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Director of the Department of
Energy's Pacific Northwest
National Laboratory



DOE's 17 NATIONAL LABORATORIES

address critical scientific challenges





PNNL was born from the **MANHATTAN PROJECT**

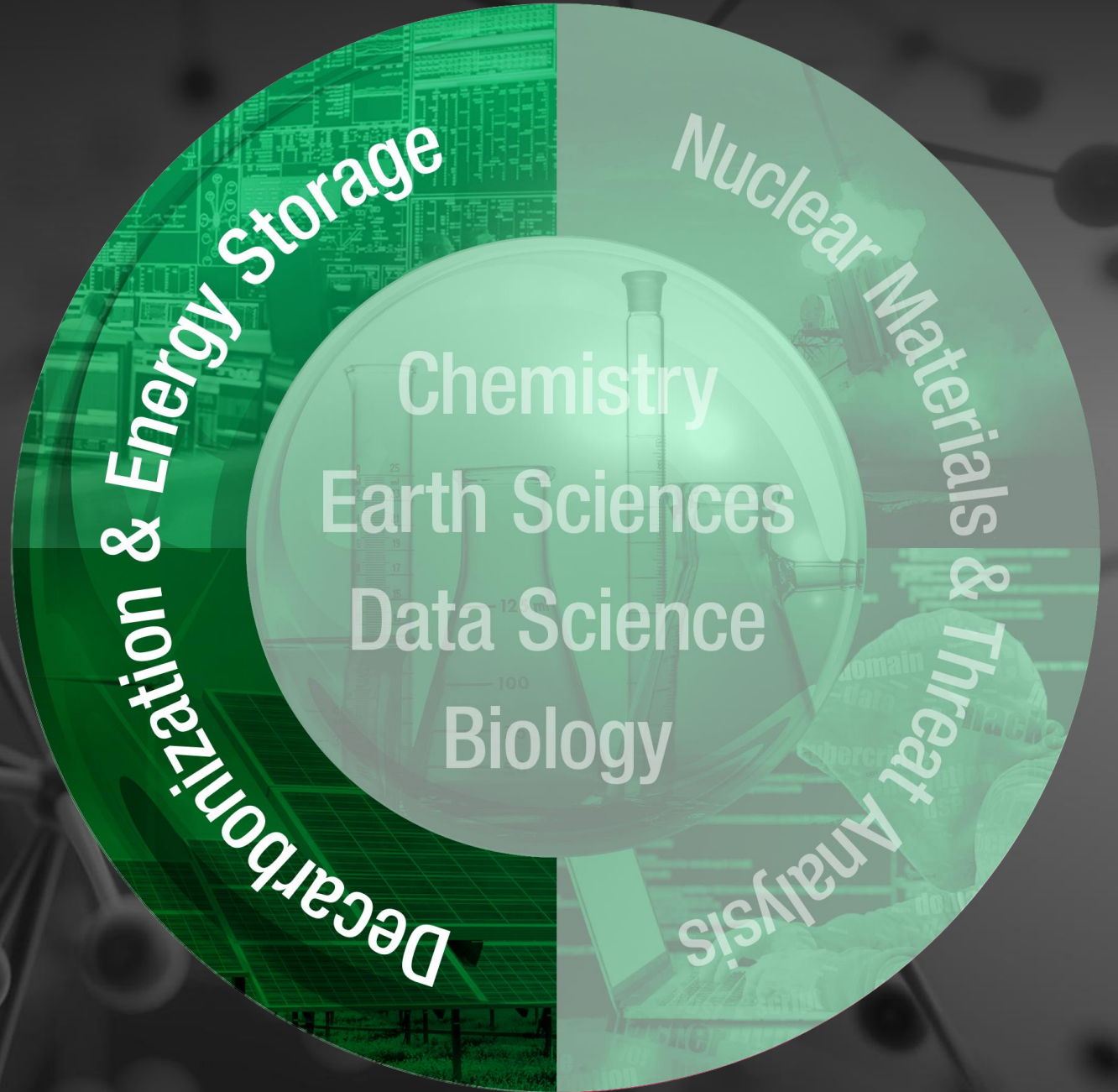




Today, PNNL is a *regional, national, and international*
SCIENTIFIC RESOURCE



PNNL is focused
on our nation's
**GREATEST
CHALLENGES**



GRID MODERNIZATION

is a critical priority



GRID

MODERNIZATION
LABORATORY
CONSORTIUM

U.S. Department of Energy

We must deliver
**THESE
OUTCOMES**



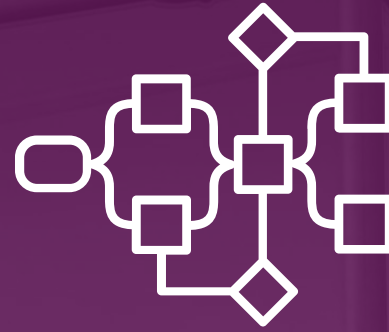
These outcomes must be
**FULLY
INTEGRATED**



