# Method to create a Shared Axis Energy Diagram for Scotland:

## Gas Data:

<http://www2.nationalgrid.com/data-item-explorer/>



Click the arrow next to ‘demand’ – which brings a range of other options



Click the arrow next to ‘LDZ Actual’ – which brings a range of other options

LDZ means the Low Pressure Distribution Zone – i.e. non-transmission connected customers. In electricity terms – this would be equivalent to distribution network customers. The LDZ for Scotland has the two letters ‘SC’.



Click the arrow next to ‘DM’ – which brings a range of other options

DM means Daily Metered – which is mainly domestic natural gas supply.

Click the checkbox against

* Demand, Actual DM, LDZ(SC), D+6

which is the LDZ demand for Scotland which is published 6 days after the actual day in question. D+1 is available, but D+6 is preferable due to some data errors being picked up in the timeframe between D+1 and D+6. If there is not a time critical need to have data for the previous 6 days – then D+6 is better.

This process of clicking arrows and checkboxes should be used for

* Demand, Actual NDM, LDZ(SC), D+6

The next checkbox is under the ‘Exit Point Actuals’ -> ‘Industrial Offtake’ -> ‘Energy’

* NTS Energy Offtaken, BPGrngmouth, Industrial Offtake



**Demand**

* LDZ Actual > DM > Demand, Actual DM, LDZ(SC)
* LDZ Actual > NDM > Demand, Actual NDM, LDZ(SC)
* Exit Point Actuals > Industrial Offtake > Energy > NTS Energy Offtaken, BPGrngmouth, Industrial Offtake
* Exit Point Actuals > Interconnector > Energy > NTS Energy Offtaken, Moffat, Interconnector
* Exit Point Actuals > NTS Power Station > Energy > NTS Energy Offtaken, Gowkhall, NTS Power Station
* Exit Point Actuals > NTS Power Station > Energy > NTS Energy Offtaken, Peterhead l, NTS Power Station

The next checkbox is under the ‘Exit Point Actuals’ -> ‘Interconnector’ -> ‘Energy’

* NTS Energy Offtaken, Moffat, Interconnector

The next checkboxes are under the ‘Exit Point Actuals’ -> ‘NTS Power Station’ -> ‘Energy’

* NTS Energy Offtaken, Gowkhall, NTS Power Station
* NTS Energy Offtaken, Peterhead, NTS Power Station

There should now be a total of 6 checkboxes that are ticked.

* Demand, Actual DM, LDZ(SC), D+6
* Demand, Actual NDM, LDZ(SC), D+6
* NTS Energy Offtaken, BPGrngmouth, Industrial Offtake
* NTS Energy Offtaken, Moffat, Interconnector
* NTS Energy Offtaken, Gowkhall, NTS Power Station
* NTS Energy Offtaken, Peterhead, NTS Power Station

Which covers Scotland’s gas demand – and the exports through the Moffat Interconnector (for interest).

*In addition in its own file:*

*‘Supplies’ > ‘Daily actuals physical’ > ‘energy’ > ‘STFergus(all 3 +1d)’*

*‘Supplies’ > ‘daily actuals physical’ > ‘energy’ > ‘NTS system input physical’*





## Transport Data:

et3\_13.xls from:

<https://www.gov.uk/government/statistics/oil-and-oil-products-section-3-energy-trends>

use units below to change from thousand tonnes to GJ then multiply by 1000 (thousand tonnes) and then by 1000000000/3600000 to get the value in kWh per **MONTH.** This value is then divided by the number of days in the month to get the daily value for each month. This value is at a UK level – and Scotland’s demand is estimated at 10% of this UK level.

energy content of motor spirit = 47.09 Gross GJ/T

energy content of derv = 45.64369011 Gross GJ/T

energy content of aviation turbine fuel = 46.19 Gross GJ/T

Typical daily values should be Motor Spirit *400,000,000* kWh/day, DERV *700,000,000* kWh/day, Aviation Turbine Fuel *430,000,000* kWh/day.

## Electrical Data:

<https://demandforecast.nationalgrid.com/efs_demand_forecast/faces/DataExplorer>

The spreadsheets DemandData\_2005-2010, DemandData\_2011-2016 can be downloaded and combined. The spreadsheets Demand\_Data2017 and DemandData\_Update are the spreadsheets updated on a regular basis and are used to add data to an existing spreadsheet.

The half hourly values are summed over a day using a pivot table in excel. The value for INDO (Initial Demand Outturn) is column ‘C’ in the downloads, and is marked ‘ND’. ENGLAND\_WALES\_DEMAND is column ‘H’, EMBEDDED\_WIND\_GENERATION is column ‘I’, EMBEDDED\_SOLAR\_GENERATION is column ‘K’.

EMBEDDED WIND and SOLAR are at a GB level and not broken down into Scotland and England and Wales. The transmission connected WIND is already in the ND and England and Wales values – but embedded generation is not.

Subtracting ENGLAND\_WALES\_DEMAND from ND should leave Scottish Demand (as Northern Ireland demand is not included in electrical demand values). However, this is without embedded generation – so an estimated amount of GB embedded demand should be added to the ND-ENGLAND\_WALES\_DEMAND

The amount estimated is currently 30% of embedded wind, and 2.5% of embedded solar as the shape of this seems to look visually closer to the GB level shape of ND + EMBEDDED\_WIND\_GENERATION and EMBEDDED\_SOLAR\_GENERATION. i.e. dips at the weekend and holidays – but fairly smooth in terms of increases and decreases throughout the year.

However, the electrical demand values are not robust using this method – so it would be interesting to find a more robust method.

Divide by 2000!

# Visualisation

All the data should now be available on a daily basis – and in similar units and can be graphed using any standard package as a time series.



any queries – drop me an email on [grant.wilson@sheffield.ac.uk](mailto:grant.wilson@sheffield.ac.uk) or call on 0114 222 7608

**Additional Notes - Andy**

Gas Data – The gas data is made up of 5 different components. The interconnector at Moffat can be selected out of interest.

When selecting dates, to pull a year (e.g. 2013) select 01/01/2013 to around a month past the end of 2013, 01/02/2014. This is because this date is for “applicable for” but “applicable to” is the date used for plotting and there’s a few days lag between these fields meaning not all “applicable to” entries are recorded on the same day.