DIVISIA

Changes in Energy Use

New Zealand *1990–2020*

It's all about this equation:

Δ Energy = **Δ** Activity + **Δ** Structure + **Δ** Fuel Switching + **Δ** Efficiency

In the Residential, Industrial and **Transport** Sectors

This project is important because:

Current issues facing government:

- Climate change work
  - Δ Activity
  - Δ Structure (e.g. transport mode switching)
  - Δ Fuel Switching
  - Δ Efficiency

My own team's work:

- Understanding future energy needs
  - Δ Activity (e.g passenger km travelled)
  - Δ Structure
  - Δ Fuel Switching
  - Δ Efficiency

The data:

We get the data from major fuel users and/or other government agencies

For the major transport modes we are collecting:

- Fuel use
- Activity (i.e passenger km travelled or freight-tonne km travelled)








Boons

- Easy to engage with major fuel users (NZ is a small place)
- We have pre-existing relationships with other government agencies
    - (E.g. Ministry of transport for a large amount of transport statistics)
- Already have a lot of fuel use data available within our team
- Experience calculating similar indicators in the IEA Energy Efficiency Indicators report
- Can use some of these values in the IEA Energy Efficiency Indicators report
- EECA, another government institution is keen to help on this report
- Have developed data sharing agreements to give major fuel users confidence about our data

Booms

- Bad understanding of what data is available within government that we can use, and how accurate it is
- Difficulty estimating some activity values. Especially Buses and fishing vessels.
    - No fishing vessel data at all. We guess we could estimate it using fisheries economic activity
- Large amount of data points, need to establish clear, simple systems.
- Data cleaning
- Data of varying degrees of accuracy increases complexity and decreases confidence in findings
- Some data we already have within our team but it took a while to realise that!

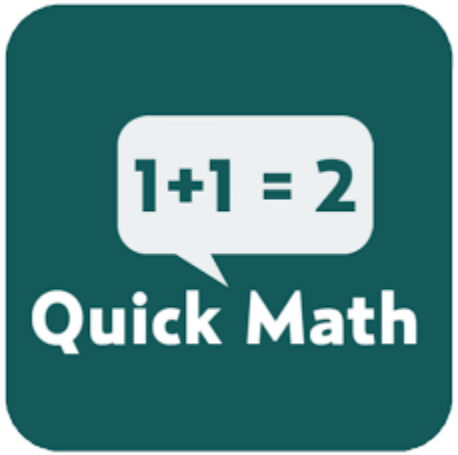
Estimating bus activity value for years 1990-2020:

- For Buses we have two estimates we can use:
  - one that we don't have much confidence in but that covers the full period we need
  - and an estimate for 2019 bus activity by EECA (energy efficiency and conservation authority) (another govt organization involved in Energy)
- So scale the values (or trend) pre-2019 by the better accuracy 2019 value:

Scalar = (2019_EECA_value/2019_full_period_value)

*YYYY_value = Scalar * YYYY_full_period_value*

This is a simple to understand method and gives us reasonable accuracy compared to any other method.



IEA’s Energy Efficiency indicators report

- We have to produce values on activity and energy use in different areas of transport.
- In the past we have had issues gathering the necessary data for a lot of these values.
    - So we estimated these using the most accurate but simple methods we could.
- We are working on improving these values by getting better data. This data is also helpful for the sake of other projects like DIVISIA.
- Developing clear and simple systems for processing the data and calculating our estimates is useful for reducing future time spent, as well as helping to document the processes. This is done in a mix of R and Excel.

Estimating most other values in EEI report:

- For single point of time estimates of fuel use (**Residential** and **Transport** values generally):
  - Scale fuel use by an **activity** measure to get values over time
    - Activity= GDP, Passenger km, Freight km
- **Industry** and **Commercial** values are based on our values from the balance tables
- Values for efficiency of residential appliances from EECA (energy efficiency and conservation authority)