

CIMS-COPPER-SILVER: assessing the impact of energy policies using specialized energy demand and supply models

April 2025

Overview: The CIMS-COPPER-SILVER model workflow is built to credibly assess energy policy questions that affect both demand and supply sectors. The workflow achieves this through leveraging the strengths of a technology-rich demand-focused model (CIMS), an electricity system planning model (COPPER) and a detailed dispatch power system model (SILVER). CIMS simulates the evolution of energy demand by sector and by energy end-use. For electricity in particular, annual load is disaggregated to hourly load curves which are passed to COPPER. COPPER solves for optimal power system configuration and calculates new electricity prices associated with that configuration, then passes these new electricity prices back to CIMS to begin a new iteration. Once electricity prices stop changing significantly, iteration between the models stops and the final power system configuration is checked for feasibility using the more temporally and spatially granular SILVER model.

CIMS is being updated and open-sourced by the [Energy & Materials Research Group](#) at Simon Fraser University, in collaboration with the [Open Insights project](#) at the University of Victoria, while [COPPER](#) and [SILVER](#) are already released open-source and maintained by the [SEIT Group](#) at the University of Victoria.

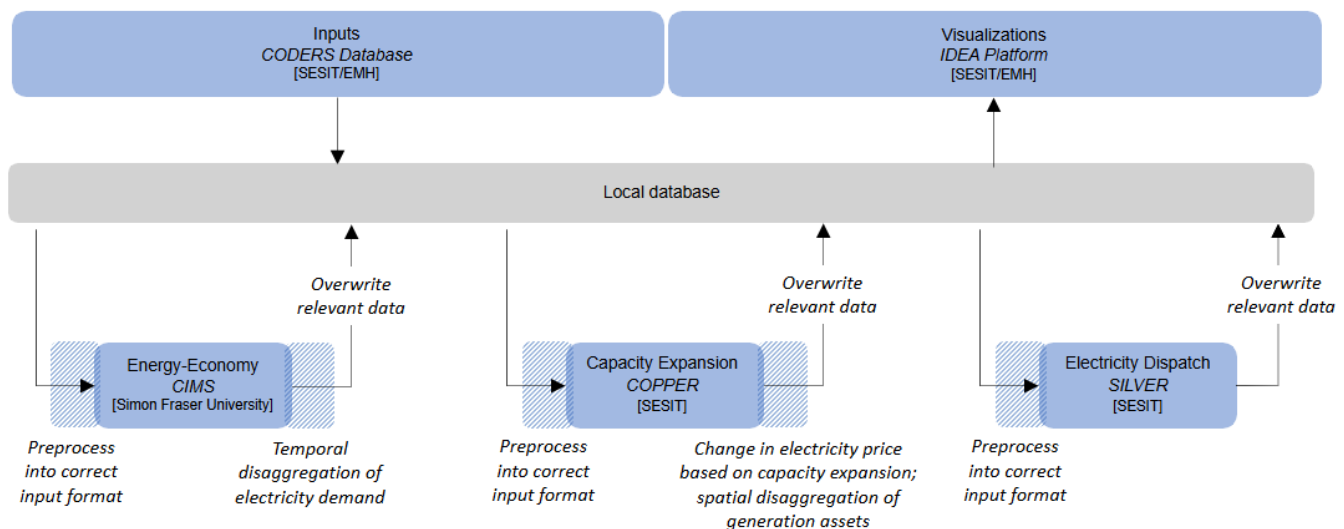


Figure 1: Schematic of the CIMS-COPPER-SILVER workflow.

Key features of CIMS-COPPER-SILVER

- **Detailed energy demand and supply modelling:** CIMS covers energy demand from all energy-intensive industries including personal / freight transportation, residential / commercial buildings, iron / steel, and other industrial sectors. However, it does not include a detailed power sector, potentially leading to a simplified feedback between electricity demand and prices. Linking CIMS to COPPER & SILVER allows for a more robust calculation of how electricity prices are likely to evolve under particular energy demand and supply policies.
- **8760 analysis:** SILVER models the electricity system for each hour of the year (ie., 8760), sense-checking the grid configuration modelled by COPPER for operational feasibility.
- **Behaviourally realistic:** Instead of basing its simulation of technology choices only on financial information, CIMS differentiates itself from conventional bottom-up analysis by including intangible (non-financial) costs, which reflect real-world consumer and business preferences.

- **Bottom-up & technology-rich:** Through a ‘stock-flow’ model, CIMS simulates retirements, retrofits, and new purchases over time for technologies as detailed as the type of lightbulb used in residential buildings. COPPER includes more than 40 possible generation and three storage technologies. SILVER models each province’s electricity grid at the asset-level, representing each individual generator separately.

Policy / research questions CIMS-COPPER-SILVER is designed to explore:

1. Is there a Canadian net-zero scenario that keeps electricity rates affordable? What are its characteristics?
2. How much electricity is needed in 2050 and for what end-uses?
3. What are the costs of different energy sources in 2050 under different net-zero scenarios?

Timeline: A calibrated version of CIMS-COPPER-SILVER is complete for all of Canada and will be released open-source by mid-2025. If you are interested in collaboration on any part of the M3 platform, please reach out about collaborations to platform@cme-emh.ca.