# EPower – Power Generation Consultation

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# AGENDA



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# STAGE 1

## THE BASE CASE & EMISSIONS ANALYSIS

# STAGE 1 – THE MODEL

## Part 1 – Base Case Assumptions

- No Solar Power Assumed
- Wind Power Assumed at an Average of 6000MW

## Part 2 – Emissions Analysis

- CO2 Emission Limit Reduced by Increments of 5% for a 50% Total Emission Cut

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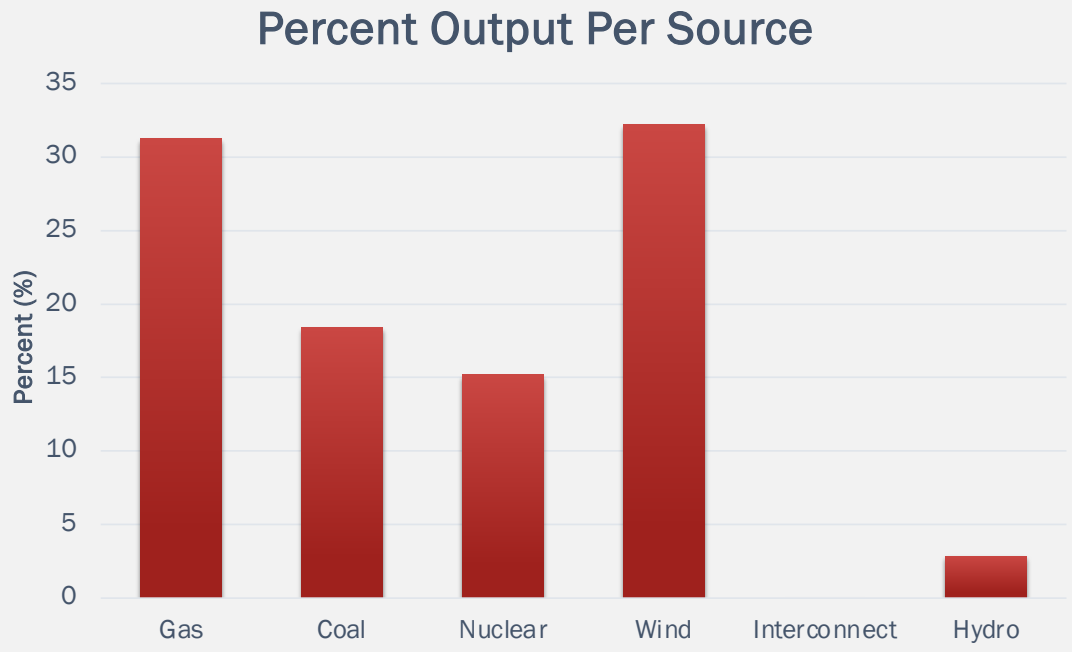
# STAGE 1 – POWER OPERATION RECOMMENDATION

| Source (MW) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Gas | 4917 | 6000 | 6000 | 6000 | 6000 | 6000 |
| Coal | 0 | 3167 | 3167 | 5167 | 5167 | 3167 |
| Nuclear | 2833 | 2833 | 2833 | 2833 | 2833 | 2833 |
| Wind | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 |
| Interconnect | 0 | 0 | 0 | 0 | 0 | 0 |
| Hydro | 0 | 0 | 1250 | 2000 | 0 | 0 |
| **Period Total** | **13750** | **18000** | **20000** | **22000** | **20000** | **18000** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Pumping** | 1750 | 0 | 0 | 0 | 0 | 0 |

