Heat Energy Sources in Canada

Team 9: Benjamin MacAdam, Noah Bolohan, Anton Iatcenko, Ryan Thiessen, Alireza Yazdani, Yakine Bahri

Math$^{\text{Industry}}$

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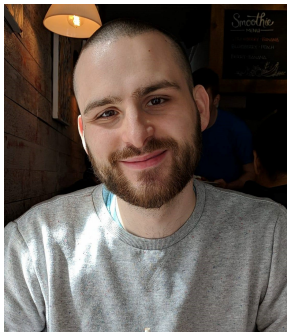
Team Members

Benjamin is a PhD candidate in the programming languages lab at the University of Calgary. His research interests mainly revolve around tangent categories and their applications to differentiable programming and Lie theory.



Noah is a recent graduate student from the University of Ottawa studying the effects of seasonality on predator-prey scenarios. His work focuses on bistability and bifurcations in ordinary differential equation models using MATLAB and XPPAUTO. His interests lie in mathematical ecology and mathematical modelling.

Anton is a PhD student at the Departmen of Mathematics at SFU. His background is in the areas of pde analysis and kinetic theory, while the current interests are leaning towards numerical solutions of partial differential equations and mathematical modelling.

Team Members

Ryan is a Master's student at the University of Alberta, working on an analysis of scaling limits of the kinetic chemotaxis equation. He has a background in Physics, Mathematical Biology, and Numerical Methods.

Alireza is a M.Sc. student at Mathematics department of Simon Fraser University. His background is in the areas of mechanical engineering and computational fluid dynamics, while his current research is to implement new algorithms for solving partial differential equation on surfaces using parallel computing techniques.

Yakine is a Postdoctoral Fellow at the University of Victoria. His broad research interests are in applied mathematics, specifically the nonlinear PDEs arising from physics (nonlinear optics, plasma physics or micro-magnetism). The focal point of his research is the qualitative description of the dynamics including singularity formation or long-time asymptotic.

