

Sheffield zero carbon project - work package 2 (business-as-usual scenario)

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Agenda

- Introduction to project and to WP2
- Summary of WP1 results
- Approach to developing the BAU scenario
- Initial results
- Discussion
- Next steps

Introduction to the project

- Objective – to deliver a series of reports and information that will inform the development of a zero carbon plan and specific investment proposals.
- Project structure:
 - WP1 – baseline inventory
 - WP2 – gap analysis
 - WP3 – options and interventions
 - WP3.1 – city level
 - WP3.2 – Council-specific
 - WP4 – SCC governance arrangements

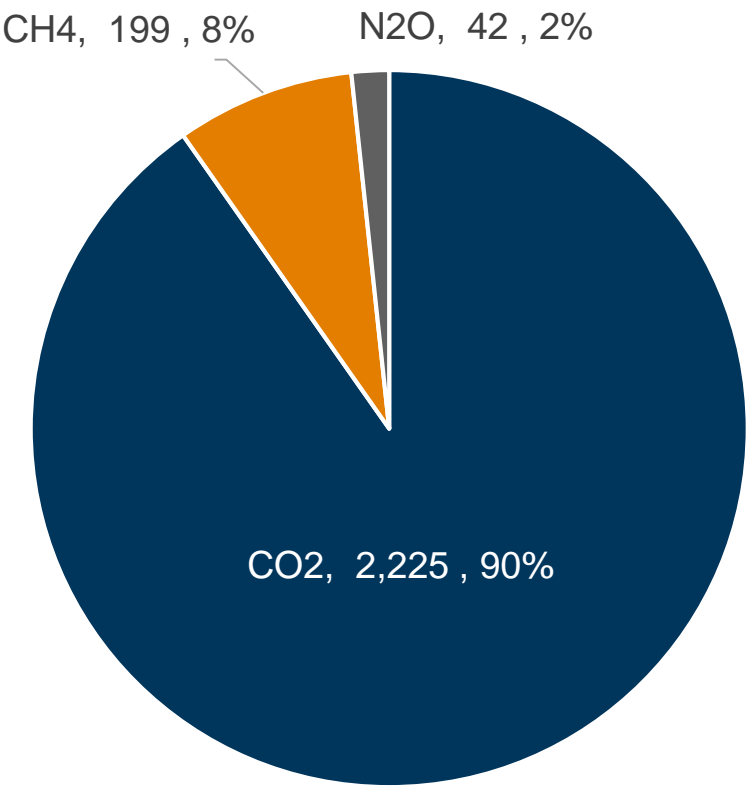
Introduction to WP2

- To develop a business-as-usual (BAU) decarbonisation trajectory.
- BAU = continuation of existing trends and policies.
- Objective = to assess how it will perform against a 2030 target and a requirement to remain within a 16 MtCO₂ carbon budget.
- 2030 target: not formally defined. Our working definition → net zero carbon dioxide, defined as a 95% reduction in net emissions by 2030.
- 16 MtCO₂ carbon budget: from Tyndall Centre analysis of science-based targets. Covers period 2020-2100, but very front-loaded. Analysis has since been updated – 15.2 MtCO₂.

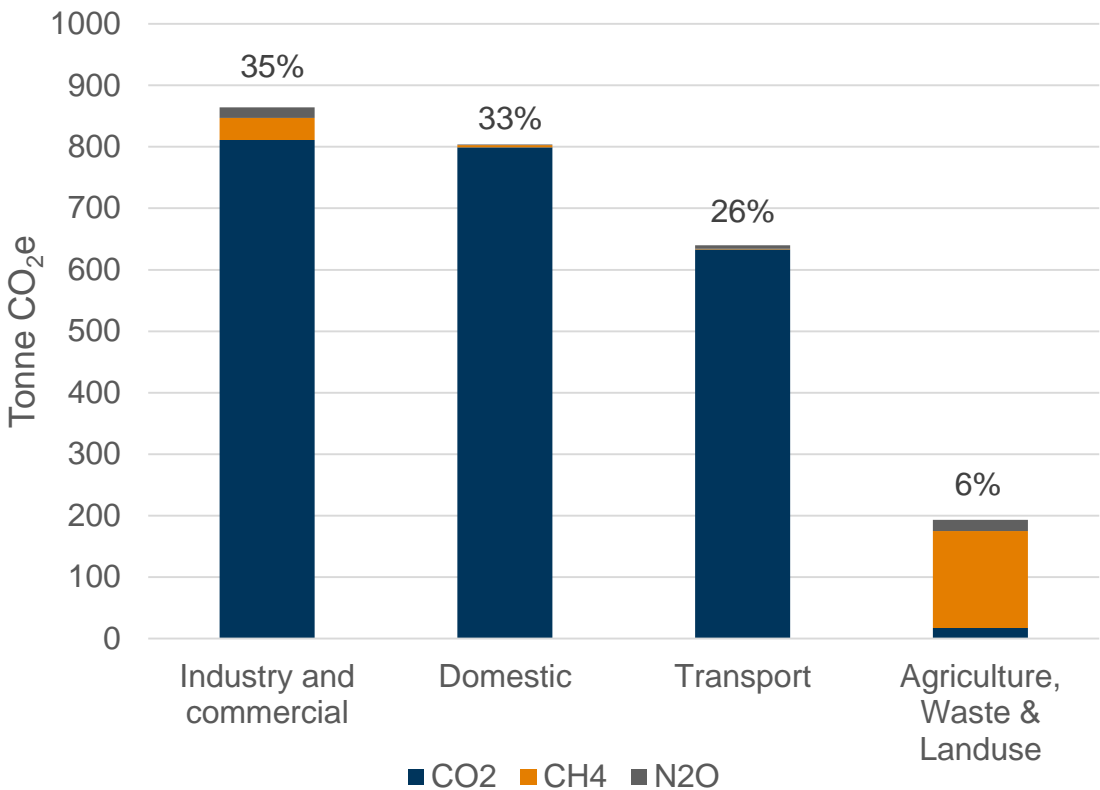
Carbon budget period	Recommended carbon budget (Mt CO ₂)
2018-2022	9.3
2023-2027	4.9
2028-2032	2.6
2033-2037	1.3
2038-2042	0.7
2043-2047	0.4
2048-2100	0.4

