

CONFERENCE OF EUROPEAN STATISTICIANS

Expert Forum for Producers and Users of Climate Change-Related Statistics
28-30 August 2023, Geneva

METERED ELECTRICITY GENERATION IN IRELAND

Prepared by Gerry Brady, Central Statistics Office, Ireland

Abstract

This paper examines the microdata underlying dashboards monitoring real-time electricity generation and demand. The data were obtained from EirGrid, the State-owned electric power transmission operator. The electricity generation microdata are in 15-minute and 30-minute time periods at generation plant level from 2016 onwards. The dataset could be analysed in conjunction with meteorological data. The electricity generation microdata should mirror electricity consumption microdata when it becomes available through Smart Meters. Electricity generation is more relevant to the compilation of emission inventories than electricity consumption.

I. CONTEXT

1. The 2021 Climate Action and Low Carbon Development (Amendment) Act set legally binding national emissions reduction targets. The emissions reduction target for electricity is a 75% reduction in 2030 compared with 2018 levels. A switch to using electricity for transport and heating underlies many of the targets in the Climate Action Plan. To meet the targets, there will need to be a substantial increase in the proportion of electricity generated from renewable fuels and a substantial switch from fossil fuels to using electricity for transport and heating.
2. Power transmission operators monitor electricity generation and demand in real time. They often use dashboards to show the fuel mix and the balance between supply and demand. This paper analyses the microdata underlying such dashboards. The dashboard for Ireland is available here <https://www.smartgriddashboard.com/#all/generation>
3. From a climate perspective, emission inventories include the emissions from the fuels used to generate electricity. A transition from combustion to electric vehicles assumes that electricity will be generated from fuels with lower emissions. If fossil fuel generation is used to meet peak daily demand then emissions could be lowered by flattening demand through Smart Meter based lower off-peak tariffs for consumers.

A. Legal access to administrative data

4. The CSO worked with EirGrid to establish what data were available on electricity generation before submitting a request under the Statistics Act, 1993. The request specified each data item as well as the

statistical purposes that the data would be used for. The uses included making anonymized data available for research purposes.

B. Power grid microdata

5. The CSO receives electricity, gas, and water meter consumption microdata from the utility companies. These data provide very detailed information on final energy use by households and enterprises. The consumption data does not tell us which fuels are being used to generate electricity hence the need to get access to the generation microdata.

6. The CSO contacted the State-owned power transmission operator in late May 2023 to establish what level of microdata they had on the fuels used to generate electricity. They had 30-minute data from the transmission system operator and 15-minute data from the distribution system operator – the latter is the company that manages electricity meter consumption microdata. They had 15-minute data on imports and exports and 15-minute or 30-minute microdata on the electricity used to charge batteries and for pumping water for storage hydroelectricity. This 15-minute and 30-minute granularity is the equivalent of Smart Meter data.

7. A challenge with Smart Meter consumption microdata is the sheer volume of it. At 30-minute intervals it will amount to over 17,500 data records per meter per annum. There are around 2.5 million meters in Ireland compared with around 500 generation plants. The generation data are available back to 2016 whereas Smart Meter consumption microdata are not yet fully available.

8. Each electricity generation plant connected to the power grid is assigned to a primary fuel. A power plant may have more than one generation unit. In such cases, each unit within the plant is assigned a primary fuel. Some plants use secondary fuels - additional survey-based data would be needed to distribute the use of primary and secondary input fuels at plant level.

C. Adding statistical value

9. The CSO is the only organisation that has been given full access to the electricity generation microdata at plant level at 15-minute and 30-minute time periods. The CSO will work with energy agencies and research institutes to ensure that the full policy and statistical value of the data are realised.

10. The microdata show the development of new energy such as: solar farms; ocean-based wind and tidal plants; waste to energy incinerators; and battery storage. The increased use of these renewable energy sources is linked with policy initiatives to decarbonise energy.

11. The fuel mix used for electricity generation is closely related to meteorological conditions. During periods with wind, there is a switch from using natural gas. Trend in the microdata are correlated with the use of electricity for heating and cooling in winter and summer. Solar farm electricity generation occurs over a longer period each day as we progress from winter to summer. The 30-minute data show these trends. There is a link between rainfall, river flow, and hydro generation.

D. Additional uses

12. The microdata contain information on combined heat and power plants that generate electricity primarily for their own use but also to export to the power grid. The microdata can provide statistics on the quantity of electricity sold to the national grid by autoproducers.

13. The short-time period microdata show sociological aspects of how we live such as when we wake up, have dinner, and go to sleep. Analyses of differences between weekday and weekend generation patterns could also be made.

E. Conclusions

14. The microdata provide mirror statistics to Smart Meter electricity consumption microdata but are already available with a historical time series.

15. The microdata will show trends in the proportion of electricity generated from renewable fuels.

16. The microdata can be used as a data source for existing energy statistics reporting requirements.

17. The electricity generation data should be held by transmission operators in many countries as they are used to make financial payments to generation plants.

18. Statistics and preserving long time series microdata are not the responsibilities of electricity transmission operators. There is a role for national statistical offices to obtain access to the microdata time series to safeguard it and to make it available for more detailed analyses.

* * * * *