

User Interfaces for *IDAES, NAWI WaterTAP, PrOMMiS, PARETO, and CCSI²* Status, Plans, and Discussion

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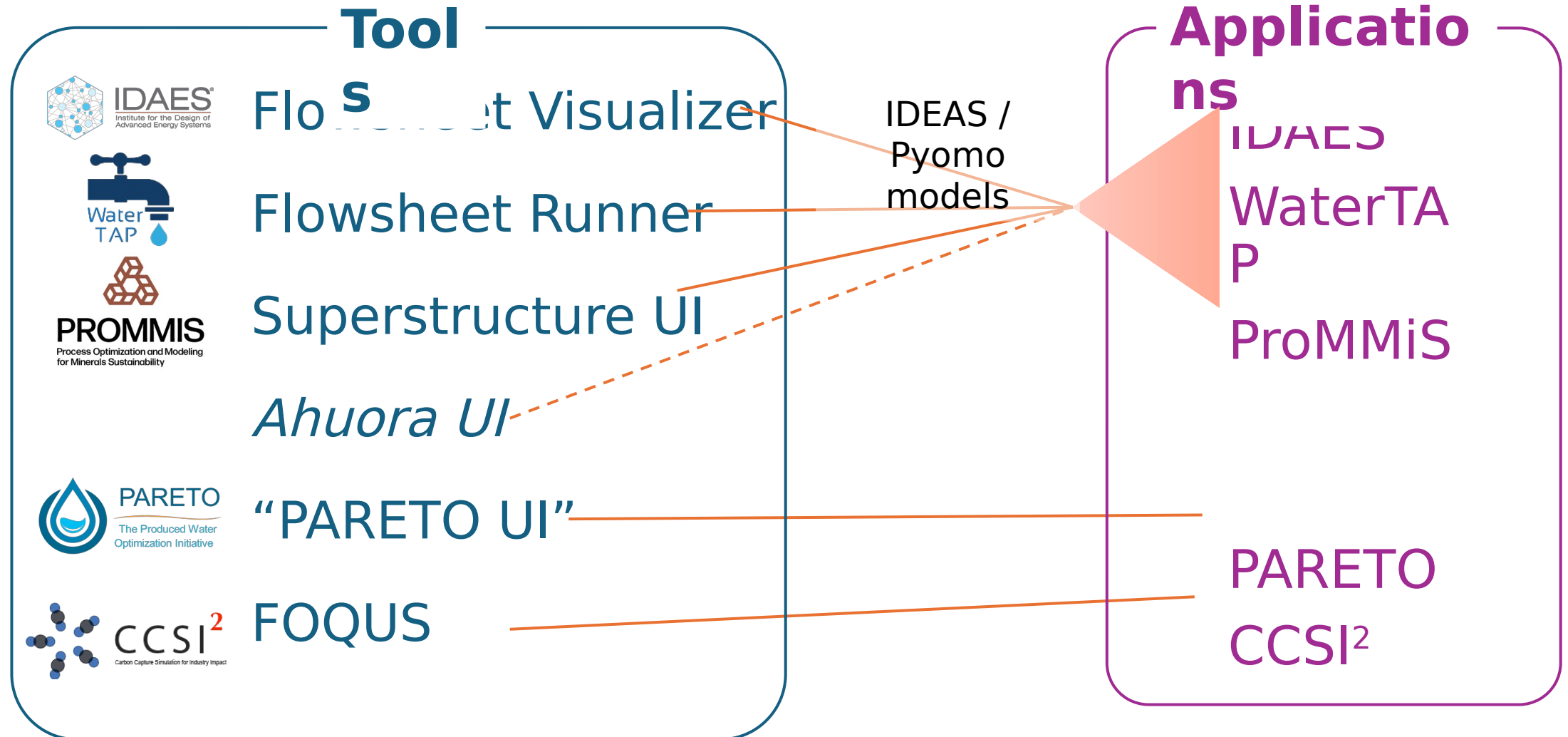
Project Institutions



Outline

- Overview
- Walk-through of current UIs
 - Status
 - Plans
 - Q&A
- Summary
- Q&A

Overview



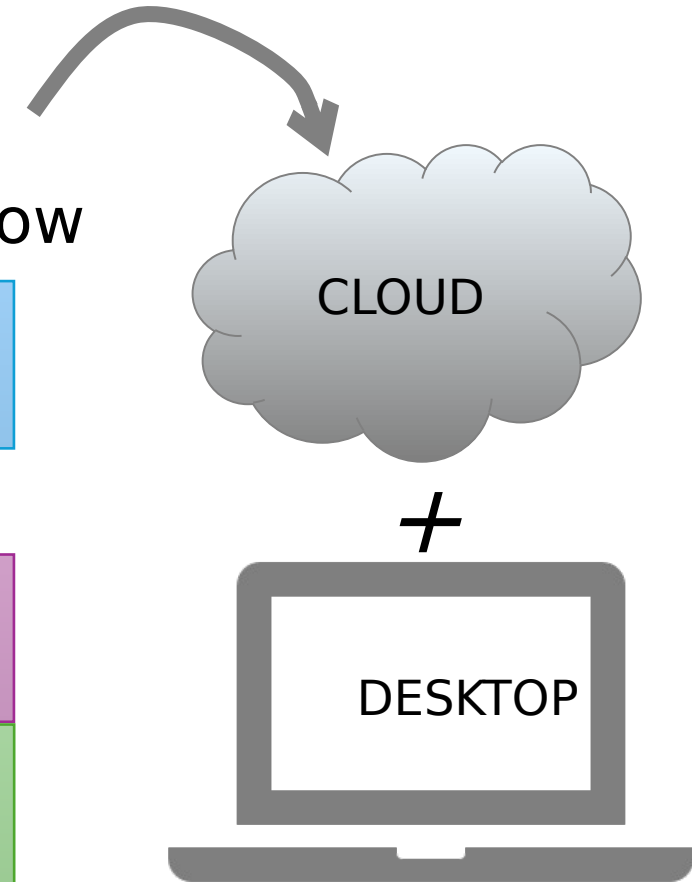
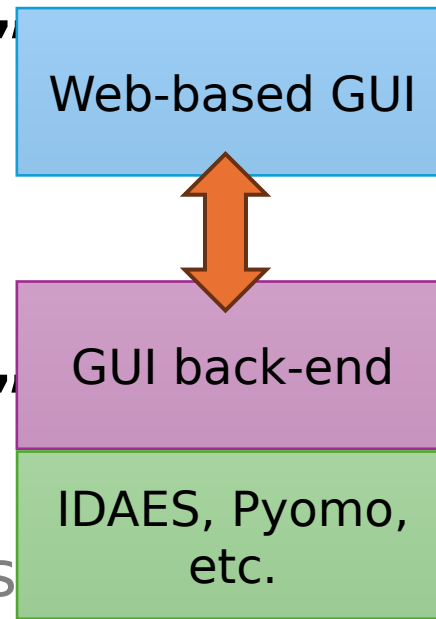
General strategy

- Limited funding – don't try to be all things to all people
- Engage with users & communities -> understand needs
- Target two communities
 - Developers, including Uni partners et al.
 - Advanced users

Do *not* target naïve users, except as viewers of results pages

General development principles

- Use Web technologies where possible
 - Allows for deployment in “the cloud” or on the desktop (e.g., Electron) – mostly desktop for now
- Use the same front-end “stack”
 - ReactJS - Interactivity
 - Material UI – Look and feel
 - Plotly – Plots and graphing
- Use the same back-end “stack”
 - Python
 - FastAPI – library to handle requests



Tool walk-through

- Current status
 - Basics
 - Functionality
 - Types of models
 - Installation
 - Examples/screenshots
- Plans
 - New features
 - Improvements, refactorings
- Q&A

Flowsheet Visualizer



Functionality

Automatic layout of flowsheets in Python code

Save as image

View stream table

Start from script, console, or Jupyter Notebook

View and run diagnostics

In Notebook, updates to flowsheet reflected in diagram

Types of models

IDAES/Pyomo

Installation

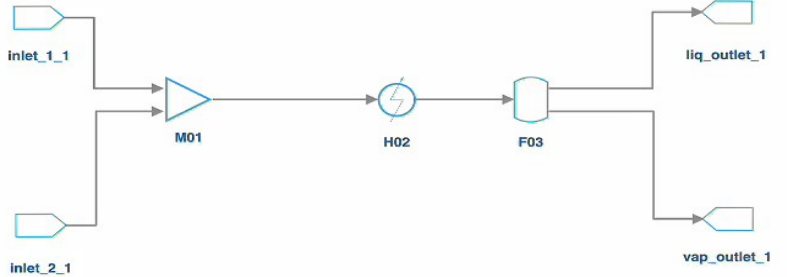
Install IDAES Toolkit with '[ui]' :
`pip install ideas-pse[ui]`

