



Material Efficiency Strategies – Potential to reduce Greenhouse Gas Emissions

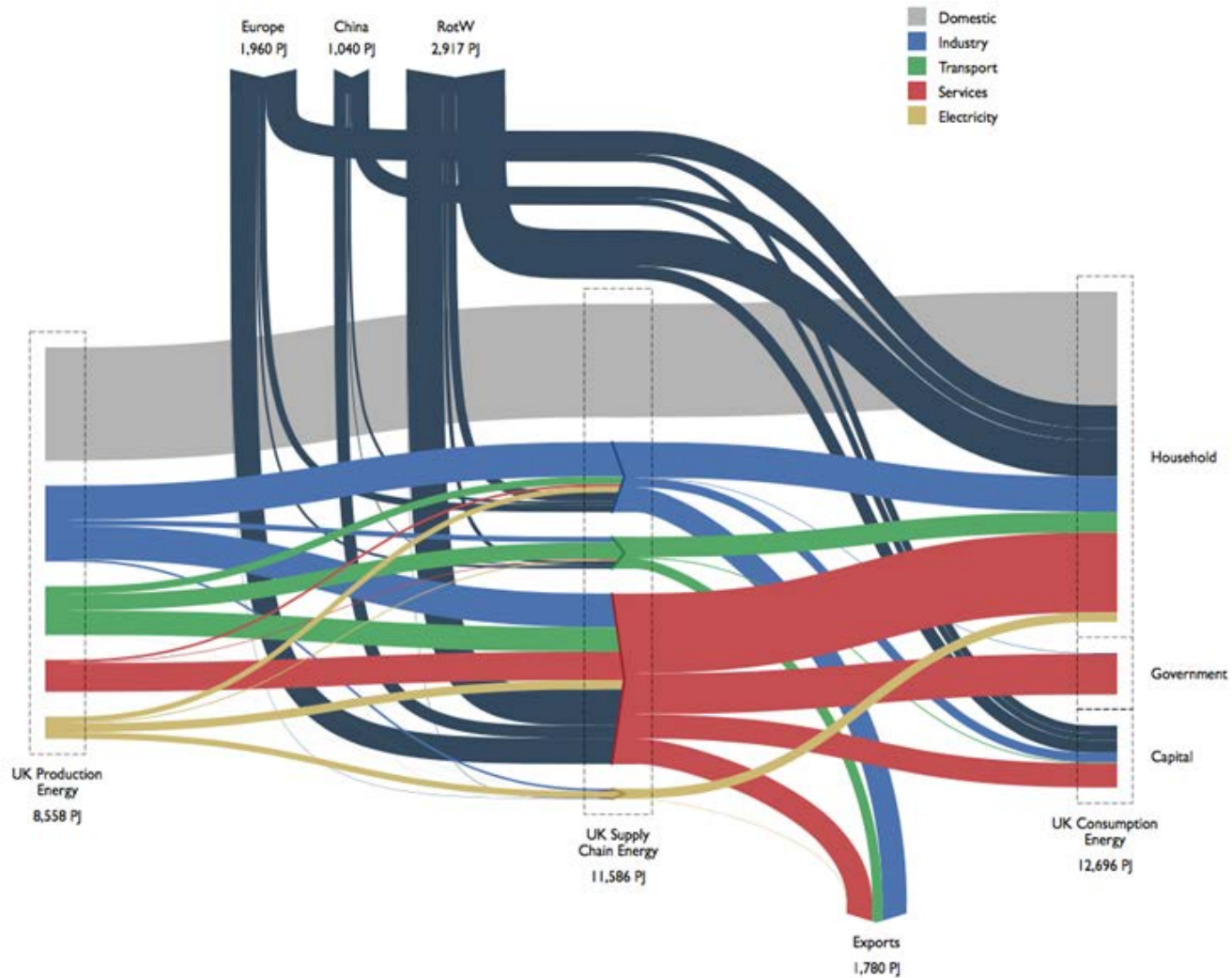
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Energy demand modelling



