

The following presentation was given at:

The SCAF 2016 Cost Estimating Challenge

*Tuesday 19th April 2016
BAWA Centre, Bristol*

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SCAF conference Case Study Workshop

Rolls-Royce Plc

- Alastair Maxwell, Patricia Patilla Sanchez
- 19th April 2016 - Bristol

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Introduction

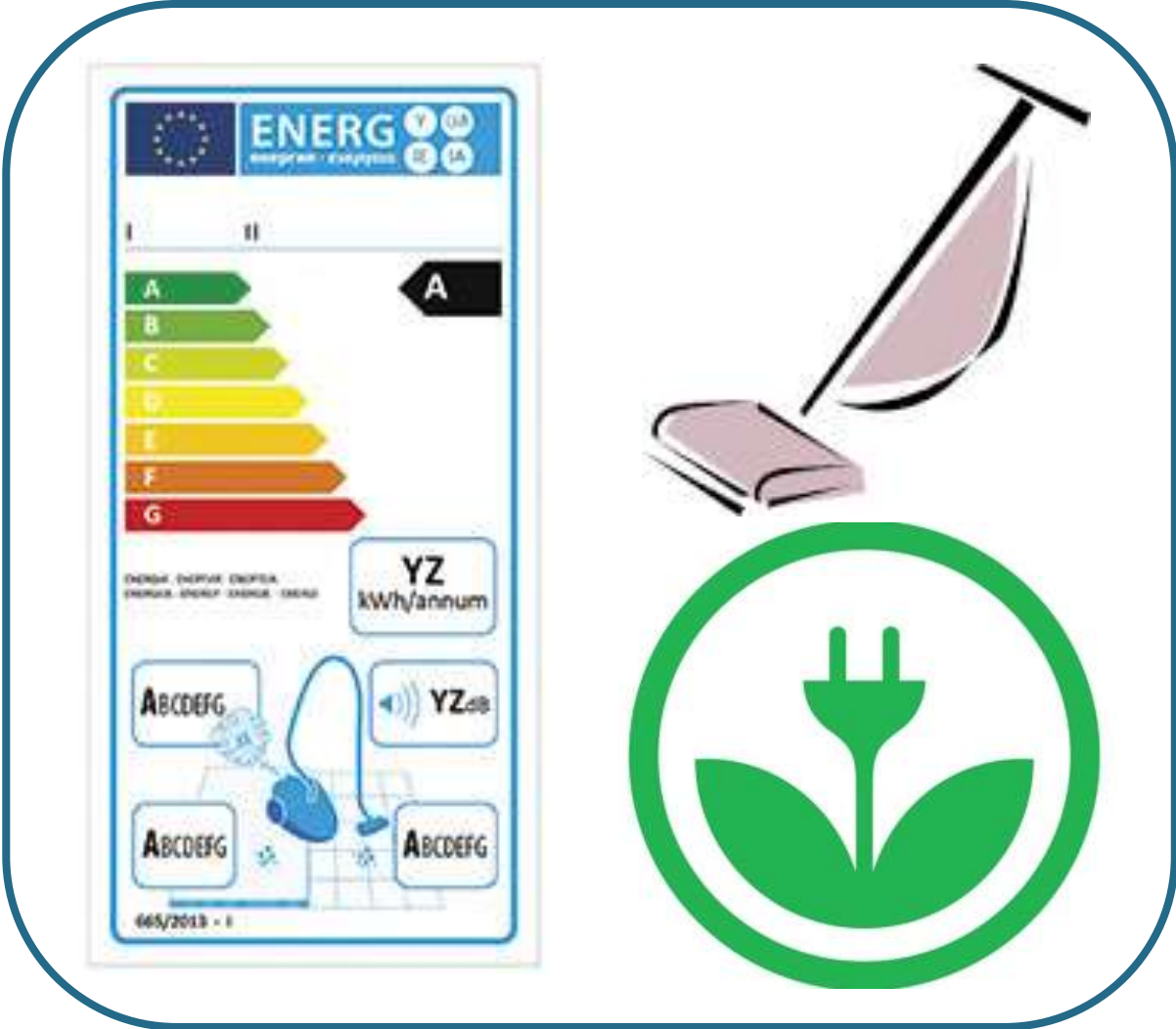
- Alastair Maxwell – Life Cycle Cost Lead
 - Maths and German graduate
 - Life Cycle Cost experience less than a year