INNOVATION

in key areas will drive

TRANSFORMATION



MODELING
& ANALYTICS



ENERGY
STORAGE

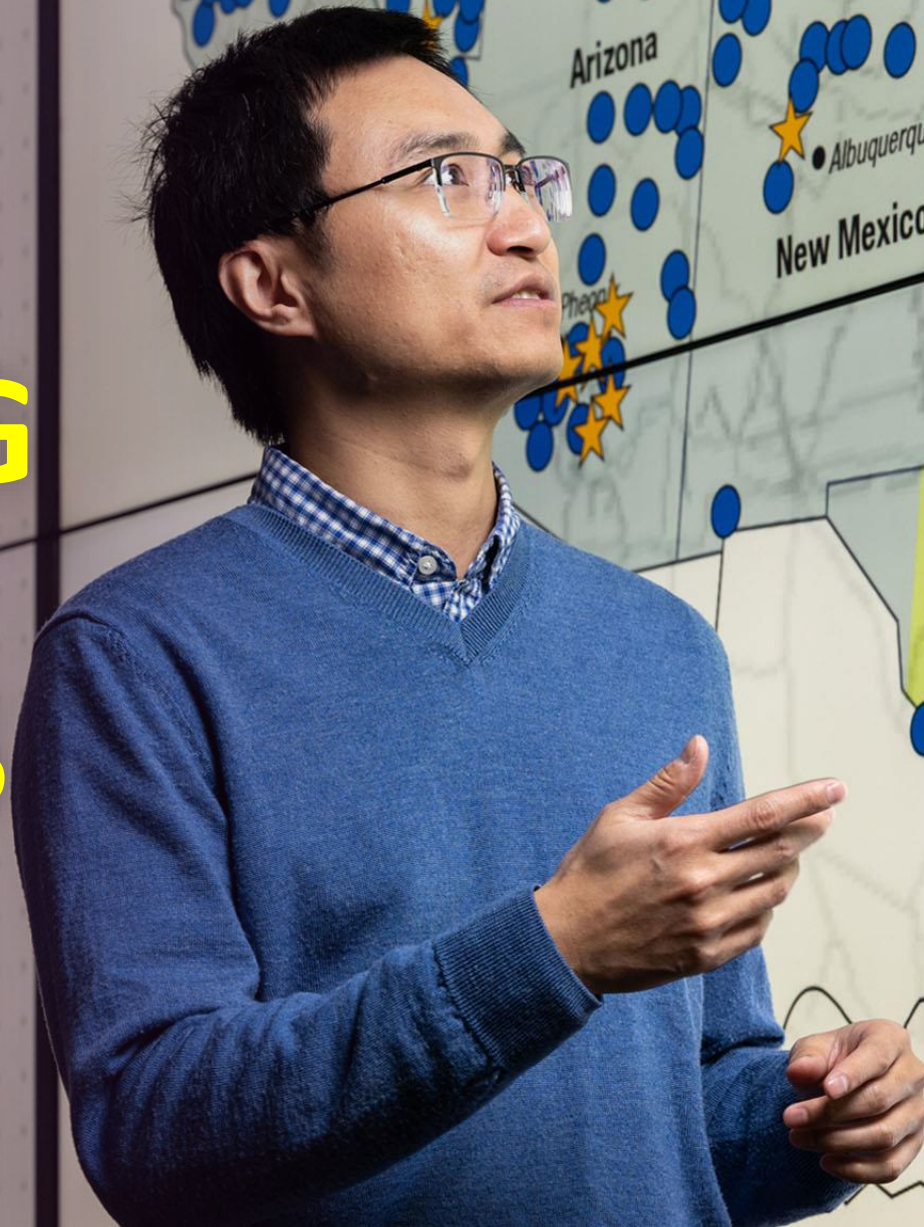


TRANSACTIONAL
CONTROL



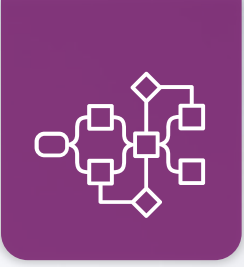
ALL-HAZARDS
RESILIENCY

MODELING AND ANALYTICS

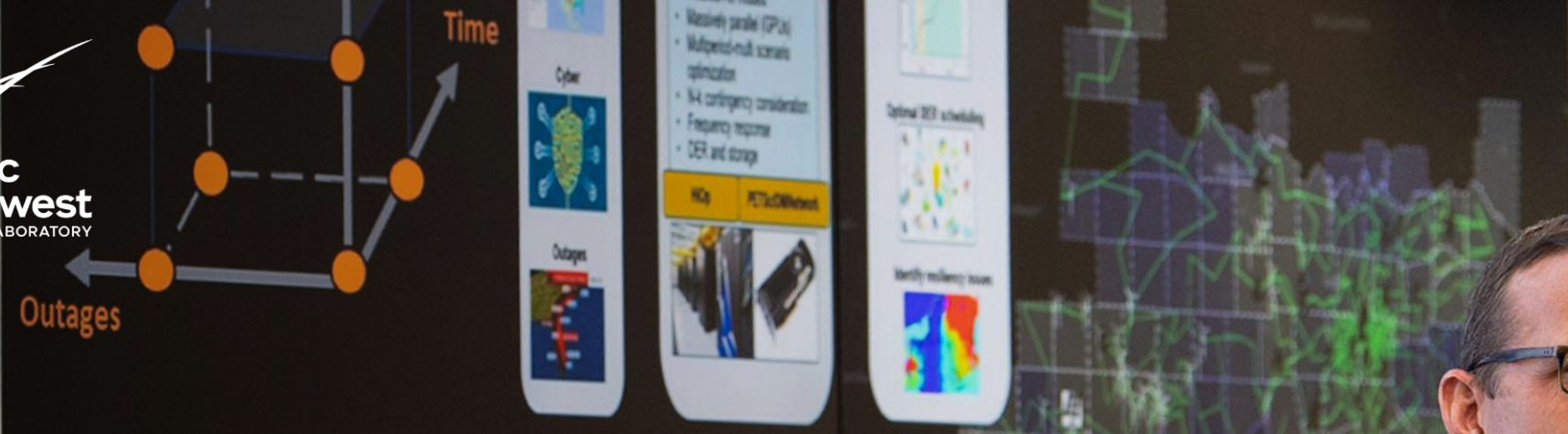


...distribution may lead to false positives





Providing
**DISTRIBUTION SYSTEM
INSIGHTS**
from generation to end use



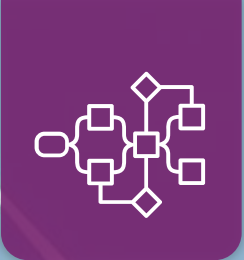
Pacific Northwest NATIONAL LABORATORY



EVENT
3rd CASCADING EVENT
▶ Third line overloaded 0-10 seconds after initialization of the fourth stage

