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An Iterative Approach to Improve PV Hosting Capacity for a Remote Community

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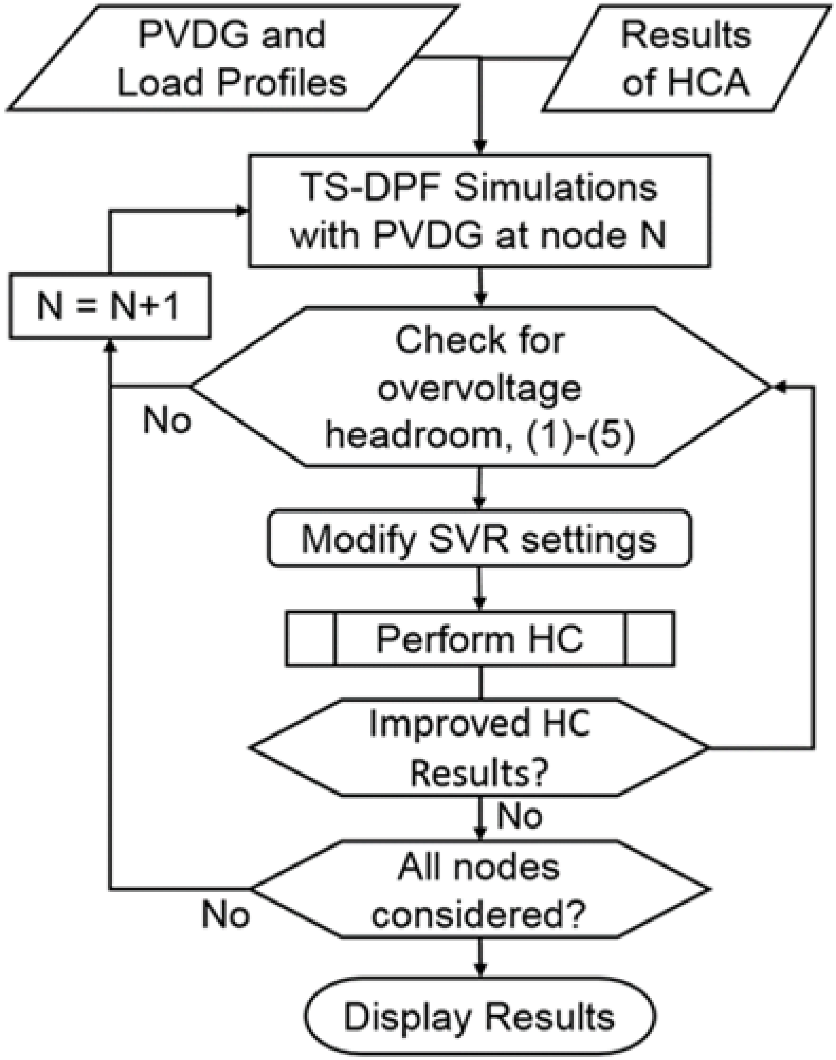
Methodology - Iterative Approach



Results

	VRFB	NaS	Ad. Lead-Acid
Specs: Power, Energy	2 MW, 5 Hrs	2 MW, 5.5 Hrs	2 MW, 10 Hrs
Depth of Discharge, η_{trip}	100%, 72%	80%, 75%	80%, 90%
Plant Life (Yrs)	15	15	15
Plant Cost*	**9,014,589**	**8,242,454**	**12,056,215**
Fixed O & M (Annual)	17,956	25,190	24,024
Variable O & M (Annual)	4,276	3,110	1,944
		100 km of upgrade to 25 kV line @ $ 70,000 /km	7,000,000
		Capacity upgrade for 80 km @ $ 35,000 /km	2,800,000
		Transformers, Communications etc.	1,500,000
		Total upgrade cost**	**11,300,000**

Conclusions

- Availability of multiple voltage regulators on the long rural section feeding power to remote communities can be exploited with the margins in their overvoltage limits to host more PVDG
- Coordination of voltage regulator settings with four quadrant operation of BESS can collectively improve PV hosting capacity up to 60% from the base-case hosting capacity
- Use of battery energy storage can be a cost-competitive alternative to the infrastructure upgrade – for remote communities