



SNC • LAVALIN



# Why we can't achieve Net Zero without diversity

March 2021



**Engineering  
Net Zero**

In partnership with our planet





# Housekeeping

Remain on mute

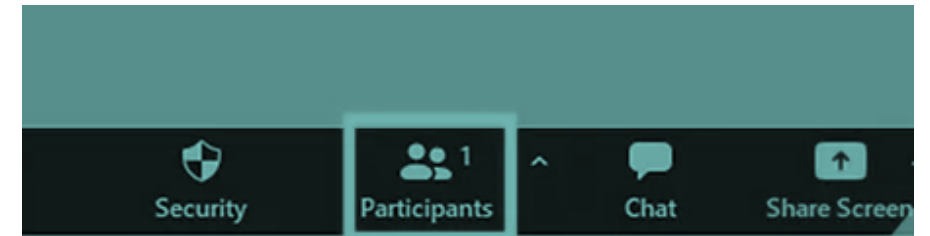
The meeting will be recorded

## Questions

- Please post your questions or raise your hand.
- We will read your question or invite you to ask your question
- Please do not unmute to talk unless asked

## Troubleshooting

- Minimise use of Wi-Fi
- Close other applications if required
- If you lose connection log back in.
- If you have other questions post in the chat and the facilitator will provide support





Sarah Long  
Bid & Strategy Lead  
Power Generating Assets



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Graduate Engineer  
Power New Build





## What is Net Zero ?

Government commitment to bring all greenhouse gas emissions to net zero by 2050





## Why is it difficult?

- Demand for energy is going up
- Efficient design and good eco behaviours can reduce this a bit, but..
- We are still going to need a lot of electricity



“We can achieve Net Zero in 2050, CCC has shown us how we can do it”

**Maybe, but no they haven't.**

CCC's Net Zero report set out a scenario that showed it is theoretically feasible to reach Net Zero in 2050 but CCC are also clear that this scenario is not a plan. Furthermore, CCC subsequently reported that the gap between our achievement and our aspiration is actually widening. We are not on course to meet Net Zero in 2050.



“With more energy efficiency and storage, we can meet Net Zero using renewables”

**Not So.**

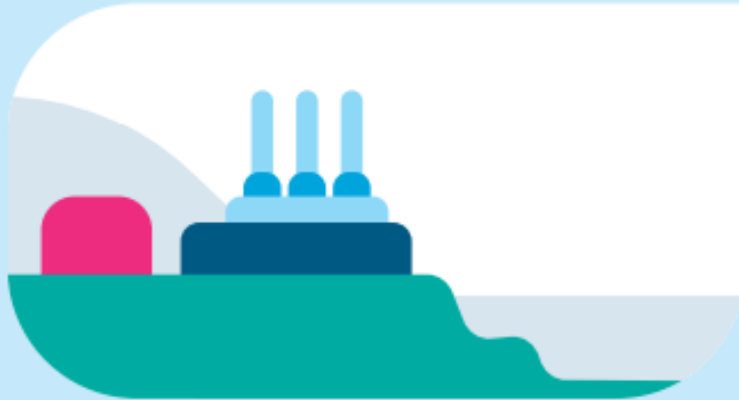
CCC has already assumed aggressive efficiency measures, there is no grid scale energy storage technology available today that will enable a system running only on intermittent renewables. Firm Power is an essential requirement for a cost-effective stable system.

“Renewables are now the lowest cost form of generation”

**It's not that simple.**

Renewables are achieving competitive cost of power at the generator (LCOE) but as the percentage of renewables on the system increases so does the cost of system modification and back up to cover periods of low renewable output.

At high penetration, the marginal cost of renewables, measured on a whole system basis, will be far higher than the reported LCOE.



“Carbon Capture and Storage CCS is a proven technology ready to deploy”

**Yes and No.**

Carbon capture, transportation and geological injection are all proven technologies BUT there is currently no system anywhere in the world that provides large scale CCS to multiple diverse carbon sources including large intermittency. CCS cluster deployment faces significant technical and commercial challenges.

“Hydrogen will be a carbon free source of energy”

**Not So.**

Hydrogen is NOT an energy source. Free Hydrogen does not exist in nature, it must be separated from methane or from water, both require significant energy input and separation from methane leaves large volumes of CO<sub>2</sub> for disposal. Hydrogen has potential as an energy store and as an energy vector. In both cases there are significant technical issues to overcome and conversion losses can be substantial.



“If time is short, we need to pick a technology and run with it”

**No.**

There is no single technology that will enable us to deliver Net Zero. We will need to deploy multiple technologies and must retain or develop the capability to deliver them in a dynamic economic environment.



