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Title:

PART II OF II: DEPLOYING NETWORK MODELS OF STATIONARY COMBINED HEAT AND POWER FUEL CELL SYSTEMS FOR ENCHANCED DESIGN AND CONTROL TO LOWER EMISSIONS AND ENERGY COSTS

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Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

The Maximizing Emission Reductions and Economic Savings Simulator (MERESS) is an optimization tool that allows users to evaluate avant-garde strategies for installing and operating combined heat and power (CHP) fuel cell systems (FCSs) in buildings. This article discusses the deployment of MERESS to show illustrative results for a California campus town, and, based on these results, makes recommendations for further installations of FCSs to reduce greenhouse gas (GHG) emissions. MERESS is used to evaluate one of the most challenging FCS types to use for GHG reductions, the Phosphoric Acid Fuel Cell (PAFC) system. These PAFC FCSs are tested against a base case of a CHP combined cycle gas turbine (CCGT). Model results show that three competing goals (GHG emission reductions, cost savings to building owners, and FCS manufacturer sales revenue) are best achieved with different strategies, but that all three goals can be met reasonably with a single approach. Model results further demonstrate that FCS installations can be economical for building owners without any carbon tax or government incentives. Although no particular building type stands out as consistently achieving the highest emission reductions and cost savings (Scenarios B-2 and E-2), certain building load curves are clear winners. For example, buildings with load curves similar to Stanford Univeristy's Mudd Chemistry building (a wet laboratory) achieve maximal cost savings (1.5% with full federal and state incentives but no carbon tax) and maximal CO2 emission reductions (32%) (Scenarios B-2 and E-2). Finally, based on these results, this work makes recommendations for reducing GHG further through FCS deployment. (Part I of II articles discusses the motivation and key assumptions behind the MERESS model development.)

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