- Patricia Patilla Sanchez – Solution Design & LCC Lead
 - Aerospace Engineer
 - Life Cycle Cost experience less than a year



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Purpose and scope of the project



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General data gathering approach

- **Data Sources**

- John Lewis Website
- Official Journal European Union – No 665/2013

- **Data Normalisation and Aggregation**

- Vacuum Cleaner considered only for domestic use
- UK Household growth trend in line with last 20 years
- Vacuum cleaner lifecycle is 8 years (live in a disposable world, repair costs not accounted for!)
- 10 % UK Households replace vacuum annually
 - New Vacuum – 80%
 - Second Hand Vacuum – 20%



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General data gathering approach

- **Cleaning Tasks Details**

- 1 vacuum cleaner per UK household
- Annual Average cleaning tasks is 30
- Time to Hoover average UK floor space is 30 min
- Including an obstacle factor of 15% is 35 min

- **Electricity Usage and Spend**

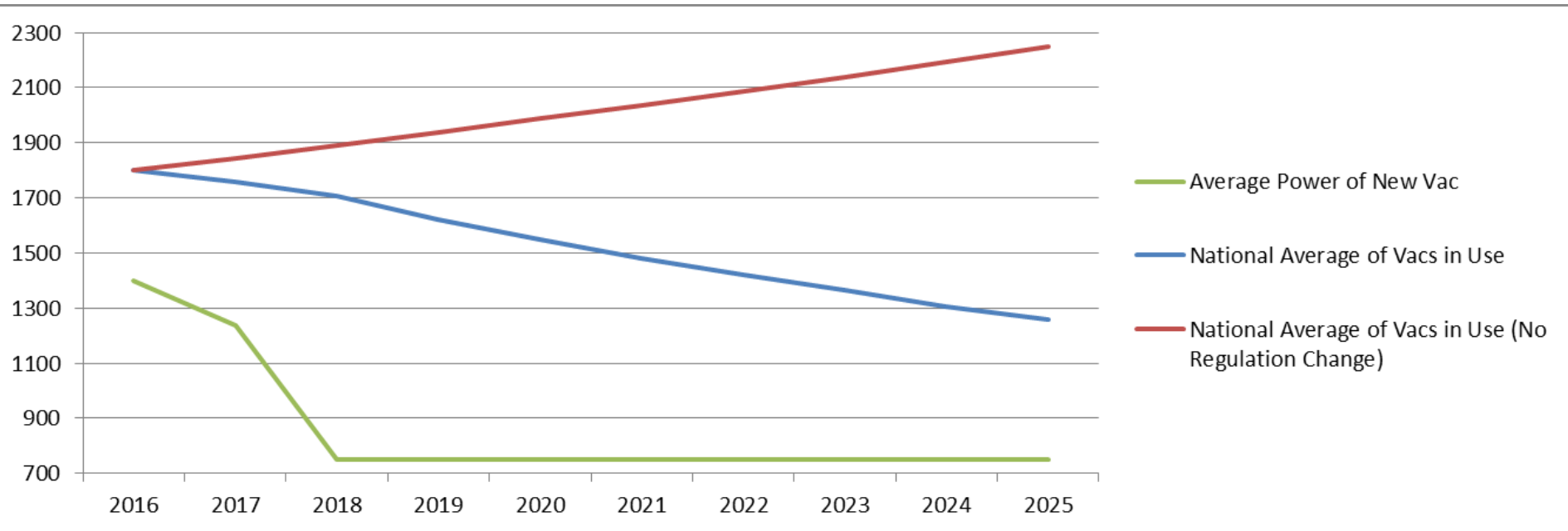
Average price per kWh 13.86 p	Per Household	Total UK (2016)
Current electricity usage per year	31.05 kWh	850 000 MWh
Current spend per year	4.30 GBP	120 m GBP



