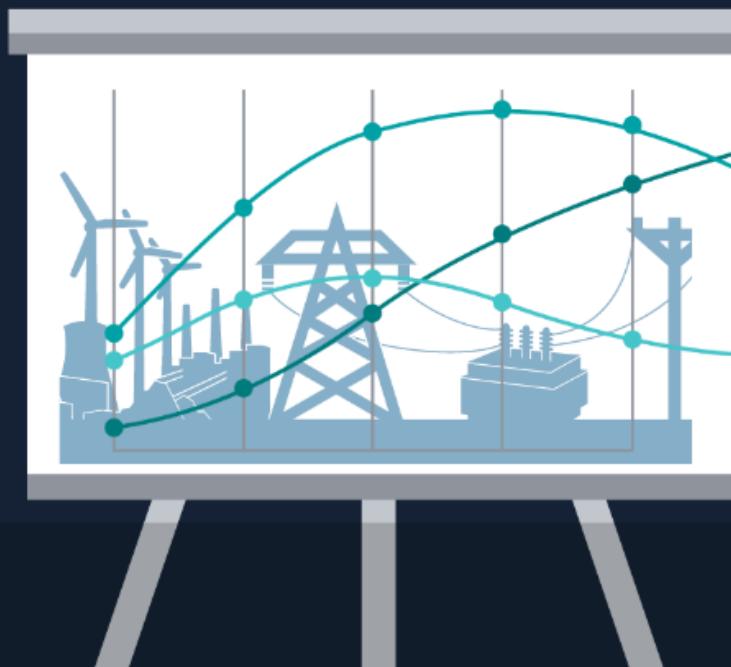
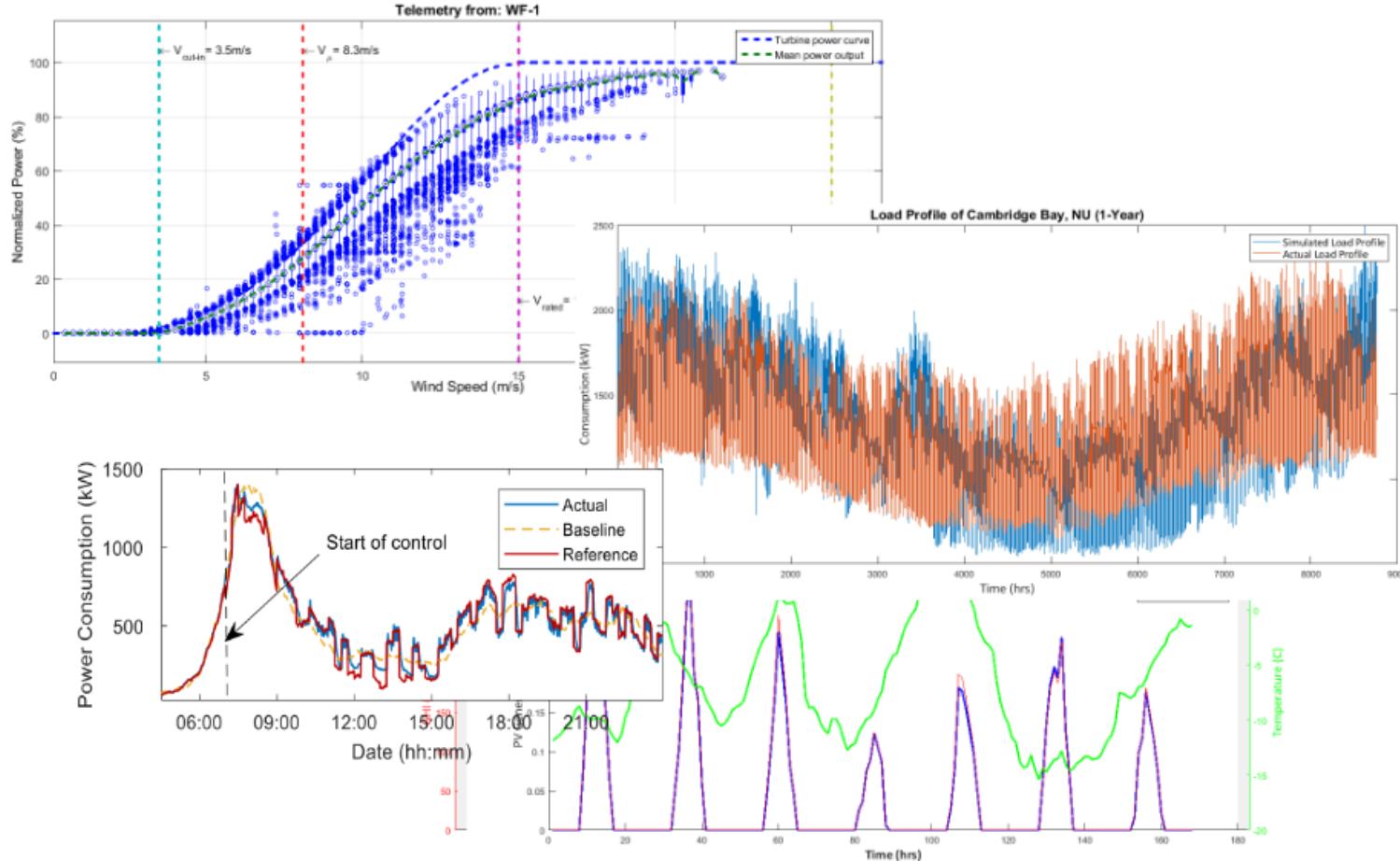


