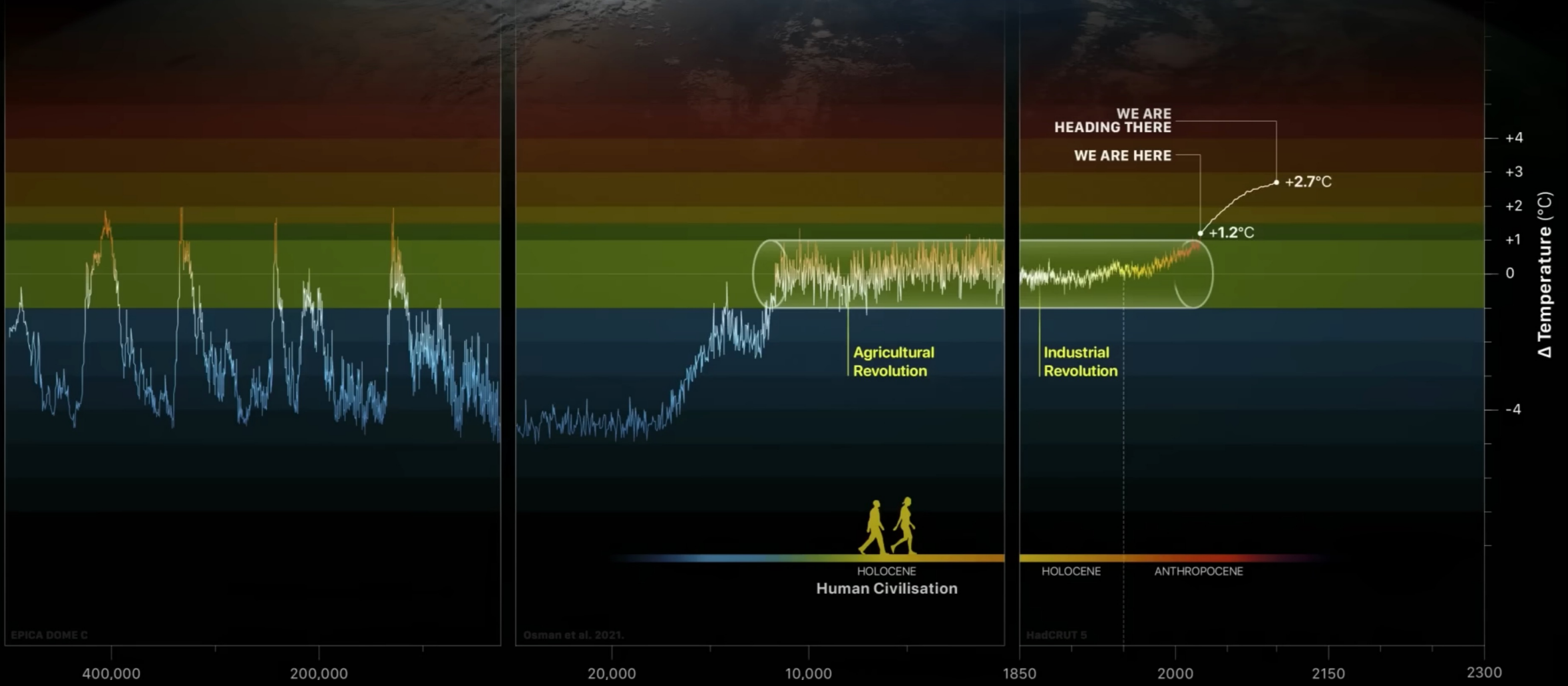
Annual global mean temperature anomalies (°C) relative to 1850-1900 average



Annual global mean temperature anomalies (°C) relative to 1850-1900 average

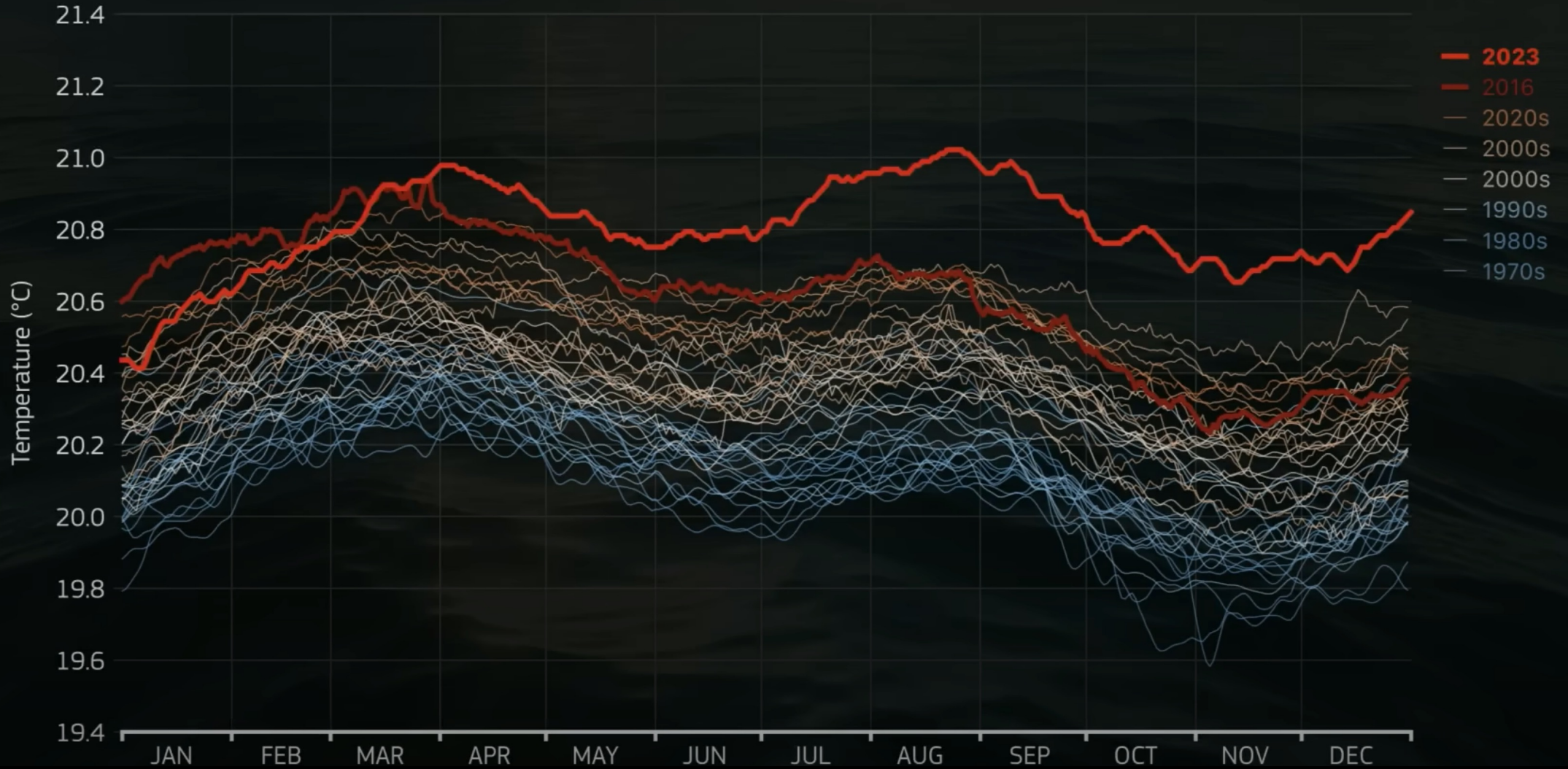


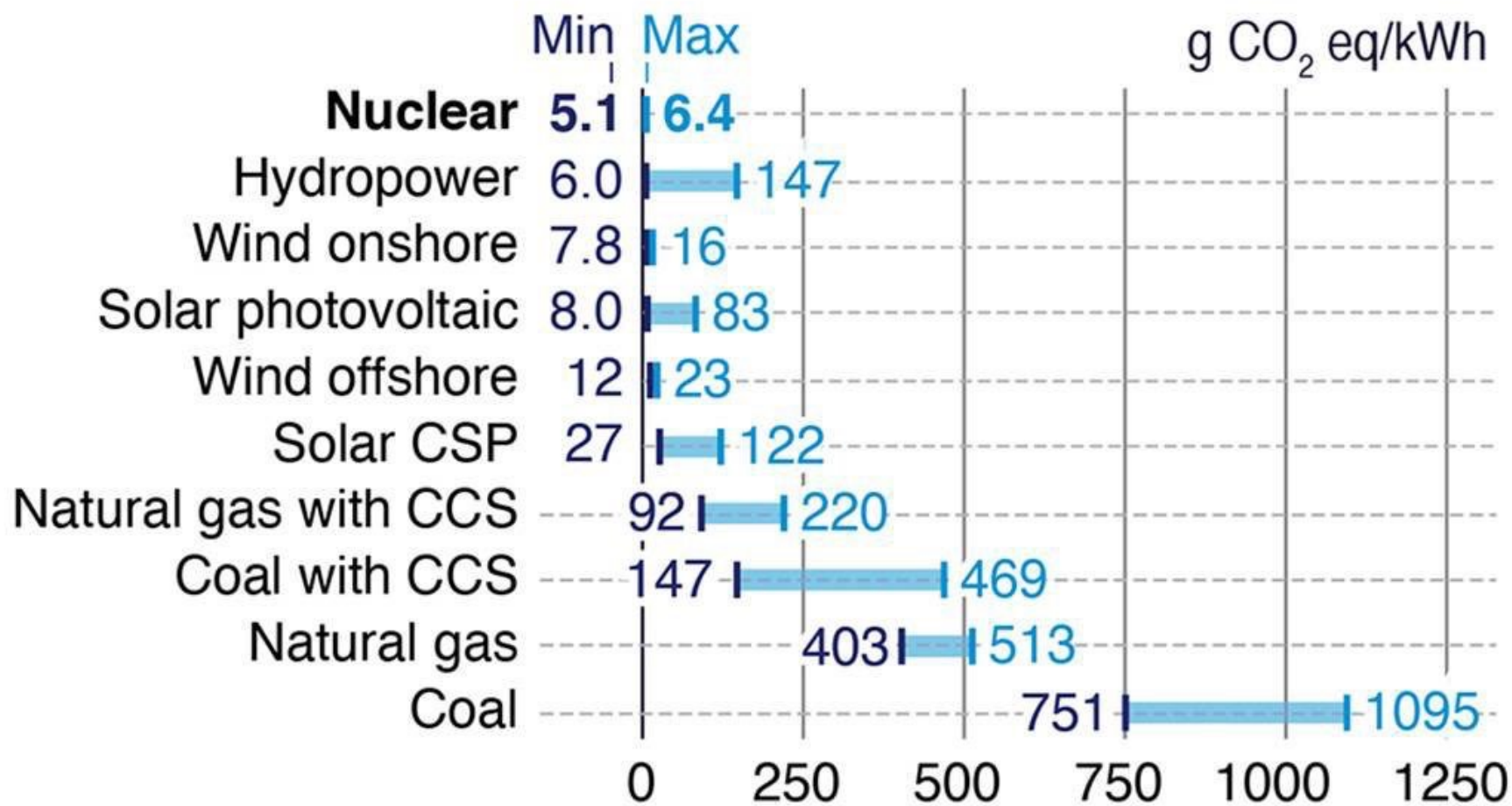
Humanity's Journey on Earth



Daily Sea Surface Temperature · 60°S–60°N

Data: ERA5 1979-2024





Source: based on data from UNECE (2022). Note: CSP — concentrated solar power; CCS — carbon capture and storage.