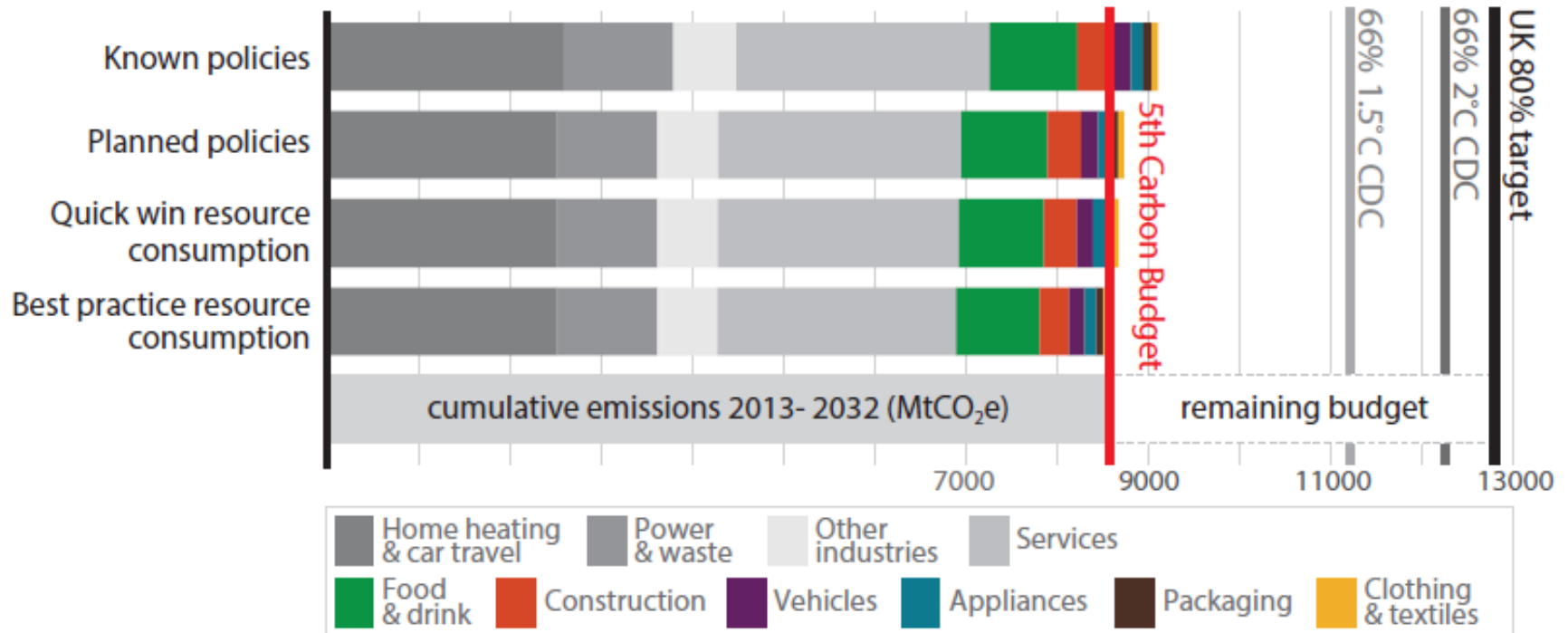
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UK Carbon Budgets



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The temperature related targets

5th carbon budget – 5 UK carbon budgets have been agreed up to 2032

66% chance of 1.5°C – Global emissions converge to an average global per capita emissions point in 2050 which does not exceed the total cumulative budget to keep average global temperature rise to less than 1.5°C

66% chance of 2°C – Same as above but for 2°C

UK 80% target – the existing UK 2050 climate target is equivalent to a 50% chance of exceeding 2°C average global temperature rise, but is not reconciled with a 2°C global cumulative budget