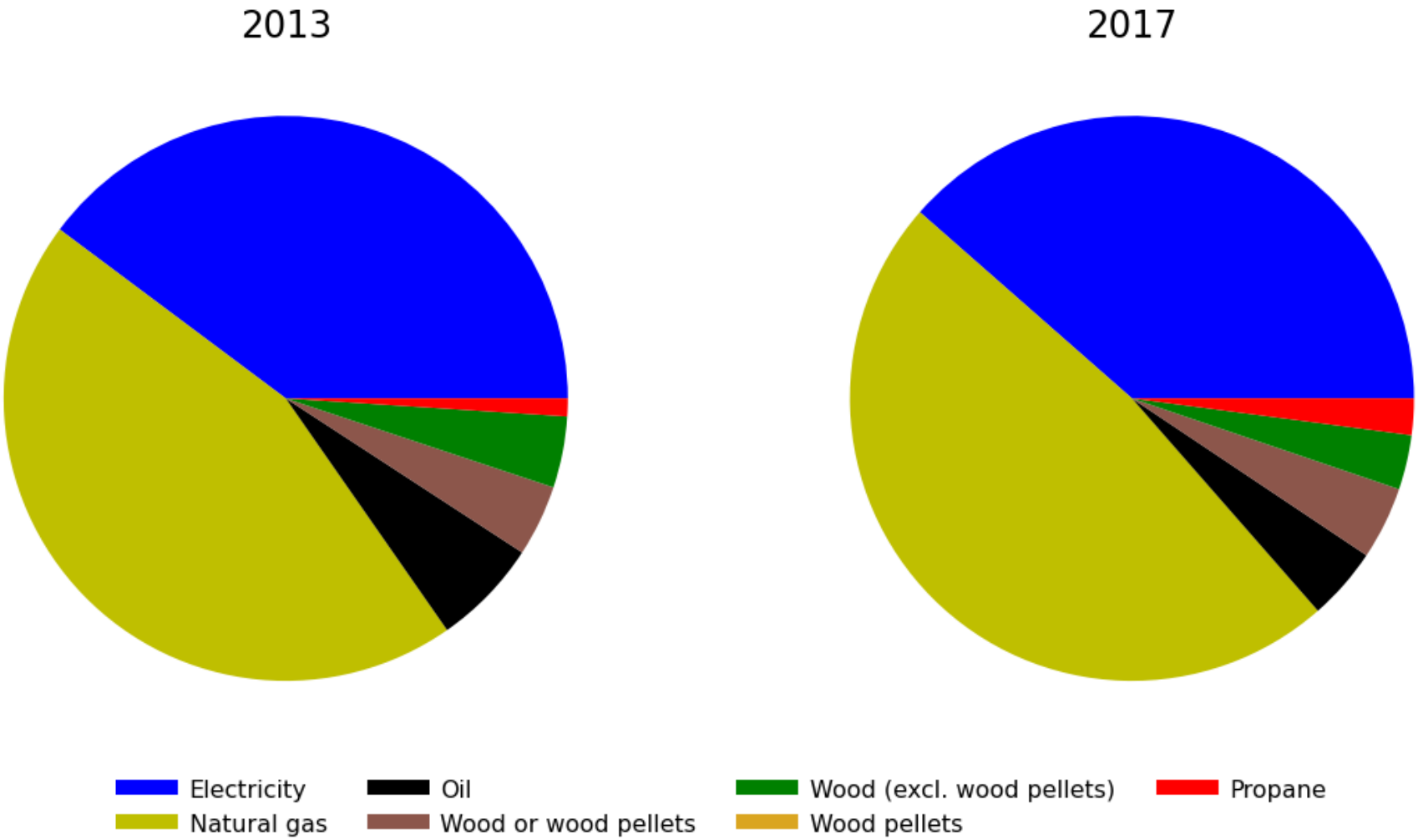
The Data Set

Primary heating systems and types of energy sources
The table contains 2304 series, with data for the years 2013, 2015 and 2017. It contains data described by the following dimensions:

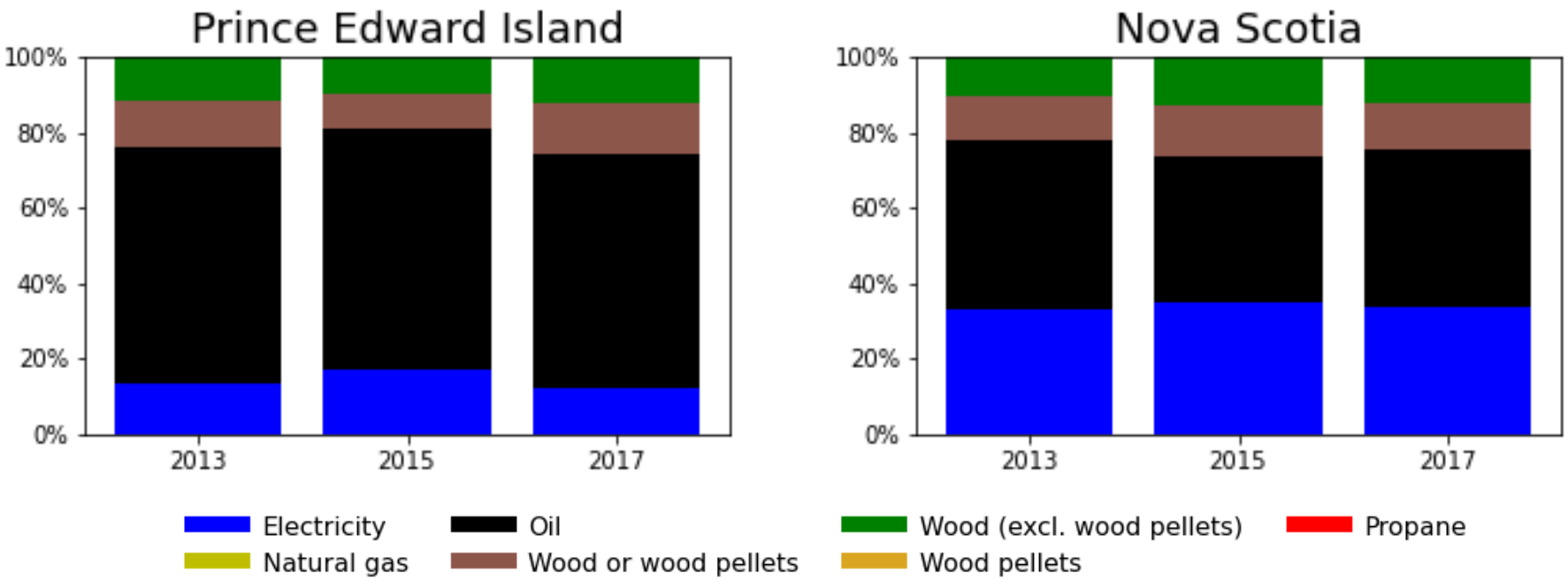
- Geography (48 items: Canada; Newfoundland and Labrador; Prince Edward Island; Nova Scotia; ...)
- Primary heating system and type of energy (48 items: All primary heating systems; Electricity; Natural gas; Oil; ...).

Source: https://open.canada.ca/data/en/dataset/ec3282b6-013f-41b1-aa63-24ad8bda79ee