Summary of WP1 results

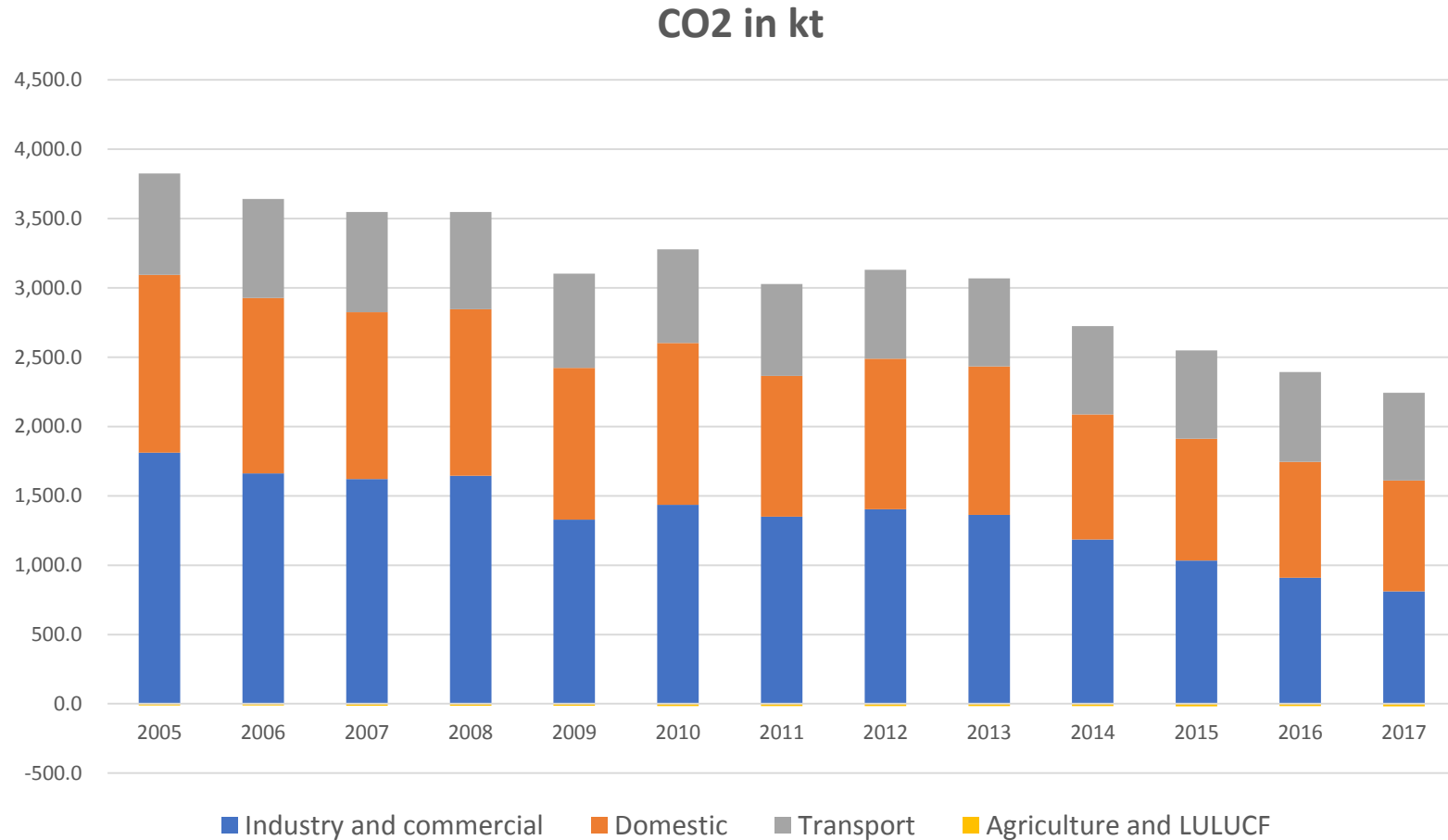
GHG breakdown from all sectors in Sheffield for 2017 (kt CO₂e)



GHG by sector in Sheffield (2017)



