

Information paper – 3

Fuel mix in grid electricity

Prepared by:
David Clark

A paper referenced in the book:

WHAT COLOUR is YOUR BUILDING?

David H. Clark



© Cundall Johnston & Partners LLP. 2013

Issue 1.0: 29 July 2013

This information paper is one of a series of papers written during the preparation of the book **What Colour is Your Building?** (www.whatcolourisyourbuilding.com). The papers do not form part of the book and have not been peer reviewed. They provide further technical detail, analysis and information to support statements made in the book. All of the papers can be downloaded from www.wholecarbonfootprint.com.

Fuel mix in grid electricity

This information paper provides a brief overview of the mix of fuels used to generate electricity in the UK and other countries.

UK grid electricity

The carbon intensity of the UK's grid electricity reduced by 30% during the 1990s as new natural gas power stations were built to meet a growing energy demand - the 'dash for gas' - and some coal fired power stations were closed – refer to Figure 1. Despite this lower carbon energy generation the total CO₂ emissions only reduced by 15% (from 204 to 173 million tonnes CO₂) between 1990 and 2008 because electricity demand increased by almost a quarter during the same period.¹ The published grid emissions factor (based on a 5 year rolling average) has remained fairly constant since 2000, at an average of 0.60 kgCO₂e/m² with only minor variations (+/- 3%).²

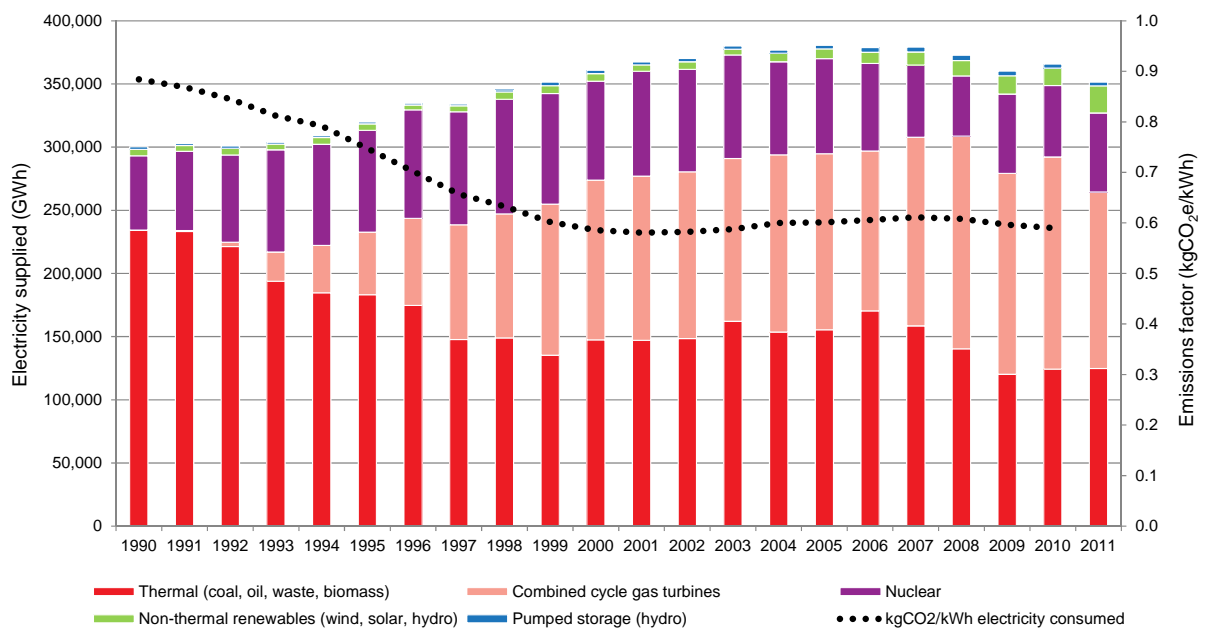


Fig 1 UK grid electricity consumption and emissions factor (source: adapted from DEFRA & DECC)

International grid electricity

The type of fossil fuels used to generate electricity has a significant impact on the emissions factor (kgCO₂e/kWh) for grid electricity in a country. Other factors include the efficiency of the power stations and the losses in the infrastructure from the power station to the end consumer. Figure 2 shows the mix of fuels used in various countries to meet their total energy demand (including electricity, heating and transportation) and the emission factors for grid electricity.³ The figure does not show the mix of fossil fuels used to generate the electricity alone.