Docs: <https://idaes-ui.readthedocs.io>

Flowsheet Visualizer: Layout

IDAES Diagnostics sample_visualization Refresh Save Reset Layout Help

Diagram



Diagnostics BLOCK: FLOWSHEET Refresh

Structural Issues 1 Numerical Issues 2

Model Statistics

- Activated Blocks: 21 (Deactivated: 0)
- Free Variables in Activated Constraints: 166 (External: 0)
- Free Variables with only lower bounds: 21
- Free Variables with only upper bounds: 0
- Free Variables with upper and lower bounds: 42
- Fixed Variables in Activated Constraints: 0 (External: 0)
- Activated Equality Constraints: 153 (Deactivated: 0)
- Activated Inequality Constraints: 0 (Deactivated: 0)
- Activated Objectives: 0 (Deactivated: 0)

WARNINGS 3

- Warning: 13 Degrees of Freedom
- Warning: Structural singularity found
 - Under-Constrained Set: 166 variables, 153 constraints
 - Over-Constrained Set: 0 variables, 0 constraints
- Warning: Found 98 potential evaluation errors

Stream Table Diagnostics Logs Hide Fields

Variable		s_inlet_2_1	s_inlet_1_1	s01	s02
flow_mol	mol/s	1	1	1	1
mole_frac_comp benzene	-	0.5	0.5	0.5	0.5
mole_frac_comp toluene	-	0.5	0.5	0.5	0.5
temperature	K	298.15	298.15	298.15	298.15
pressure	Pa	101325	101325	101325	101325

Flowsheet Visualizer: Rearrange diagram

IDAES Diagnostics sample_visualization Refresh Save Reset Layout Help

Diagram

inlet_1_1
inlet_2_1
M01
H02
F03
liq_outlet_1
vap_outlet_1

Stream Table Hide Fields

Variable		s_inlet_2_1	s_inlet_1_1	s01	s02
flow_mol	mol/s	1	1	1	1
mole_frac_comp benzene	-	0.5	0.5	0.5	0.5
mole_frac_comp toluene	-	0.5	0.5	0.5	0.5
temperature	K	298.15	298.15	298.15	298.15

Flowsheet Visualizer: Stream table

IDAES Diagnostics sample_visualization Refresh Save Reset Layout Help

Diagram

```
graph LR; inlet_1_1 --> M01; inlet_2_1 --> M01; M01 --> H02; H02 --> F03; F03 --> liq_outlet_1; F03 --> vap_outlet_1;
```

Stream Table

Variable		s_inlet_2_1	s_inlet_1_1	s01	s02
flow_mol	mol/s	1	1	1	1
mole_frac_comp benzene	-	0.5	0.5	0.5	0.5
mole_frac_comp toluene	-	0.5	0.5	0.5	0.5
temperature	K	298.15	298.15	298.15	298.15
pressure	Pa	101325	101325	101325	101325

Hide Fields

Flowsheet Visualizer: Diagnostics Panel

IDAES Diagnostics sample_visualization Refresh Save Reset Layout Help

Diagram

```
graph LR; inlet_1_1 --> M01; inlet_2_1 --> M01; M01 --> H02; H02 --> F03; F03 --> liq_outlet_1; F03 --> vap_outlet_1;
```

Stream Table Hide Fields

Variable	s_inlet_2_1	s_inlet_1_1	s01	s02
flow_mol mol/s	1	1	1	1
mole_frac_comp benzene	0.5	0.5	0.5	0.5
mole_frac_comp toluene	0.5	0.5	0.5	0.5
temperature K	298.15	298.15	298.15	298.15

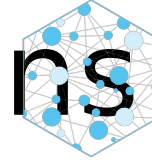
Flowsheet Visualizer: Run diagnostics

The screenshot displays the IDAES Flowsheet Visualizer interface. The top navigation bar includes the IDAES logo, a 'Diagnostics' toggle switch (which is turned on), the current view 'sample_visualization', and utility buttons for 'Refresh', 'Save', 'Reset Layout', and 'Help'.

The main interface is divided into three primary sections:

- Diagram:** Shows a process flowsheet with three units: a reactor (M01), a heat exchanger (H02), and a separator (F03). Two inlet streams, 'inlet_1_1' and 'inlet_2_1', feed into M01. The output of M01 goes to H02, which then feeds into F03. F03 has two outlet streams: 'liq_outlet_1' and 'vap_outlet_1'.
- Diagnostics:** This panel provides a summary of model statistics and warnings. It includes a 'BLOCK: FLOWSHEET' label and a 'Refresh' button. It categorizes issues into 'Structural Issues' (3) and 'Numerical Issues' (2).
 - Model Statistics:**
 - Activated Blocks: 21 (Deactivated: 0)
 - Free Variables in Activated Constraints: 166 (External: 0)
 - Free Variables with only lower bounds: 21
 - Free Variables with only upper bounds: 0
 - Free Variables with upper and lower bounds: 42
 - Fixed Variables in Activated Constraints: 0 (External: 0)
 - Activated Equality Constraints: 153 (Deactivated: 0)
 - Activated Inequality Constraints: 0 (Deactivated: 0)
 - Activated Objectives: 0 (Deactivated: 0)
 - WARNINGS (3):**
 - Warning: 13 Degrees of Freedom
 - Warning: Structural singularity found
 - Under-Constrained Set: 166 variables, 153 constraints
- Stream Table / Diagnostics Logs:** This section is currently empty, displaying the message: 'Please select a function to check diagnostics result!'.

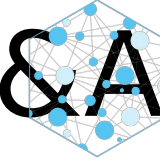
Flowsheet visualizer plans



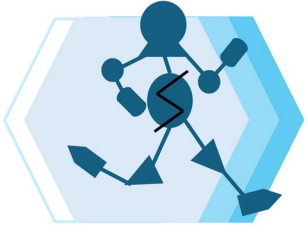
IDAES[®]
Institute for the Design of
Advanced Energy Systems

- Bugfixes, possible minor enhancements
- No major features planned in this cycle
- Possible future enhancements include:
 - View details of any unit / stream
 - Improved diagnostics workflow and visualization
 - Editing of model variables
 - Integration with Flowsheet Runner

Flowsheet visualizer Q&A



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Flowsheet Runner aka WaterTAP UI



Functionality

- API for devs to export IDAES model output, input variables
- Select model from list
- Set inputs
 - Free/fixed
 - Sweep over range
- Solve (ipopt, etc.)
- Compare different runs
- Sensitivity analysis results

Types of models

IDAES / Pyomo

Installation

Local install, 1-click

<https://watertap-org.github.io>

Flowsheet Runner: Flowsheets List



Flowsheets

← Flowsheet Name ▾

Last Run

NEW FLOWSHEET +

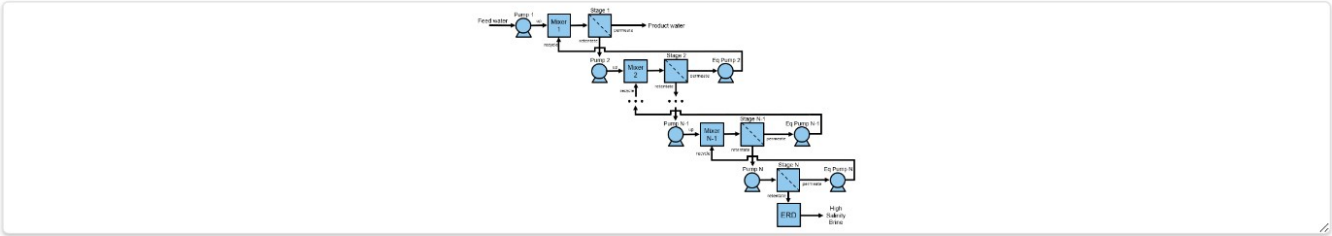
BSM2 flowsheet	9/4/2024
BSM2_P_extension flowsheet	7/23/2024
Dye Desalination flowsheet	9/4/2024
Electrodialysis with concentrate recirculation flowsheet	9/4/2024
Generic treatment train flowsheet	9/5/2024
Granular Activated Carbon (GAC) flowsheet	9/4/2024
LSRRO flowsheet	9/4/2024
Mechanical vapor compression flowsheet	9/4/2024
NF-DSPM-DE flowsheet	9/4/2024
OARO flowsheet	9/4/2024
RO with energy recovery flowsheet	9/4/2024