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Data is everything...



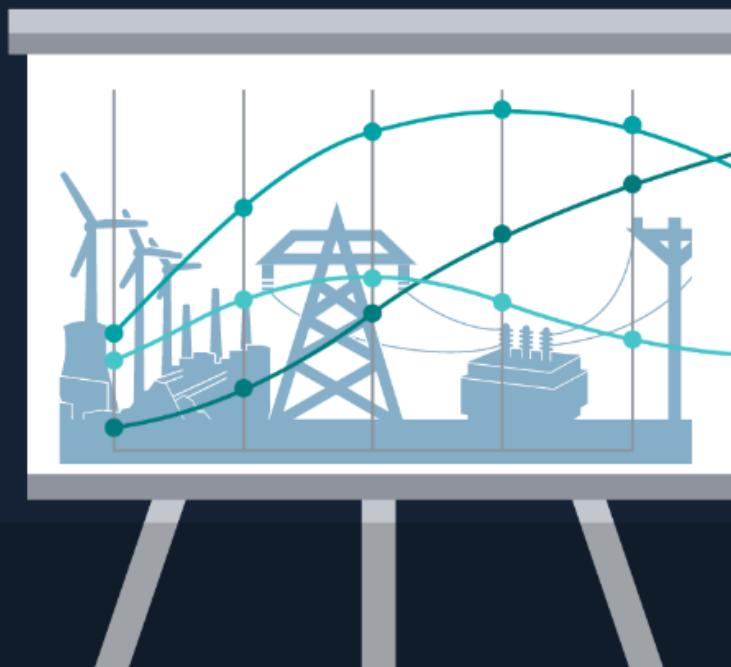
Simulation Model

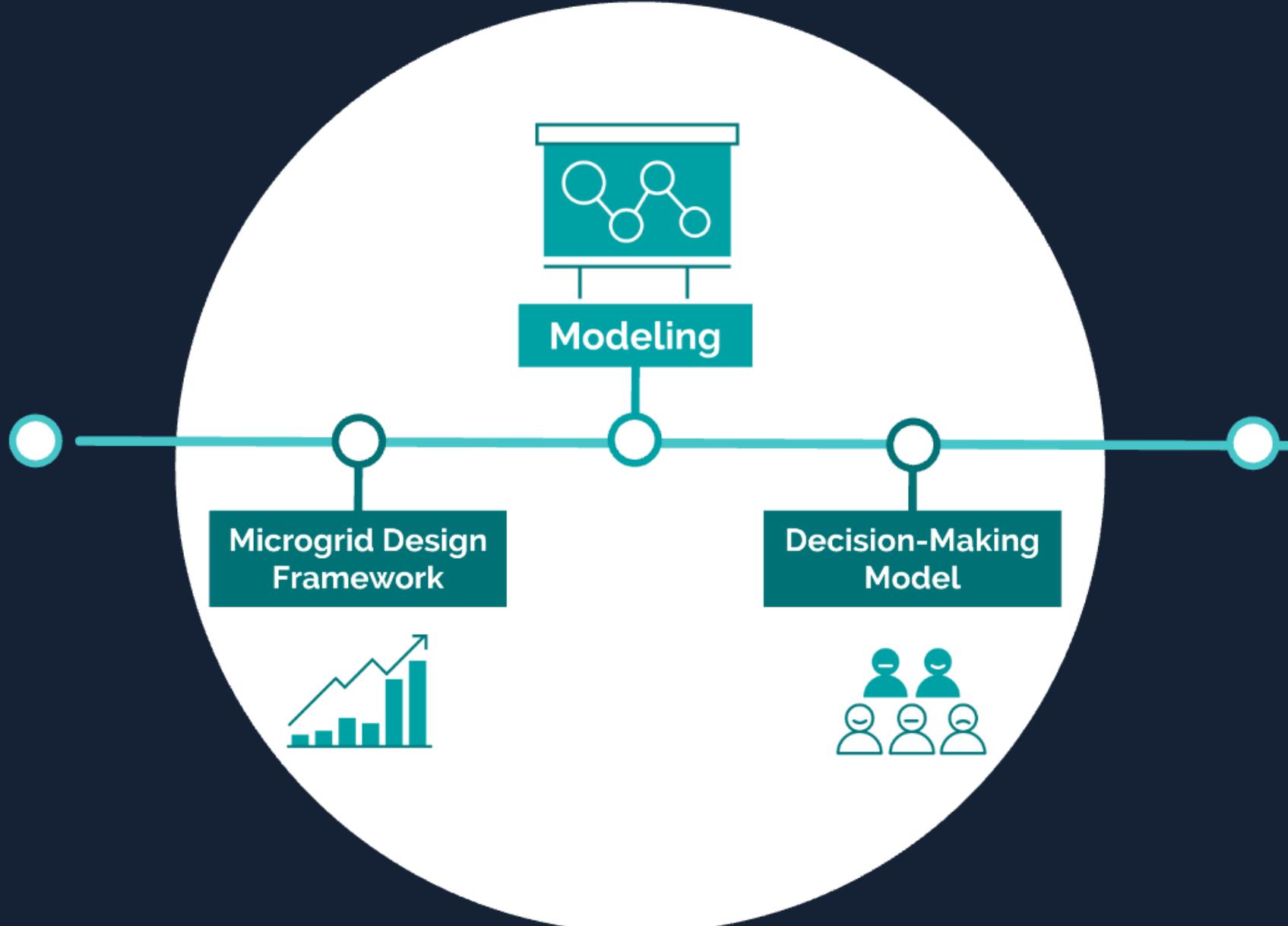
- Wind generation profiles
- PV generation profiles
- Controllable load profiles
- Community load profile