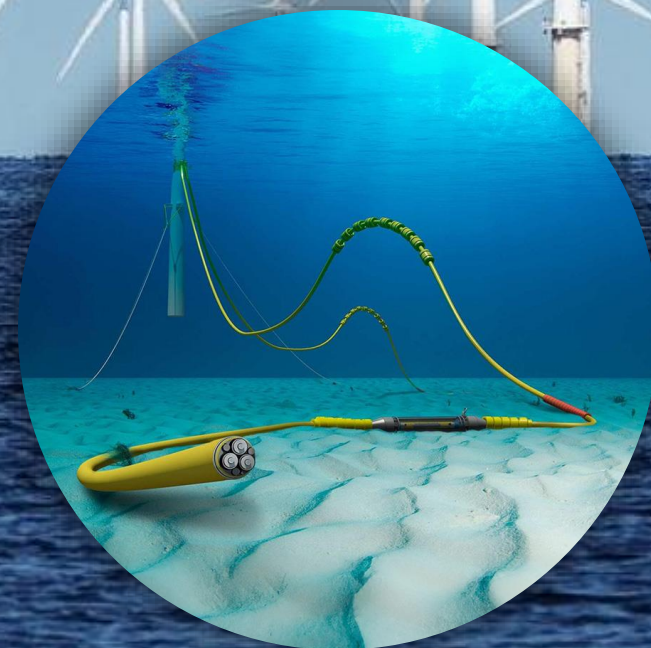
Modeling and analyzing DISRUPTIVE GRID EVENTS