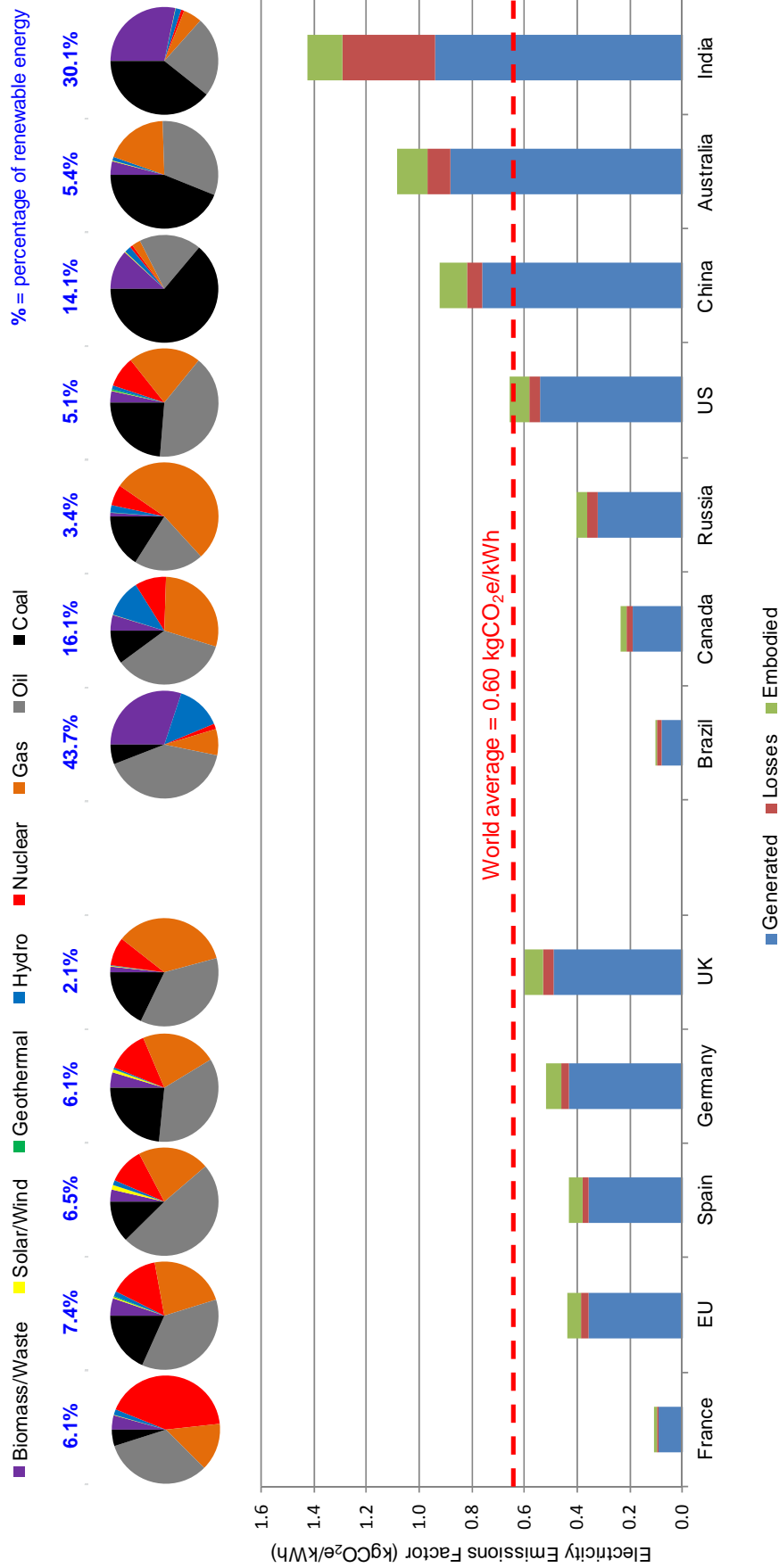


Fig 2 The mix of energy sources to the total primary energy supply in 2006 (including all energy used for electricity, transport, heating, etc) and grid electricity emissions factors for select countries (source: DEFRA / Ecofys)

Notes

All websites were accessed on 15 June 2013 unless noted otherwise.

1. The electricity generation by fuel source data is from Table 5.1.3 of the Long Term Trends supplement of the Digest of United Kingdom energy statistics (DUKES) 2012. www.gov.uk/government/organisations/department-of-energy-climate-change/series/digest-of-uk-energy-statistics-dukes
2. The grid electricity emissions factors are sourced from Table 3c of 2012 Guidelines to DEFRA / DECC's GHG Conversion Factors for Company Reporting. www.gov.uk/government/publications/2012-greenhouse-gas-conversion-factors-for-company-reporting
3. The emission factors are sourced from DEFRA – refer note 1. The percentage contribution of each of the energy sources to the total primary energy supply in each country in 2006 is taken from *Factors underpinning future action – country fact sheets 2008 update*. Prepared for the Department of Climate Change by Ecofys, Nov 2008. This includes all energy used in each country for electricity generation, heating, transportation, manufacturing and so on – it is not the mix of fuels used for electricity generation.
www.undpcc.org/undpcc/files/docs/publications/submitted/Report_factors_underpinning_future_action_country_fact_sheets.pdf.

The inevitable legal bit

While reasonable efforts have been made to provide accurate information, Cundall Johnston & Partners LLP do not make any representation, express or implied, with regard to the accuracy of information contained in this paper, nor do they accept any legal responsibility or liability for any errors or omissions that may be made. This paper is provided for information purposes only. Readers are encouraged to go to the source material to explore the issues further. Please feel free to use any material (except photos, illustrations and data credited to other organisations) for educational purposes only under the [Creative Commons Attribution-Non-Commercial-Share-Alike 2.0 England & Wales licence](https://creativecommons.org/licenses/by-nc-sa/2.0/). If you spot any errors in the paper then please contact the author so that the paper can be corrected.