
i-STUTE – What is it for?

Dr Hywel Davies

3rd June 2014

**Technical Director
Chartered Institution of
Building Services Engineers**

www.cibse.org



i-STUTE – What does it stand for?

interdisciplinary centre for Storage,
Transformation and Upgrading of Thermal Energy

One of six EPSRC funded End Use Energy Demand
Centres



i-STUTE – What are its aims?

to advance progress to a low carbon emission future through integration and innovation of heating and cooling technologies together with new business models and consumer understanding

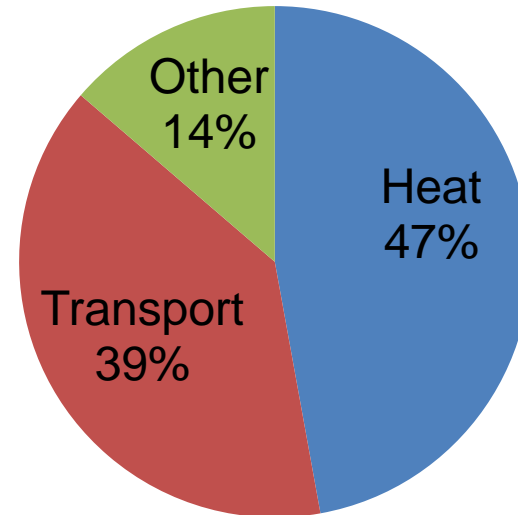
And a low carbon future should also be a lower energy, lower energy import dependent future



Why heating and cooling?

- 47% of fossil fuels in the UK are burnt for low temperature heating purposes (25% of CO₂ emissions)
- 16% of electricity in the UK used to provide cooling - Worldwide it represents 10% of greenhouse gas emissions