# SUMMARY




£13,824,000

Total Revenue

£12,016,333

Total Cost

£1,807,667

Total Profit

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# STAGE 1 – THE MODEL

## Part 1 – Base Case Assumptions

- No Solar Power Assumed
- Wind Power Assumed at an Average of 6000MW

## Part 2 – Emissions Analysis

- CO2 Emission Limit Reduced by Increments of 5% for a 50% Total Emission Cut

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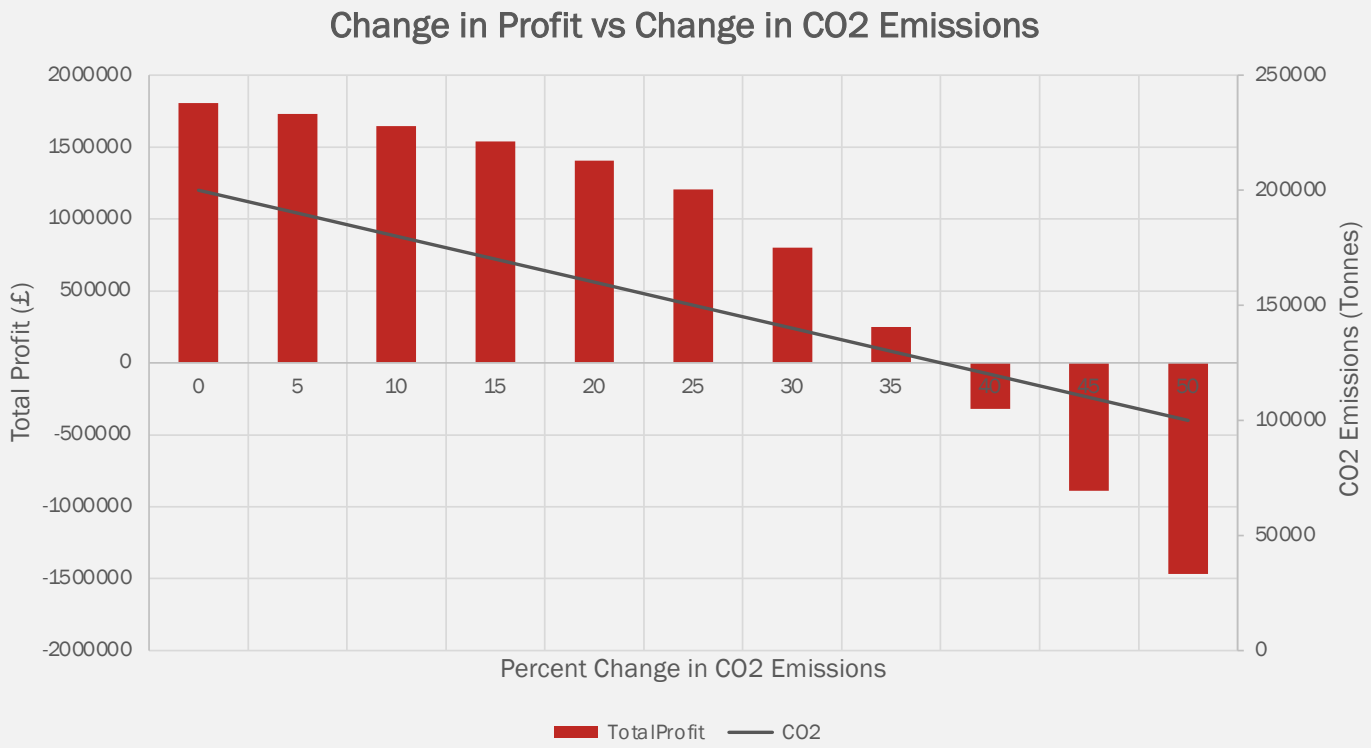
# STAGE 1 - EMISSIONS ANALYSIS

