

SPECs

Solar-Plus for Electric Co-ops

Early-Decision Modeling for Utility Solar + Storage Systems

June 10, 2021

Simon Sandler, Christian Casillas

Presentation Objectives



- Review purpose and structure of SPECs Model
- Briefly describe Gap Analysis and Sensitivity Analysis features
- Walk through screen-share of Excel Model
- Launch discussion of the model's strengths and limitations

Early-Stage Decision Model



The SPECS Early-Stage Decision (ESD) Model is an Excel-based tool, designed to help electric co-ops:

- Explore value streams for a potential solar-plus-storage project
- Educate co-op decision-makers about project benefits/costs
- Provide output that could be included in a solar-plus RFP
- Support a “sanity check” and discussion of RFP responses

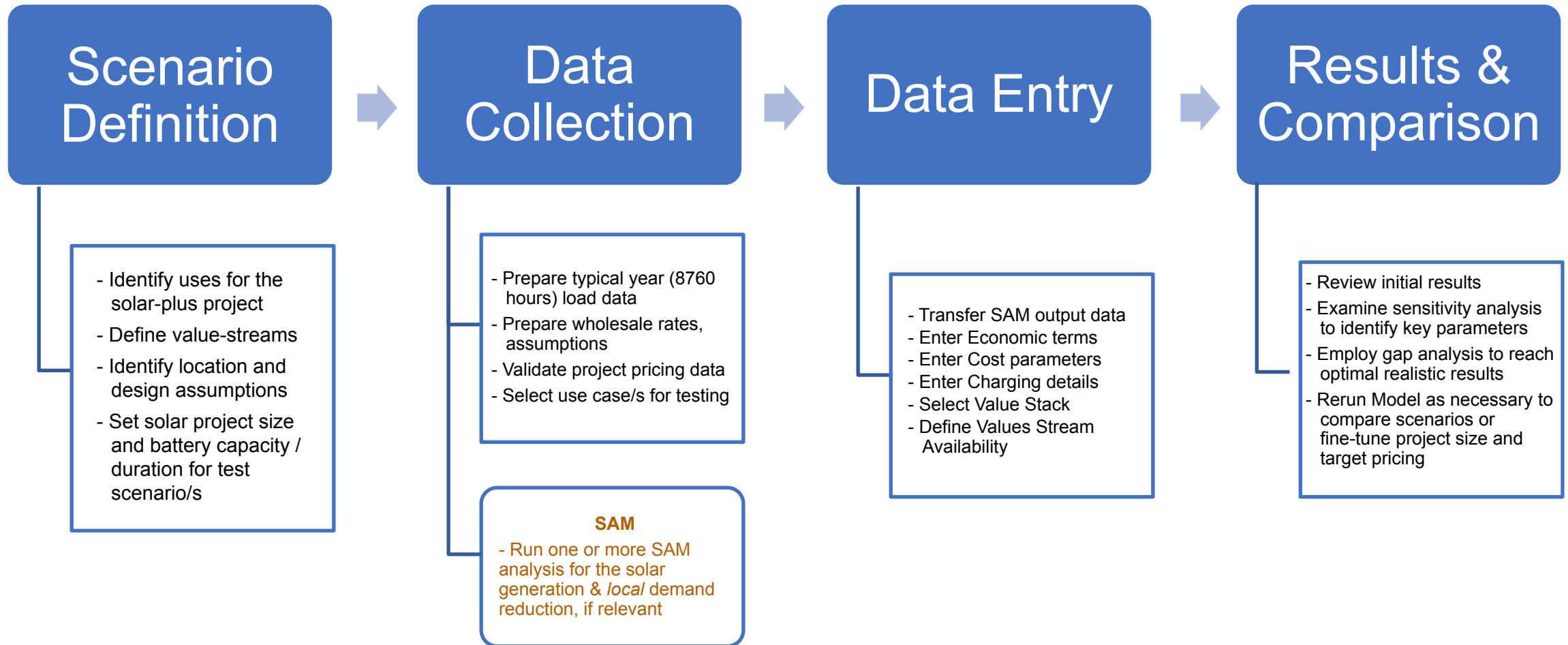
The ESD Model explores combinations of 4 value streams in 8 generic use cases, as well as modification of use cases through **gap analysis** and **sensitivity analysis**.