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Data Analysis

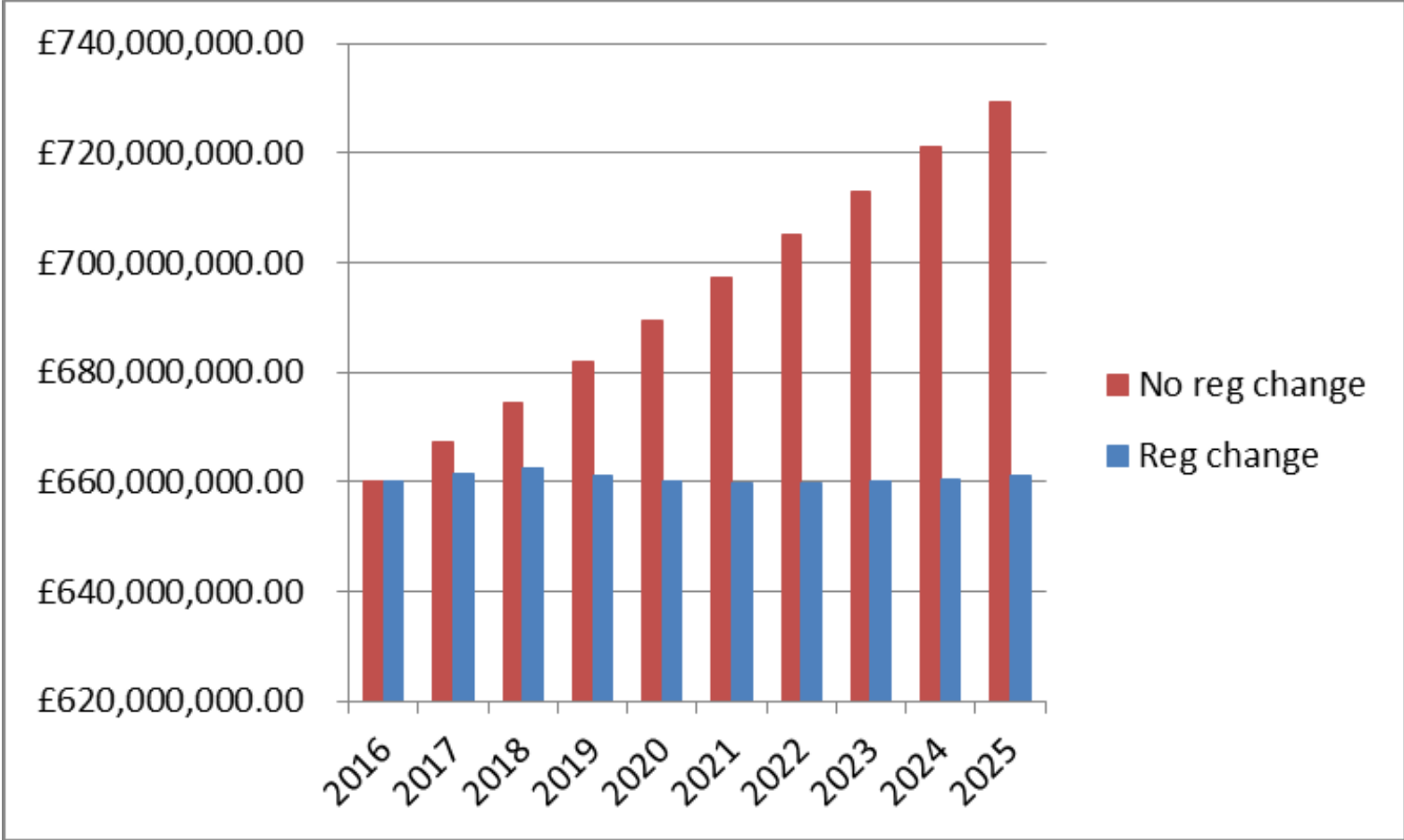
- Average Wattage of Vacuums in use in the UK**



