

ADVANCED LEARNING FOR ENERGY RISK TRACKING-ALERT

NSF Project_ID1951813

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Award Type: PG, FY2020

Principal Research Investigators

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Community Partners

Participant	Role
COSA (Innovation, Emergency, Solid Waste, Convention Centers, ALAMO Dome)	Communication with SA residents and business about city support services during outages
CPS Energy (Data Analytics, Outage and Asset Management, Customer Relations)	Communication with consumers and CPS departments for outage prediction and mitigation
Health (University Health Center)	Outage impacts on patients, staff, and services
Education (AH ISD, Northeast ISD, SA ISD, UTSA)	Outage impact on labs, classes, and services
San Antonio Water System	Outage impact on water distribution
Chamber of Commerce	Outage impact on commerce and visitors
Business (small and large)	Outage impact on economic wellbeing
AH-Alamo Heights; ISD-Independent School District; SA-San Antonio; UTSA-The University of Texas at SA	

This slide serves as a brief Introduction to investigators and community partners

Project Overview

Visual Schematic

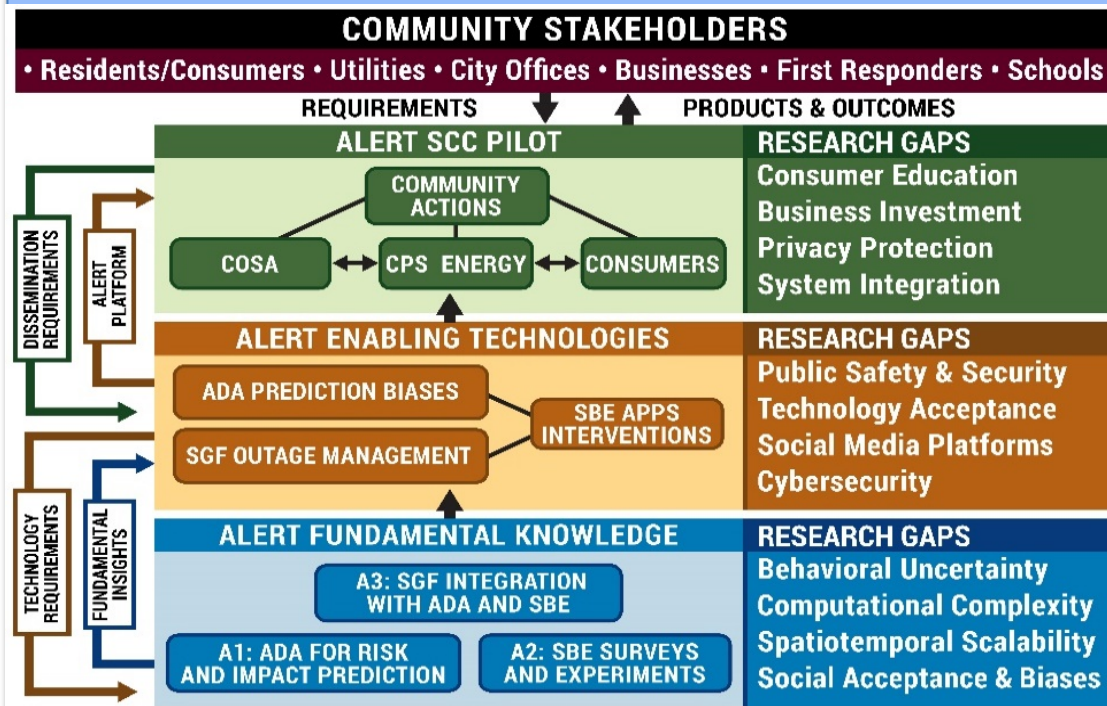


Figure 1. ALERT research and implementation methodology
 SCC-Smart and connected communities; COSA-City of San Antonio; ADA-Advanced data analytics; SBE-Social, behavioral, and economic; SGF-Smart grid fundamentals

Project Vision

1. Make communities resilient to electricity outages by creating messages about the state of risk (SoR) of outages and offering education and training to develop the workforce and community management and mitigation to reduce the risk and avoid outage impacts
2. Engage smart grid fundamentals (SGF) and advanced data analytics (ADA) with social, behavioral and economic (SBE) sciences to lay foundation how the consumer partnership with the utility companies and city agencies can result in community benefits, particularly underserved communities.

