Five axes of transformation for climate-scale nuclear deployment

LUCID CATALYST

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The decarbonization challenge

a. Global GHG emissions

GHG emissions (GtCO$_2$-eq yr^{-1})

Modelled pathways:

- Trend from implemented policies
- Limit warming to 2°C (>67%) or return warming to 1.5°C (>50%) after a high overshoot, NDCs until 2030
- Limit warming to 2°C (>67%)
- Limit warming to 1.5°C (>50%) with no or limited overshoot

⊢·····•·····⊣ Past GHG emissions and uncertainty for 2015 and 2019 (dot indicates the median)

The decarbonization challenge

a. Global GHG emissions

GHG emissions ($GtCO_2$-eq yr^{-1})

80
70
60
50
40
30
20
10
0
-10

2010 2015 2020 2025 2030 2035 2040 2045 2050

The
10 Terawatt
Gap
(500GW/yr)

To help with the decarbonization challenge

Nuclear energy needs to achieve

- Climate speed
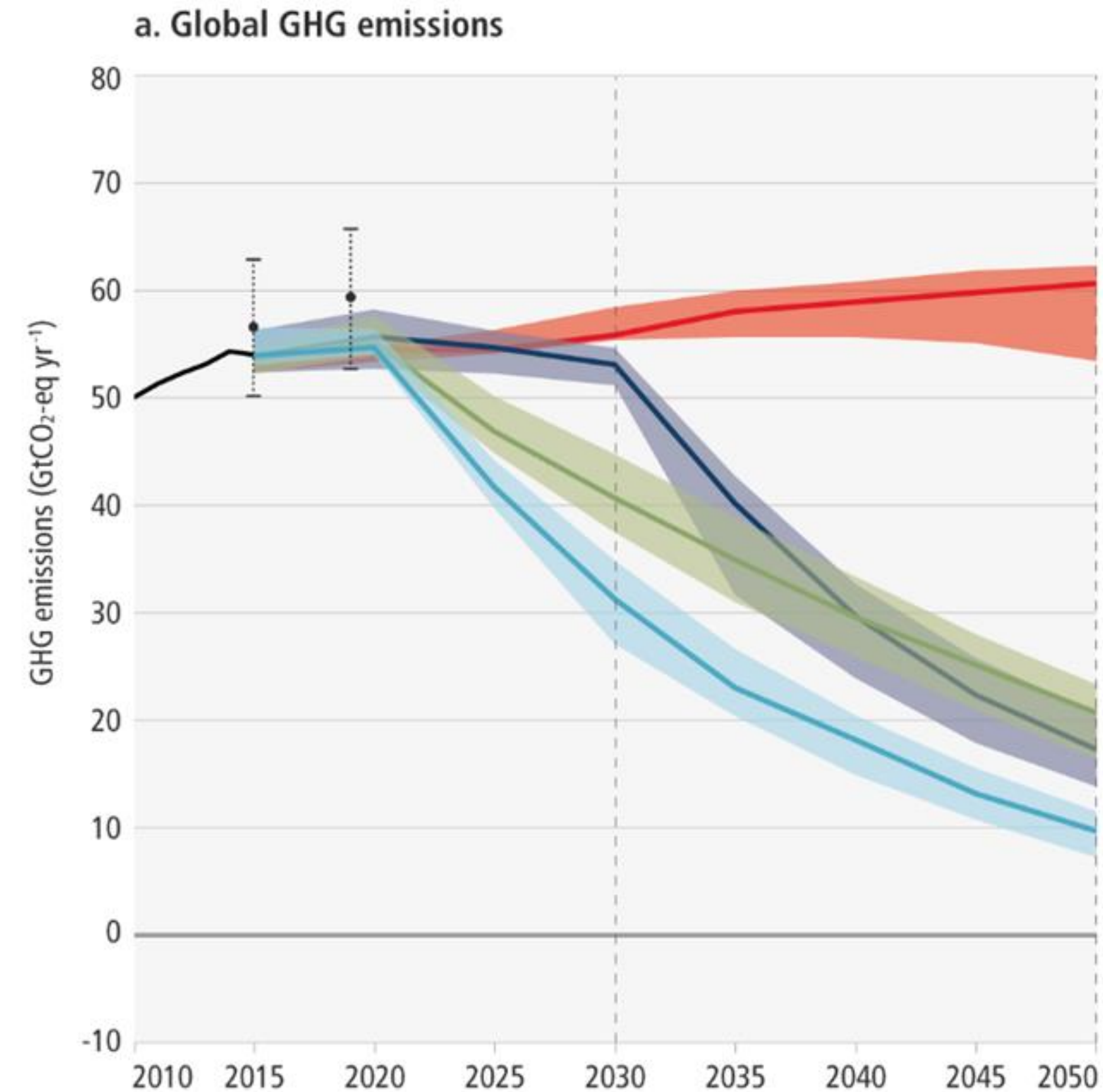- Climate scale

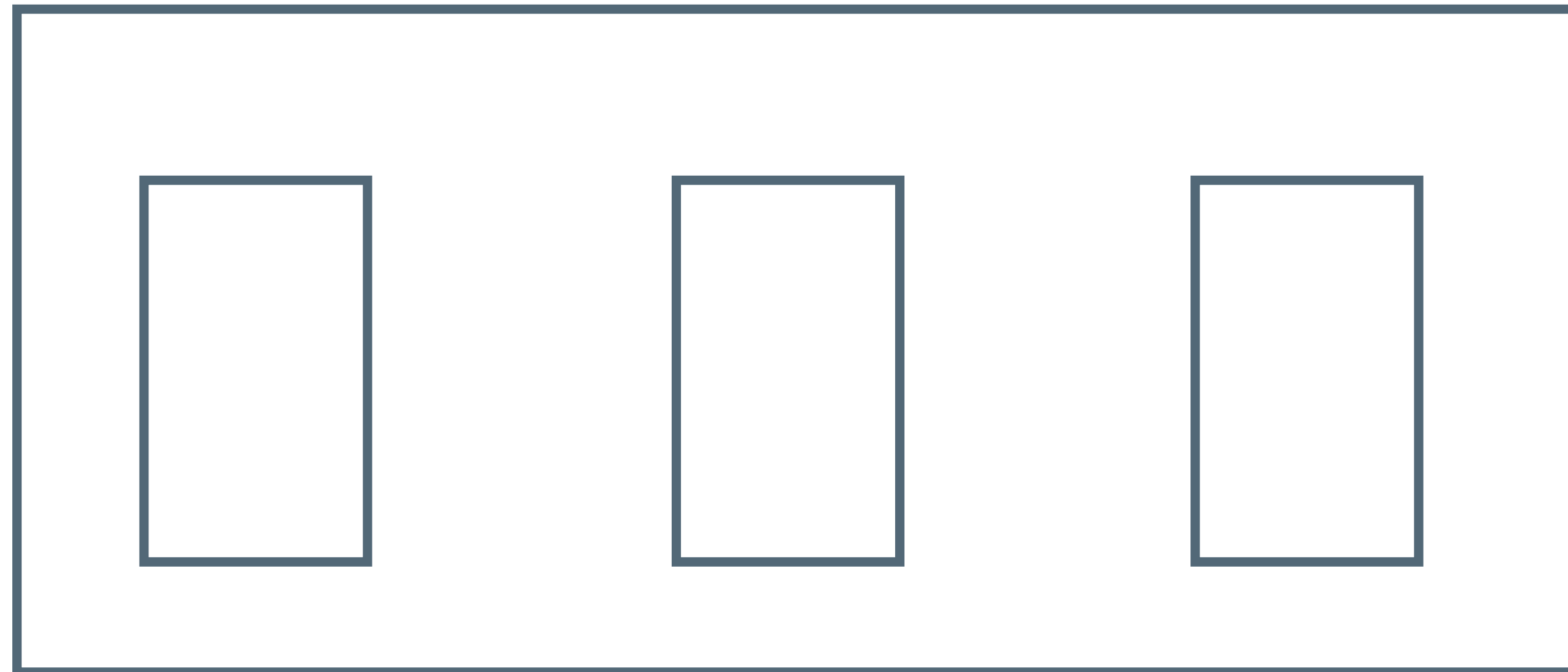
a. Global GHG emissions
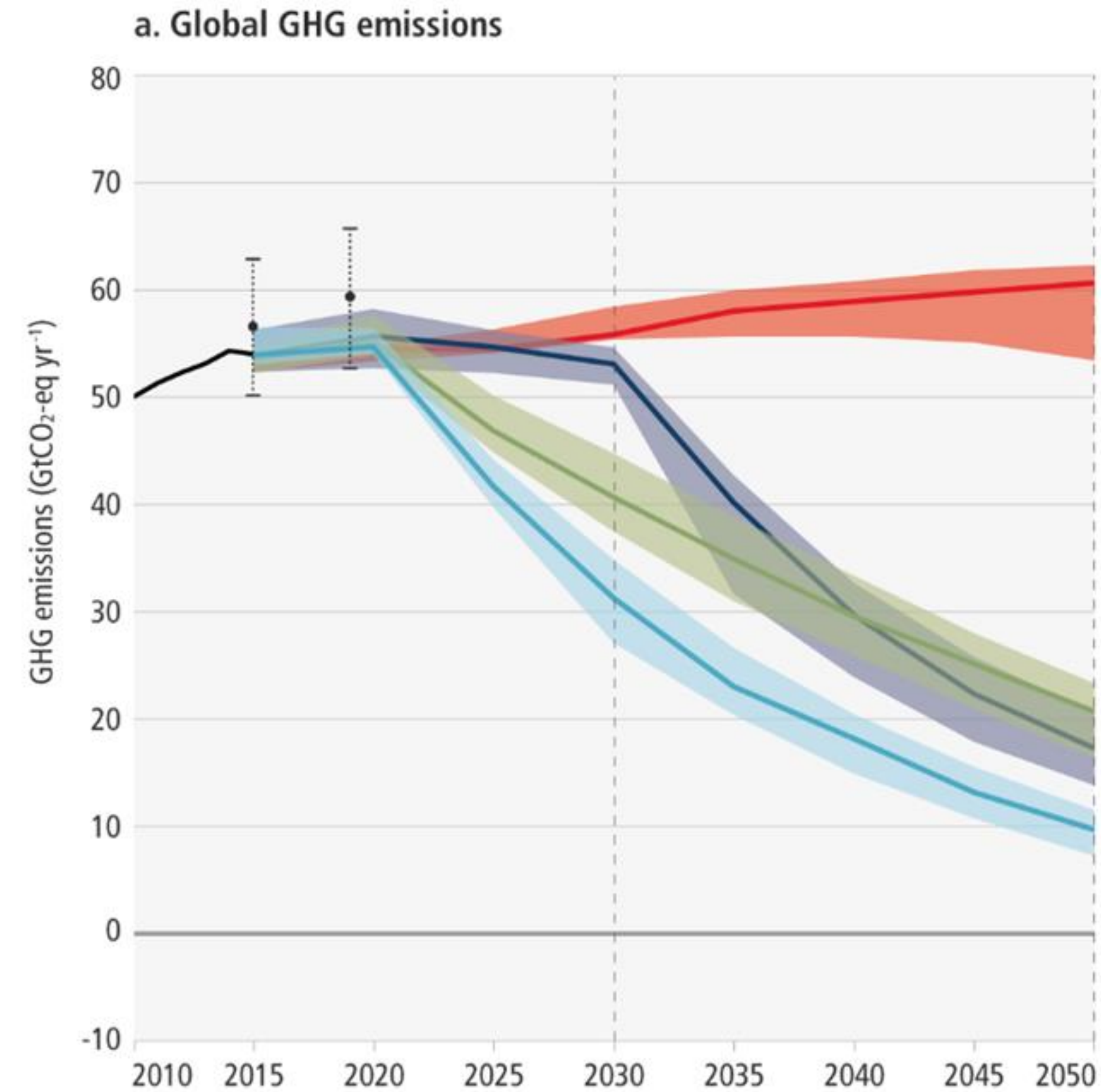
To help with the decarbonization challenge

Nuclear energy needs to be

- Fast to build

- An attractive investment

- Vanilla (like solar)