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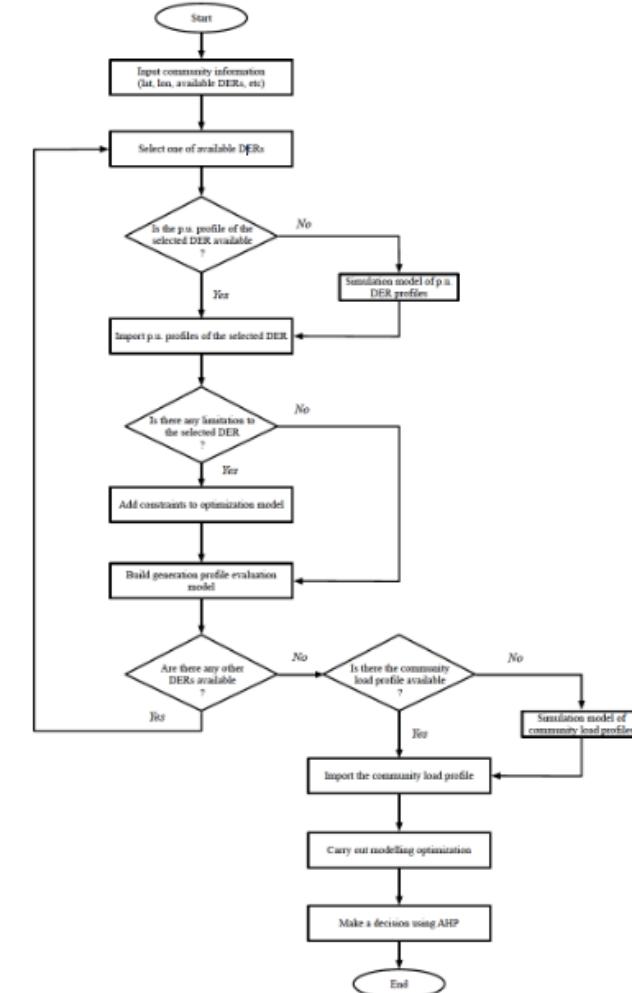


Framework help find optimal solutions

An optimal combination of available DERs taking account for **costs, reliability, environmental effects and economic potential** for rural and remote communities