Flowsheet Runner: Input Page



LSRRO

DEGREES OF FREEDOM: 12



Model Options ▾

INPUT OUTPUT COMPARE

Saved Configurations: Analysis Type: optimization

Primary Pumps ^

Pump 1 outlet pressure: 85 bar ▾
Lower: 0.1 Upper: 500.0000000

Pump 1 efficiency: 0.75 fraction ▾

Pump 2 outlet pressure: 65 bar ▾
Lower: 0.1 Upper: 500.0000000

Pump 2 efficiency: 0.75 fraction ▾

Pump 3 outlet pressure:

Booster Pumps ^

Pump 2 efficiency: 0.75 fraction ▾

Pump 3 efficiency: 0.75 fraction ▾

Stage 1 ^

Stage 1 water permeability coefficient: 1.51 LMH/bar ▾

Stage 1 salt permeability coefficient: 0.13 LMH ▾

Stage 1 membrane area: 66.46 m² ▾

Flowsheet Runner: Optimization Output

INPUT OUTPUT COMPARE

[↓ DOWNLOAD RESULT](#)

[📁 SAVE CONFIGURATION](#)

Category	Variable	Units	Value
Feed	Volumetric flow rate	m3/hr	3.6
	NaCl concentration	g/L	70
Primary Pumps	Pump 1 outlet pressure	bar	85
	Pump 1 efficiency	fraction	0.75
	Pump 2 outlet pressure	bar	65
	Pump 2 efficiency	fraction	0.75
	Pump 3 outlet pressure	bar	63.6
	Pump 3 efficiency	fraction	0.75
	Pump work	kW	16.191
	Pump work recovered	kW	-4.543
	Net pump work	kW	11.648
	Energy recovery	%	28.058
Booster Pumps	Pump 2 efficiency	fraction	0.75
	Pump 3 efficiency	fraction	0.75
Stage 1	Stage 1 water permeability coefficient	LMH/bar	1.51
	Stage 1 salt permeability coefficient	LMH	0.13
	Stage 1 width	m	7.42
	Stage 1 permeate pressure	bar	1
	Stage 1 channel height	mm	1
Membrane area	Stage 1 space porosity	fraction	0.85
	Stage 1 membrane area	m2	66.46
	Stage 2 membrane area	m2	141.22
	Stage 3 membrane area	m2	1.73

Flowsheet Runner: Compare Page

INPUT OUTPUT **COMPARE**

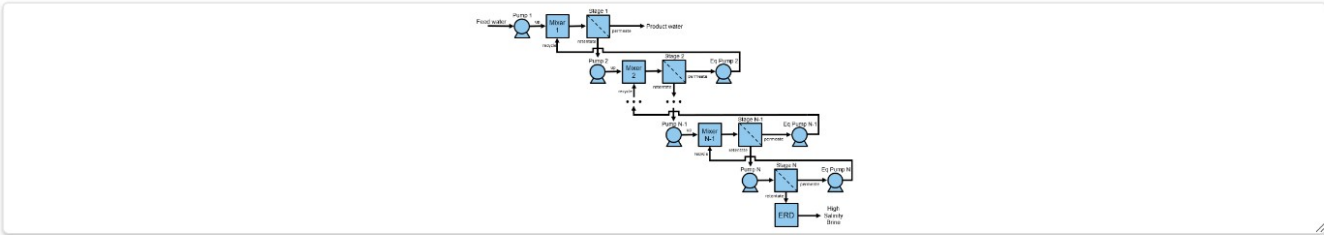
TABLE VIEW CHART VIEW

	Metric	LSRRO 2 ▾	LSRRO 1 ▾	Value Difference
Feed	Volumetric flow rate	3.6 m3/hr	3.6 m3/hr	0.00
	NaCl concentration	70 g/L	70 g/L	0.00
Primary Pumps	Pump 1 outlet pressure	85 bar	85 bar	0.00
	Pump 1 efficiency	0.75 fraction	0.75 fraction	0.00
	Pump 2 outlet pressure	65 bar	65 bar	0.00
	Pump 2 efficiency	0.75 fraction	0.75 fraction	0.00
	Pump 3 outlet pressure	63.6 bar	63.6 bar	0.06
	Pump 3 efficiency	0.75 fraction	0.75 fraction	0.00
	Pump work	18.588 kW	16.191 kW	2.40
	Pump work recovered	-4.526 kW	-4.543 kW	0.02
	Net pump work	14.062 kW	11.648 kW	2.41
	Energy recovery	24.349 %	28.058 %	-3.71
Booster Pumps	Pump 2 efficiency	0.5 fraction	0.75 fraction	-0.25
	Pump 3 efficiency	0.23 fraction	0.75 fraction	-0.52
Stage 1	Stage 1 water permeability coefficient	1.51 LMH/bar	1.51 LMH/bar	0.00
	Stage 1 salt permeability coefficient	0.13 LMH	0.13 LMH	0.00
	Stage 1 width	7.32 m	7.42 m	-0.10
	Stage 1 permeate pressure	1 bar	1 bar	0.00
	Stage 1 channel height	1 mm	1 mm	0.00
	Stage 1 space porosity	0.85 fraction	0.85 fraction	0.00
	Stage 1 membrane area	66.48 m2	66.46 m2	0.02

Flowsheet Runner: Sensitivity

LSRRO

DEGREES OF FREEDOM: 12



Model Options ▾

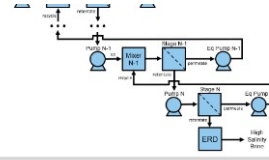
INPUT OUTPUT

[TABLE VIEW](#) [CHART VIEW](#)

Net pump work	Energy recovery	Number of stages	Water volumetric recovery	Mass water recovery rate	Salt rejection	Specific ene
19.675	19.448	3.000	31.296	31.914	99.289	
15.933	22.435	3.000	35.611	36.314	99.289	
13.847	24.802	3.000	37.412	38.150	99.289	
12.543	26.621	3.000	38.425	39.184	99.289	
11.648	28.058	3.000	39.081	39.853	99.289	

[↓ DOWNLOAD RESULTS](#)

Flowsheet Runner: Sensitivity (2)

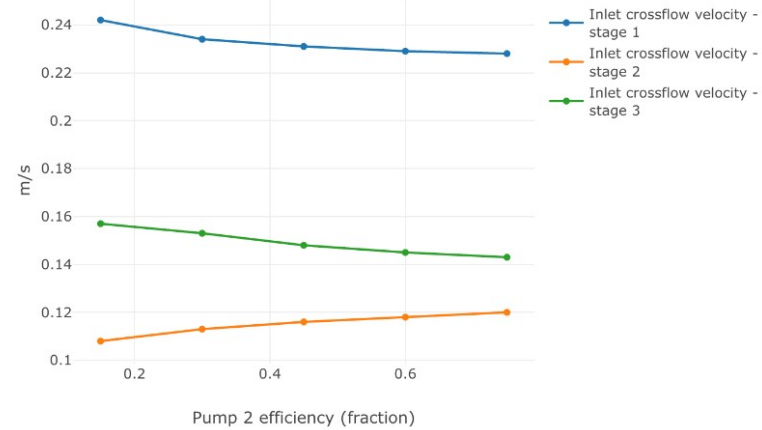


Model Options ▾

INPUT OUTPUT

TABLE VIEW CHART VIEW

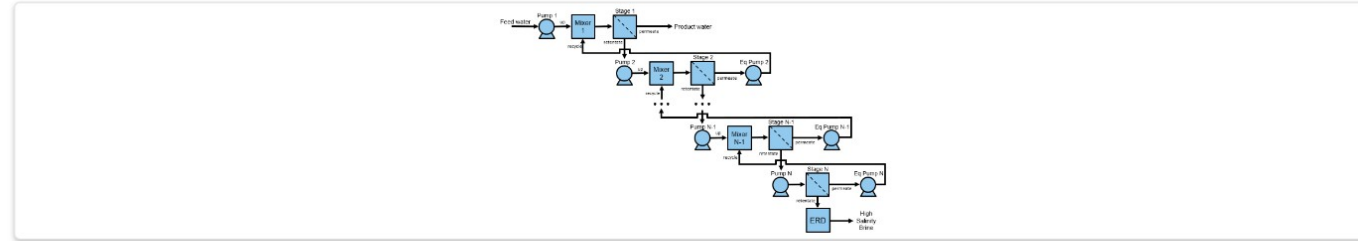
3
Average water flux - stage 1
Average water flux - stage 2
Average water flux - stage 3
Average NaCl flux - stage 1
Average NaCl flux - stage 2
Average NaCl flux - stage 3
Inlet Reynolds number - stage 1
Inlet Reynolds number - stage 2
Inlet Reynolds number - stage 3
Inlet crossflow velocity - stage 1
Inlet crossflow velocity - stage 2
Inlet crossflow velocity - stage 3