# Net Zero – Diversity Delivers

Developing innovative technologies



Addressing the required build rate



Improving understanding and challenging behaviours

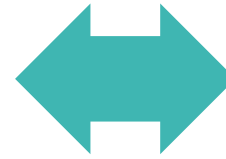




# Diversity Delivers

## Developing innovative technologies

- Hydrogen
- Carbon Capture & Storage
- Small Modular Reactors
- Energy Storage
- Efficiencies – transport & power



## Diverse Perspectives and Views

- Improved problem solving
- Break out of echo chambers
- Better decisions
- Improved collaboration
- Approach to risk



THE *SUNDAY TIMES* No. 1 BESTSELLER

MATTHEW  
SYED

THE POWER OF DIVERSE THINKING

REBEL  
IDEAS

From the bestselling author of *Black Box Thinking*





# Diversity Delivers

Developing innovative technologies



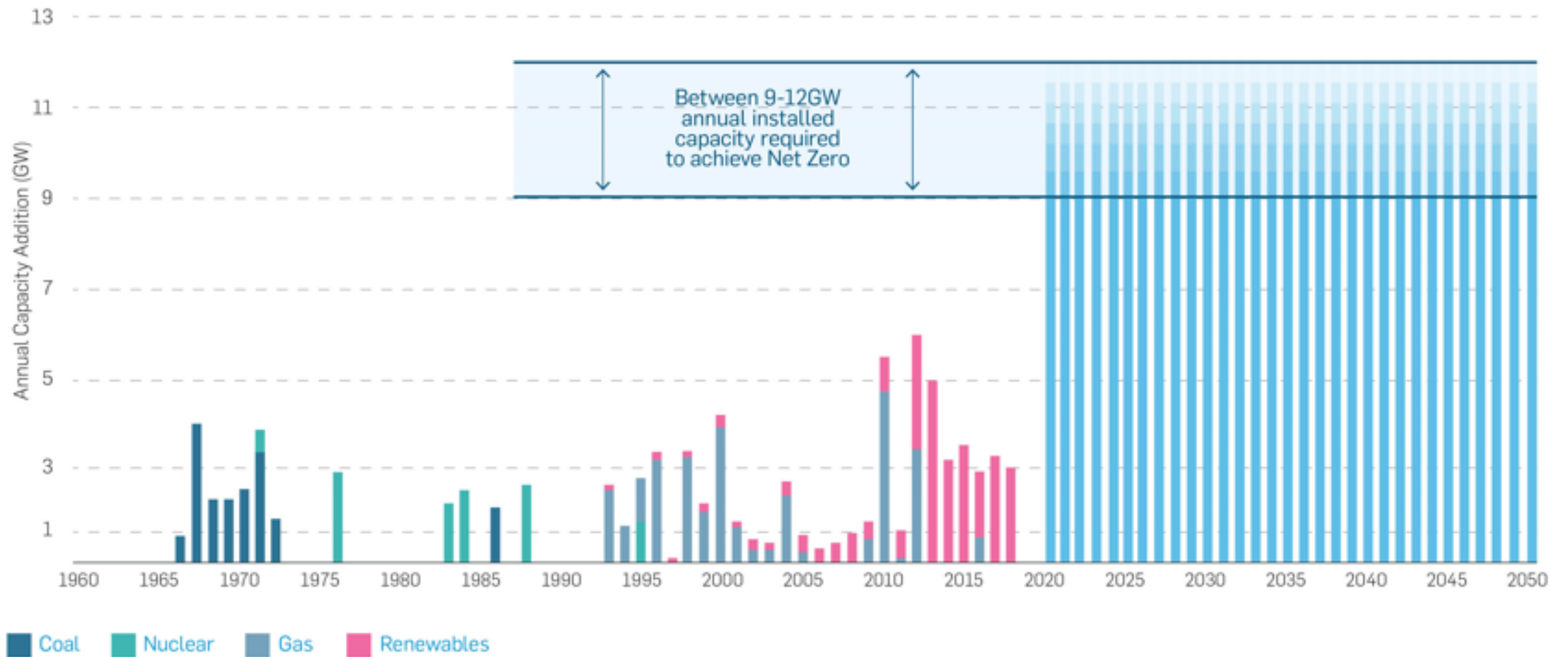
Diverse Perspectives and Views



Addressing the required build rate



# Power Generation – Unprecedented Build Rate





# Diversity Delivers

Developing innovative technologies



Diverse Perspectives and Views



## Addressing the required build rate

- 9-12 GW a year for the next 30 years
- 'Build, Build, Build'
- 200+ offshore wind turbines a year
- 1 Nuclear power station every 5 years
- 3 CCGT or Biomass stations a year