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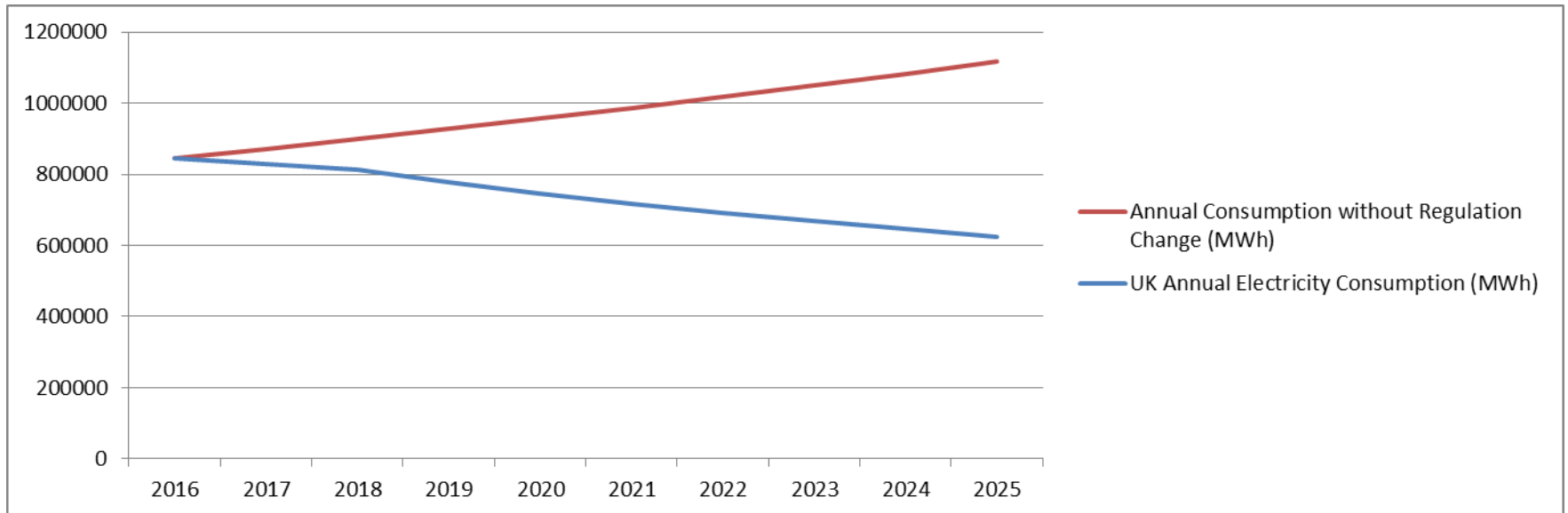
Data Analysis