Flowsheet Runner: Sensitivity (3)

LSRRO

DEGREES OF FREEDOM: 10



Model Options ▾

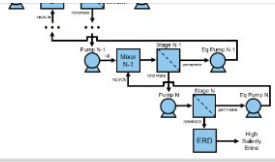
INPUT OUTPUT

TABLE VIEW CHART VIEW

Salt permeability coefficient - stage 3	Average water flux - stage 1	Average water flux - stage 2	Average water flux - stage 3	Average NaCl
11.375	21.042	8.500	11.534	
12.016	21.043	8.704	12.216	
12.600	21.044	8.917	12.893	
12.600	21.054	10.209	12.349	
12.600	21.054	10.209	12.349	
12.600	21.054	10.209	12.348	
12.600	21.061	11.071	12.317	
12.600	21.061	11.071	12.317	
12.600	21.061	11.071	12.316	

[↓ DOWNLOAD RESULTS](#)

Flowsheet Runner: Sensitivity (4)

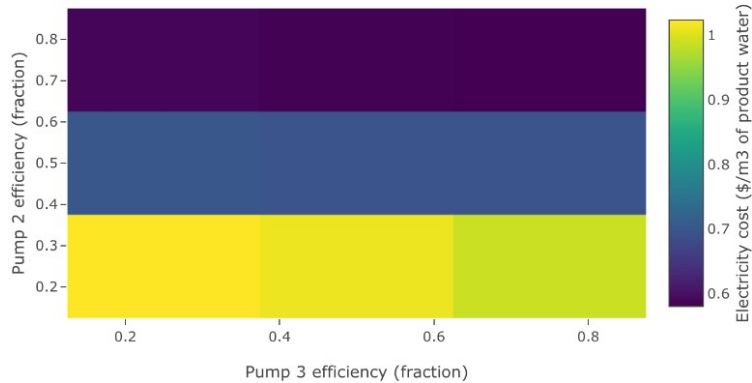


Model Options ▾

INPUT OUTPUT

TABLE VIEW CHART VIEW

Mass water recovery rate
Salt rejection
Specific energy consumption
Electricity cost
Total membrane area
Annual feed flow
Annual water production
Levelized cost of water
Total CAPEX LCOW
Primary pump CAPEX LCOW
Booster pump CAPEX LCOW
Energy recovery device CAPEX LCOW
Membrane CAPEX LCOW



Flowsheet Runner plans: Cross-project

Use across IDAES flowsheet projects

- Project branding
- Project flowsheets

The screenshot displays the WaterTAP UI interface for a cross-project flowsheet runner. The main window is titled "WaterTAP UI" and shows a process flow diagram for a "Metab" project. The diagram includes a "feed" stream entering a "metab_hydrogen" reactor, which then feeds into a "metab_methane" reactor. The "metab_methane" reactor produces three streams: "product_methane", "product_H2O", and "product_hydrogen".

The interface includes several control panels and tabs:

- Feed Panel:** Shows "Volumetric flow rate" set to 1.18 m³/h and "COD concentration" set to 6.76 g/L, both with "Fixed" dropdown menus.
- Hydrogen reactor Panel:** Shows various parameters for the "Hydrogen reactor", including "Water recovery" (1), "COD conversion" (0.22), "H₂ conversion ratio" (0.05), "HRT" (6), "Mixer specific power" (0.05), "Vacuum specific power" (9.19), "Specific heating" (7.88), and "Bead bulk density" (7.2). Each parameter has a unit and a "Fixed" dropdown menu.
- Methane reactor Panel:** Partially visible at the bottom, showing "Methane reactor" parameters.
- Analysis Type:** A dropdown menu set to "optimization", with "RESET" and "RUN" buttons.
- DEGREES OF FREEDOM:** Displayed as 0 in the top right corner of the main window.

Flowsheet Runner plans

- Software repository alignment with cross-project goals
 - Better dependency management and maintenance
- Add support for IDAES “decision support” applications
- Streamline API/tools to add existing flowsheets
- *Possible integration with Ahuora GUI*

Flowsheet runner Q&A



PARETO UI



Functionality

Decision-support tool for produced water management

Given a network of sources, sinks, etc., optimize infrastructure buildout alternatives

User can edit any input, or override optimization choices

Compare solutions with tables and charts

Types of models

Pyomo PW networks created from Excel spreadsheets

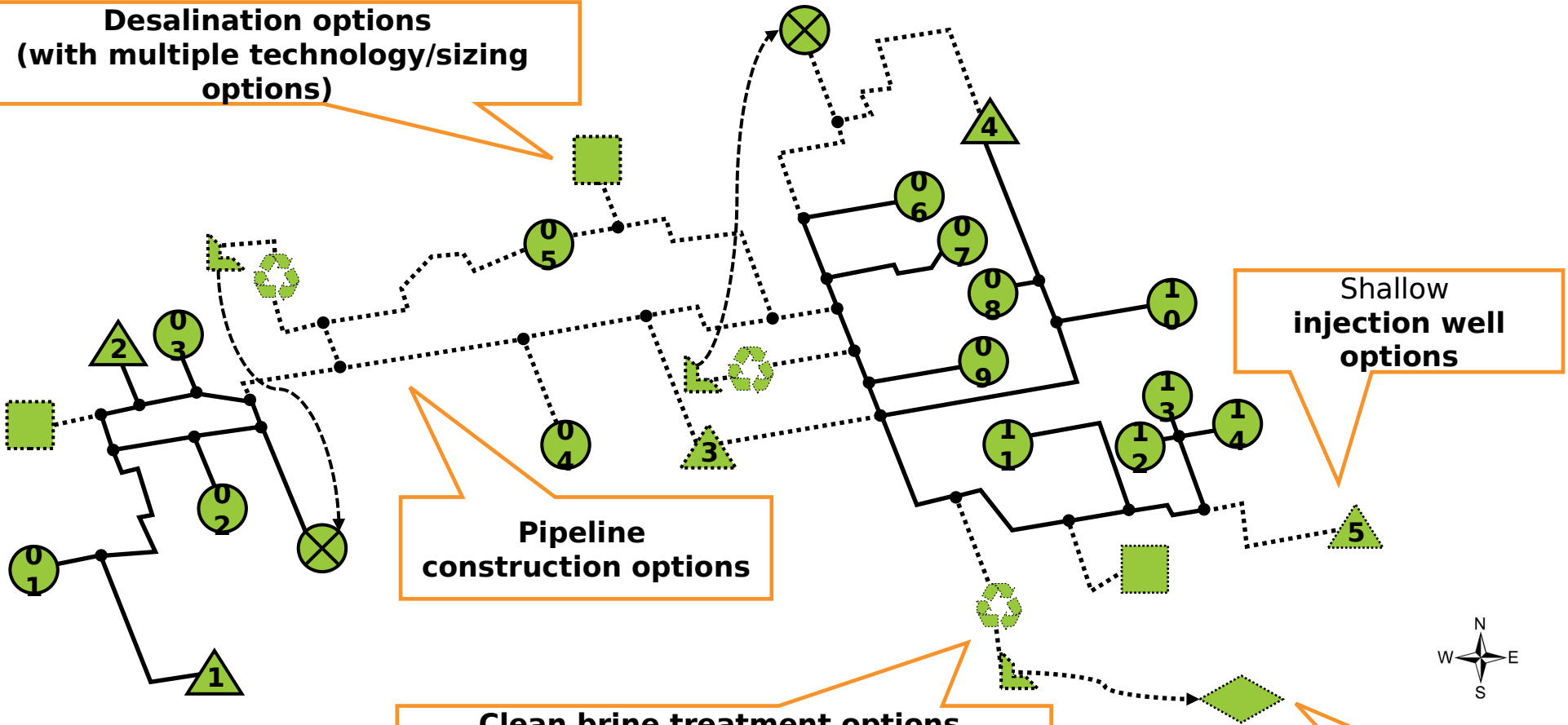
Installation

One-click native installer

Docs: <https://www.project-pareto.org/software/>

PARETO UI: Pre-built “scenarios”