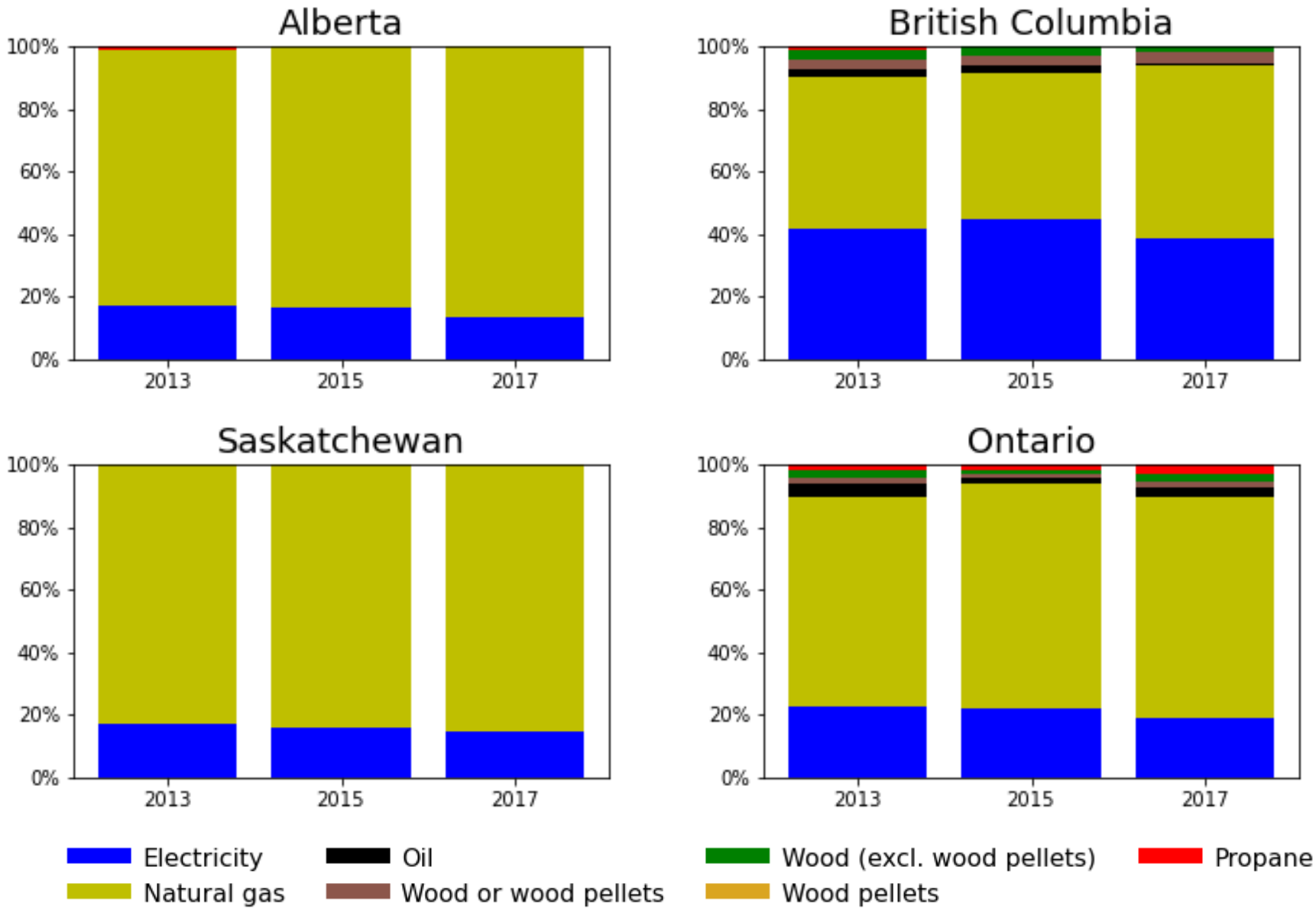
Primary heating types in Canada: 2013-2017



