



Making OSeMOSYS FAIR

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A gap in aspiration (perspiration)

Vision

- Scenarios as an immersive experience
- Explicit traceable links from model results back to data sources
- Researchers as creators and curators of new knowledge
- Tools and methods that meet the challenge of post-normal science and complex, interconnected systems

Reality

- A bunch of graphs on a website or in Excel
- No one except the modeller understands
- Researchers as manual data cleaners, programmers and paper writers
- Lots of tools that meet some of the challenges, often siloed, working towards this



Introduction

FAIR

Findable

Accessible

Interoperable

Reproducible

- FAIR is for data, what about energy modelling?
- u4RIA –community to audit

OSeMOSYS

Open Source Energy System Model

Developed initially as an open-source alternative to e.g. MARKAL/TIMES

Used globally for capacity building, teaching and research





OSeMOSYS – Open Source Energy Modelling System

Design Criteria

Quick and easy to understand and use

Fully open-source from formulation to solver

Free to a user

Directly editable, extensible and adaptable

Desirable Attributes

Powerful and optimised for performance

Reliable, robust and well supported

Time efficient to generate results

Flexibility to add the functionality you need to answer the specific question you have



OSeMOSYS as a test case

Multiple user created versions

- GNU Math Prog
 - Normal
 - Short
 - Fast
- GAMS
- Python
 - Pyomo
 - PULP
- Julia (NEMO)

Challenges and opportunities:

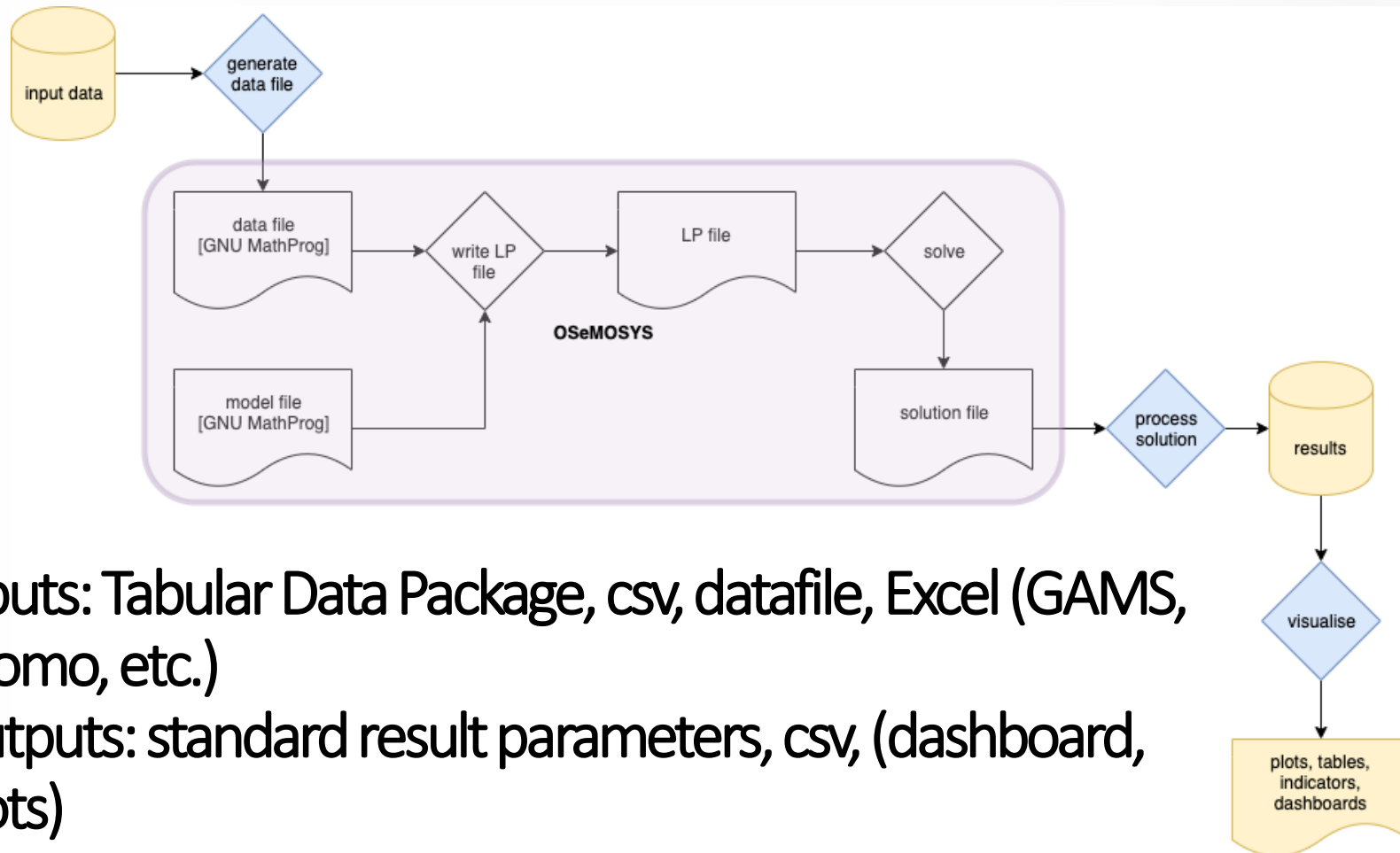
- Retain users
- Exploit capabilities
- Use the right tool for the right job
- Automate tasks
- Enable reproducibility
- Increase efficiency by decreasing duplication of work



