

CHARLES RIVER ASSOCIATES

DECISION-SUPPORT SOFTWARE FOR GRID OPERATORS

PROJECT TITLE:	Transmission Topology Control for Infrastructure Resilience to the Integration of Renewable Generation		
ORGANIZATION:	Charles River Associates International, Inc. (CRA)	LOCATION:	Boston, MA
PROGRAM:	GENI	ARPA-E AWARD:	\$1,338,592
TECH TOPIC:	Electricity Transmission & Distribution	PROJECT TERM:	3/16/12 – 3/15/14
WEBSITE:	www.crai.com		

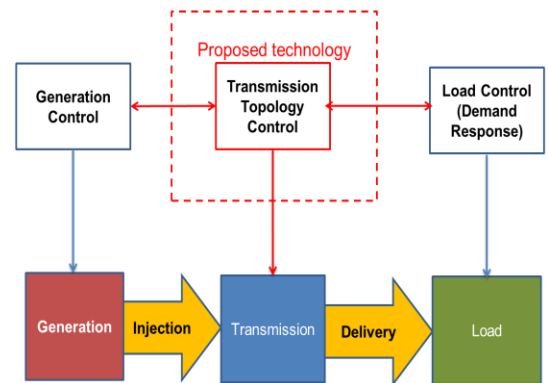
CRITICAL NEED

The U.S. electric grid is outdated and inefficient. There is a critical need to modernize the way electricity is delivered from suppliers to consumers. Modernizing the grid’s hardware and software could help reduce peak power demand, increase the use of renewable energy, save consumers money on their power bills, and reduce total energy consumption—among many other notable benefits.

PROJECT INNOVATION + ADVANTAGES

The CRA team is developing control technology to help grid operators more actively manage power flows and integrate renewables by optimally turning on and off entire power lines in coordination with traditional control of generation and load resources. The control technology being developed would provide grid operators with tools to help manage transmission congestion by identifying the facilities whose on/off status must change to lower generation costs, increase utilization of renewable resources and improve system reliability. The technology is based on fast optimization algorithms for the near to real-time change in the on/off status of transmission facilities and their software implementation.

Graphic Depiction of Proposed Technology



IMPACT

If successful, CRA’s technology could save between \$1-2 billion in annual generation costs, enable more renewable energy to be incorporated into the grid and reduce or delay the needs for new transmission investments.

- **SECURITY:** A more efficient, reliable grid would be more resilient to potential disruptions from failure, natural disasters, or attack.
- **ENVIRONMENT:** Enabling increased use of wind and solar power would result in a substantial decrease in carbon dioxide (CO₂) emissions in the U.S.—40% of which are produced by electricity generation.
- **ECONOMY:** Active grid management could ease transmission congestion which costs the U.S. an estimated \$4-8 billion each year.
- **JOBS:** Advances in power grid control technology could result in new high-paying jobs in supporting sectors such as engineering and information technology.

CONTACTS

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Decision Technology