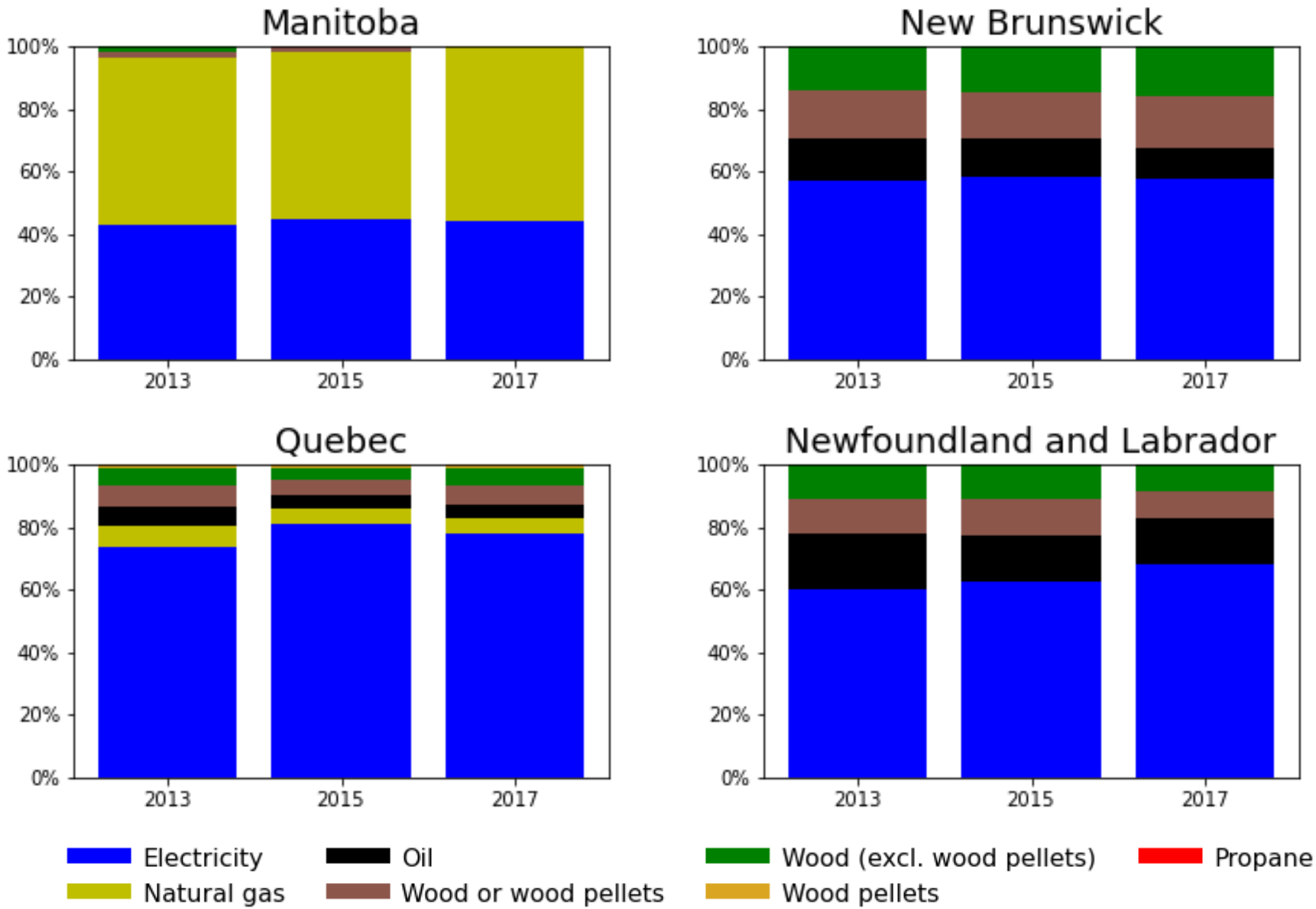
Data by Province



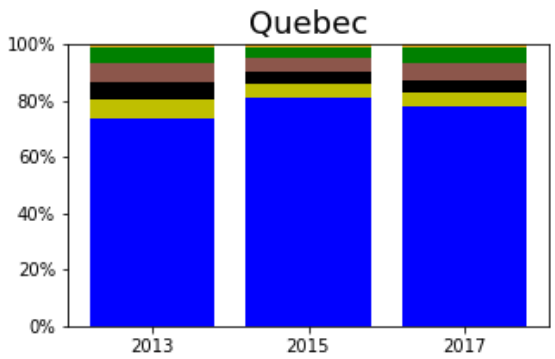
Data by Province

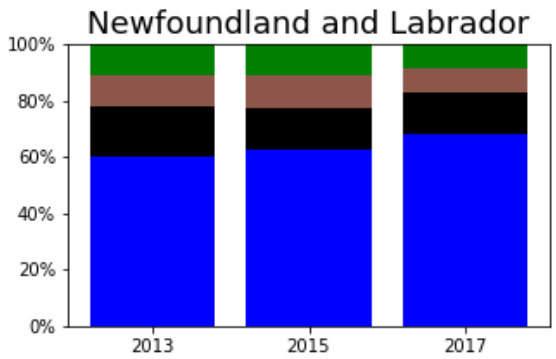


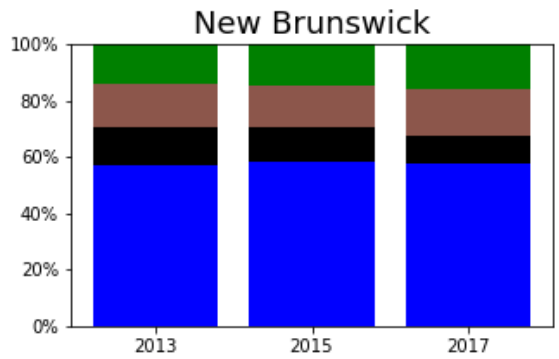
Data by Province

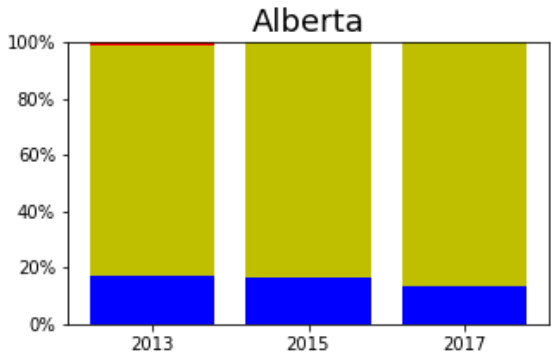