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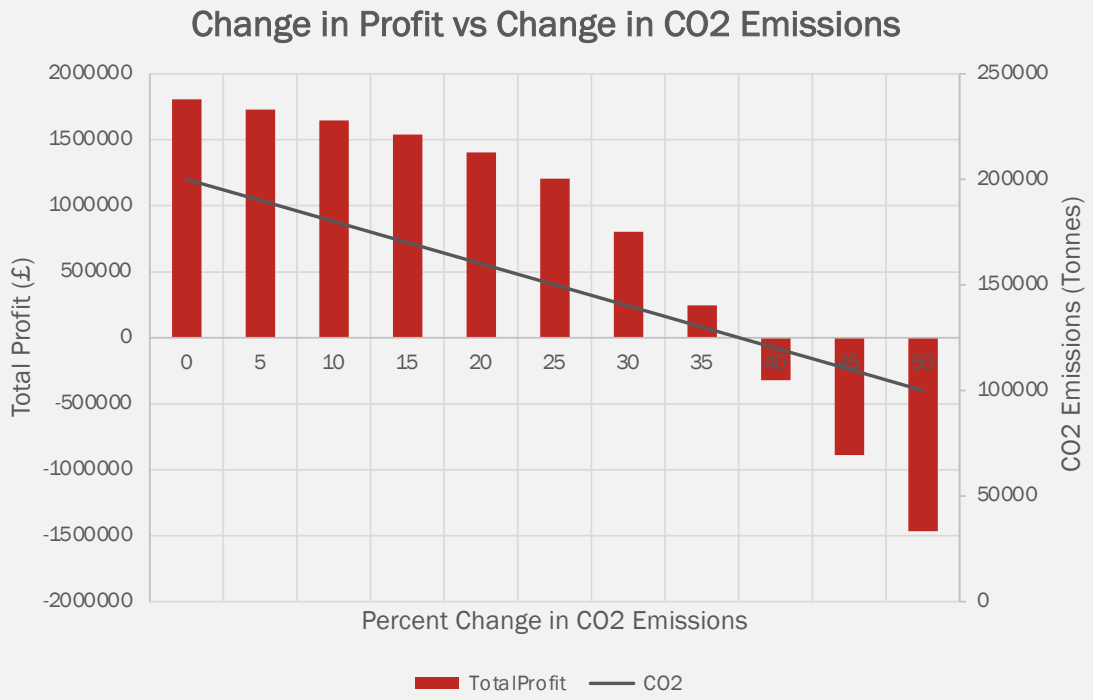
# STAGE 1 - EMISSIONS ANALYSIS




## 50% CO2 Reduction

£13,824,000
Total Revenue

£15,290,000
↑
£12,016,333
Total Cost

-£1,466,000
Total Loss

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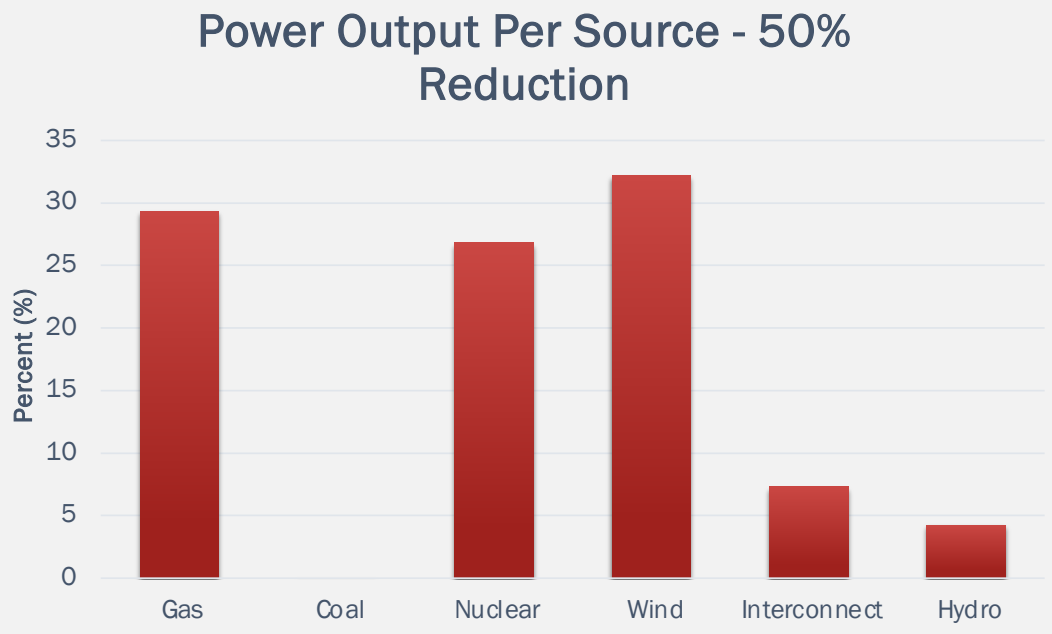
# STAGE 1 - EMISSIONS ANALYSIS