Desalination options
(with multiple technology/sizing options)



Pipeline construction options

Clean brine treatment options
(with enhanced evaporation/sizing options)

Shallow injection well options

Water sharing option

Legend

- Production pad
- Completions pad
- PW injection **option**
- PW treatment **option**
- Treated PW pit **option**
- PW desalination **option**
- PW sharing **option**
- Existing pipeline
- Pipeline **option**

Representative Example Only

PARETO UI: Configure scenario

innits



Scenario P2

[VIEW SCENARIO LIST](#)



Data Input



Optimization Setup



Model Results

Input Summary

Network Diagram

Plots

Dynamic Inputs

Completions Demand

Disposal Operational Cost

Treatment Operational Cost

Completions PadOutside System

Desalination Technologies

Desalination Sites

Trucking Time

Pad Rates

P2

Input Summary

Statistic	Value	Units
Total Completions Demand	1,446,429	bbl
Total Produced Water	2,825,953	bbl
Total Starting Disposal Capacity	2,525,714	bbl
Total Starting Treatment Capacity	0	bbl

[CONTINUE TO OPTIMIZATION](#) →

PARETO UI: Configure scenario inputs (2)



Scenario P2

[VIEW SCENARIO LIST](#)



Data Input



Optimization Setup



Model Results

Input Summary

Network Diagram

Plots

Dynamic Inputs

Completions Demand

Disposal Operational Cost

Treatment Operational Cost

Completions PadOutside System

Desalination Technologies

Desalination Sites

Trucking Time

Pad Rates

P2

Completions Demand (bbl/day)

[Column & Row Filters](#)

CompletionsPads	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10
CP01	0	10,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
CP02	0	0	0	0	0	0	0	0	0	0
CP03	0	0	0	0	0	0	0	0	0	0

[CONTINUE TO OPTIMIZATION](#) →

PARETO UI: Optimize



Scenario Baseline

[VIEW SCENARIO LIST](#)



Data Input



Optimization Setup



Model Results

OPTIMIZATION SETTINGS

Objective Selection ⓘ

Minimize Cost

Solver ⓘ

CBC (Free)

CBC (Free)

Gurobi (Commercial)

Maximum Runtime ⓘ

0 %

Optimality Gap ⓘ

Water Quality ⓘ

False

Hydraulics ⓘ

False

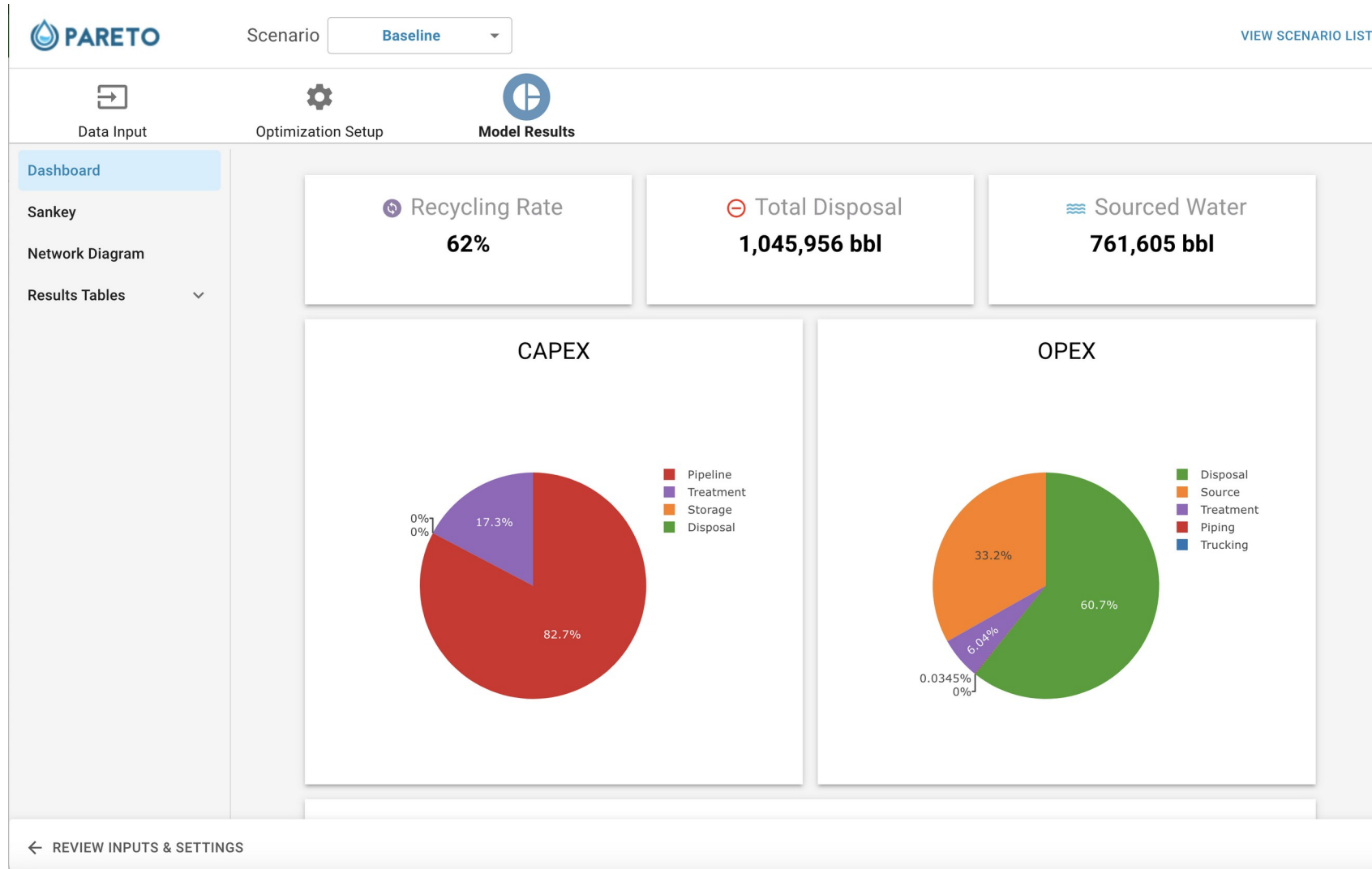
[Advanced User Options](#)