Material efficiency strategies



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Product Group	Description	QW	BP
Clothing & textiles	Increase the lifetime of commercial and household clothing and shoes by 3 and 9 months (WRAP, 2013).	10%	33%
	Divert additional clothes, shoes, carpets and rugs from landfill for re-use: the weight of clothes discarded annually are almost equivalent to the weight of new clothes bought. 31% of these are landfilled (WRAP, 2011). Only 4% of rugs and carpets are re-used, with the majority going to landfill (WRAP, 2012).	5%	15%
	Reduce supply chain waste through an efficiency improvement in fibre and yarn production, dyeing and finishing (WRAP, 2013).	5%	15%
Food & drink	Reduce avoidable household, hospitality and food service food waste: on average 19% of household and 18% of the hospitality and food service sector food purchases are thrown away, of which 60% and 75% respectively are avoidable. WRAP suggest a 30% reduction is challenging, but case studies have achieved 80% (WRAP, 2013a).	30%	66%
Packaging	Reduce the weight of packaging through lightweight design (plastic, glass, paper and metals): case studies have shown between 10-46% material savings for glass bottles, cardboard boxes etc., which in addition reduces transport and storage needs.	10%	20%
	Increase packaging recycling rates by industry and households towards achieving recycling targets set for 2030 in the EU Packaging Directive: on average, 67% of total UK packaging is recycled or recovered (WRAP, 2015). This should be 75% by weight by 2030. 24% of plastic is currently recycled, 64% of glass, 85% of card and paper and around 55% of metal products. Recycling of card and paper has reached its recycling rate.	10%	20%
	Waste prevention measures in industry and households e.g. reducing supply chain waste and using less packaging.	5%	10%