50% CO2 Reduction

£13,824,000
Total Revenue

£15,290,000
↑
£12,016,333
Total Cost

-£1,466,000
Total Loss

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# STAGE 2

## IMPLEMENTATION OF SOLAR POWER, ANALYSIS OF AUTUMN MODEL, AND EMISSIONS ANALYSIS

# STAGE 2 – THE MODEL

## Part 1- Assumptions

- Solar Power Implemented
- Maintain 50% CO2 Emission Reduction
- Wind Power Assumed to be Affected by an Autumn Multiplier

## Part 2 – Emissions Analysis

- Analysis of Impact of not Using Dirty Fuels:
  - Gas
  - Coal
  - Nuclear

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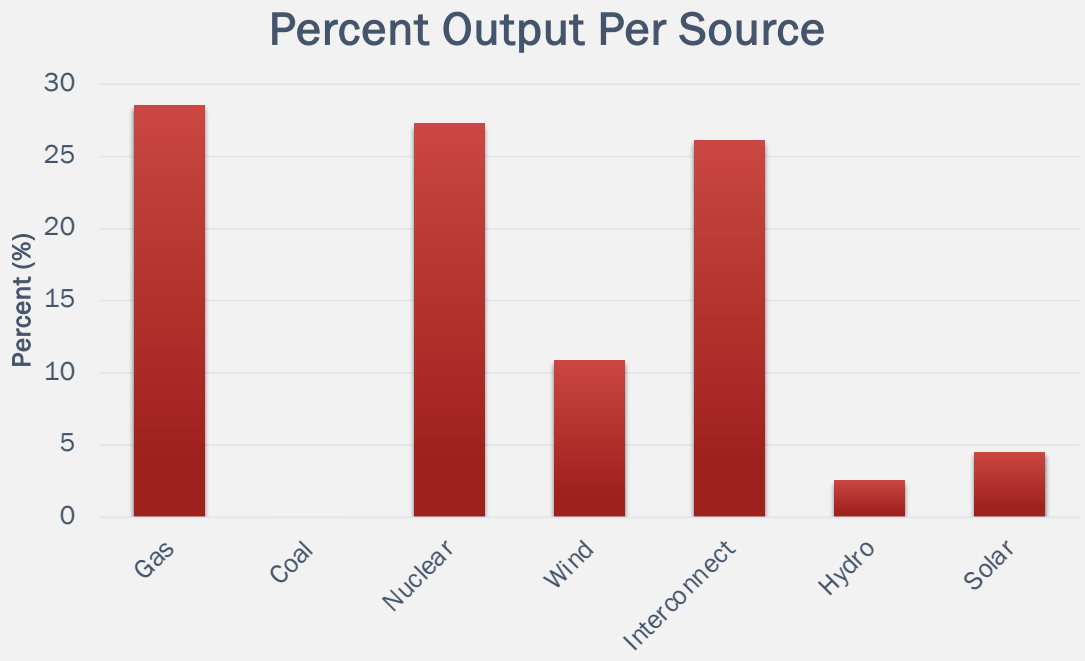
# STAGE 2 – POWER OPERATION RECOMMENDATION

| Source (MW) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Gas | 5000 | 5278 | 5278 | 5278 | 5278 | 5278 |
| Coal | 0 | 0 | 0 | 0 | 0 | 0 |
| Nuclear | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| Wind | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| Interconnect | 0 | 4722 | 4722 | 6789 | 6789 | 5722 |
| Hydro | 0 | 0 | 0 | 1933 | 933 | 0 |
| Solar | 0 | 1000 | 3000 | 1000 | 0 | 0 |
| Period Total | 12000 | 18000 | 20000 | 22000 | 20000 | 18000 |
| Pumping | 0 | 0 | 0 | 0 | 0 | 0 |