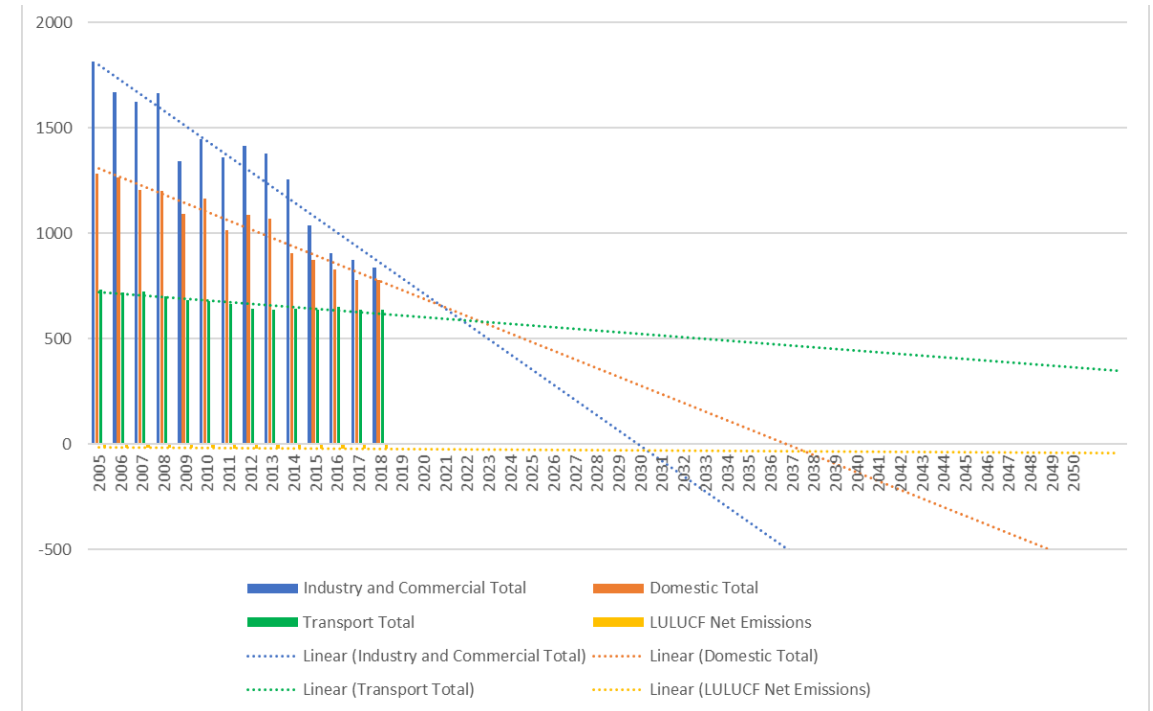
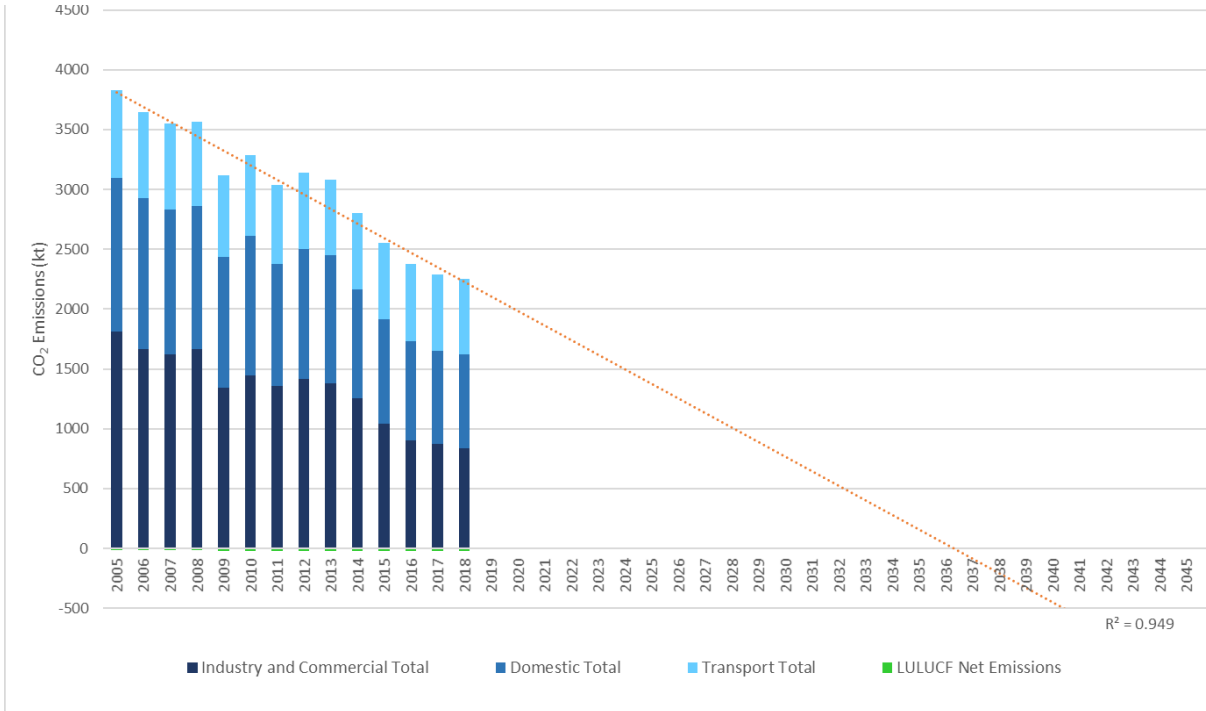
Summary of WP1 results (cont.)



Total emissions have dropped by 42% since 2005

- Industrial and commercial emission have dropped by 55%
- Domestic emissions have dropped by 37%
- Transport emission have dropped by 13%

Extrapolating past trends



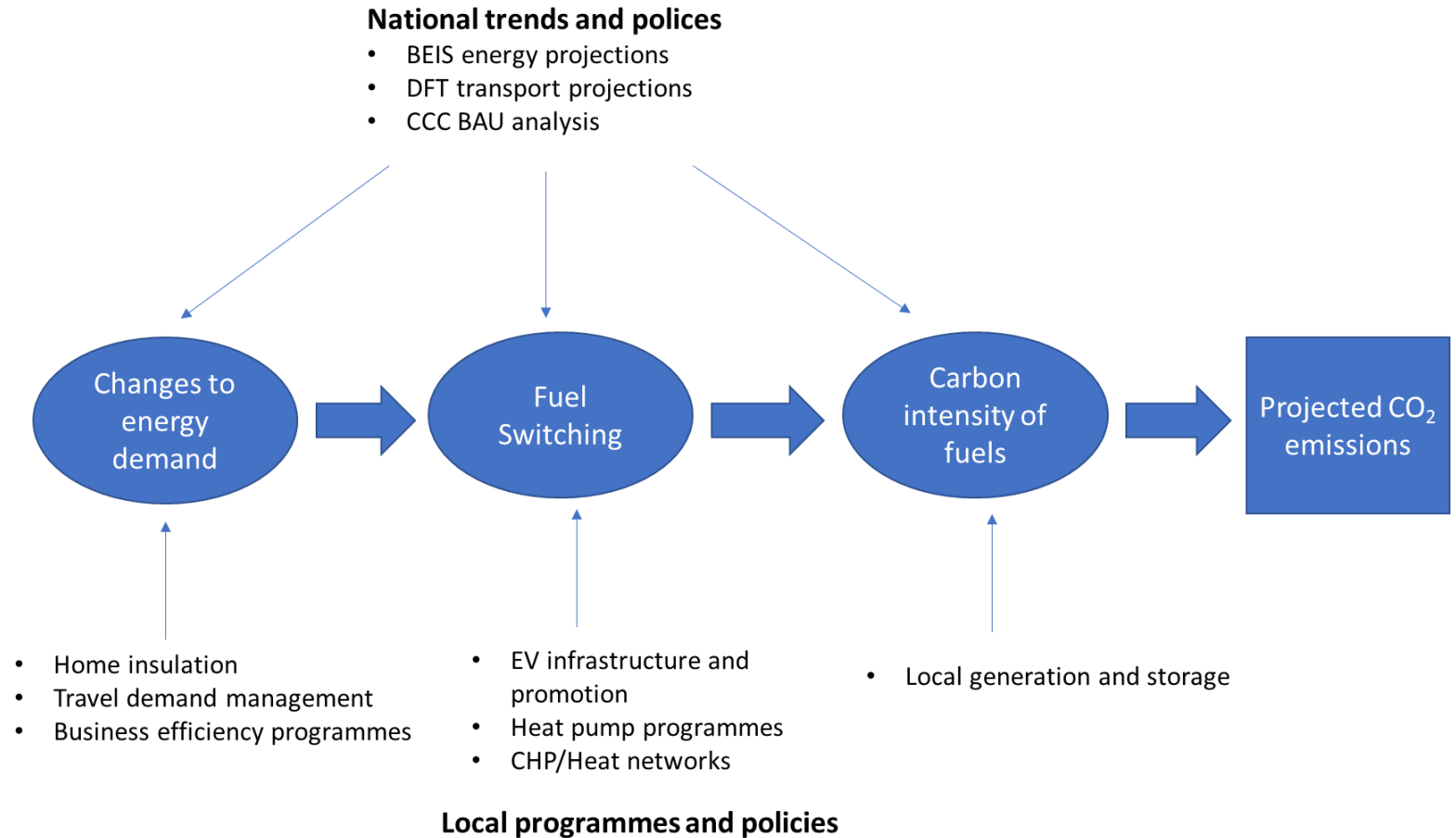
What does this tell us?

