

Creation of an Electricity Satellite Account

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Overview

Currently there is a significant amount of work being put into reconciling models of the economy with models of the physical generation and transmission of electricity. Yet, there is a fundamental challenge which has not been addressed to date, and that is better capturing the electricity sector within the economic system of national accounts (SNAs). Generally in the SNA framework the electricity sector has been represented by a single aggregate sector representing generation, distribution, transmission and supply. In this paper, we set out the principals and construction of an electricity satellite account (EISA) in which we improve the resolution of the electricity sector. We implement our suggested approach using data for Scotland, a good case study given that it has a diverse mix of generation technologies, detailed electricity statistics and formal set of economic accounts. Additionally, it is also part of a larger (Great Britain) electricity grid which has interesting aspects for the (inter-regional) trade in electricity. These accounts could be created for almost any nation or region in a standardised manner, given the similar availability of data.

Methods

Satellite accounts by definition are a framework which is linked to the central economics national accounts which enables attention to be focussed on a certain field or aspect ¹. The satellite account framework has been pioneered since the 1970s and most commonly applied in the tourism sector for the creation of Tourism Satellite Accounts (TSAs). In the TSA framework there are four key guidelines of construction which transfer to other satellite accounts. They can be summarised as: 1) basing estimates on reliable statistical sources, 2) using statistical data that are produced on a continuing basis, 3) ensuring the comparability of data within the same country over time and across countries and other types of economic activity, and 4) ensuring the internal consistency of all data used and in their collection and use, and ensuring their consistency and comparability with other macroeconomic data².

We adapt and extend the application of satellite accounts from tourism to electricity in this paper, such that the framework for the TSAs can be used for the electricity sector. This is, to our knowledge, the first attempt at the creation of an EISA. The full paper gives exact details on the creation of the electricity satellite account, the data used and why Scotland was chosen. As such we create a coherent bottom-up disaggregation of the electricity sector within the Scottish economic accounts.

Overall there are seven core tables in the Scottish EISA. The first four tables have a focus on consumption: domestic consumption of imported electricity (Table 1); domestic consumption of domestically produced electricity (Table 2), and; consumption of electricity produced in the 'domestic' location but consumed by those residing outside of that location (so, exports) (Table 3). Table 4 aggregates the information of Tables 2 and 3 for domestically produced electricity. These tables are both generated in physical and monetary terms. The next two tables link the information from the first tables to the SNA through a production account (Table 5) and domestic consumption account (Table 6). The final table 7 is focused on employment.

Results

Creating the Scottish EISA allows for information to be determined about the electricity sector which would otherwise be unknown in the SNA framework: including the different role generation technologies play in the electricity market. For instance, we discover the economic contribution of individual electricity generation technologies, taking account of each technologies generation profile, time of day of generation and value of production at each point. Additionally, we discuss possible applications and uses of EISA as the input to modelling work, and to better inform the economic and energy consequences of changing patterns of electricity production.

Conclusions

This paper outlines the creation and use of EISAs so that the representation of the electricity sector in SNAs is improved which will in turn make economic models more accurate. The method used comes from an adapted TSA framework and allows for information to be found about the electricity sector which would otherwise be hidden.

References

- 1, OCED, 2003, "Satellite Accounts", *Glossary of statistical terms*, pp 1
- 2, EUROSTAT, 2008. "Tourism Satellite Account : Recommended Methodological Framework " *Statistical Commission*, pp.1–127