# STAGE 2 - SUMMARY




£13,824,000

Total Revenue

£21,449,778

Total Cost

-£7,625,778

Total Profit

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# STAGE 2 – THE MODEL

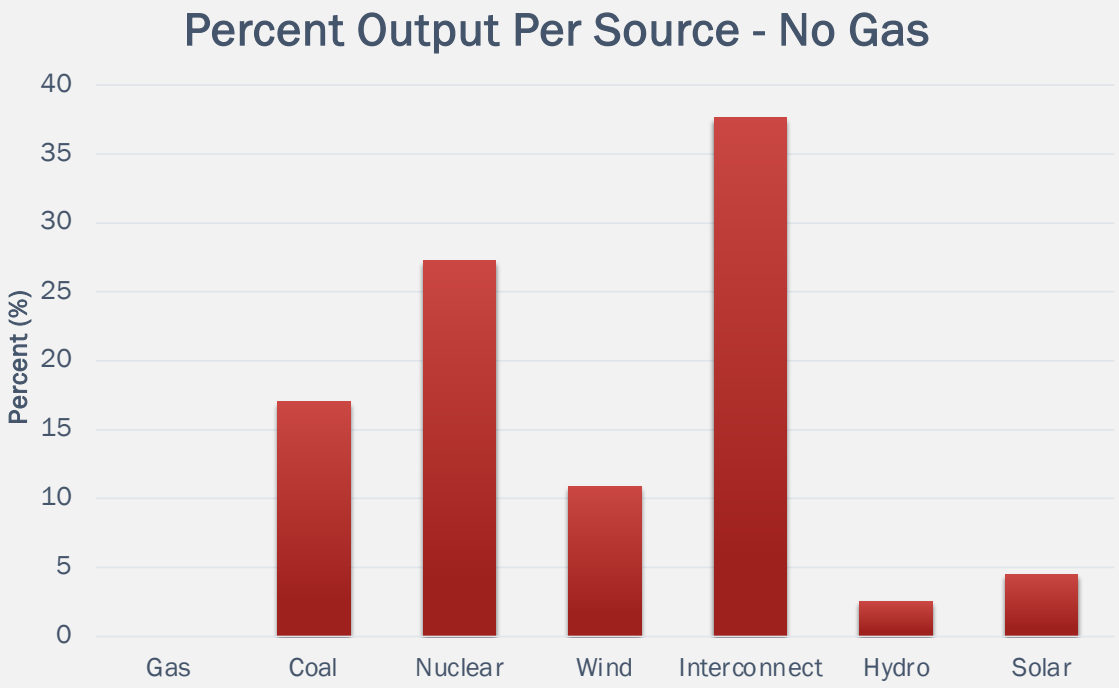
## Part 1- Assumptions

- Solar Power Implemented
- Maintain 50% CO2 Emission Reduction
- Wind Power Assumed to be Affected by an Autumn Multiplier

## Part 2 – Emissions Analysis

- Analysis of Impact of not Using Dirty Fuels:
  - Gas
  - Coal
  - Nuclear

# STAGE 2 – EMISSIONS ANALYSIS: GAS




90,000 units

CO2

30,000 units

Sulphur

-£9,873,000

Total Profit

£

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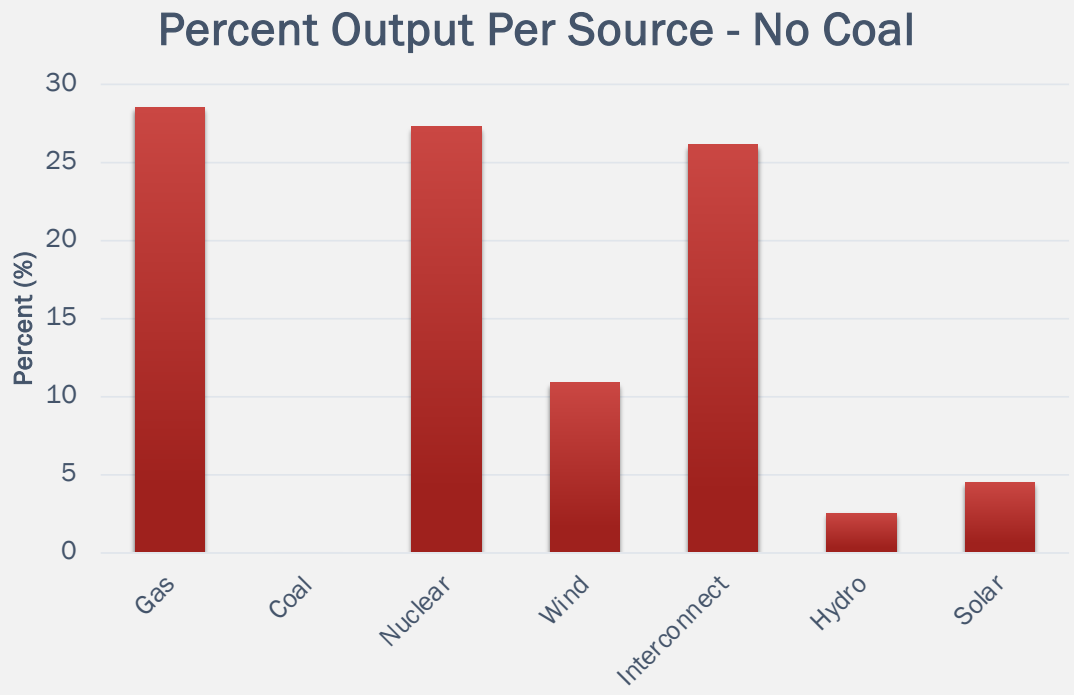
# STAGE 2 – EMISSIONS ANALYSIS: COAL