Model Use



SPECs

Solar-Plus for Electric Co-ops



Model Logic

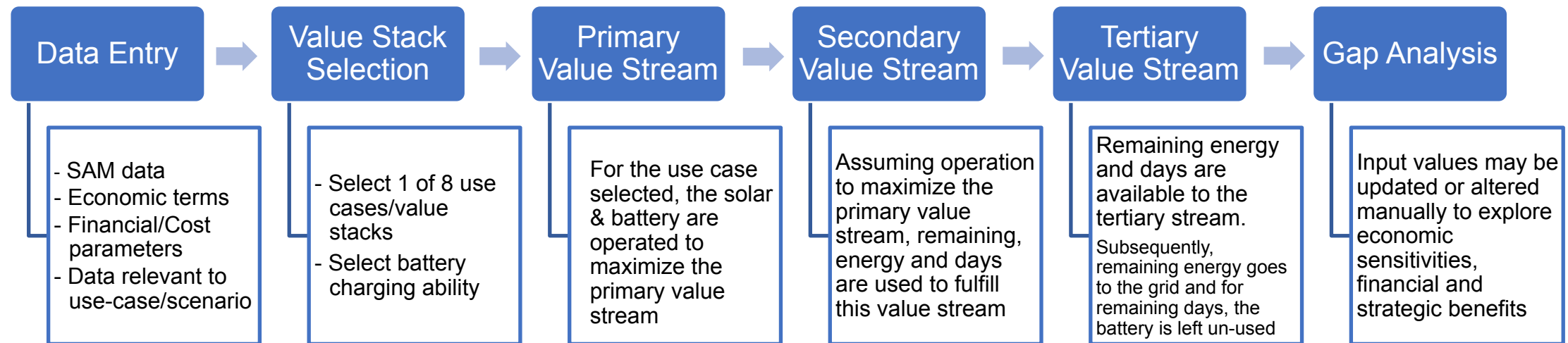


SPECs

Solar-Plus for Electric Co-ops

Model follows a prescriptive methodology

- It is not optimization or iterative
- Each model input and selection will directly change the outputs
- Designed with transparency and the ability for advanced users to edit



Let's Run the Model!



SPECS

Solar-Plus for Electric Co-ops

VALUE STACK SCENARIO

Utility Value Stack	1
Backup generation	Selection
Change direction	Take & Give

Value Stream	Qty Allowed
Backup	100%/yr
Local Demand Reduction	14.8%
Energy Storage	1,142.800
Applies Services	1.000

Value Stack Priority

1	2	3	4	5	6	7	8
Local Demand	Local Demand	Local Demand	Local Demand	CP Demand	CP Demand	CP Demand	CP Demand
AP	Energy Storage	Energy Storage	Energy Storage	Energy Storage	Energy Storage	Energy Storage	Energy Storage

GENERAL INPUTS

Inputs that may not match SAM User Input Calculated

Wholesale Energy Demand	100	\$/hr
Wholesale energy cost 1	0.025	\$/kWh
Wholesale energy cost 2	0.025	\$/kWh
Utility local demand charge	3.00	\$/kW
Utility capacity cost	5.00	\$/kW
Utility demand cap	0.000	\$/hr

Wholesale Energy Demand	100	\$/hr
Wholesale energy cost 1	0.025	\$/kWh
Wholesale energy cost 2	0.025	\$/kWh
Utility local demand charge	3.00	\$/kW
Utility capacity cost	5.00	\$/kW
Utility demand cap	0.000	\$/hr

Wholesale Energy Demand	100	\$/hr
Wholesale energy cost 1	0.025	\$/kWh
Wholesale energy cost 2	0.025	\$/kWh
Utility local demand charge	3.00	\$/kW
Utility capacity cost	5.00	\$/kW
Utility demand cap	0.000	\$/hr

ADDITIONAL VALUE STREAMS

EST Capital Cost	1000	\$/kW
Time to Deploy	1	yr
Cost of Storage	5	\$/kWh
Storage System	1000	\$/kW
Storage Capital Cost	1000	\$/kW

RESULTS

Utility benefits and costs	1.3%
NPV	\$145,000
IRR	21.5%
Payback	11.0 years
Simple Payback	10.0 years
LOI for Battery A (yr)	50.0%

UTILITY VALUE STREAMS YRS 0-25

UTILITY CASH FLOW YRS 0-25

GAP ANALYSIS TOOLS

SENSITIVITY ANALYSIS

Percent Change	3%
PV PPA price (Manually Enter)	0.0050
Battery ISA price (Manually Enter)	0.0000
Utility & PPA Utility NPV	NPV

Chart Title

1. Value stack selection

2. General input parameters

3. Output Metrics

4. Gap analysis tools

5. Sensitivity analysis tools

Input tab