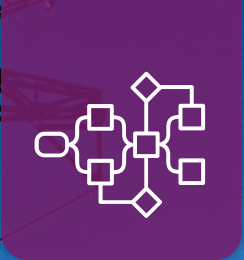




Assessing cost benefits of

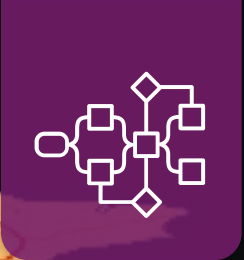
FLOATING OFFSHORE WIND



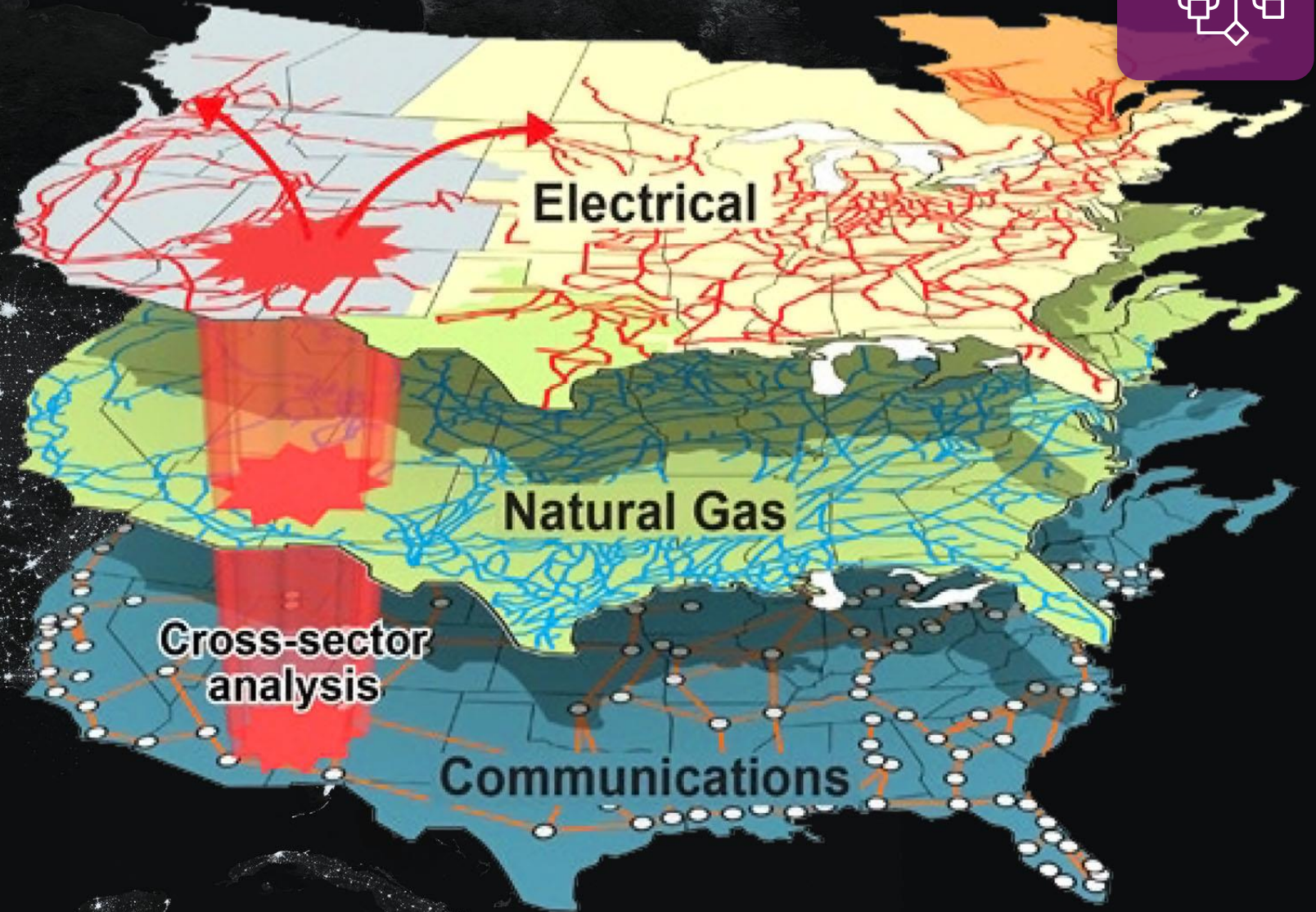


Preparing a
**NATIONAL
TRANSMISSION
PLANNING STUDY**
for DOE

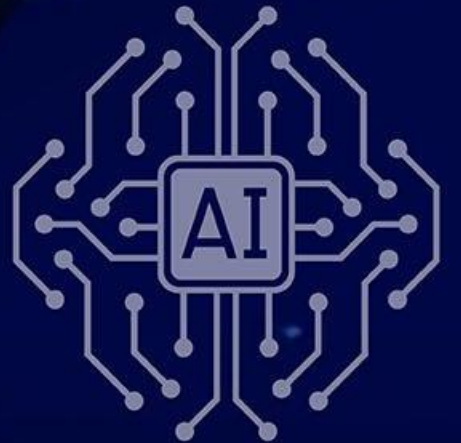




Providing unparalleled