- Sheffield has already made good progress...
- ...but sectors are very diverse in terms of progress.

But not a realistic BAU pathway – and does not mean we don't need further action!

Methodology for developing the BAU scenario

- Take WP1 results as starting point (base year = 2017).
- Focus on CO₂ emissions – dominant source.
- Use Ricardo's net zero analysis tool to project emissions forward:
 - Project forward for existing fuels and sectors based on assumptions on demand growth and energy efficiency improvements (both %/yr).
 - Consider options for fuel switching, for example petrol/diesel cars to EVs, gas boilers to heat pumps.



National level projections

3 main sources:

- BEIS energy and emissions projections.
 - To 2035
 - Have final energy consumption data for all sectors
 - Includes impact of existing policies
- DfT road traffic forecasts
 - To 2030
 - Have data on projected growth in trips, mileage, mode shares etc
- CCC projections
 - Used for their net zero work
 - Did not set out an explicit BAU scenario, but could provide ideas for certain assumptions

Approach

- Use energy demand projections (kWh) to 2035 and assume continuation of trend to 2037.
- We apply the % change in energy demand to different fuels and sectors.
- This already factors in the impact of existing policies, so (in theory) don't need to make any further adjustments.
- But, may need to make some adjustments, for example:
 - Where we can see that the assumptions in the BEIS forecasts are different to the equivalent parameters in Sheffield.
 - Where we can see the policy landscape in Sheffield would lead to a different rate of change in energy demand.
 - If there have been changes in policy since the most recent BEIS projections were published (April 2019).

Assumptions – growth factors

Assumption	BEIS (UK)	Sheffield
GDP growth	2.097 %/yr	(2.2 %/yr)
Households	0.85 %/yr	0.5 %/yr
Uptake of EVs	25% of car and van mileage in 2050 being zero emissions	?
Traffic growth by 2030	1.01%	(0.97%)

- Other variables unlikely to be Sheffield-specific, e.g. winter degree days and average fuel prices.

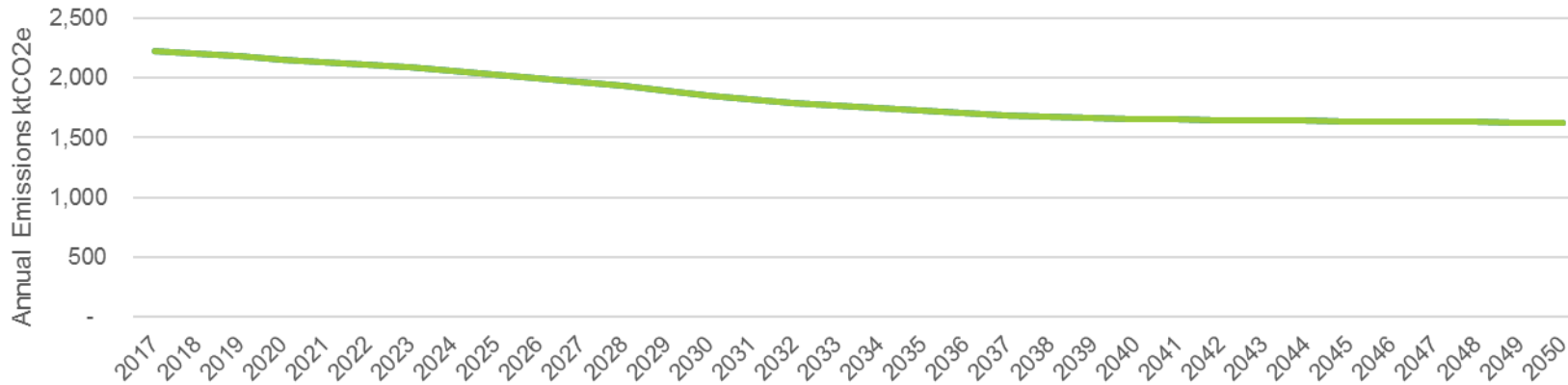
Assumptions – policies

- BEIS projections follow UNFCCC guidance on BAU projections – includes impact of all existing policies (and previous policies that may still be having an effect).
- Grey areas:
 - Targets vs policies – our approach is to focus on policies.
 - Proposed policy developments – could include as sensitivity, or in mitigation scenario in WP3.

Assumptions – policies (cont.)