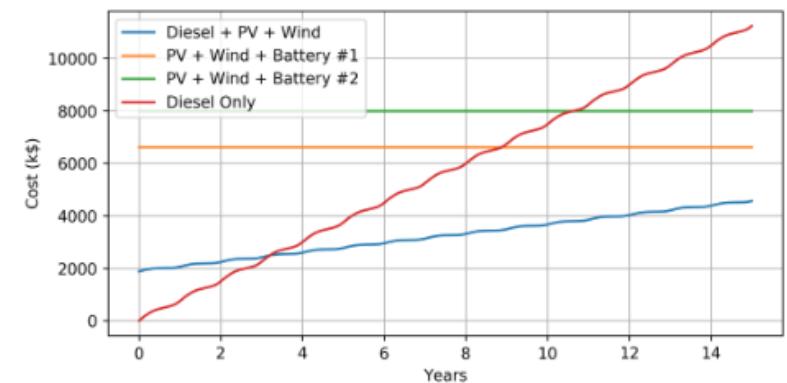
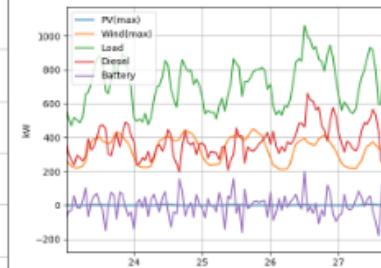
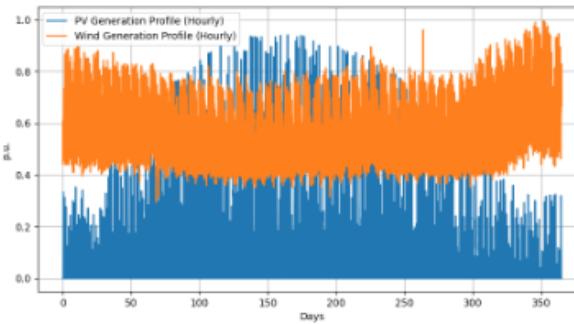
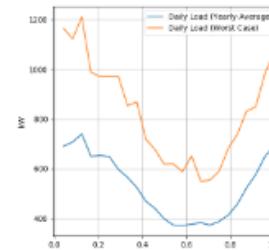
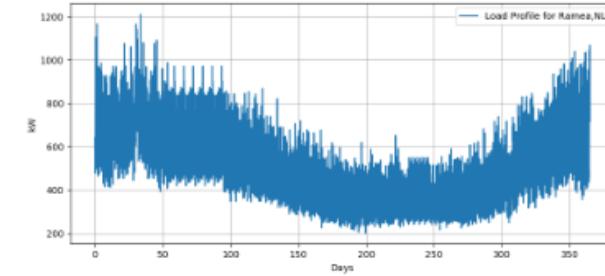
→ **Input:** DER simulated/physical profiles
Community load profile
Constraints / limitations

→ **Optimizer:** Best return of investment (ROI)
100% renewable
Customized objectives





Framework help find optimal solutions

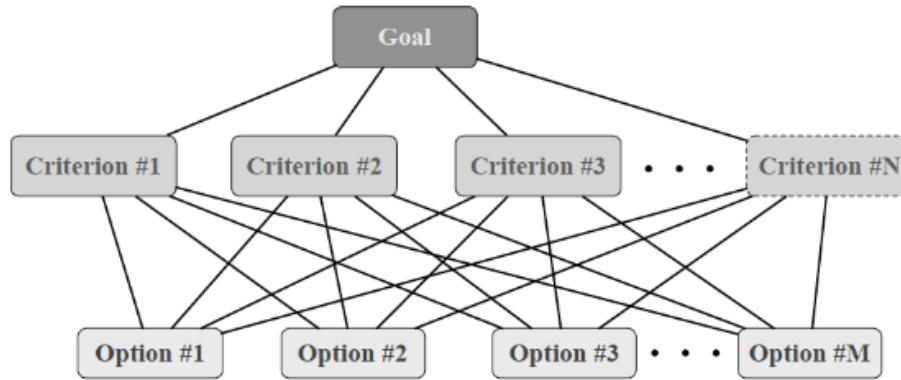


Scenario Study	DER Solution	Wind Turbine (kW)	PV Panel (kW)	Battery (kWh)	Capital Investment (k\$)
a	Diesel + Wind + PV	600 (150x4)	30 (2x15)	0	\$1,875.00
b	Wind + PV + Battery (#1)	1650 (150x11)	30 (2x15)	1293	\$6,604.00
c	Wind + PV + Battery (#2)	1500 (150x10)	630 (2x315)	1386	\$7,984.00

The framework can bridge the **gap** between related policies and practicality.