OPTIMIZE →

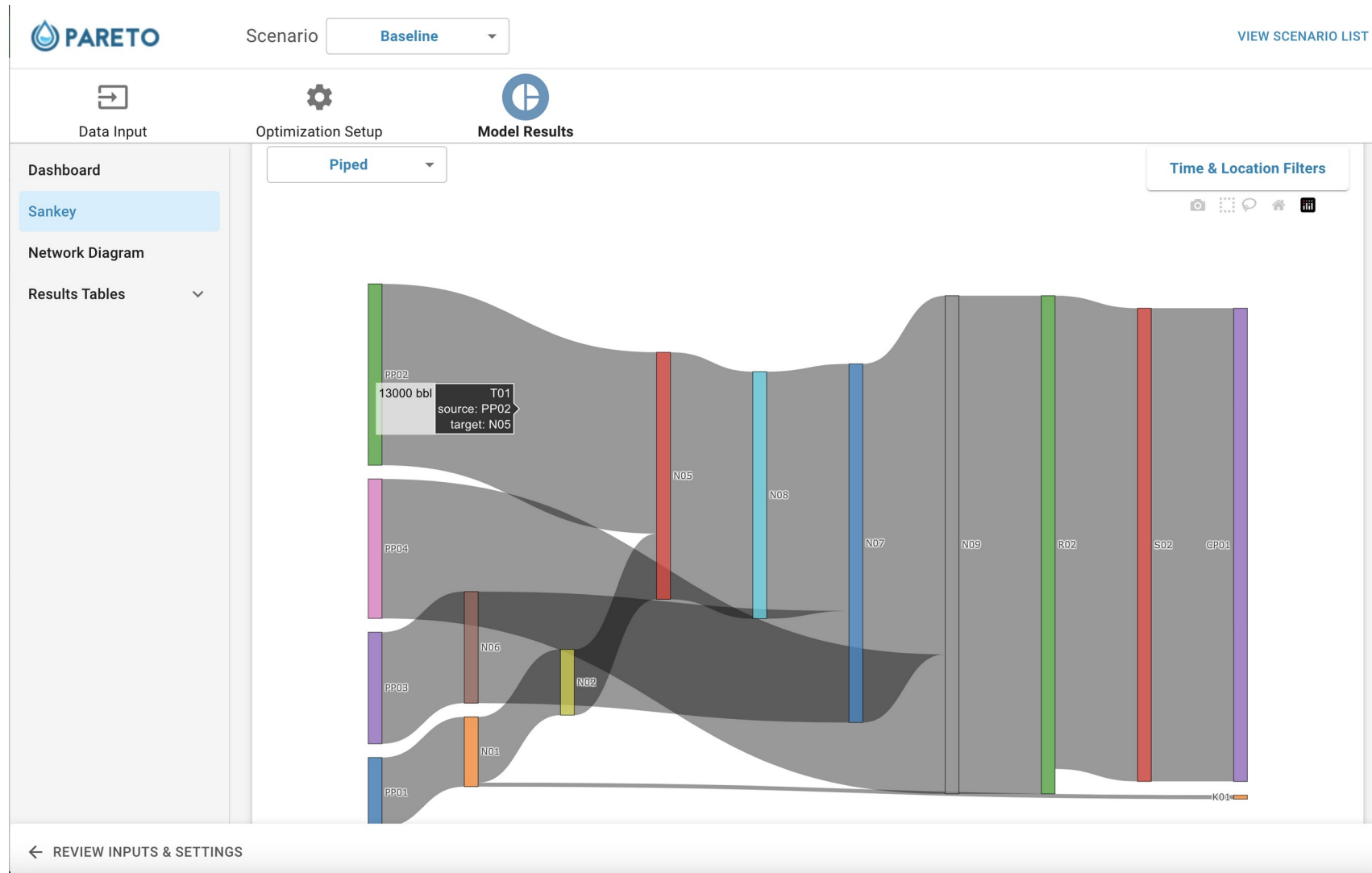
← BACK

OPTIMIZE →

PARETO UI: Result summary



PARETO UI: Results Sankey diagram



PARETO UI: Override optimizer decisions



Scenario Baseline

[VIEW SCENARIO LIST](#)



Data Input



Optimization Setup



Model Results

Dashboard

Sankey

Network Diagram

Results Tables

Overview

Infrastructure Buildout

Piped

Cost Piped

Trucked

Cost Trucked

Sourced

Cost Sourced

Pad Storage In

Pad Storage Out

Cost Disposal

Cost Treatment

Infrastructure Buildout

[+ ADD INFRASTRUCTURE OVERRIDE](#)

CAPEX Type	Location	Destination	Technology	Capacity	Unit	Override	Value
Treatment Facility	R02	--	CB	50,000	bb/d		
Pipeline Construction	PP04	N09	--	4	in	<input checked="" type="checkbox"/>	<input type="text" value="6"/>
Pipeline Construction	S02	CP01	--	6	in	<input type="checkbox"/>	0
Pipeline Construction	R02	S02	--	6	in	<input type="checkbox"/>	4
Pipeline Construction	N09	CP02	--	4	in	<input type="checkbox"/>	6
Pipeline Construction	N09	R02	--	6	in	<input type="checkbox"/>	8
Pipeline Construction	N09	N07	--	6	in	<input type="checkbox"/>	12
Pipeline Construction	N09	N07	--	6	in	<input type="checkbox"/>	<input type="text" value="Value"/>

To add more options, edit the Pipeline Diameter Values table in the data input section.

Rows per page: 50 1-7 of 7

[+ ADD INFRASTRUCTURE OVERRIDE](#)

[← REVIEW INPUTS & SETTINGS](#)

[RE-RUN OPTIMIZATION →](#)

PARETO UI: Compare solutions



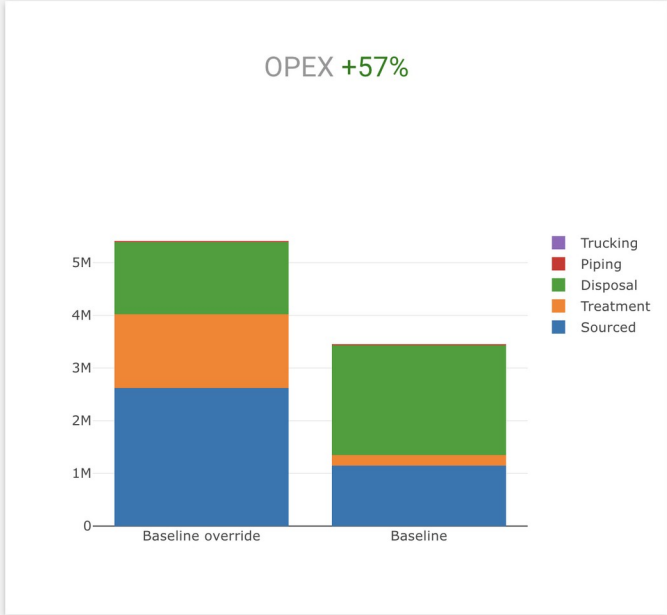
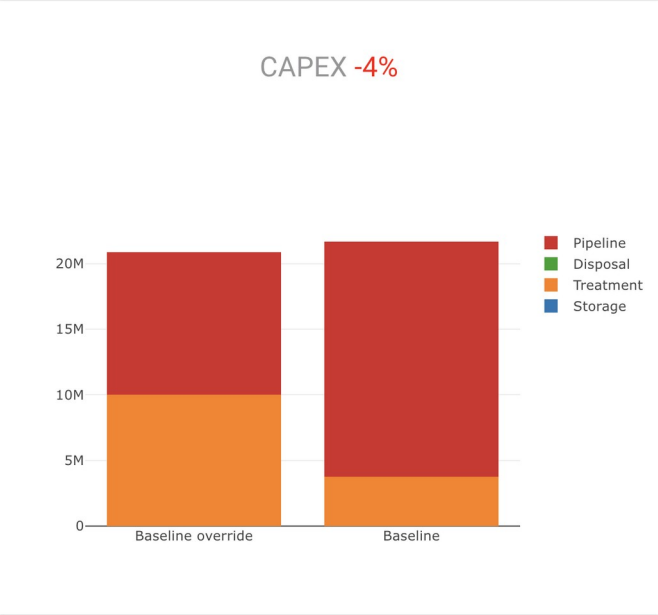
Scenario
Baseline override

Reference
Baseline


- Outputs
- Dashboard
- Infrastructure Buildout
- Dynamic Inputs
- Static Inputs
- Manual Overrides

Key KPIs
Baseline override vs Baseline

Recycling Rate -49% 14% vs 62%	Disposal -359,584 bbl 686,372 bbl vs 1,045,956 bbl	Sourced +988,395 bbl 1,750,000 bbl vs 761,605 bbl
--	--	---



PARETO UI: Show on map (beta)

 Scenario demo map [VIEW SCENARIO LIST](#)

Data Input Optimization Setup Model Results

PARETO Input File demo map

Network Diagram

Plots


Dynamic Inputs

- Completions Demand
- Disposal Operational Cost
- Treatment Operational Cost
- Completions PadOutside System
- Desalination Technologies
- Desalination Sites
- Trucking Time
- Pad Rates
- Flowback Rates
- Node Capacities

PARETO Input File

A PARETO input file has been generated based on the schematic file uploaded. Fill out this input file and upload it here to begin your optimization

[Download PARETO input file](#)



[View Full Network Map](#)

PARETO UI plans



PARETO UI Q&A



“Superstructure” UI



Functionality

Create and solve
superstructures

Initially working with zero-
order known performance

Goal: Build Pyomo models
to incorporate more
complex technology
options

Types of models

IDAES / Pyomo

Installation

WIP, currently only from source

[https://github.com/prommis/
prommis-ui](https://github.com/prommis/prommis-ui)

Superstructure: Create



PROMMIS
Superstructures



1

Input Parameters

2

Build Superstructure

3

Results



EXPORT

SOLVE



Input Parameters

Plant Start Year

2028



Operational Lifetime (years)