Domestic	Commercial	Industry	Transport
Building regs Part L	Building regs Part L	Building regs Part L	Renewable Transport Fuel Obligation (RTFO)
Products policy	Products policy	Products policy	Car fuel efficiency policies
Smart metering	Smart metering	CRC-ees	LGV fuel efficiency policies
Heat Networks Investment Project	Heat Networks Investment Project	ESOS	HGV fuel efficiency policies
Renewable Heat Incentive	Renewable Heat Incentive	Renewable Heat Incentive	Local sustainable transport fund
Private Rented Sector (PRS) Energy Efficiency Regulations	PRS Energy Efficiency Regulations	PRS Energy Efficiency Regulations	PSV fuel efficiency policies
F-gas regulation	F-gas regulation	F-gas regulation	SECR
Boiler Plus	Energy Performance of Buildings Directive (EPBD)	Industrial Heat Recovery Support (IHRS)	
Energy Company Obligation	CRC-ees	CRC-ees	
	ESOS	ESOS	
	Streamlined energy and carbon reporting framework for business (SECR)	SECR	

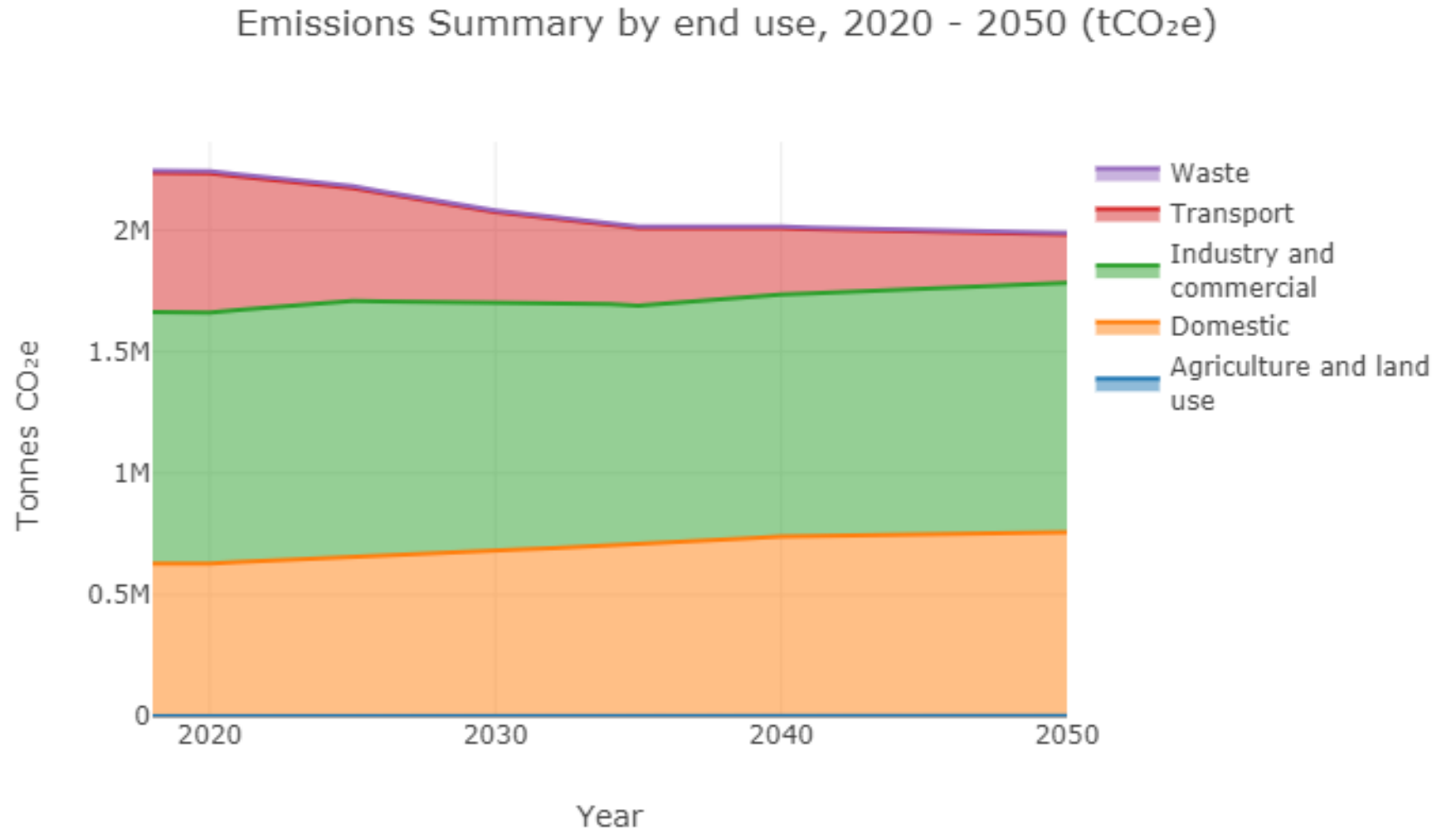
A central scenario (BEIS reference)



- CO2 reduction from 2017 = 16.9% by 2030 and 24.1% by 2037
- Doesn't get to net zero even by 2050