**MULTI-
SECTOR**
data and insights



Leveraging the
**POWER
OF AI**
for decision making
and planning



TRANSACTIVE CONTROL



Deploying on our campus to **OPTIMIZE OPERATIONS**





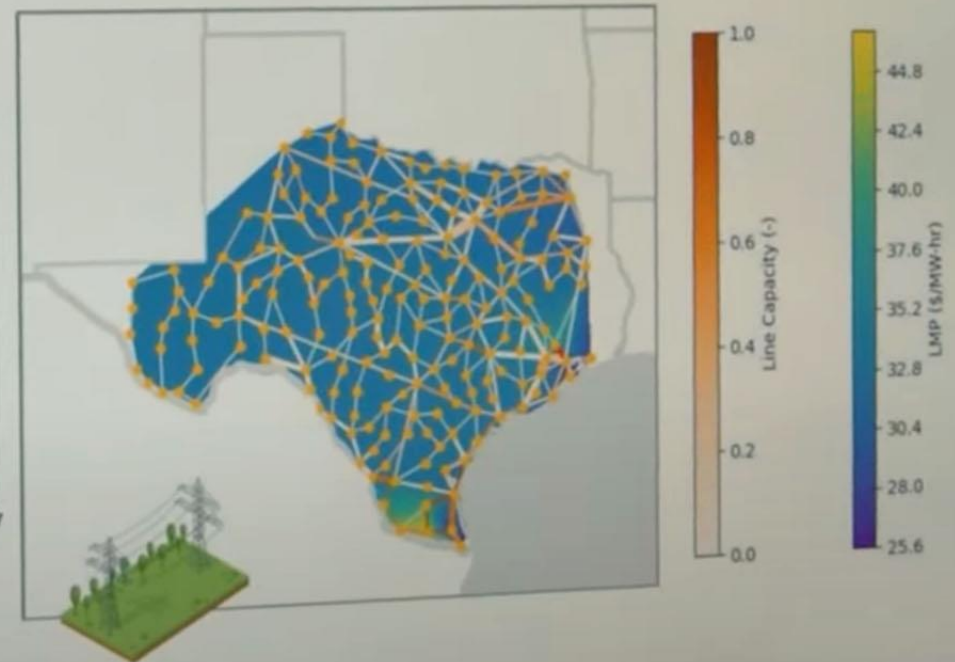
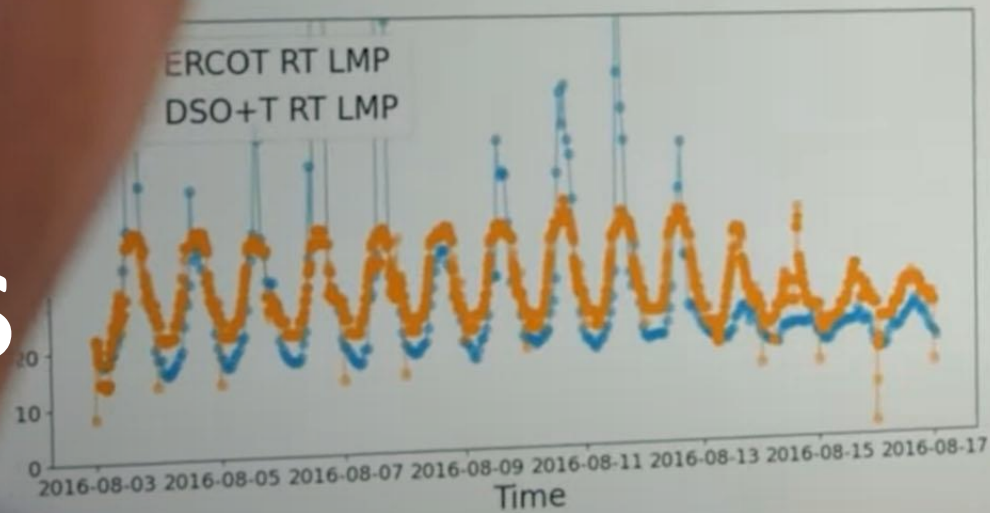
Connecting buildings to the grid **SMART CITIES**