100,000 units

CO2

0 units

Sulphur

-£7,625,778

Total Profit

£

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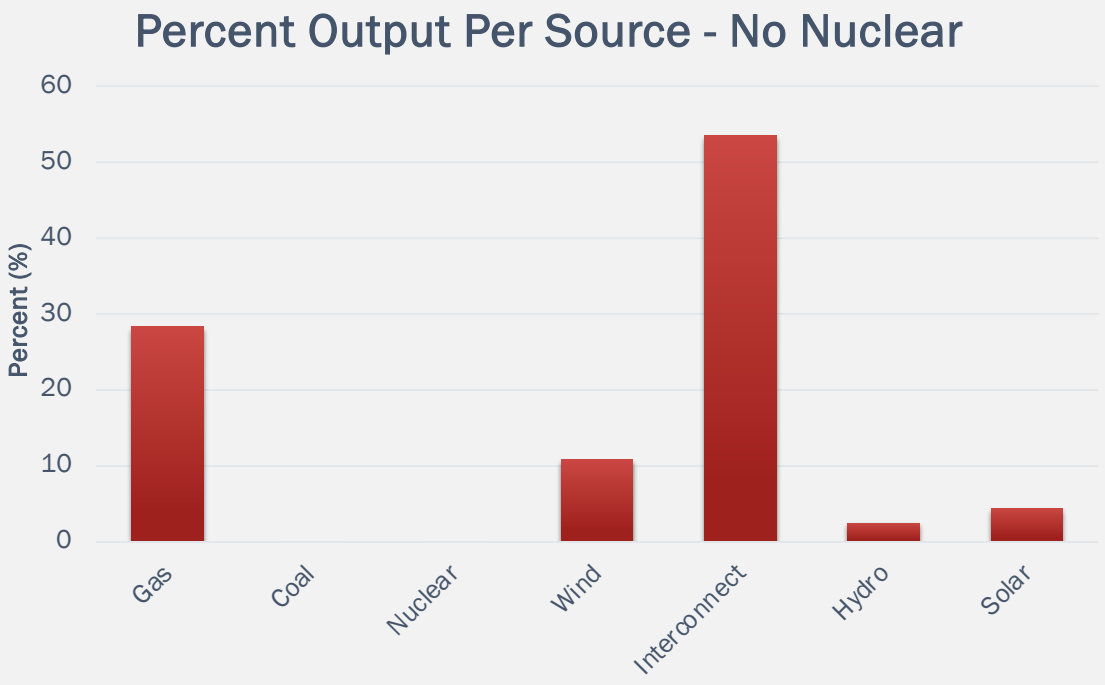
# STAGE 2 – EMISSIONS ANALYSIS: NUCLEAR




100,000 units

CO2

0 units

Sulphur

-£13,623,000

Total Profit

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# RECOMMENDATIONS

# RECOMMENDATIONS – SCENARIO

- A New Autumn Model is Considered Where:
  - There are no maximum output restrictions placed, except on solar power
  - Solar power can be as much as three times its current maximum power output during autumn sunlight hours
  - There is no limit on how much water (potential energy) the hydro reserve can hold
  - Emissions are restricted to 100,000 units of C02 and 30,000 units of Sulphur