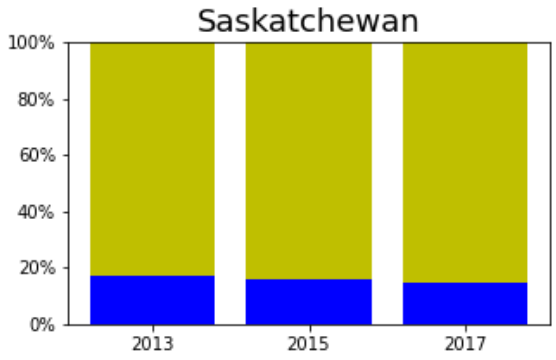
Province Groupings

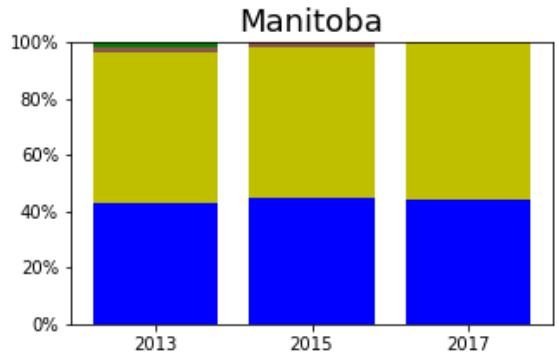


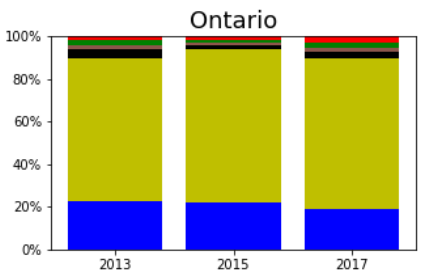


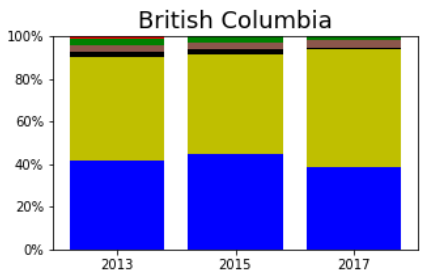


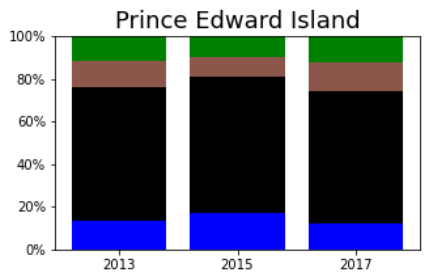


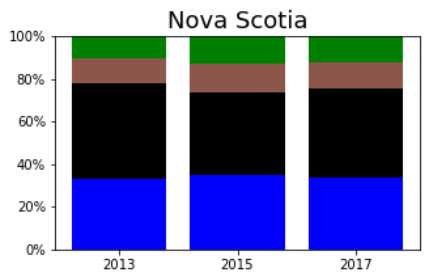