Project Overview

Use-Inspired Research

Problem: Electricity outages and their impacts on the community. Developing advanced methods for outage risk prediction and defining SBE interventions to engage electricity consumers in outage impact management and mitigation

City of San Antonio (COSA), Texas: Population of 2.0M, with 1/3 at least 50 years of age; 64% Latino (Hispanic-majority city) median income: \$52k; proportion in poverty: 18%; over 30 higher education institutions with 100,000 college students and 30,000 higher education graduates yearly; 18 ISDs with over 400,000 K-12 students

CPS Energy: municipally utility owned by COSA for over 80 years; The largest MUNI in the USA; Innovator and national technology leader

PG Activities

Project Team Building: The team is formed with experts in SGF, ADA and SBE sciences. The team spans four universities from four cities (San Antonio, College Station, Houston, Philadelphia), allowing extensive education and outreach

Refining Research and Pilot objectives:

Discussions with COSA, CPS Energy and selected consumer groups about the research focus to serve their needs, and the pilot design scope and scale to meet the research objectives

Community stakeholder engagement and

feedback: Planning a community survey based on a smaller set of participants to establish a sense of the community trust in the utility company supplying the risk messages



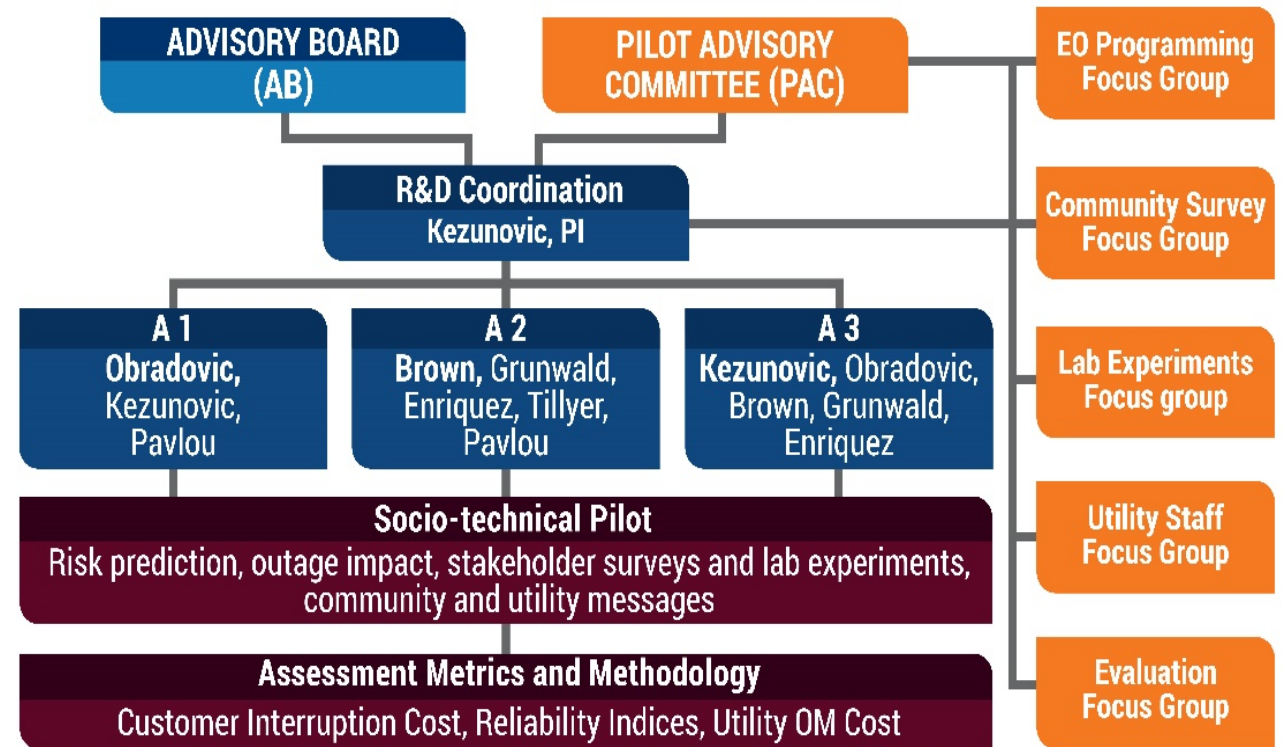
Project Update

Activities to date: Meetings with COSA, CPS Energy, and interviews with prospective pilot participants

Planning grant activities so far: We are defining the full proposal components such as utility system model needed for the study of SGF, ADA candidate methods for risk prediction implementation, and SBE interventions in form of surveys and behavioral economics experiments

Example: We are also focusing on the project management components as described by the Figure to the right

This effort requires us to define members of the Advisory Board (AB), as well as the members of the Pilot Advisory Committee (PAC). In addition, we are defining the research Aims (A) and key components of the community pilot (participants and metrics)



Suggested length: 45(s)

Project Evolution

Starting Point: existing utility practice (baseline) as shown in Figure below

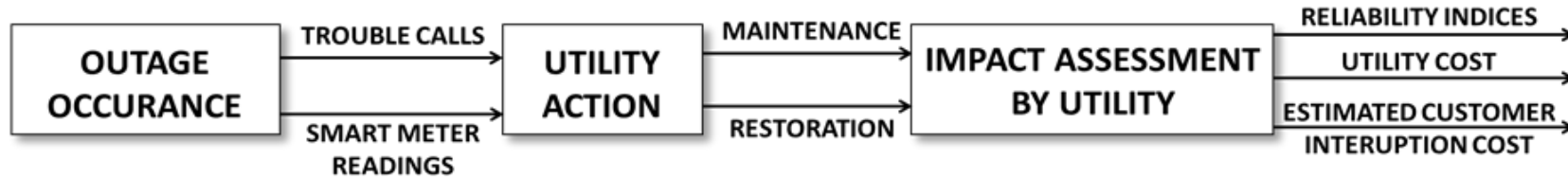


Figure: A baseline for utility assessment of outage impacts

Examples of feedback that informed further understanding:

- *In discussions with CPS Energy, we gained a better understanding what their processes to deal with the practice shown in the above figure are, and we learned what the processes that we envision would look like. The COSA representatives gained an understanding what would their role be in the dissemination of ALERT messages*
- *We learned that the electricity consumers look for prediction certainty rather than risk probability. This affected our survey design thinking for different consumer groups, and their educational and social background*
- *The consumers we interviewed indicated that they will rather take early warnings even if they are somewhat inaccurate Vs. more accurate prediction that do not allow enough time to take mitigation measures*
- *Schools appeared to be particularly vulnerable due to huge number of local facilities (over 480 campuses) with over 350,000 students. While many commonalities have been identified, some categories of impacts were unique to the age of the school installation, diversity of students, and social welfare*

Suggested length: 30(s)

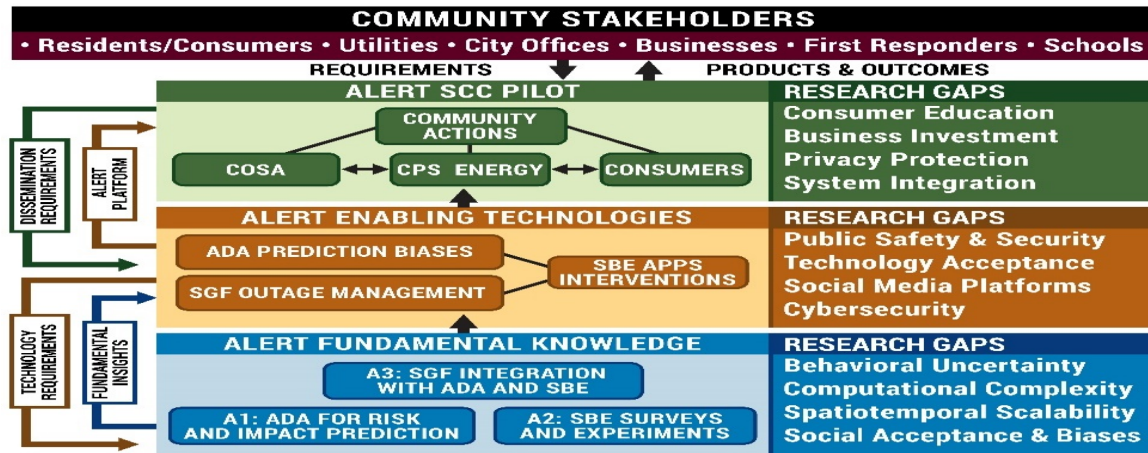
PROPOSAL TITLE: ADVANCED LEARNING FOR ENERGY RISK TRACKING-ALERT

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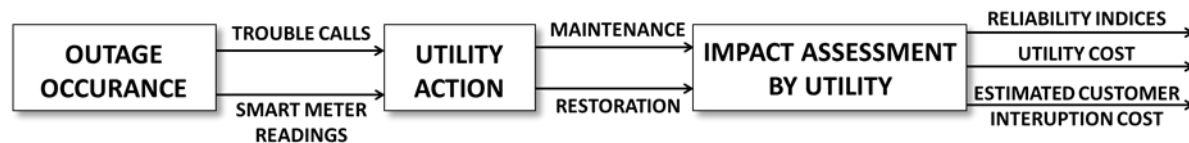
Visual Schematic



Project Vision

ALERT changes the existing utility outage management practice from passive to active consumer engagement enabling SCC stakeholders to reduce electricity service outage impacts and increase community safety and security through vigilance and preemptive measures to avoid outages. **ALERT educates diverse workforce** needed to support such community engagement paradigm of the future.

Use-Inspired Research



A baseline for utility assessment of outage impacts

ALERT seeks to engage consumers in management and mitigation of socio- and techno-economic aspects of the outage risk, which changes the baseline above that does not engage consumers. Our approach requires trust between utilities and consumers and a change in the culture of SCC engagement to benefit the stakeholders. We **partner** with the City (COSA) and CPS Energy in San Antonio, TX

PG Activities

Project Team Building: Experts in SGF, ADA and SBE sciences from four universities with extensive education and outreach
Refining Research and Pilot objectives: Discussions with COSA, CPS Energy and selected consumer groups about the research focus and the pilot design scope and scale
Community stakeholder engagement and feedback: Planning community survey to assess the trust in the utility