- Commercially financeable

a. Global GHG emissions

Commercially financeable projects must be inside the commercial risk box

Cost   Duration   Risk

Nuclear is currently not commercially financeable

Expensive

Slow

Unpredictable

Cost   Duration   Risk

Nuclear is currently not commercially financeable

Cost   Duration   Risk
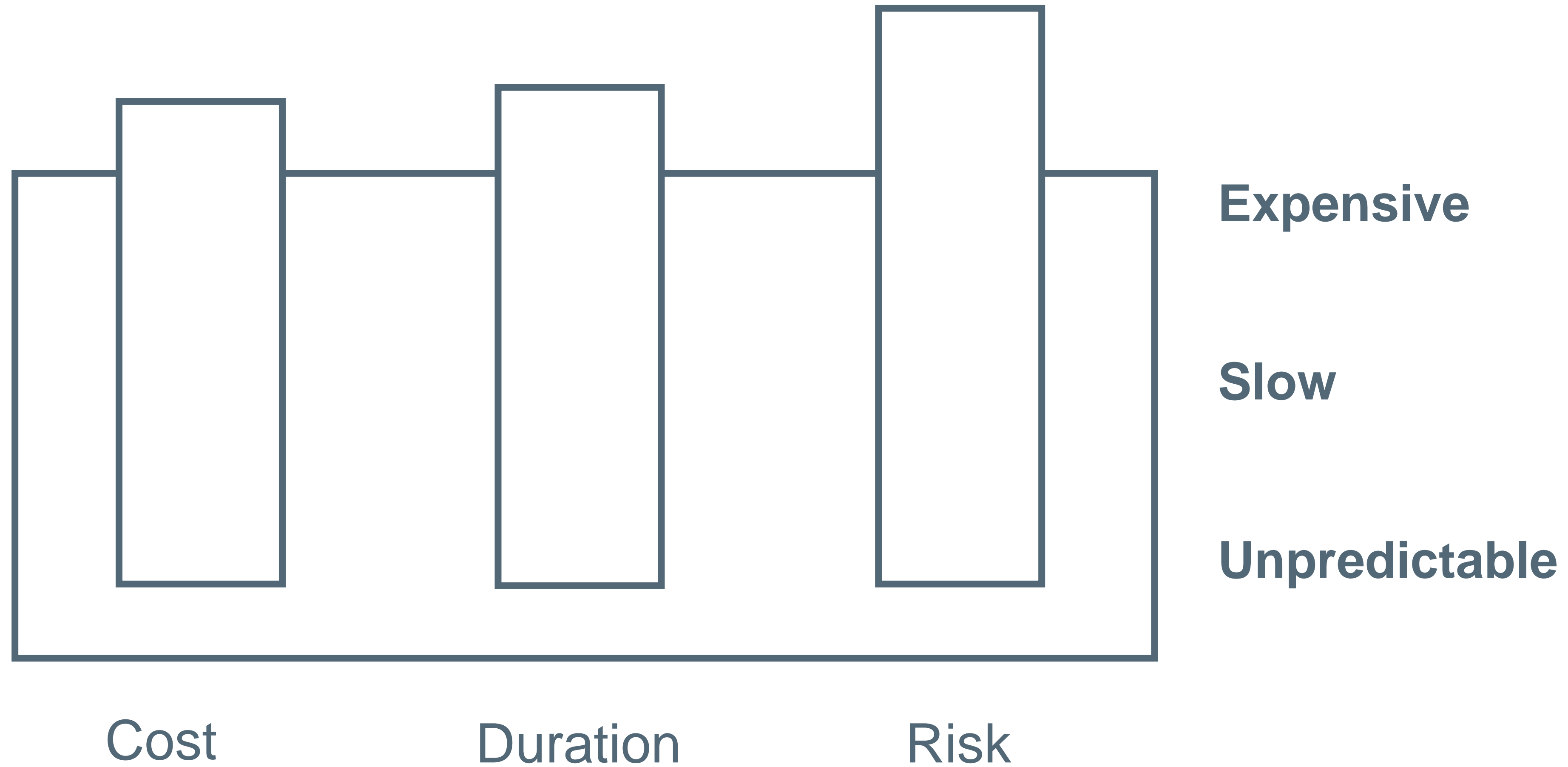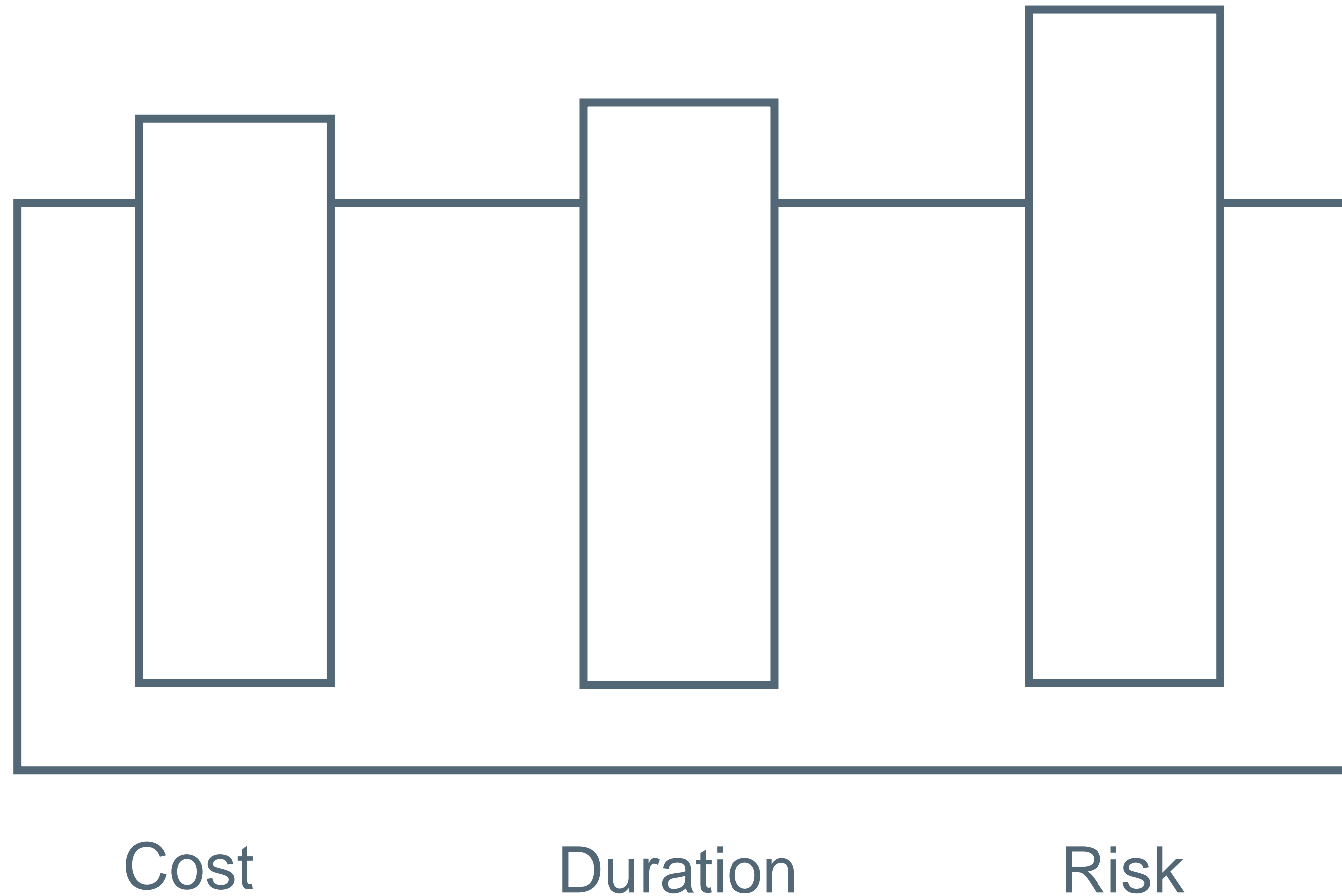
**Drivers of cost and risk (Everything takes too long and is too expensive)**