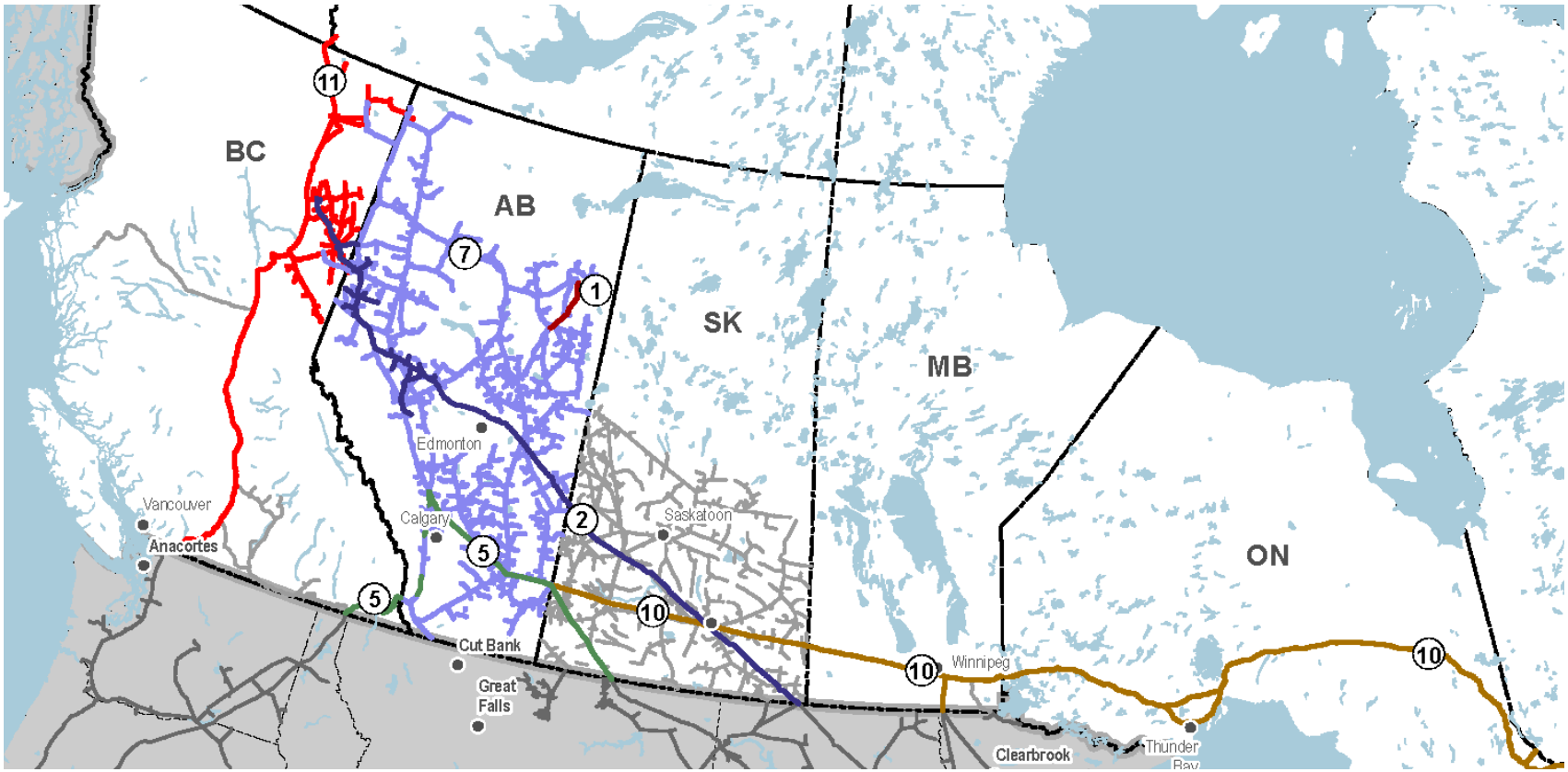








Cause of the Groupings: Natural Gas



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- MB and ON have access to the natural gas TransCanada pipeline.

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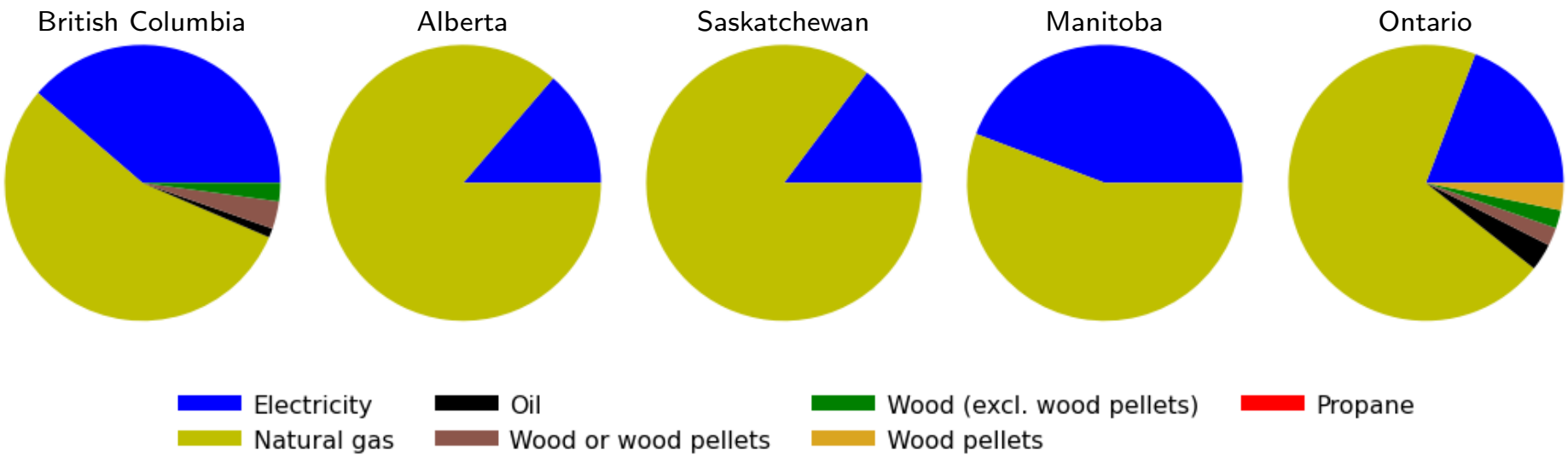