- Annual Cost of Vacuums to the UK



Data Analysis

- **Average Vacuum Power over ten year forecast**



- **Saving 2.4m MWh**
- **Equivalent to nearly 1.5 megatonnes of CO₂**



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Data Analysis

Uncertainty Bounds for Sensitivity Analysis

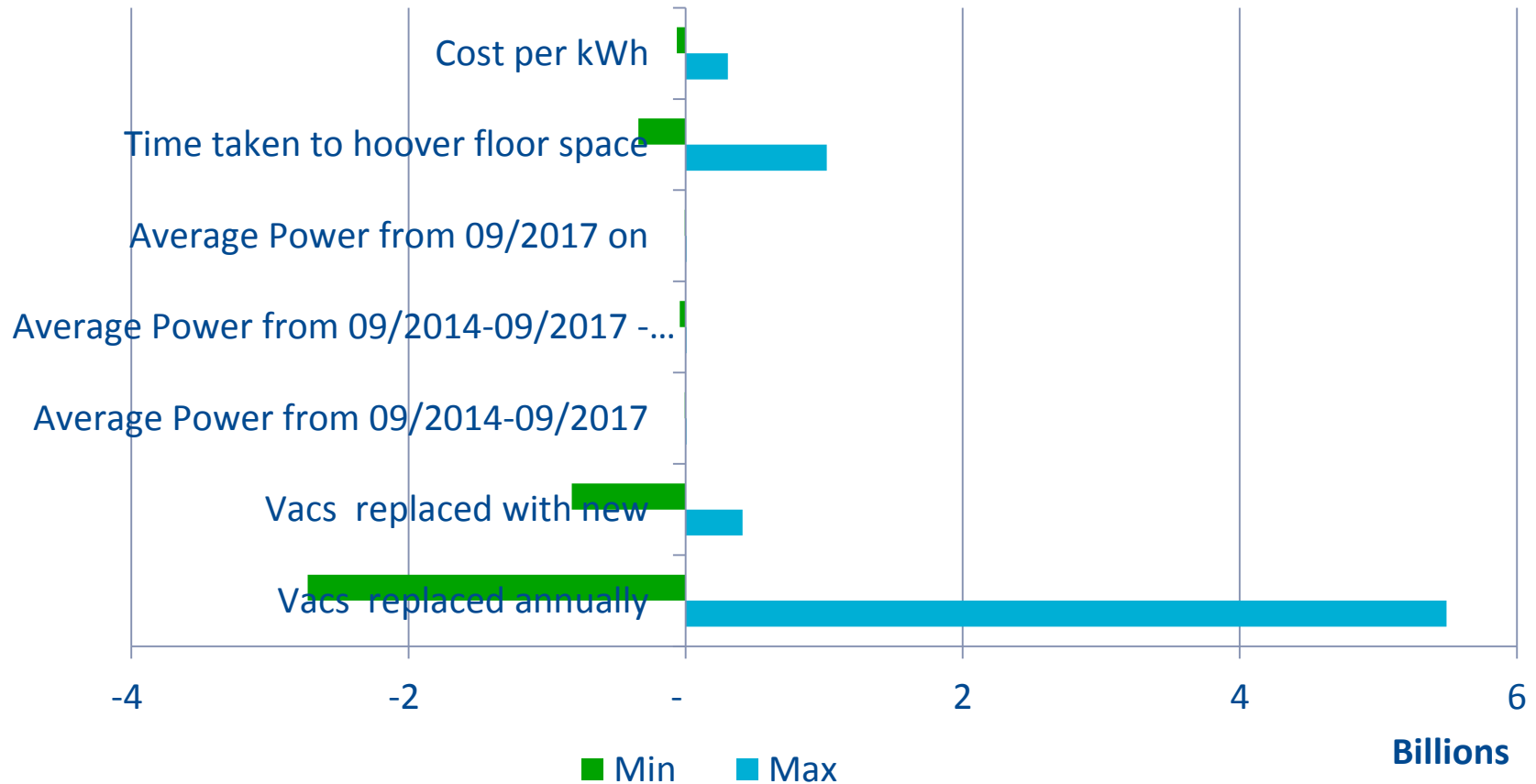
	Min	Current	Max
Vacs replaced annually	5%	10%	20%
Vacs replaced with new	60%	80%	90%
Average Power from 09/2014-09/2017	1300	1400	1500
Average Power from 09/2014-09/2017 – CHOOSE LOWER	700	1400	1500
Average Power from 09/2017 on	700	750	800
Time taken to Hoover floor space	20	30	60
Cost per kWh	13	13.86	18



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Data Analysis – Sensitivity Analysis