# RECOMMENDATIONS – NO OUTPUT RESTRICTIONS

| Source (MW) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Gas | 0 | 0 | 0 | 0 | 0 | 0 |
| Coal | 0 | 0 | 0 | 0 | 0 | 0 |
| Nuclear | 0 | 0 | 0 | 0 | 0 | 0 |
| Wind | 11600 | 14600 | 10600 | 18600 | 19600 | 17600 |
| Interconnect | 0 | 0 | 0 | 0 | 0 | 0 |
| Hydro | 400 | 400 | 400 | 400 | 400 | 400 |
| Solar | 0 | 3000 | 9000 | 3000 | 0 | 0 |
| Period Total | 12000 | 18000 | 20000 | 22000 | 20000 | 18000 |
| | | | | | | |
| Pumping | 0 | 0 | 0 | 0 | 0 | 0 |

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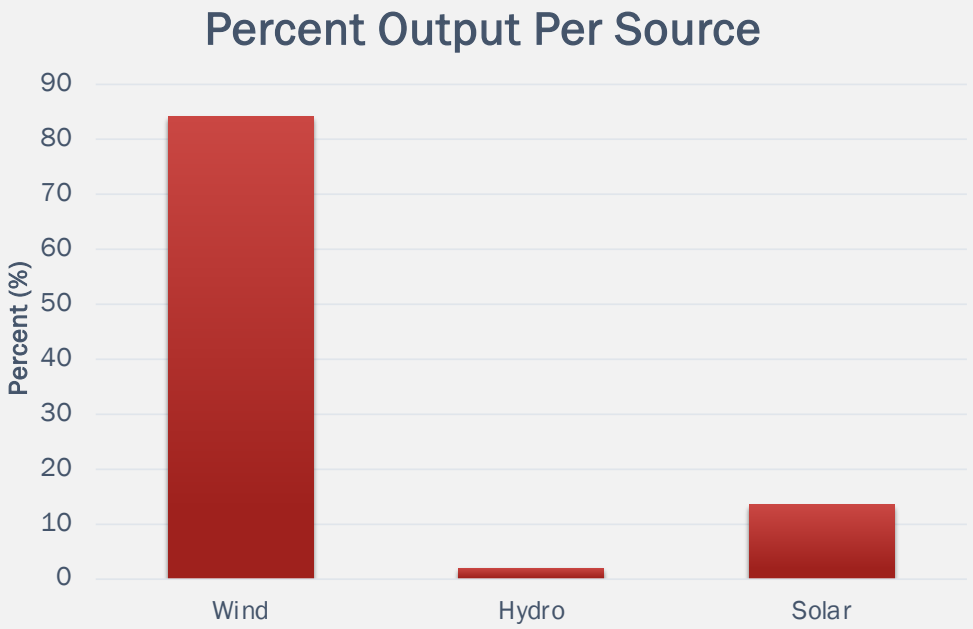
# RECOMMENDATIONS - NO OUTPUT RESTRICTIONS