Material efficiency strategies

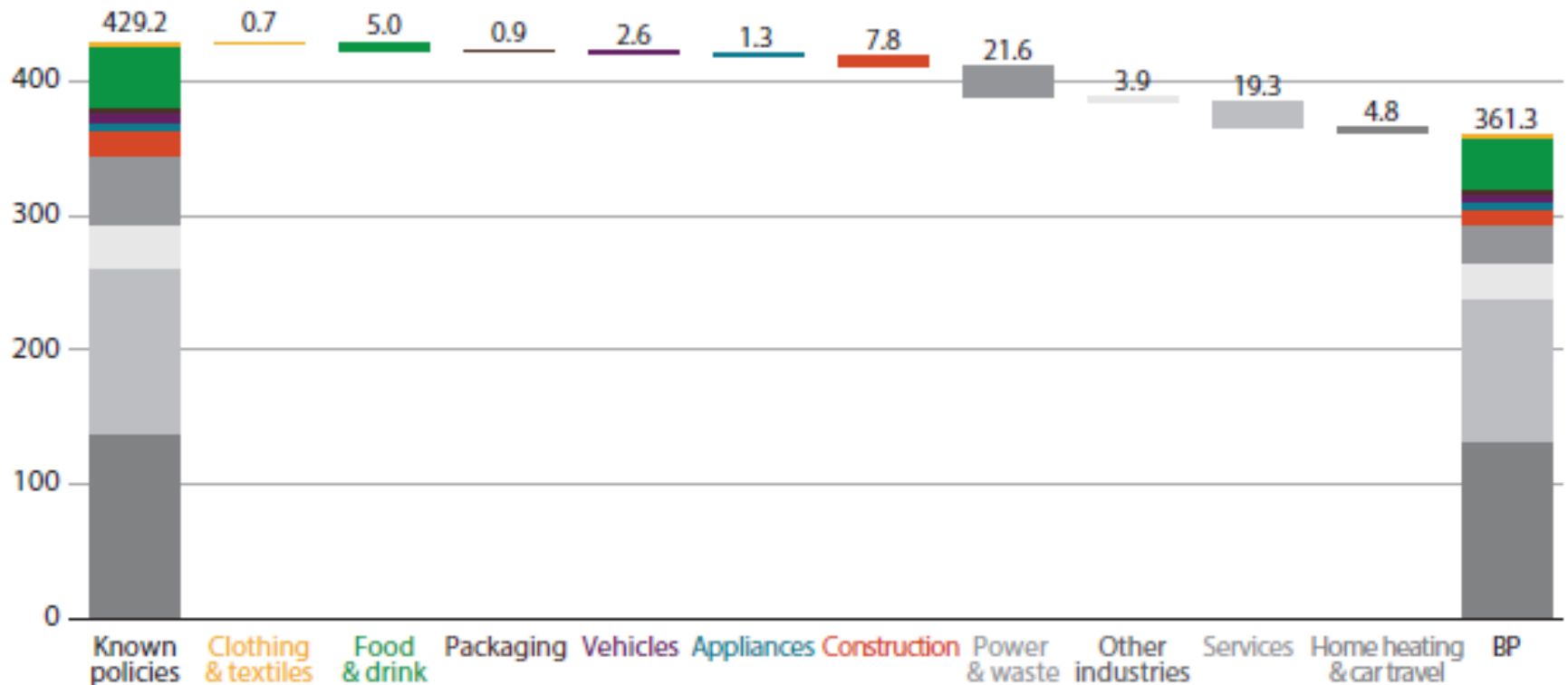


Vehicles	Lightweight and design optimisation in steel, aluminium, other metals, plastics, and systems and assemblages: case study evidence shows material reductions through using high strength steel, replacing steel with aluminium and vehicle downsizing (Modaresi et al, 2014).	3-5%	5-8%
	Reduce car ownership through leasing or car club schemes: car clubs can reduce car ownership 25%, increase in those using public transport 40%, and can achieve a 15% improvement in engine efficiency (Next greencar, 2016). The share of registered UK car club participants is ~0.002%.	1%	5%
Electronics & appliances	Increasing the lifetime of commercial and household electronics and appliances still functioning when discarded: the UK wastes the same weight of electronics as is bought each year. A third (38%) is landfilled, half (55%) is recycled and only 7% is reused as a whole product. A quarter of these are suitable for re-use.	27.5%	55%
Construction	Design optimisation to reduce material inputs.	1-2%	2-9%
	Substitution of carbon intensive materials with lower impact materials e.g. timber displacing steel, concrete and brick respectively. The best practice scenario sees timber frame increasing to the current Scottish housing market share; hybrid timber-steel becoming the dominant form for new low rise structures; cross-laminated timber making up 50% of mid-rise construction; and greater use of supplementary cementitious materials.	5, 15 & 15%	15, 70 & 70%
	On site process improvements and waste prevention	10%	20%
	Increased reuse of steel, timber, bricks and other materials in construction: e.g. structural steel reuse is currently 5%	1-10%	5-35%

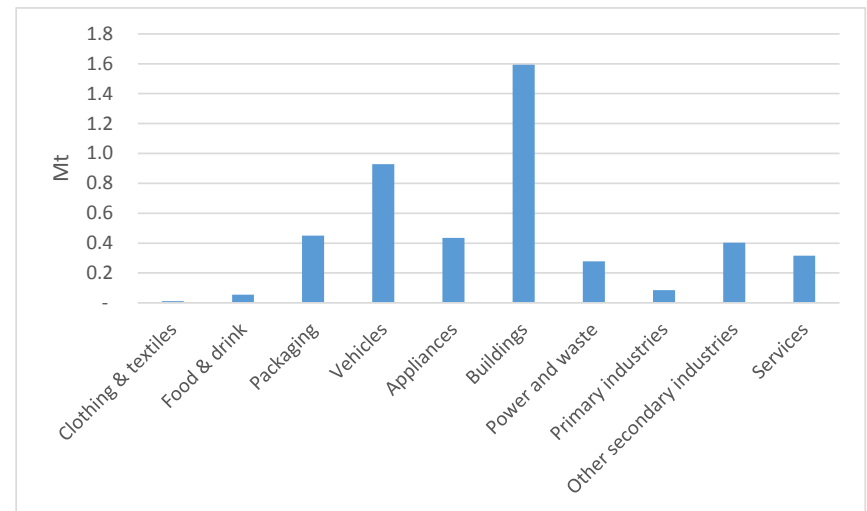
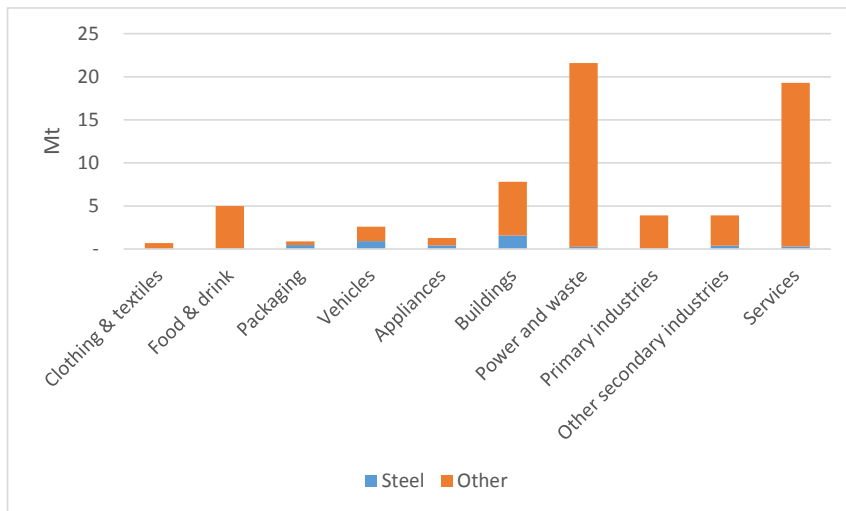
Emission savings in 2032