11



Key Components

Enter a new component

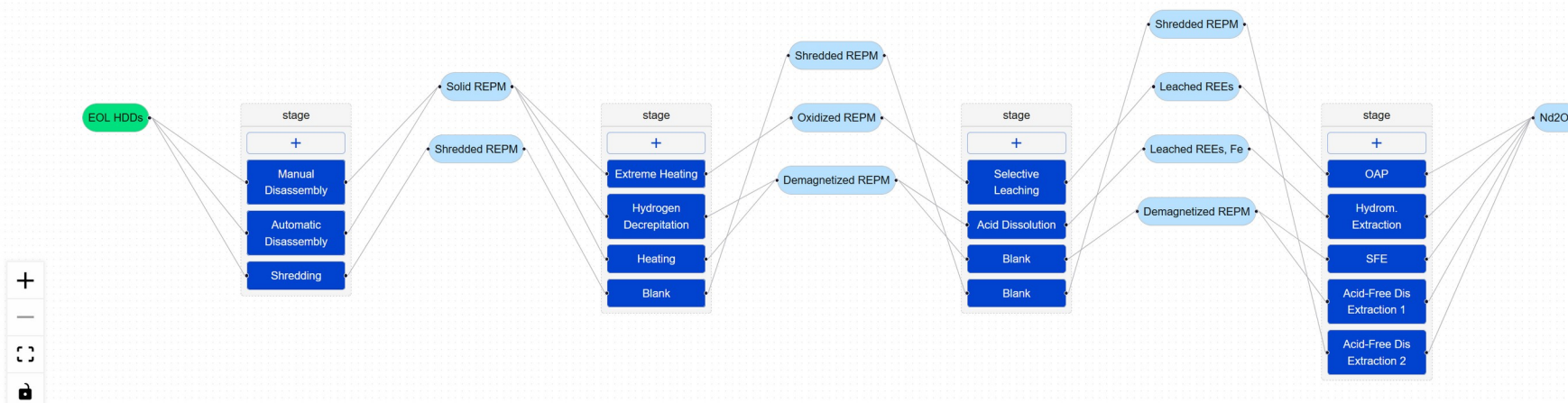


No items added

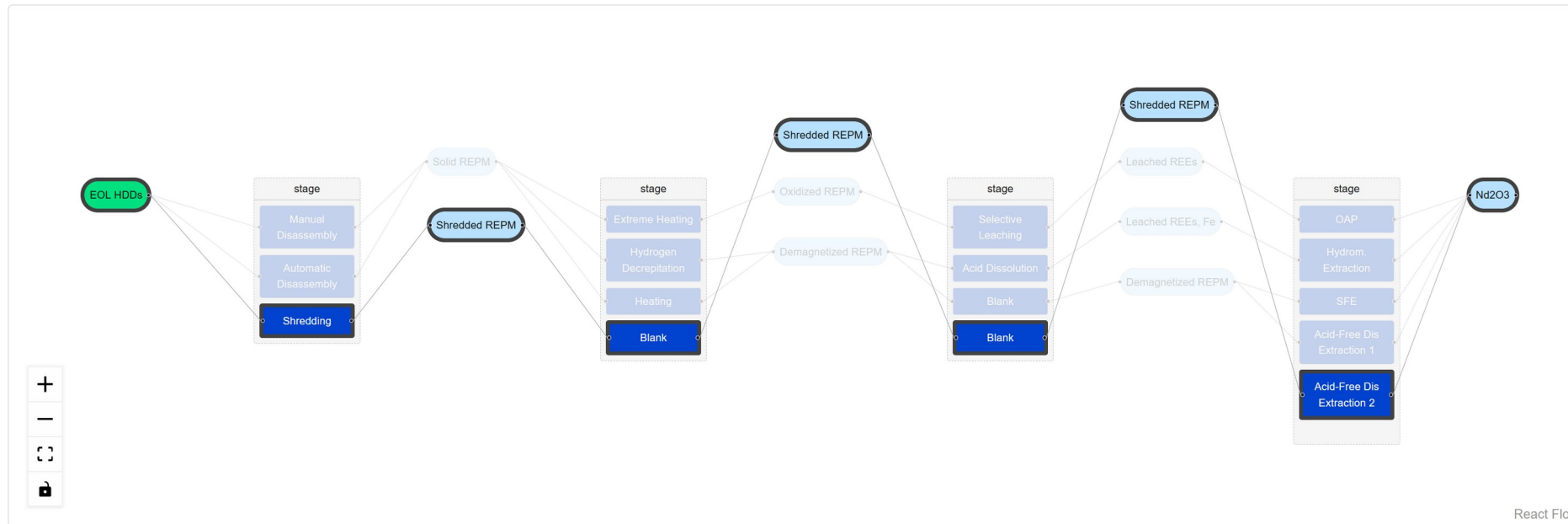
NEXT →

Superstructure: Build

- FEEDSTOCK
- STAGE
- STREAM
- ORGANIZE



Superstructure: Solve



Stream Table

Component	Units	Shredding Inlet	Blank Inlet	Blank Inlet	Acid-Free Dis. Extraction 2 Inlet	Outlet
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Superstructure UI plans



- Finish prototype
 - Build zero-order models with known performance for technologies
- UX testing/feedback with real users
- Additional applications
 - PrOMMiS
 - Other PSE projects

Superstructure UI Q&A



PROMMIS
Process Optimization and Modeling
for Minerals Sustainability

FOQUS

Framework for Optimization, Quantification of Uncertainty, and Surrogates



Functionality

Run Aspen, gPROMS models

Also run IDAES or Pyomo models

Optimization, UQ, sDOE, surrogate modeling

Run on desktop (Python GUI)

Types of models

Aspen, gPROMS (with license)
IDAES/Pyomo

Installation

Python local install:

```
pip install ccsi-foqus
```

Docs: <https://foqus.readthedocs.io>

FOQUS: Create a flowsheet

FOQUS -- [not saved yet]

Session | Flowsheet | Uncertainty | Optimization | OOU | Surrogates | DRM-Builder | Help | Settings

Metadata | Description | Change Log

Session Name: Simple_Flow | 2 (required)

Version: 00.00

Confidence: experimental

ID: 3fa49a4516984b1fa9dc2e251f5e772d (generated)

Creation Time: (generated)

Modification Time: (generated)

Working Directory: C:\Users\jeslick\work\test2



FOQUS -- [not saved yet] 4

Session | Flowsheet | Uncertainty | Optimization | OOU | Surrogates | DRM-Builder | Help | Settings

6
5a
5b
7

Node Edit

Apply | Revert | Run (this node only for testing) | Stop Run

Variables | Position | Post Processing

Name: calc | Visible

Error Status

Code: -1

Message: Did not finish

Model

Type: None | Model:

Input Variables

	Name	Value	Unit	Default	Min	Max	Description	Tags
1	x1	1.0	8g	0.0	-2.0	2.0	8e	[]
2	x2	4.0	8h	0.0	-1.0	4.0	8f	[]