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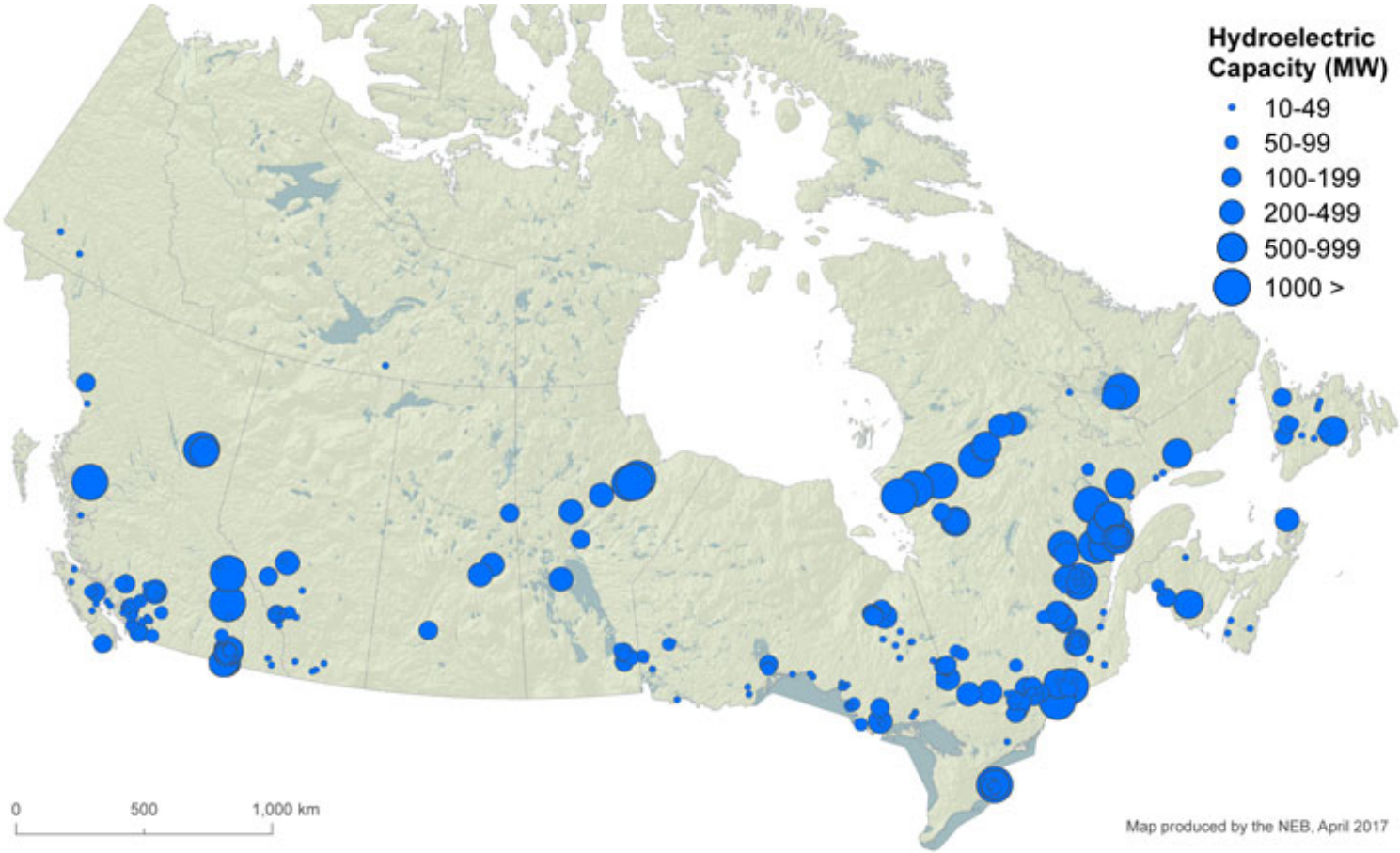

- QC: large hydroelectric capacity
- NL and NB: close to QC, no access to natural gas

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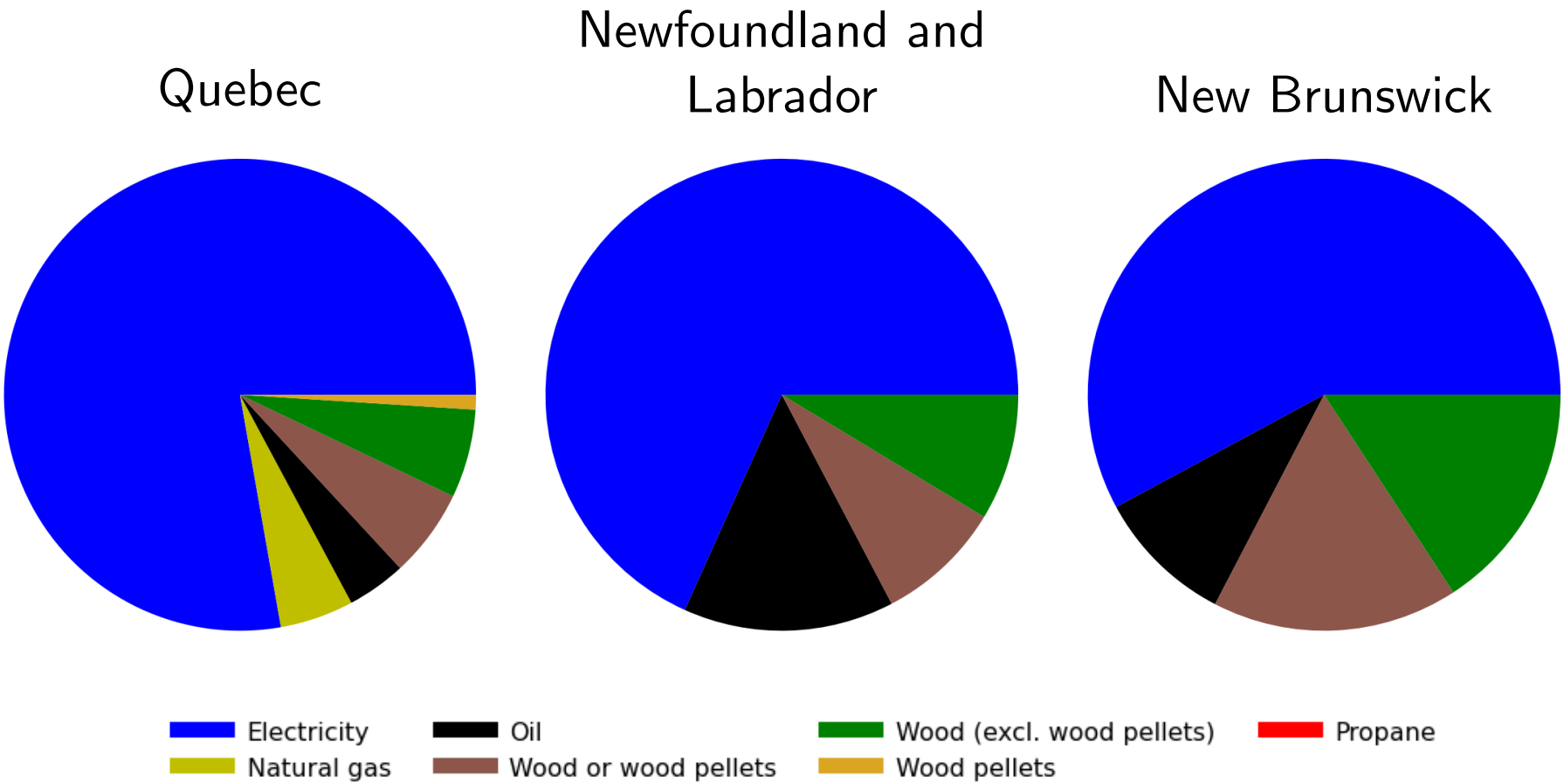