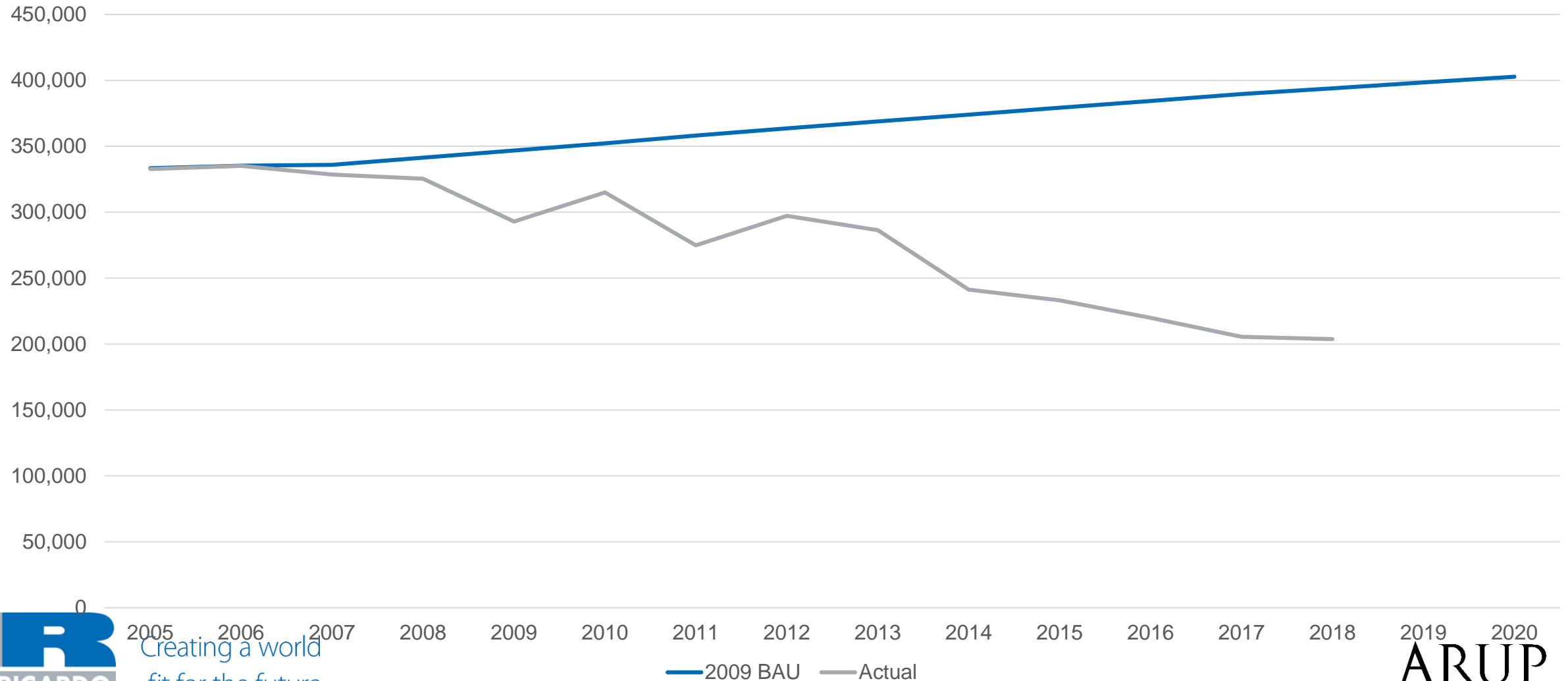
Comparison

- SCATTER tool
- All levels set to '1' – equivalent to BAU
- Shows a similar pathway



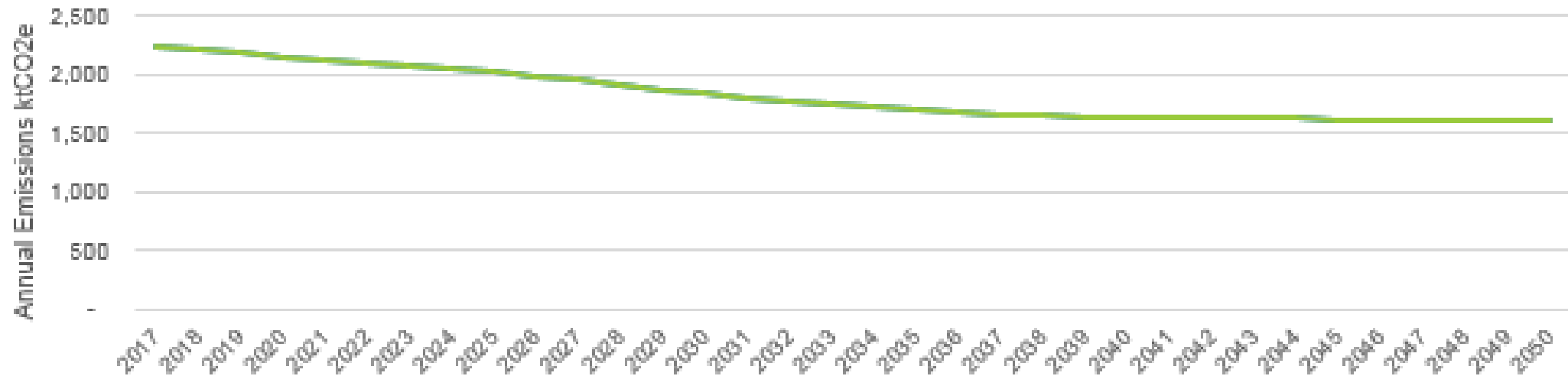
A salutary warning!

Thurrock CO2 emissions in domestic sector – BAU compared to actual



Sensitivities

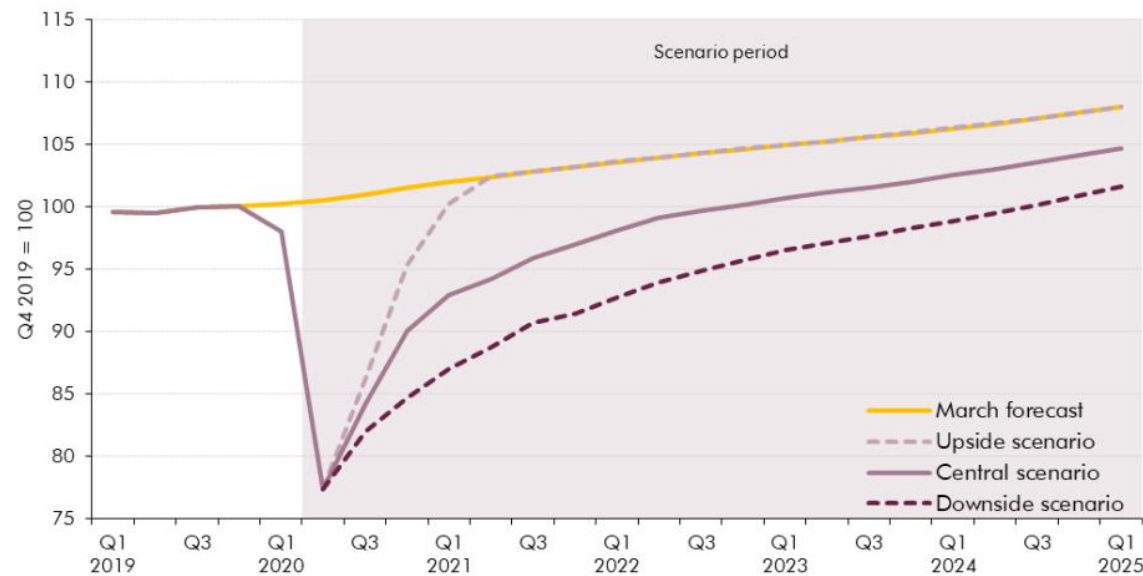
- Using BEIS low growth scenario (1.8% instead of 2.1%), pathway looks very similar.
- But reduction in CO2 emissions from 2017 levels = 17.7% by 2030 (compared to 16.9%) and 25.1% by 2037 (compared to 24.1%).