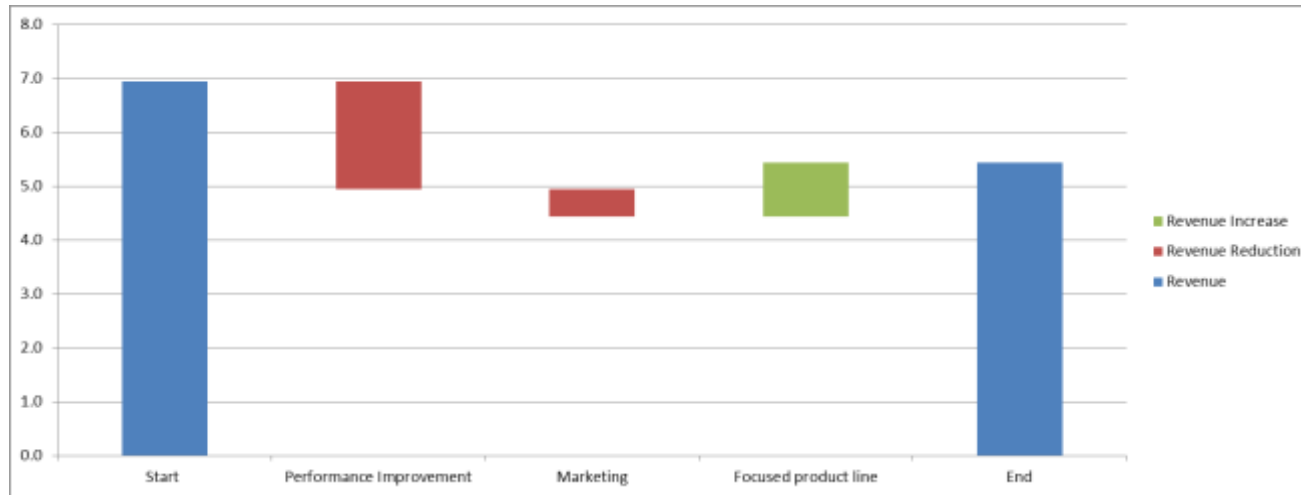
Total cost of vacuum cleaners in the UK over 10 years



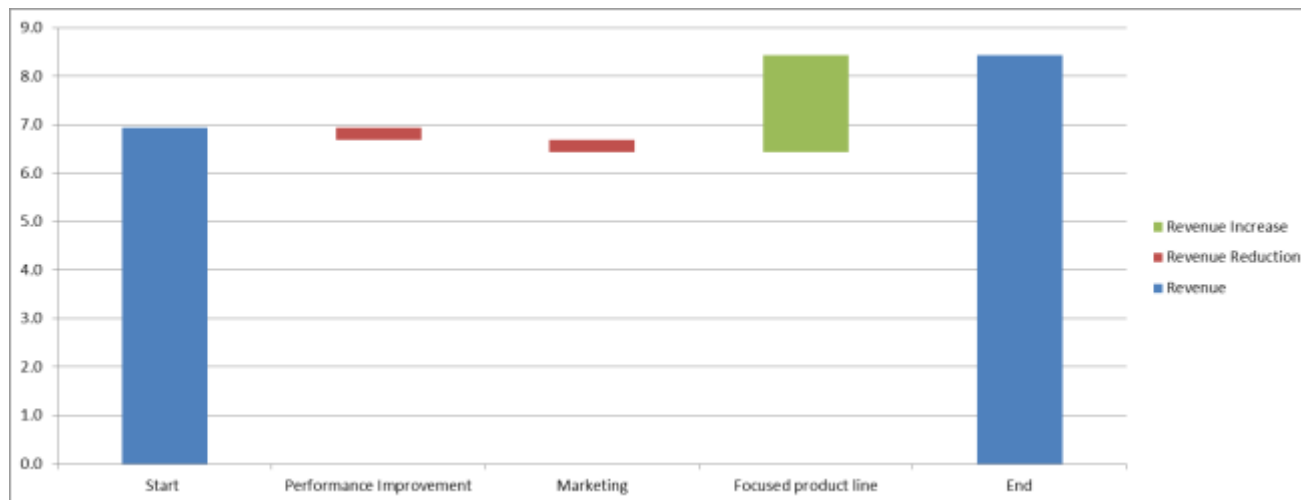
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Data Analysis – Producer's view

Wattage is a marketing tool



Wattage is not a marketing tool



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Summary

- The cost of buying vacuum cleaners has a much greater impact than cost of electricity.
- Forecasted energy consumption does not include reduced performance of cleaners or if wattage improves dpu and therefore time spent cleaning reduces.
- Sensitivity to wattage is minimal in terms of economic impact compared to the impact of the time taken per cleaning task over 10 year period.
- It would be possible to analyse producer impact by seeing variation to margins etc.
 - More analysis would be required



Lessons Learnt

- Set a clear target for the research and understand fully the question to be answered.
- Don't work on it at the end of a long day at work!
- Step out of the detail regularly.
- Don't be too ambitious
 - Producer viewpoint, Weibulls...
 - Potential impact of Brexit after 23rd June referendum



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