Breakout Session Discussion

Breakout #1: The Most Impactful Application…

Objective: *Identify the grid optimization problem(s) that, if solved more accurately or quickly, would have the greatest impact on electric grid operations (AND a large impact on the ARPA-E mission areas.)*

November 18, 2014

Breakout #1: The Most Impactful Application

‣ Which difficult grid optimization problem, if solved more optimally (solution quality, robustness, time to solution, etc.) than possible today, could have the greatest impact on grid operations?

Breakout #1: The Most Impactful Application

‣ For the group's selected application, what is the relative importance of different solution attributes/metrics: objective function value, convergence robustness, solution time, constraint satisfaction, etc.?

Breakout #1: What is Important?

Attributes ▼	ED Economic Dispatch (minutes) ▼	UC Unit Commitment (hours) ▼	Other #1 ▼	Other #2 ▼
Impact	1	2	5	6
Objective Function Global Minimum	1			
Convergence Robustness	2			
Solution Time	3			
Renewables Integration	4			
Utilization of LTC and PFC devices	5			

Breakout #1: The Most Impactful Application

‣ For the group's selected application, to what extent would the scale of the benefits of improved solutions increase or diminish in the future grid, with large renewables penetrations, increased reliance on distributed generation, etc.? How might the problem change in the future (changing time scales)?

Breakout #1: The Most Impactful Application

‣ For the group's selected application, should ARPA-E focus on specific solution approaches, such as those that rely on stochastic optimization, robust optimization, convex relaxation, heuristic-based methods, distributed optimization, (your favorite topic here), etc.?

Breakout #1: The Most Impactful Application

‣ If ARPA-E were to organize a competition focused on the group's selected application, to what extent should the test scenarios be focused on today's grid vs. the future grid? What assumptions should be made about the future grid? How should the details be worked out?

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Breakout #1: The Most Impactful Application

‣ How suitable is the group's selected application to be used as the focus problem for a results-centric competition?

  – How should different solutions be fairly evaluated (test data set(s), metrics, and performance measurement)?

  – How can the relative strengths and weaknesses of different methods be investigated and/or communicated?

  – To what extent could ARPA-E use "black-box" test methods (where ARPA-E never knows how the solutions are generated)?

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Breakout #1 Readout Summary