

# The Economics of Energy (and Electricity) Demand

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Drivers, technologies and demand side management are keys in understanding the long-term trends of both energy and more specifically electricity consumption, as well as the inter-linkages between energy and electricity consumption. This paper shed some light on those issues, by presenting and discussing some of the important economics foundations of energy demand in general, and electricity in particular.

We first look at the macro-economic context of energy demand. We examine the different drivers of energy and electricity consumption over time, and show how both are subject to the same drivers - income and price. Taking the example of electric light demand over the last centuries in the UK, we point out that relative energy prices matter for long run economic transitions. Long-run demand trends are mirrored in long-run price trends. However, we caution against the risk of taking energy demand (and carbon emissions) falls in isolation. Indeed, raising the price of energy – and hence, reducing consumption - in one country may have little effect at the world level.

We then turn to some of the features of energy service expenditures over time. We show that the share of income spent on energy services is fairly constant over time (around 8% of GDP in the UK since 1970s). Some of the other characteristics of energy service expenditure is the significance of transport fuel, and the importance, for the government, of the revenue from taxes on energy consumption, which account for 7% of total taxes in the UK.

Having discussed those features, we should not overlook the fact that the different sectors are very distinct from one another in terms of consumption profiles, and new sources of electricity demand may



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substantially change total demand and the way it is consumed. This is why an examination of the micro-economic context of energy demand is crucial. Here, we start by reviewing some of the physics of energy demand, highlighting the energy efficiency of electric power. Theoretically, large savings are possible; however the economics are unlikely to support achievement of all of the technical potential. A number of challenges need to be taken into account, including how consumers actually behave (rather than should behave).

We conclude by highlighting the various unknowns that characterise the future of energy demand, such as the scale and shape of the IT changes required, the kind of innovations that might appear in heat and transport sector, who will be the future actors of the energy market, and the uncertainty as to how consumers may react to new technological opportunities.

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