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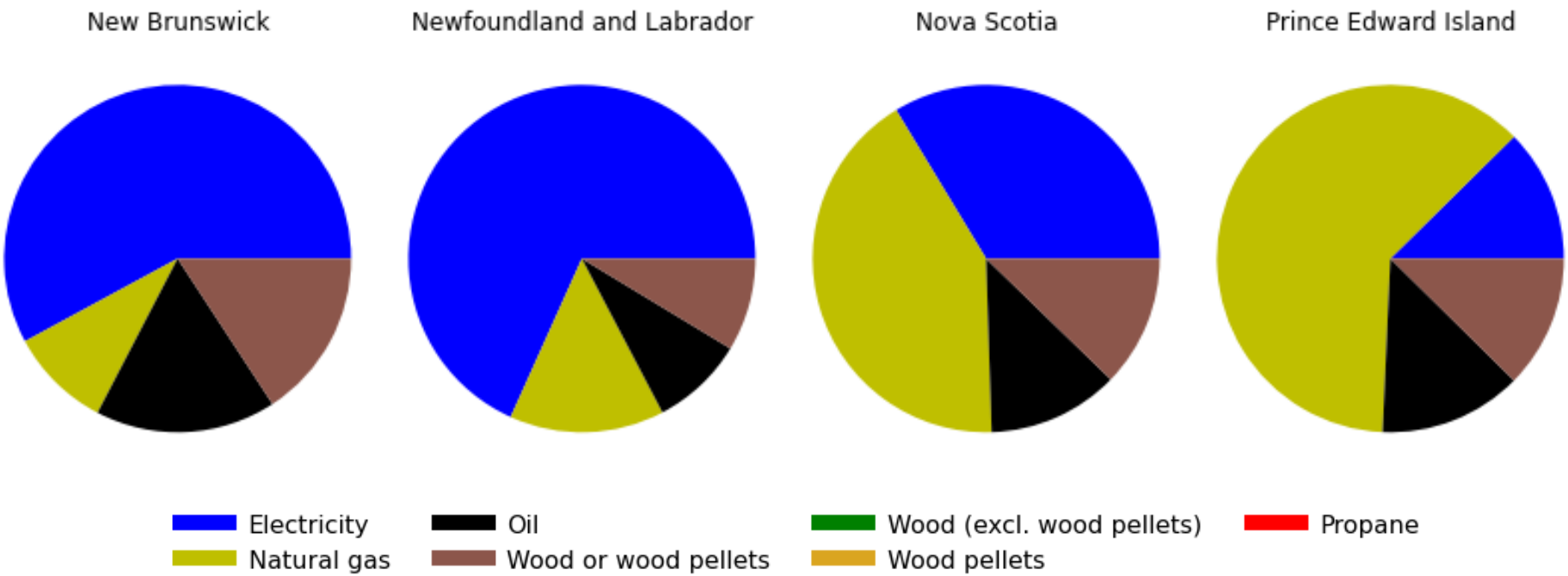
Cause of the Groupings: Atlantic Provinces



Same story in Atlantic region:

- Newfoundland, New Brunswick: access to hydro, use electric.
- Prince Edward Island, Nova Scotia: no hydro access, use oil.

Summary

- No change over time.
- The dependence is predominantly geographic.

Thank you for your attention!