The impact of Covid-19

- Impact on economic growth uncertain – GDP fell 25% between February and April. Now recovering.
- OBR Central scenario: GDP down 12.4% this year; pre-virus peak by 22Q4; GDP down 3% at horizon

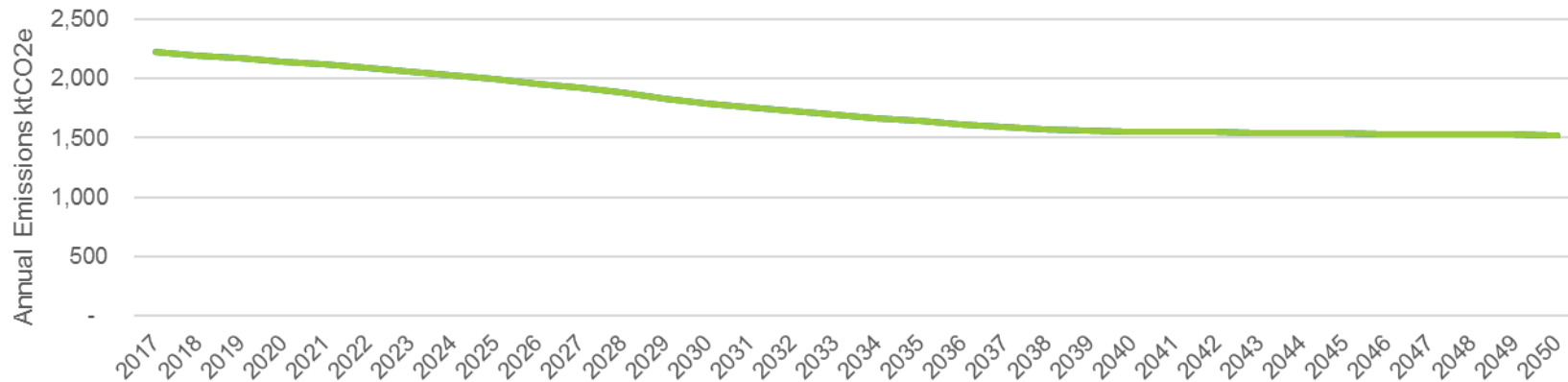
Real GDP versus March forecast



- We can work out ratio of overall energy demand to GVA growth for each sector, then rescale the BEIS factors to the different economic growth rates.

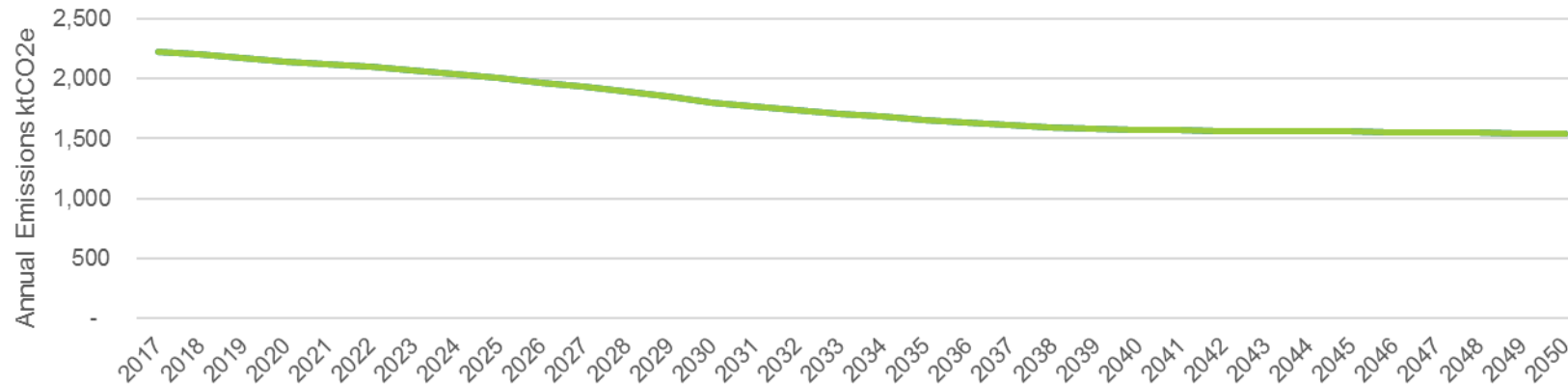
The impact of Covid-19 (cont.)

- Again, pathway looks very similar.
- But reduction in CO₂ emissions from 2017 levels = 19.6% by 2030 (compared to 16.9%) and 28.3% by 2037 (compared to 24.1%).



Future homes standard

- Again, pathway looks very similar!
- But reduction in CO2 emissions from 2017 levels = 19.0% by 2030 (compared to 16.9%) and 27.4% by 2037 (compared to 24.1%).



Ban on new sales of petrol/diesel cars and vans

- A bigger impact
- Reduction in CO2 emissions from 2017 levels = 22.2% by 2030 (compared to 16.9%) and 33.3% by 2037 (compared to 24.1%).