0 units
CO2

0 units
Sulphur

£13,099,200
Total Profit

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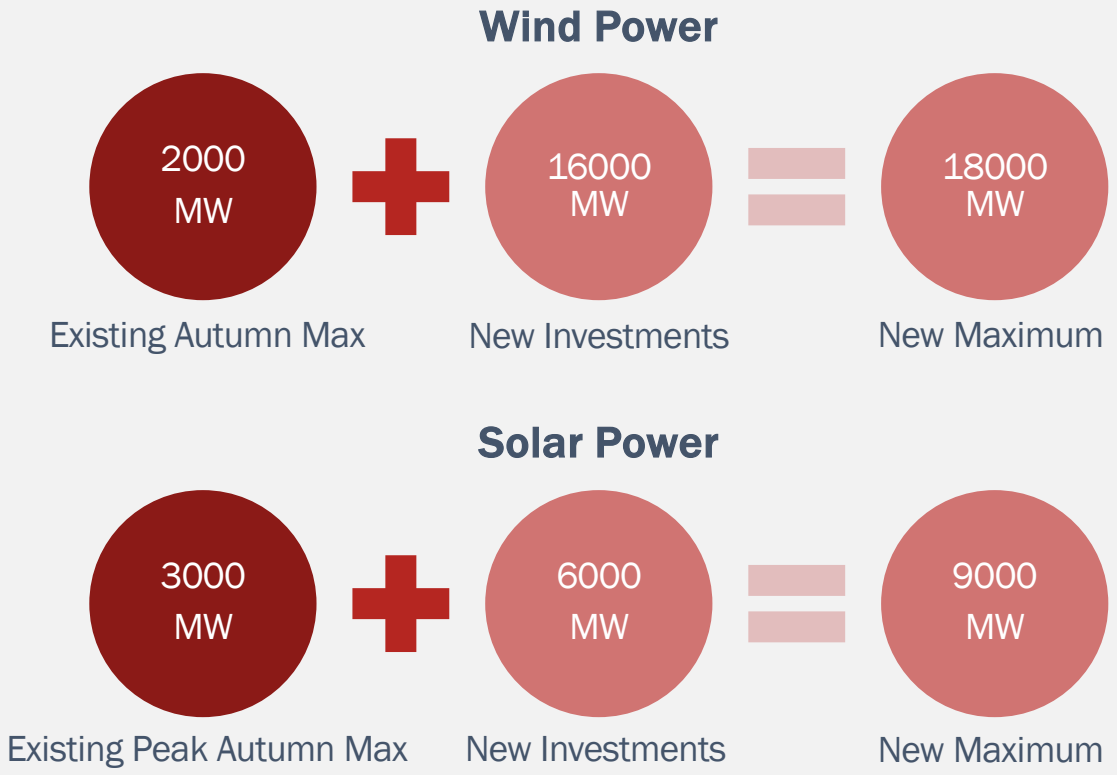
# RECOMMENDATIONS – CHANGES REQUIRED



# RECOMMENDATIONS - BENEFITS

## Hedging Against Geopolitical Risk

- The power sources recommended do not rely as much on basic commodities (eg. natural gas, coal)
- Commodity prices are often impacted by geopolitical changes
- For example, OPEC+ recently introduced a surprise oil cut, raising oil prices (Bower et al., 2023)
- While OPEC+ relates to oil, they also control 36.1% of the world's natural gas (Aizarani, 2023)

## Combating Climate Change

- The previous recommendations have the added benefit of only using green energy sources

## Satisfying Stakeholders

- These recommendations provide a viable route to generate emission-free revenue in the future
- It can satisfy the general move towards clean energy exhibited by stake holders, as shown by activist investors forcing the ExxonMobil management to implement a greener focus (Person & Jennifer Hiller, 2021)
- It would place the company at the forefront of the industry trend to green energy – the benefits of which have now been seen even by ExxonMobil's management (Jacobs, 2023)

# THANK YOU FOR YOUR ATTENTION

# RESOURCES


- Aizarani, J. (2023, January 31). *OPEC*. Statista. Retrieved April 4, 2023, from https://www.statista.com/topics/1830/opec/#topicOverview
- Bower, D., Sheppard, D., & Wilson, T. (2023, April 2). Oil price surges after Opec+ nations make surprise output cut. *The Financial Times*. Retrieved April 4, 2023, from https://www.ft.com/content/3cc7ced1-70db-4854-bd61-d9c92a9c7710.
- Jacobs, J. (2023, April 4). *ExxonMobil says low-carbon business could one day Eclipse Oil and Gas*. Subscribe to read | Financial Times. Retrieved April 5, 2023, from https://www.ft.com/content/8cb77179-cad4-437c-a20f-c8d273131284
- Person, & Jennifer Hiller, S. H.-B. (2021, May 27). *Exxon loses board seats to activist hedge fund in Landmark Climate Vote*. Reuters. Retrieved April 5, 2023, from https://www.reuters.com/business/sustainable-business/shareholder-activism-reaches-milestone-exxon-board-vote-nears-end-2021-05-26/