- Licensing
- Permitting
- Design
- Construction
- Operations-just expensive

Emerging solutions

Project stage	Challenge	Emerging Solutions
Licensing	Long, Expensive	Product based licensing
Permitting	Permitting	Designs with no site impact
Design	Extensive bespoke design	Standardized product
Construction	Complicated, regulated construction	Mass-manufactured product
Operations	Complicated, staff-intensive operations	Automated/remote operations

These could transform nuclear energy

Cost　　　　Duration　　　　Risk
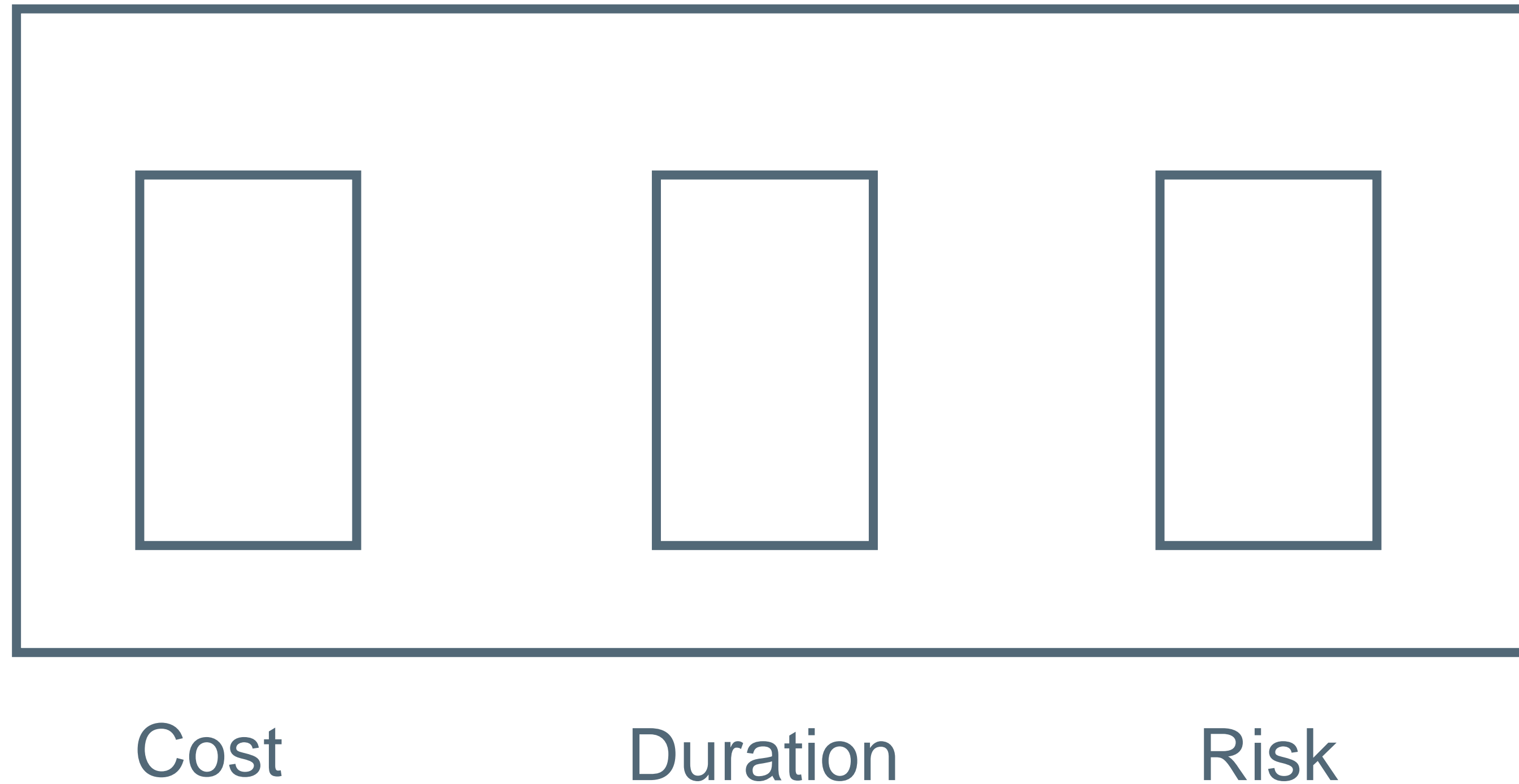
Emerging Solution	Effect
Product based licensing	Fast, low-cost licensing
Designs with no site impact	No EIS
Standardized product	No design costs
Mass-manufactured product	Low cost, high volume
Automated/remote operations	Low cost, scalable