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Steel emission savings

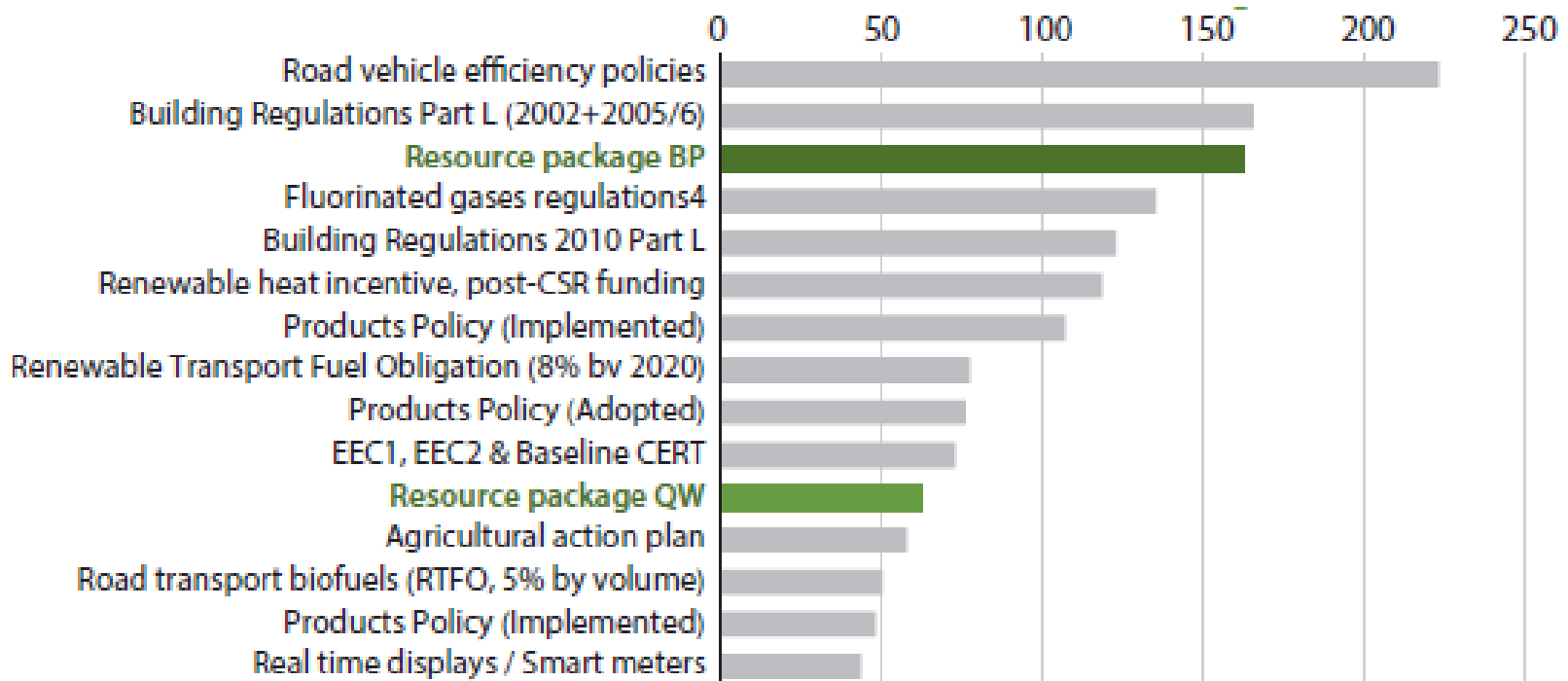


- 15% of material efficiency emission savings occur in the steel sector
- Around half of these relate to “imported emissions”
- Construction represents 30% of potential savings, 20% in buildings and 10% in appliances