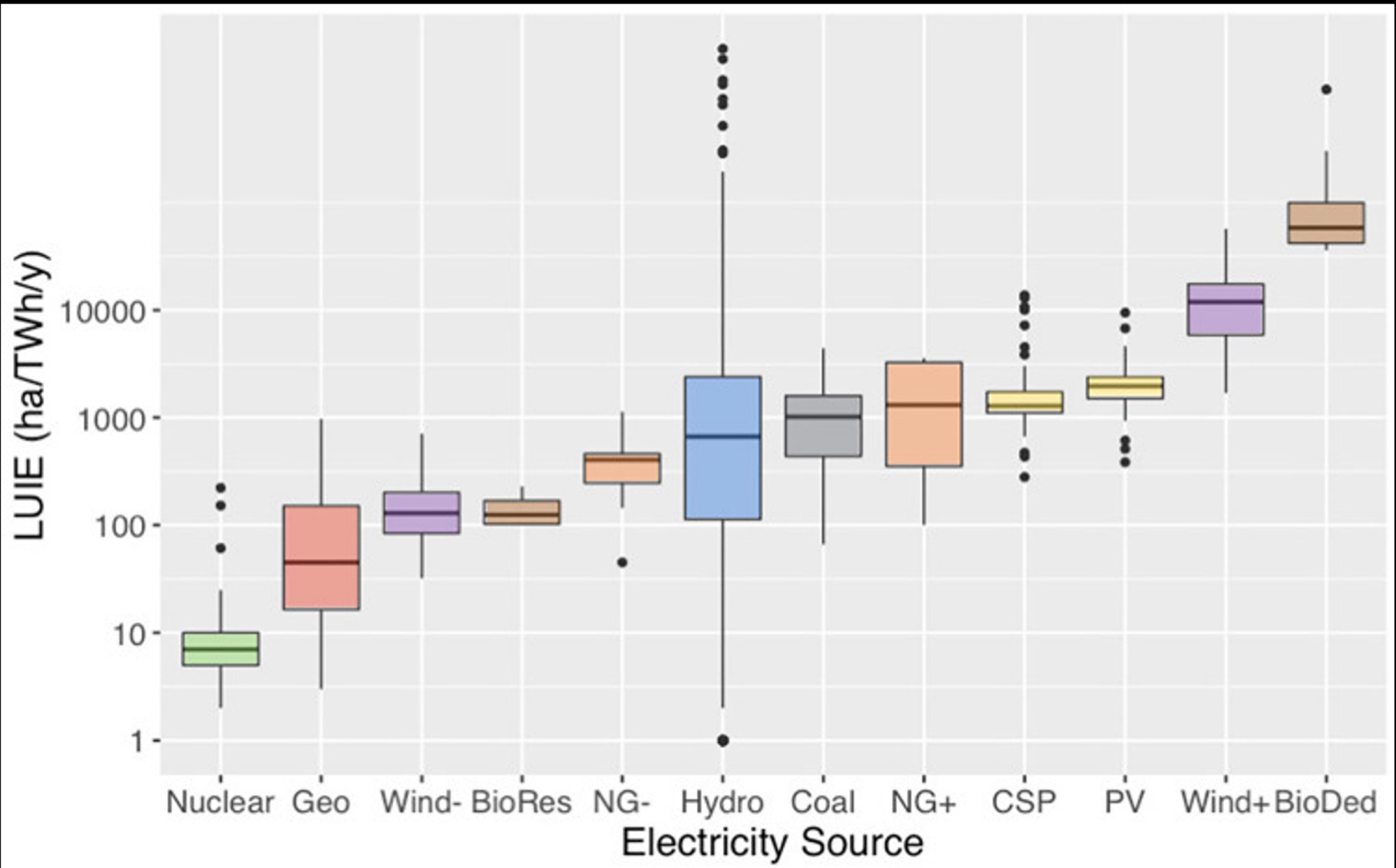
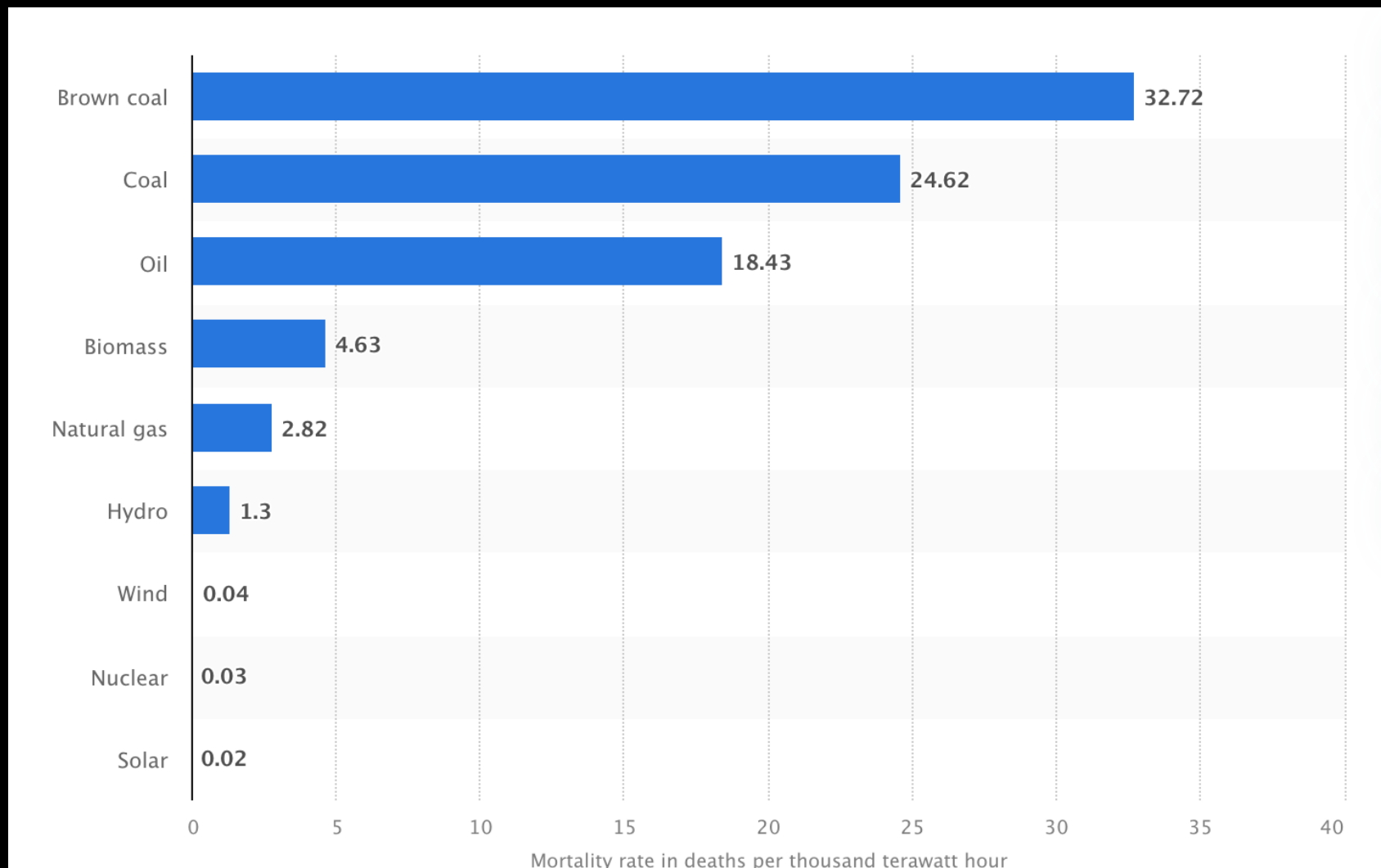
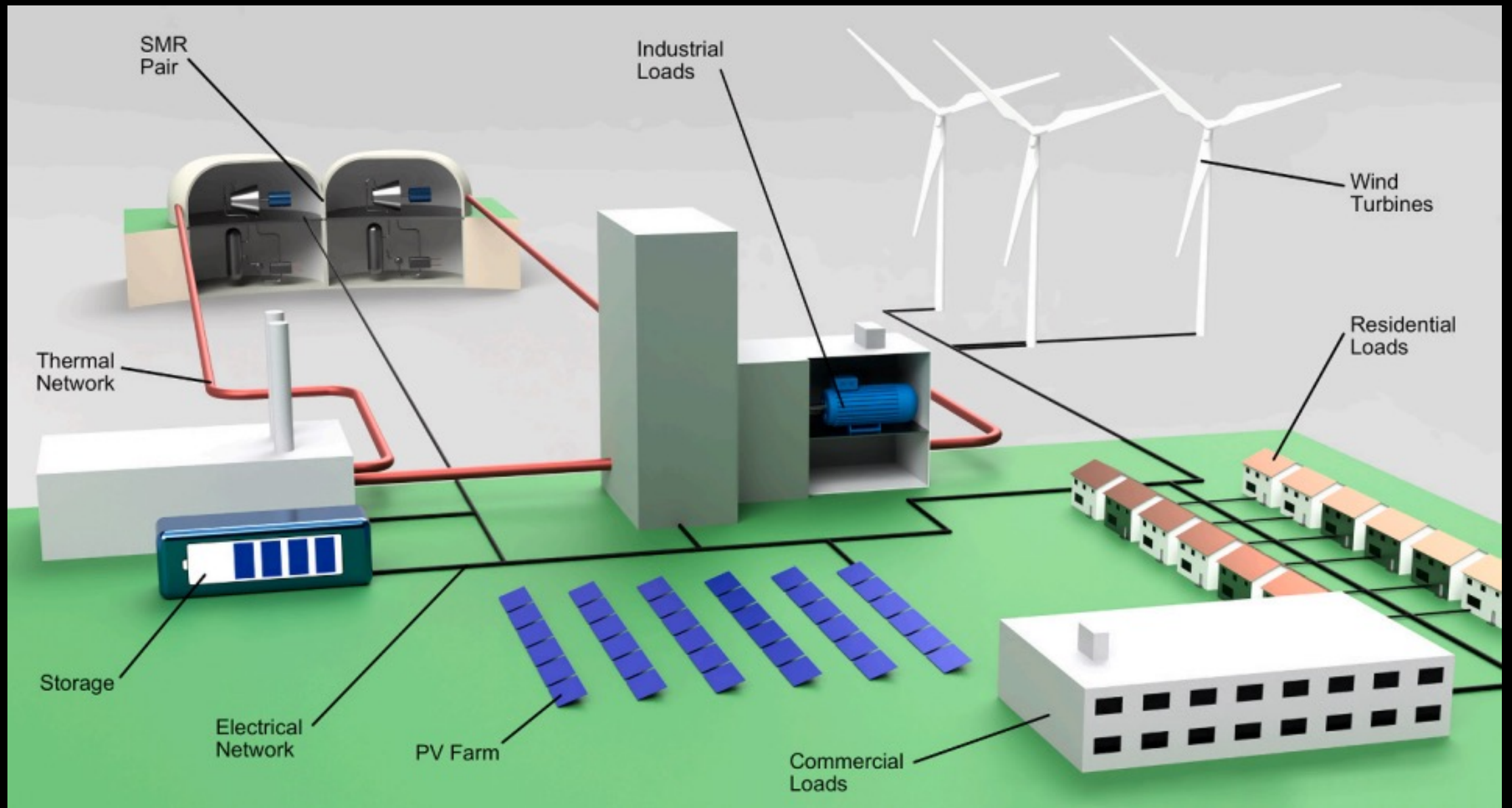


TABLE 2 TOTAL LUIE MEAN BY ENERGY SOURCE

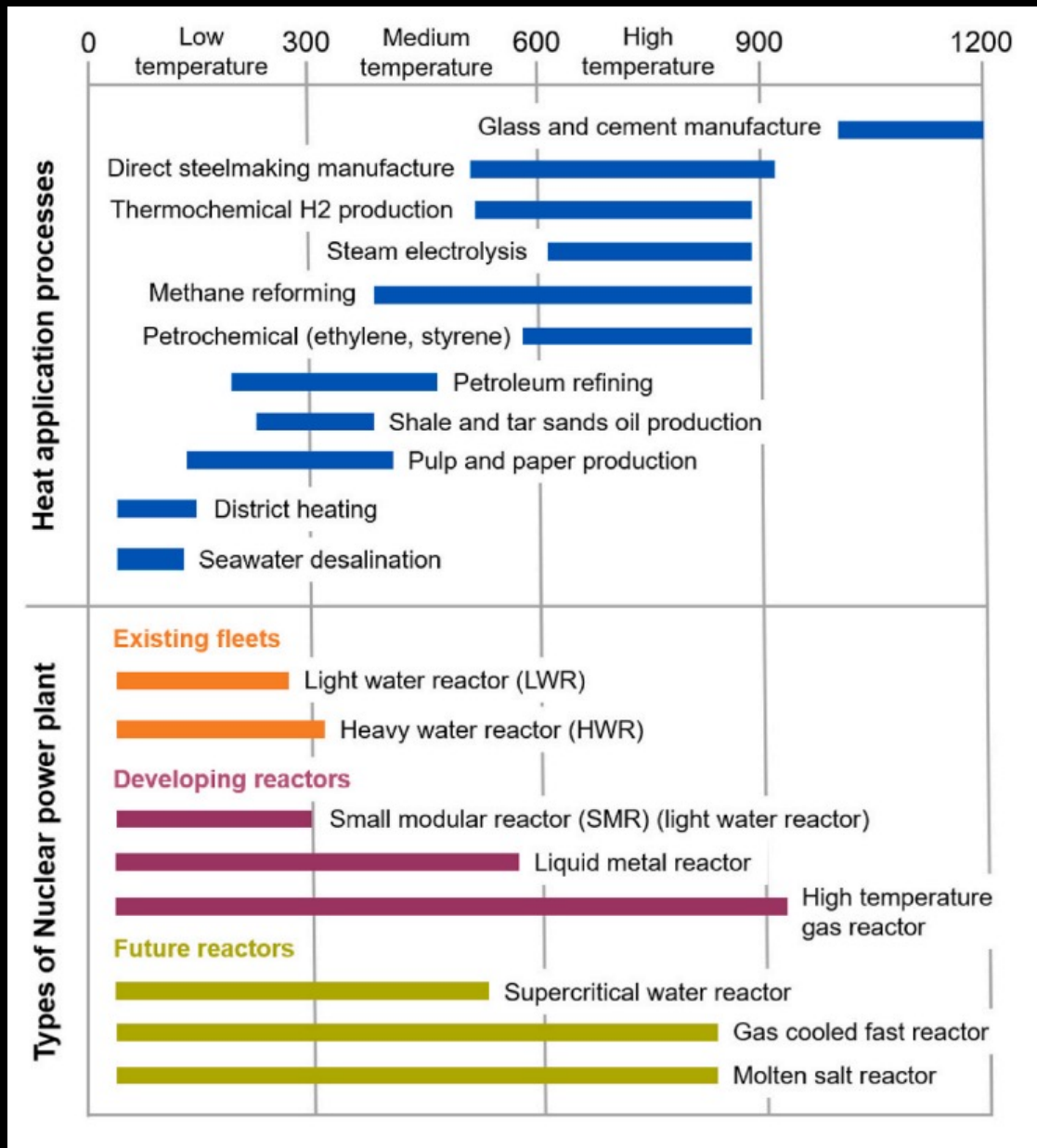
Source of energy	LUIE total (ha/TWh/y) Mean
Hydroelectric	15000
Ground-mounted PV	2100
Natural gas	410
Wind	170
Nuclear LR	15
SMR	8





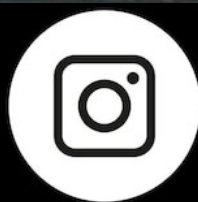
Comparación de alternativas de generación

Variable	PHS	SMR	BATERÍAS	Fuente
LCOE (UDS/MWh)	100	58 proyectados para el 2030	117-414	Michaelson, 2023
Eficiencia	70 %-85 %	35 %	85 %-95 %	Nikolaos, 2023
Vida útil (años)	30	Al menos 30	10	Tang, 2023
Factor de planta	16 % a 23 %	90 %-95 %	Menor a 20 %	Krajacic, 2013 y Bolson, 2020
Factor de emisiones tCO ₂ /GWh	24	4.6-13.2	55-222	Llamas, 2023 y UNECE, 2021
Intensidad uso del suelo m ² /MWh	14	0.3		UNECE, 2021
Regulación	Existe para Colombia	No existe para Colombia	Sí existe para Colombia	



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