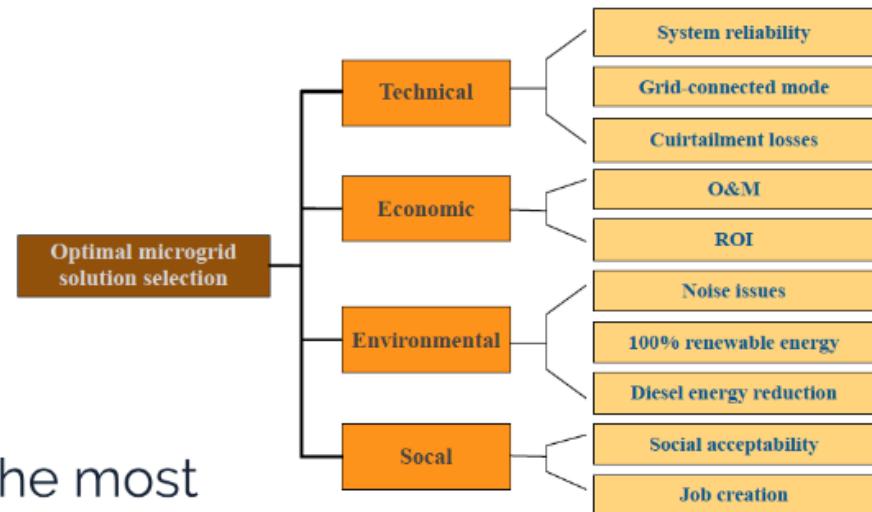
AHP: an efficient decision-making model



Architecture of AHP

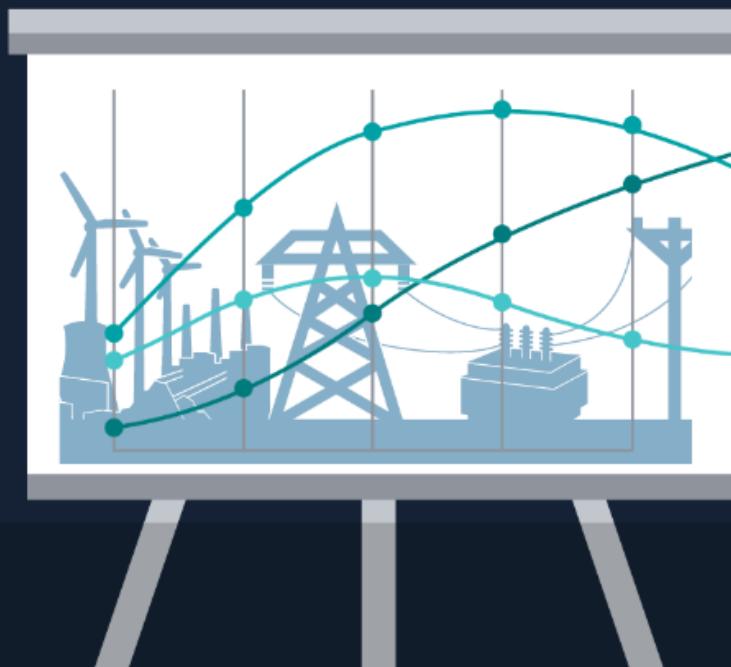
Analytic Hierarchy Process (AHP) is one of the most effective and efficient **multi-criteria decision-making** methods in **group** decision-making applications.

An example for microgrid design



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Cooperation with modelers across Canada

Python-based open-source toolkit for microgrid design

The screenshot shows the UNB Smart Grid Design Tool interface. On the left, the 'General Information' panel includes fields for Location (47.52), Main Power Source (Diesel), Load Profile (CSV file), Simulated Profile (checkboxes for Simulated Model, Population, Average Usage, MWh/Year), Capacitor Limits (Wind, PV, CHP, Controllable Load), and Parameter Setting (Wind Turbine Model, Wind P.U. Profile, Simulated Wind Profile, PV Model, PV P.U. Profile, Simulated PV Profile, Battery Storage). On the right, the 'Optimizer Selection and Data Overview' panel shows two solutions: #1 (Wind + PV + Battery) and #2 (Wind + PV + Battery). A 'Cumulate Cost Curve' graph plots Cost (\$CAD) against Years (0-14) for three scenarios: PV + Wind + Battery #1 (blue line), PV + Wind + Battery #2 (orange line), and Diesel Only (green line).

A Model provides value only when other participants can use it in a manner that is **convenient, and have the necessary resources and mechanisms in place** that helps them to make a decision.

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