Findability, Accessibility – website, documentation, forum, Github



Interoperability - otool - OSeMOSYS tools for energy modelling



- Inputs: Tabular Data Package, csv, datafile, Excel (GAMS, Pyomo, etc.)
- Outputs: standard result parameters, csv, (dashboard, plots)



Interoperability – beyond OSEMOSYS

What happens when you want to conduct an analysis beyond the scope of OSeMOSYS?

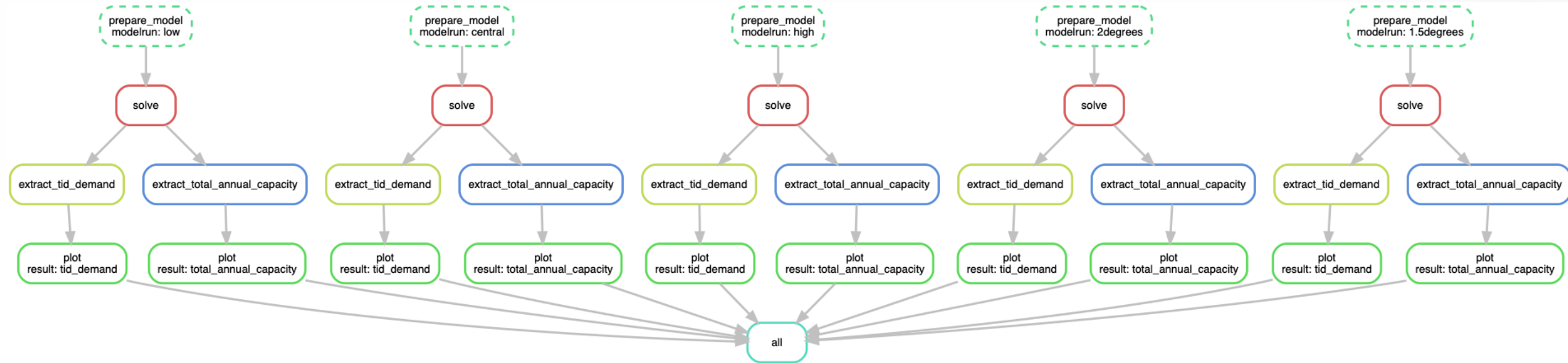
- Can you reuse data and analysis?
- How can we better link models and analyses?
- Emerging open data standards and supporting tools e.g. IAMC data template (pyam), SENTINEL data package
- Data as a link between models



Reproducibility - snakemake workflow for OSeMOSYS

Using snakemake (a workflow management system or WMS) we can repeat the same steps each time the data or model changes.

We can record, document and store these steps in version control.



https://github.com/KTH-dESA/osemosys_workflow