# Diversity Delivers

Developing innovative technologies



Diverse Perspectives and Views



Addressing the required build rate

- 9-12 GW a year for the next 30 years
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Access to the Widest Talent Pool

- Access to 100% of the population
- Agility
- Flexibility
- All types of backgrounds, experience, ways of thinking - Inclusivity



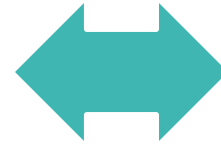


# Diversity Delivers

Developing innovative technologies



Diverse Perspectives and Views



Addressing the required build rate



Access to the Widest Talent Pool



**Improving understanding and challenging behaviours**

- 30 years is not long
- Nuclear is not 'bad'
- We need a mix of Energy sources
- We need to reduce our demand



**Diverse Perspectives and Views**

- Educating the next generation
- Trusting and following people like you



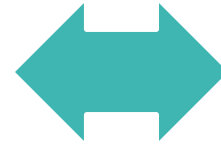


# Net Zero – Diversity Delivers

Developing innovative technologies



Diverse Perspectives and Views



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# Questions



**Engineering  
Net Zero**

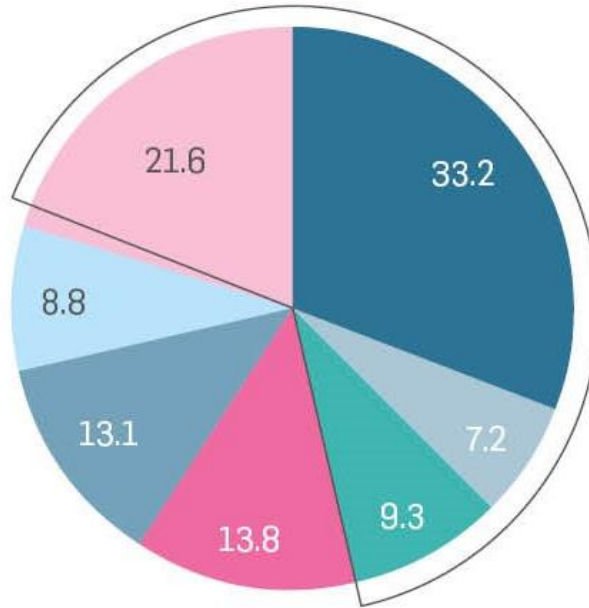
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# Power Generation – Radical Change

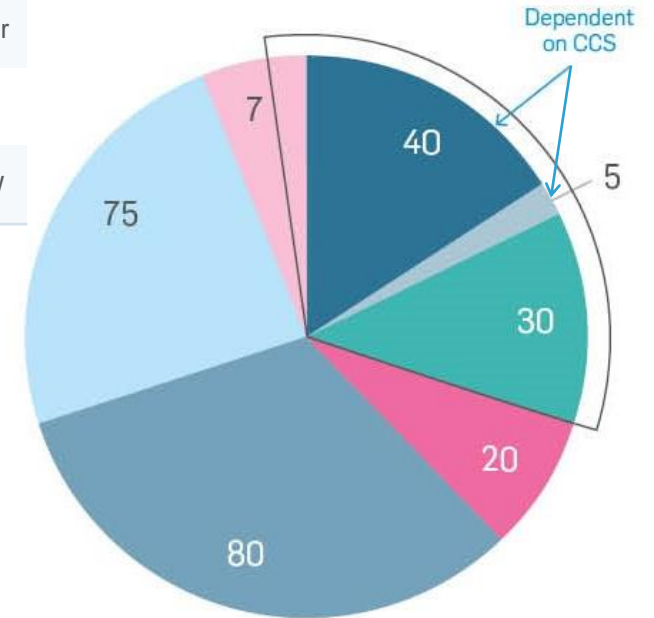
## 2018

Annual Generation	330TWhr
Peak Demand	57GW
Installed Capacity	~100



## 2050

Annual Generation	645TWhr
Peak Demand	150GW
Installed Capacity	>280GW



- Natural Gas
- Biomass
- Nuclear
- Wind (onshore)
- Solar
- Wind (offshore)
- Other (Hydro, Pumped storage, Diesel/gas oil, Wave/Tidal, Sour gas, Waste, Coal and other)

Firm power is enclosed in the outlined sectors.

Installed Generating Capacity by Technology in GW