Output Variables

Settings

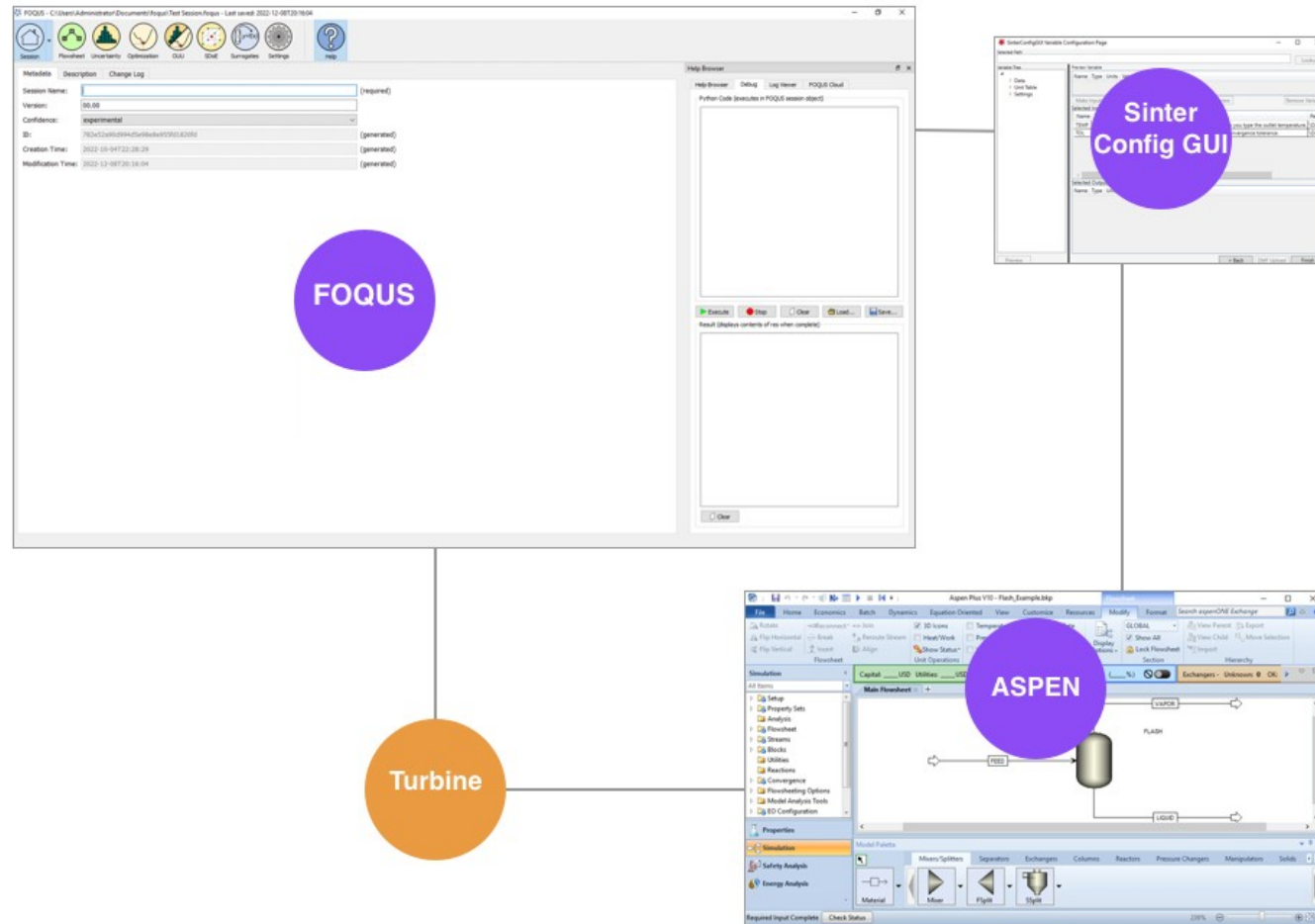
8a,c

FOQUS: Run optimization

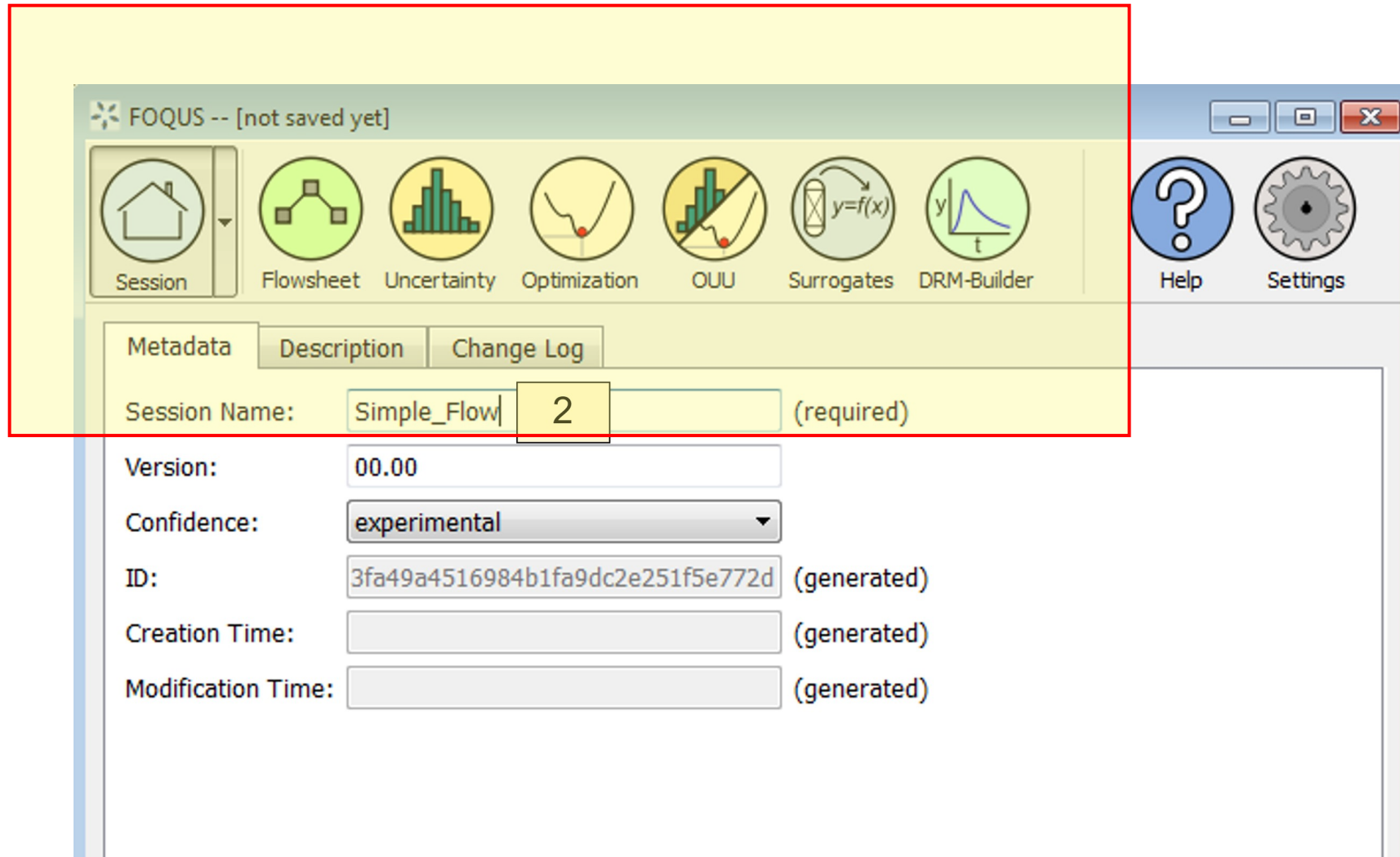
The screenshot displays the FOQUS software interface with the following components:

- Top Navigation:** Home, Flowsheet, Uncertainty, Optimization, Surrogates, and Help icons.
- Control Panel:** Includes a 'Start' button (1), a 'Stop' button, and an 'Update delay (ms): 500' field (3).
- Optimization Solver Messages (4):** A log window showing iteration progress from 0 to 34. The final message at iteration 35 reads: 'ITERATION 35: 30/30 Err: 1 TOTAL Complete: 1080 Err:4'. A 'Clear' button (8) is located below the log.
- Best Solution Parallel Coordinate Plot (5):** A line graph showing the 'Scaled Value' of various variables across iterations. The x-axis is labeled 'Variable' and lists variables such as BFB.adsDt, BFB.adsdx, BFB.adsIhx, BFB.adsN, BFB.BFBadsB.Lb, BFB.BFBadsM.Lb, BFB.BFBadsT.Lb, BFB.BFBrgnB.Lb, BFB.BFBrgnT.Lb, BFB.GHXfg.GasOut.T, BFB.rgnDt, BFB.rgnDx, BFB.rgnIhx, BFB.rgnN, BFB.rgnSF, BFB.SolidIn.Fm, and BFB.steam.F. The y-axis is labeled 'Scaled Value' and ranges from 0 to 10.
- Objective Plot (6):** A scatter plot showing the 'Objective' value over 'Iteration' (0 to 35). The y-axis ranges from 0.01 to 0.05. The objective value remains constant at approximately 0.015 from iteration 30 to 35.

FOQUS: Connect to Aspen models through “Sinter”



FOQUS: More functions not covered here



The screenshot displays the FOQUS software interface. The window title is "FOQUS -- [not saved yet]". The top toolbar contains icons for Session, Flowsheet, Uncertainty, Optimization, OOU, Surrogates, DRM-Builder, Help, and Settings. Below the toolbar are tabs for Metadata, Description, and Change Log. The Metadata tab is active, showing a form with the following fields:

Session Name:	Simple_Flow 2	(required)
Version:	00.00	
Confidence:	experimental	
ID:	3fa49a4516984b1fa9dc2e251f5e772d	(generated)
Creation Time:		(generated)
Modification Time:		(generated)

FOQUS plans



- Refer to CCSI2 leadership for details
- UI is currently in maintenance mode
 - Integration with other tools could require refactor into Web stack

Summary

- Flowsheet Visualizer
 - Developer-focused, view and run diagnostics on flowsheets
- Flowsheet Runner
 - User-focused, parameterize and run flowsheets and sensitivity analyses
- PARETO UI
 - User-focused, parameterize and run produced water models
- Superstructure UI
 - User-focused, create and run (constrained) superstructure models
- FOQUS
 - Developer-focused, create and run Aspen or Pyomo flowsheets, many additional analysis features

Final Q&A

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Acknowledgement and Disclaimer

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