SPOKANE ECO-DISTRICT

Variation of Price by Region and Time

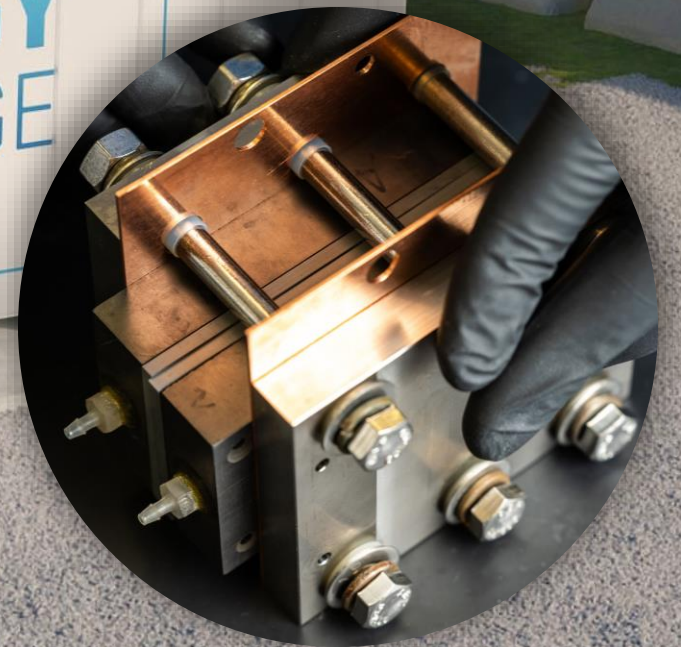
Modeling
ERCOT
COST
SAVINGS





GRID-SCALE ENERGY STORAGE

ENERGY
STORAGE





Achieving
**RECORD-SETTING
FLOW BATTERY**
performance





Integrating
**GRID-SCALE
ENERGY
STORAGE**
on our campuses





Integrating
**GRID-SCALE
ENERGY
STORAGE**
in our communities





Meeting tomorrow's
**ENERGY STORAGE
DEMANDS**
in partnership with industry

GRID STORAGE
LAUNCHPAD

3370 Stevens Drive

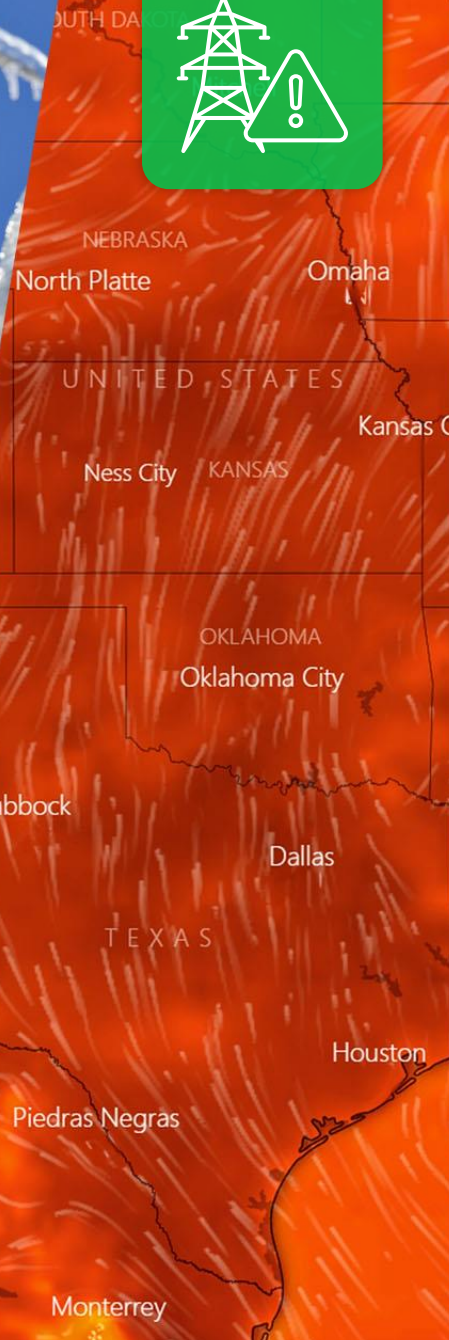


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U.S. DEPARTMENT OF
ENERGY

ALL HAZARDS RESILIENCY





Assessing impacts and
informing response to

NATURAL DISASTERS



San Antonio
Houston
Corpus Christi
Brownsville

Hurricane Harvey (August 2017)

Informing
**EMERGENCY
RESPONSE**



Identifying a path to **RESILIENT RECONSTRUCTION**

Puerto Rico and Ukraine





Providing actionable
information to guard against
CYBER THREATS



E-ISAC
CRISP
CYBERSECURITY
RISK INFORMATION SHARING PROGRAM



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Northwest
NATIONAL LABORATORY

Bringing it all together in the

ELECTRICITY INFRASTRUCTURE OPERATIONS CENTER



Developing an integrated
**REGIONAL
ENERGY SYSTEM
ANALYTICS PLATFORM**