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### **OpenIGEM Work Progress Report**

This describes the work done by Dale Jorgenson Associates (DJA) on the Open Source IGEM Project for the period from mid-May through September 2018.

The completed version of OpenIGEM will be a model referred to below as IGEM NAICS36. It will reside on a public repository hosted by GitHub (github.com), a widely-used and well-established site for making open-source code available. GitHub allows convenient source code management, including version control. As portions of the work on IGEM NAICS36 are completed, they will be posted to the repository for review and use by project managers at EPA, RTI, and the public.

The major tasks in developing the model are summarized as follows. (1) Complete documentation of the IGEM NAICS36 model and data, including an algebraic appendix of equations that serves as a reference for coders. Provide documentation of the Sym language used to define the model's sets, variables, parameters and equations. (2) Implement the IGEM NAICS36 model in Sym. (3) Provide the GEMPACK code for the model produced by Sym. (4) Provide IGEM NAICS36 data and parameter input files for GEMPACK. (5) Demonstrate how a base case is established using the IGEM NAICS36 code, data and parameters in the GEMPACK software. (6) Demonstrate the construction and solution of an example policy case.

For the phase of the project ending 30 September 2018, we have:

- 1) Established the public repositories for OpenIGEM NAICS36 and Sym. For OpenIGEM access <https://openigem.github.io> For Sym access <https://pjwilcoxen.github.io/sym/>

- 2) Begun coding modules in Sym that: (a) define sets for variables, (b) define variables, (c) define parameters, and (d) contain major subsets of equations (e.g., producer model, household model, investment model, government model, export model, etc.)
- 3) Acquired a group license for GEMPACK from Centre of Policy Studies, Victoria University, Australia.
- 4) Prepared IGEM NAICS36 documentation and Appendices covering model data and equations.

Currently available through the links at <https://openigem.github.io> are folders for preliminary model data, model documentation (item 4 above), model runs (currently a placeholder), and the “sym” and GEMPACK “tablo” files for the sets, variables, parameters and equations for IGEM’s producer and household sub-models. The “View on GitHub” tab provides access to <https://github.com/openigem/naics36/> which is the GitHub repository for IGEM NAICS36 where these folders appear.

Currently available at <https://pjwilcoxen.github.io/sym/> is direct access to the Sym source code, documentation, and a pre-built Windows executable for the Sym program. The documentation includes an overview of the Sym language, its syntax and usage, and a notational comparison of Fortran, Sym and GEMPACK coding. There also is direct access to an annotated example of Sym for the standard version of the McKibbin-Wilcoxen G-Cubed model. The “View on GitHub” tab provides access to <https://github.com/pjwilcoxen/sym/> which is the GitHub repository for Sym containing the aforementioned documentation as well as the Sym software.