Cumulative emission savings

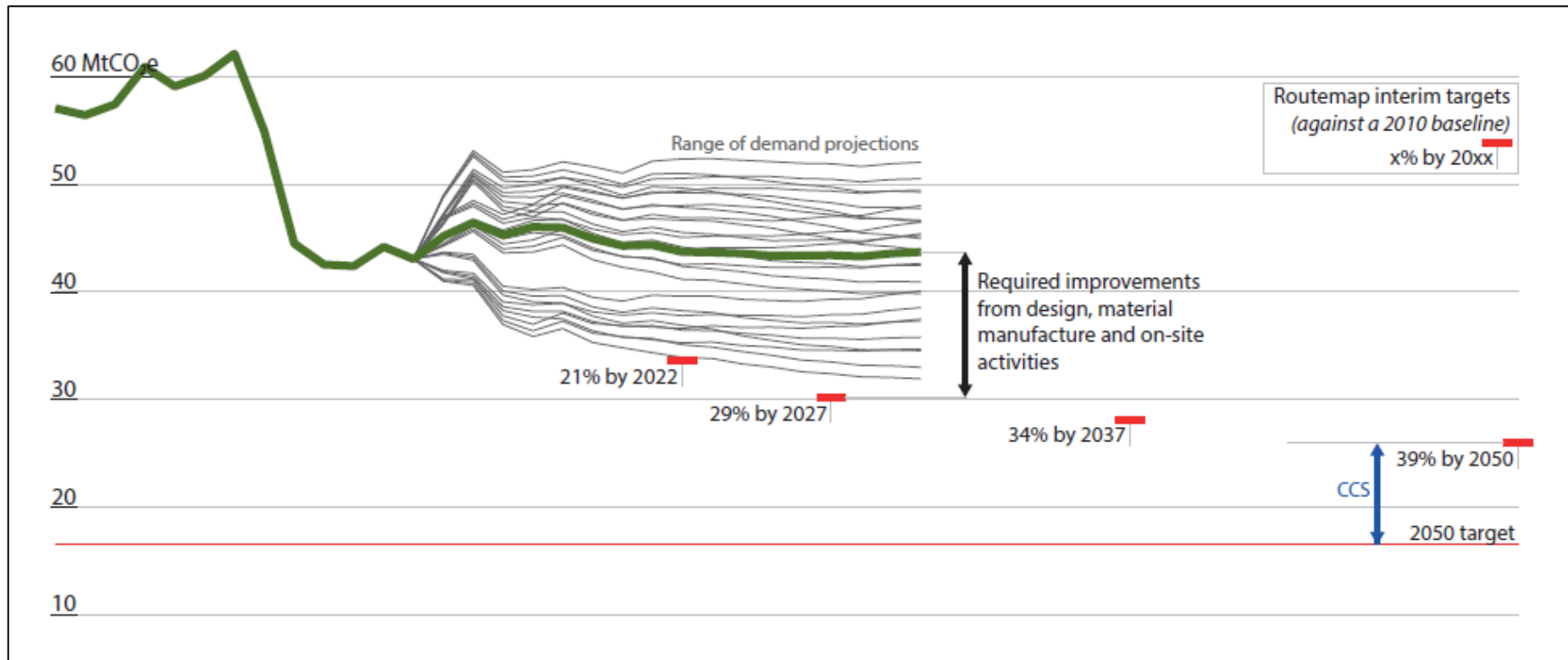


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- Significant emissions reduction are possible but require far-reaching changes in manufacturing and consumption patterns
- “Quick win” approaches are considerably more feasible but only deliver around 40% of the savings
- Steel savings reduces from 30% to 12%

Sector level analysis - Construction



- Future emissions are highly dependant on wider economic demand for infrastructure

Contacts



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