Energy Consumption
by end use 2012

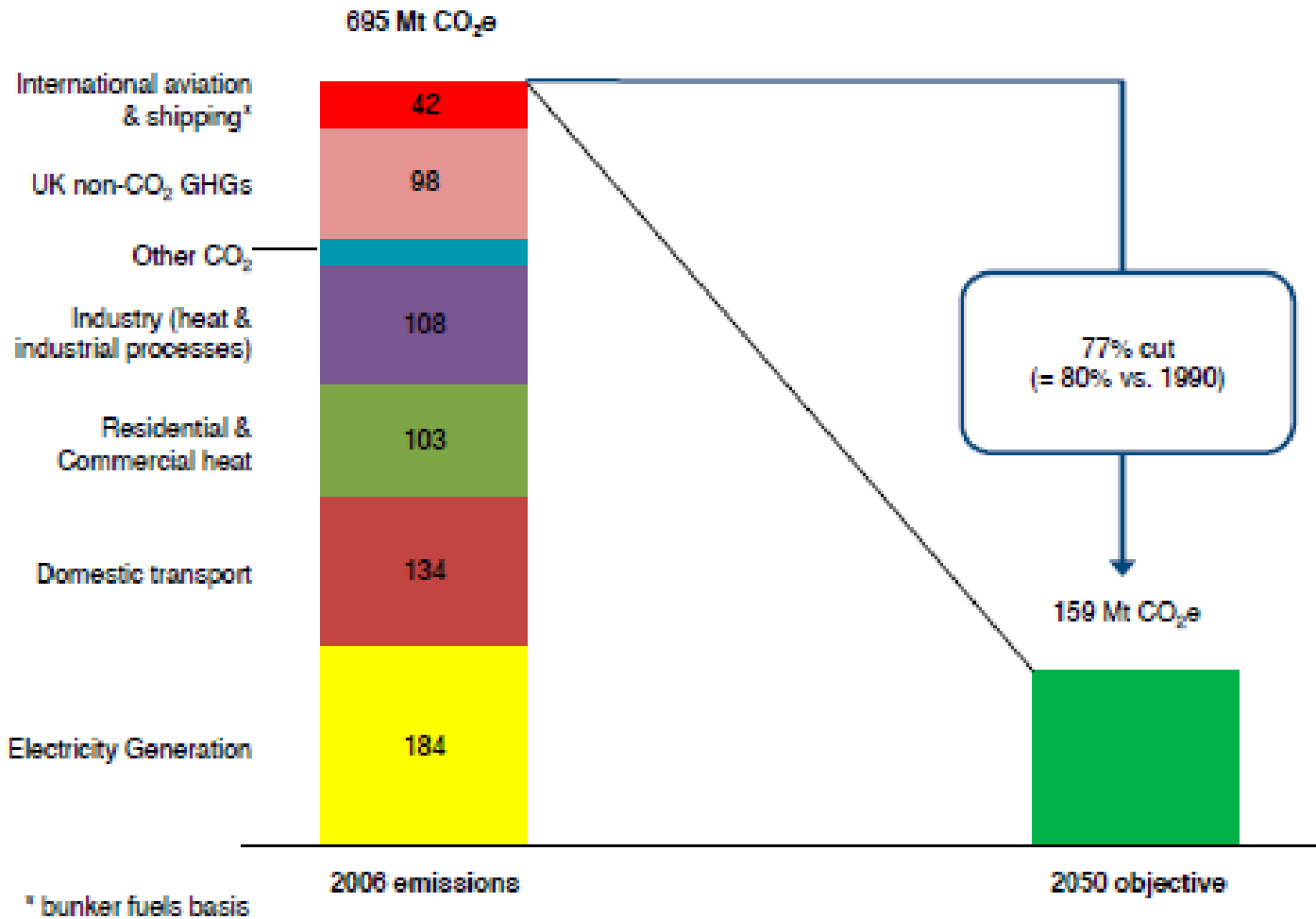


Provisional data for 2012
(DECC)