The 10 Terawatt Gap

a. Global GHG emissions
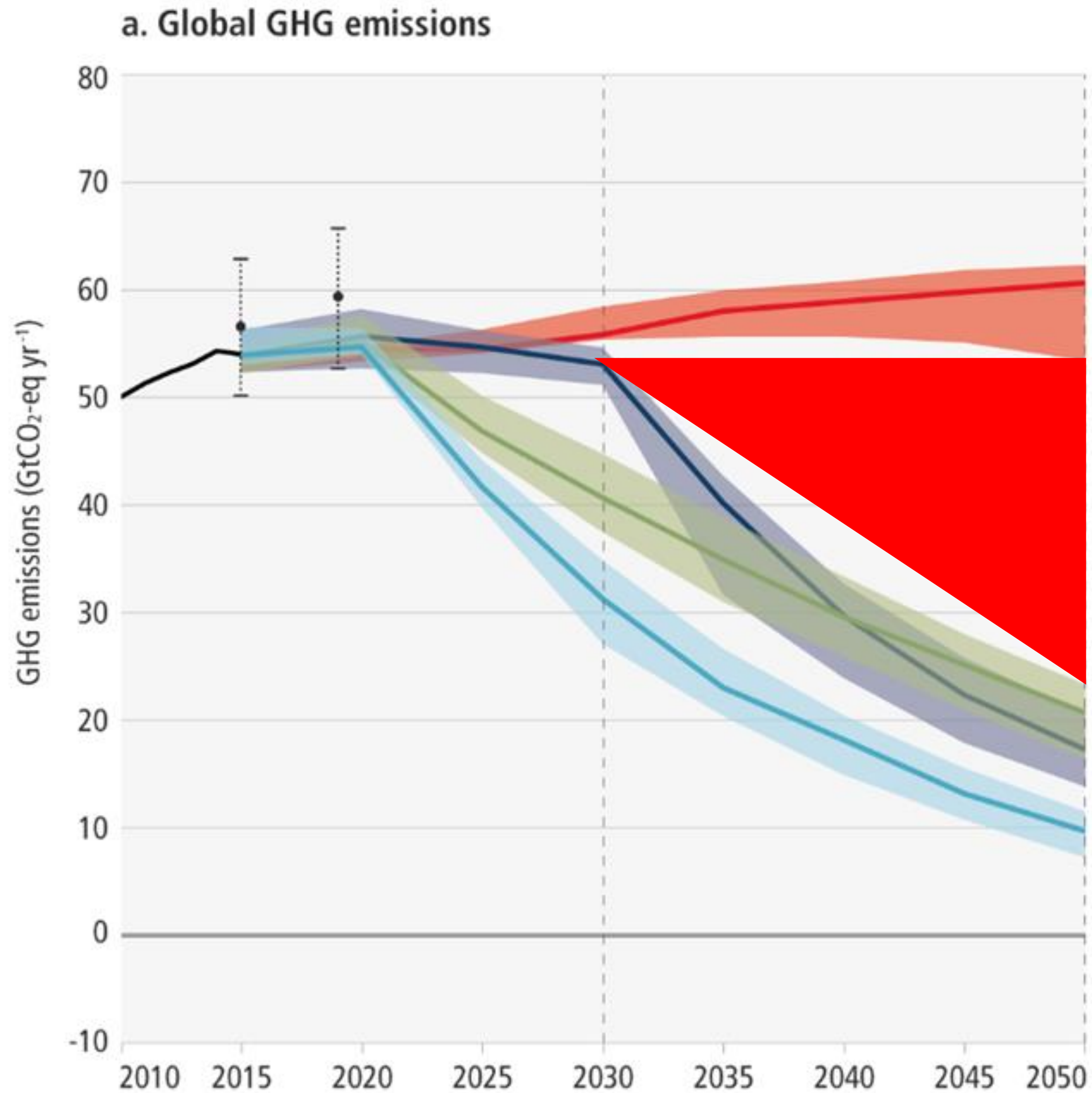
10 Factories, each making 1,000 50MWe manufactured reactors = 500GWe/yr
For 20 years = 10TW

LucidCatalyst delivers strategic thought leadership to enable rapid decarbonization and prosperity for all.

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