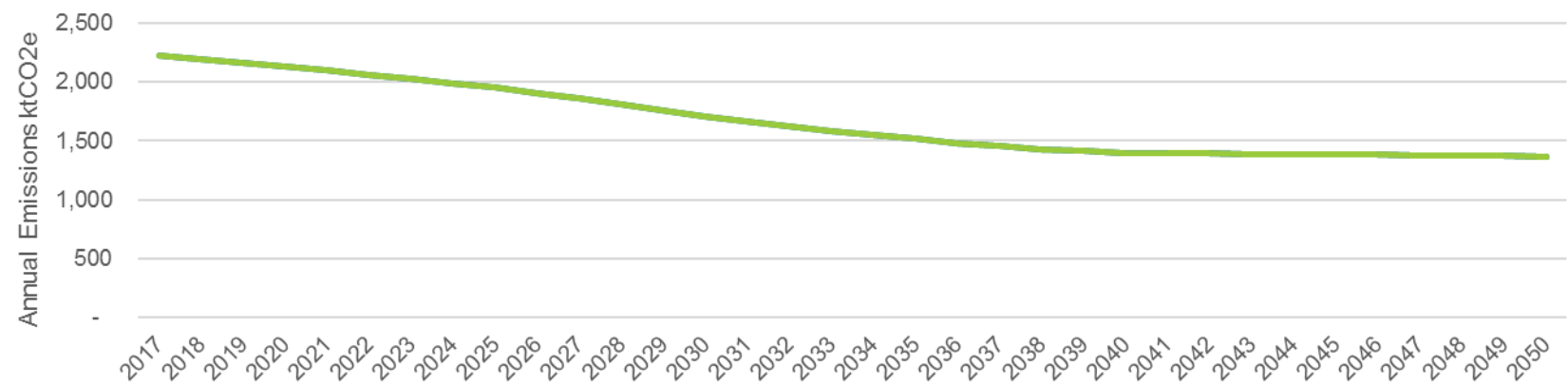


Bringing it together

Scenario	Description	CO ₂ reduction 2017-2030 (%)	CO ₂ reduction 2017-2037 (%)
BEIS reference	Latest (2019) BEIS projections, central forecast	16.9	24.1
BEIS low growth	Latest (2019) BEIS projections, GDP growth 1.8% instead of 2.1%	17.7	25.1
Covid	Taking account of Covid OBR forecasts	19.6	28.3
FHS	Taking account of Future Homes Standard	19.0	27.4
Car and van phase out	Phasing out sales of new petrol/diesel cars and vans by 2032	22.2	33.3
Combined	BEIS reference, plus impacts of Covid, FHS and car/van phase out	23.4	34.7

The 'combined' scenario

- 23.4% reduction in CO2 emissions from 2017 levels by 2030, 34.7% by 2037



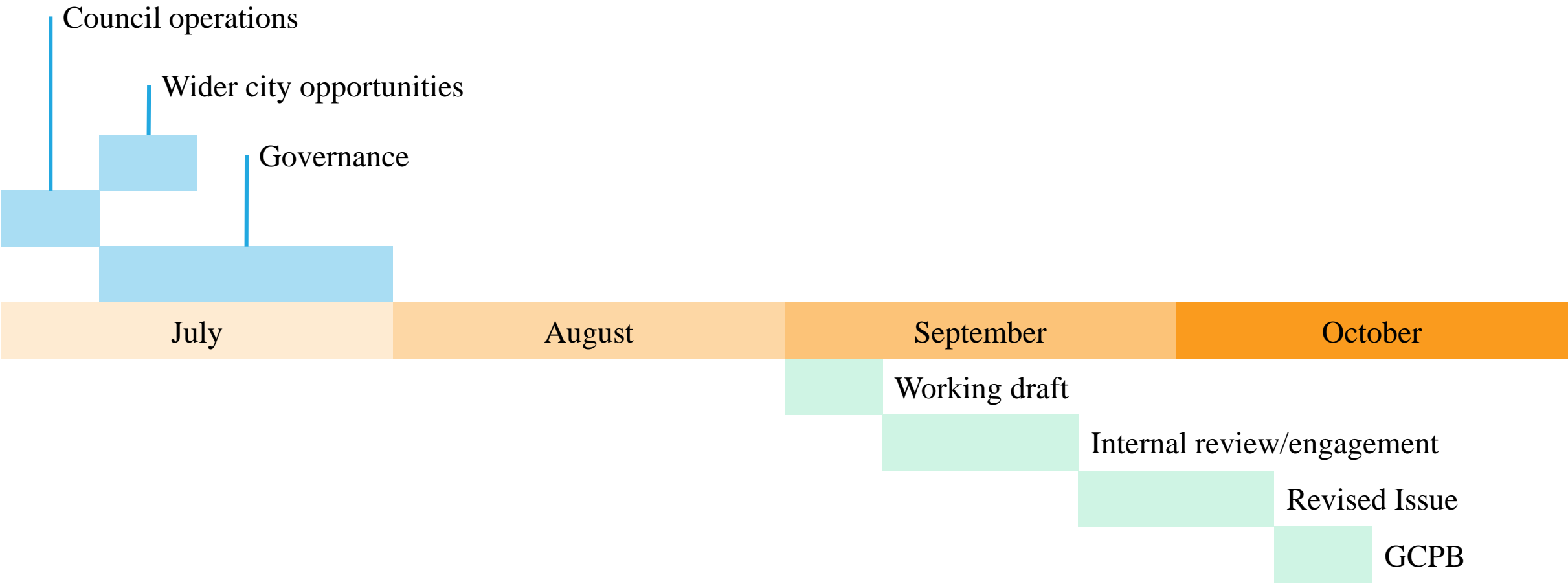
Carbon budget period	Carbon budget (MtCO2)	Combined scenario (MtCO2)
2018-2022	9.3	10.65
2023-2027	4.9	9.75
2028-2032	2.6	8.57
2033-2037	1.3	7.59
	18.1	36.56

Budget for 2018-2037 used up by 2025

Observations

- Sheffield has already made some good progress – the rate of emissions reductions so far has been higher than the national average.
- But the policy landscape is not sufficient to meet net zero by 2030, or even to continue this level of emissions reductions into the future.
- This reflects the picture at the national level, where the current policy landscape is not sufficient to meet the fourth and fifth carbon budgets, nor net zero by 2050.
- Much of the progress in recent years will be from grid decarbonisation, which has progressed at a rapid pace.
- The additional gains from this are lower than previously and more focus will need to be turned to tricky areas such as decarbonisation of heat and transport.
- Expected forthcoming policy announcements will have an impact, but still not enough.

Next steps



Creating a world
fit for the future



Questions

- Do you have any questions for us?
- Do you have any comments/suggestions?
- We have some questions for you!
 - Do you agree with the assumptions we have made?
 - Are there any reasons why assumptions should be different for Sheffield (e.g. economic growth)?
 - Are there any local policies that you think need to be factored in separately?
- Email: james.harries@ricardo.com