Context

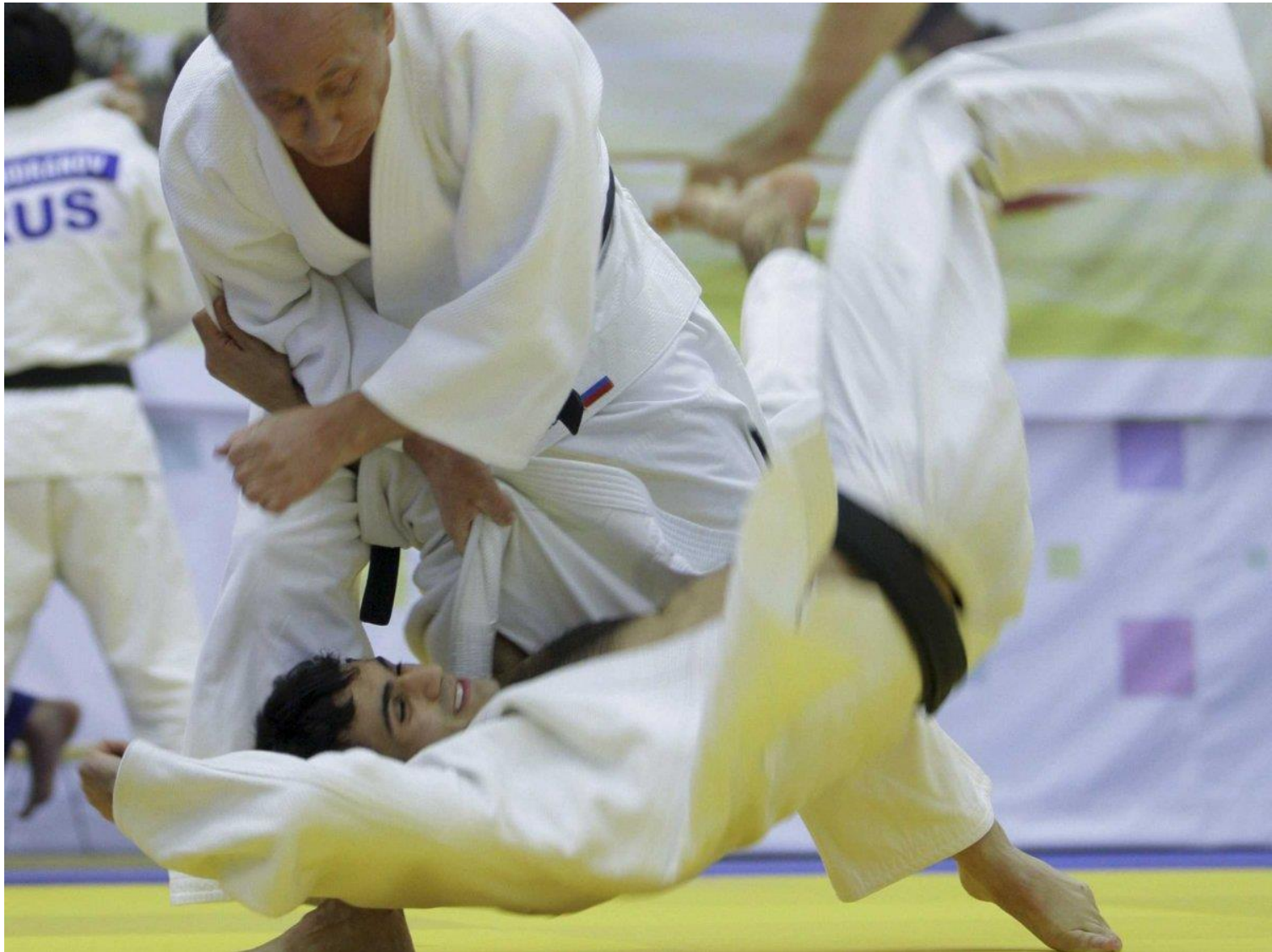
Figure 2.1 The scale of the challenge

The UK is committed to a reduction in greenhouse gas emissions of 80% by 2050 across all sectors



Building a low-carbon economy – The UK’s contribution to tackling climate change. The First Report of the Committee on Climate Change December 2008 London: TSO . ISBN 9780117039292





The relative emissions of new and existing stock

- The built environment accounts for 46% of total UK emissions
- So reducing emissions from new build by 40% reduces UK emissions by
 - 0.4 x 0.46% per annum
 - which is 0.18% of UK total
- And we want to reduce emissions by 60-80% by 2050?
- And build “nearly zero energy homes” from 2020?



The scale of the problem

- Industrial, commercial, residential buildings account for 46% of UK carbon emissions
 - New buildings account for approximately 1% of the stock each year
 - We currently have about 24 million homes in UK
 - If we build 200,000 new homes a year it will take 120 years to replace the existing stock
 - We currently demolish about 20,000 homes a year – 1200 years to demolish the existing stock,
 - So...
 - Our existing stock is the challenge if we are to reduce emissions from buildings!
-

Our low carbon future...



looks suspiciously like our hi-carb past!

The existing stock challenge

- c. 24 million homes now
- demolish 20,000, build 200,000 a year
- So, by 2050 we will have built 7.2 million new homes and demolished 800,000.
- Net housing stock 2050 = $24\text{m} + 7.2\text{m} - 800,000 = 30.2\text{m}$
- But 23.2m of them exist now!!
- 60 minutes x 24 hours x 365.25 days x 36 years = 18,934,560
- **So we need to refurbish one home every 49 seconds of every hour of every day of every year for 36 years!!!**

And that is not all...

- Commercial and industrial heating/cooling
- Cooling in retail, commercial sectors
- Storage to improve utilisation
- Training the installers and specifiers needed to cope with the new technologies
-

So i-STUTE is here to look at ways to deliver those 23 million refurbishments to heat and cool our homes, shops, workplaces in lower energy and lower carbon ways

