

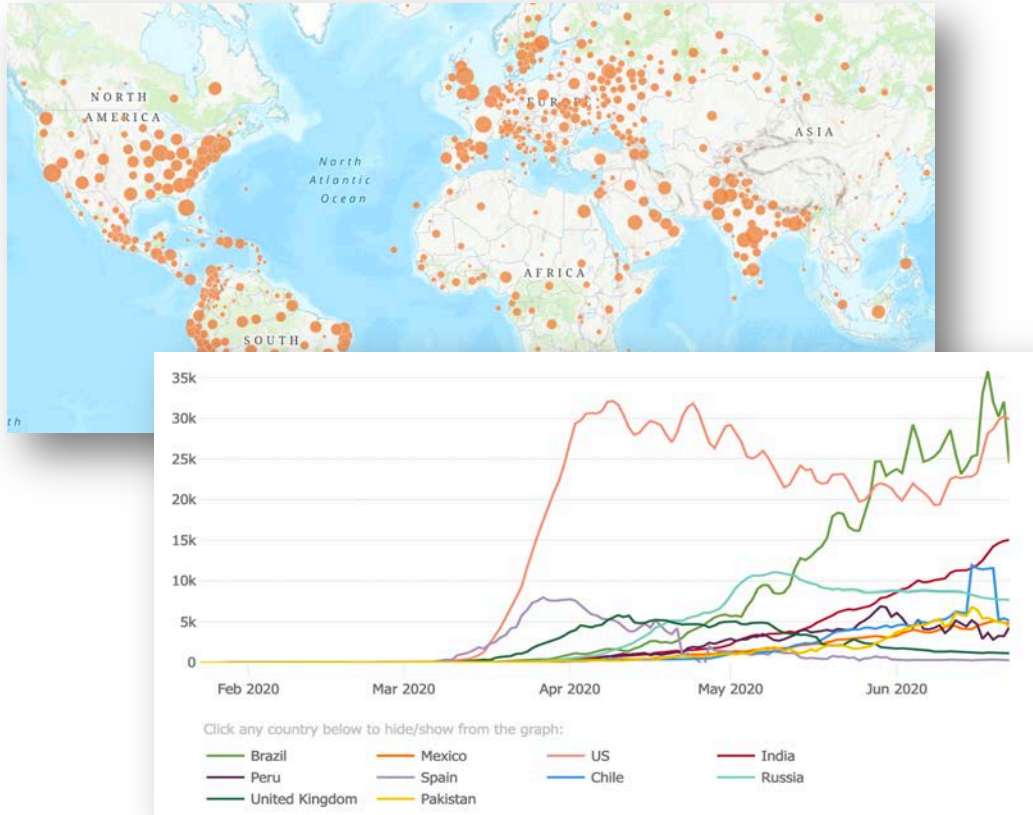
# Pandemic-Resilient and Sustainable T&D Systems

NATF-NERC Pandemic Planning And Response Activities Webinar

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# EPRI COVID-19 Response: Collaboration



Active and daily confirmed cases (June 23): Source Johns Hopkins

## Global Pandemic Webcasts

- 21 webcasts
- 7400+ participants
- 360+ companies



## Topics addressed

- Demand and energy analysis
- Operating impacts
- Mitigation practices


Using global reach to gain insights and share with wider audience

# EPRI COVID-19 Response: Deliverables

[epri.com/covid-19/](https://www.epri.com/covid-19/)




**Light-Based Disinfectant**




**Facial Thermography**



**Disinfecting Control Rooms**



**Remote Source Verification**

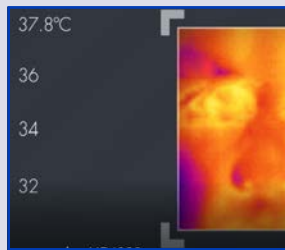


**UV Ops Guidance and Safety**

## Powering Through Together: Identifying COVID-19 T&D Operations Practices



**Keeping the Control Center Operational**



**Operator health Monitoring**



**Field Crew Practices**



**Storm Operations**



**Changes to Planned Work**

# Pandemic Resilient and Sustainable T&D Systems



**Health Monitoring, Testing, Disinfecting,  
and Teleworking**



**Work Process, Facility Design, Remote  
Operation, and Asset Management**



**Decarbonization and  
Sustainability**

**Collaboratively  
addressing the  
common global needs  
for pandemic resilient  
and sustainable T&D  
strategies**



**Demand Forecasts and Operating Impact  
Mitigations**

# Recognizing the Full Operational Value beyond COVID-19

## Acting Today

### Making changes to existing practices for COVID-19

Disinfection technologies

Operator and field practices

Social distancing guidelines

Field and operator training

Staff sequestration

Demand impact mitigation

Safety  
Reliability  
Resiliency

## Enabling Tomorrow

### Enabling sustainable capabilities and processes resilient to any scenario

Health and safety

Technology applications

Control center of the future

Renewable integration

New operational paradigms

Decarbonization pathways

Teleworking

Asset management strategies

Safety  
Flexibility  
Reliability  
Efficiency  
Resiliency  
Affordability  
Sustainability

# Research Workstreams

## Health & Disinfection



## Control Center Strategies



## Field Crew Strategies



## Operator and Field Training



## Demand and Operation Impacts



## Deferred Work & Resource Adequacy



## Asset Management Strategies



## Long-Term Demand and Sustainability



# Health and Disinfection Technologies and Methods

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## Focus Areas

- Disinfection approaches and technologies for control center and field applications
- PPE performance including specific utility applications
- Workforce health monitoring
- Workforce testing including antibody tests
- Engineering controls to reduce pathogen spread
- Impacts and opportunities with teleworking

## Key Deliverables

- Lab and field results for disinfectant tech and PPE
- Best practices for workforce testing and monitoring
- Best practices for engineering controls
- Metrics to inform telecommuting decisions

# Control Center Design and Operations Processes



## Focus Areas

- Control Center facility designs – primary / backup
- Mitigation practices, procedures, processes: sequestration, contact procedures, shift schedules
- Storm restoration and recovery processes
- Cyber-secure decentralized / remote operation
- Detection and mitigation plans and processes for concurrent pandemic and cyber attack scenarios
- Process and control automation opportunities

## Key Deliverables

- Designs, practices, procedures, and mitigations
- Security architectures for the remote access
- Cyber threat detection and attack mitigation
- Restoration plans during major events





## Focus Areas

- Communications and tracking tech for separation
- Processes for shared tools/equipment
- Safety of energized field application sanitization
- Technology and process solutions to reduce need for close proximity
- Remote reporting of crews and staggered shifts

## Key Deliverables

- Technologies for improving communications at a distance
- Work-practice improvements resulting from social distancing
- Laboratory safety performance of hand sanitizers

# Operator and Field Crew Training



## Focus Areas

- Technologies/processes for on-the-job training without requiring proximity
- Methods to transform in-person training to online platforms
- Training modules for distancing in unique T&D scenarios

## Key Deliverables

- Demonstration of remote training at an operations center
- Documentation of lessons learned on training methods using social distancing
- Modules on ways to perform T&D tasks while maintaining social distancing

# Near-Term Demand and Operational Impacts



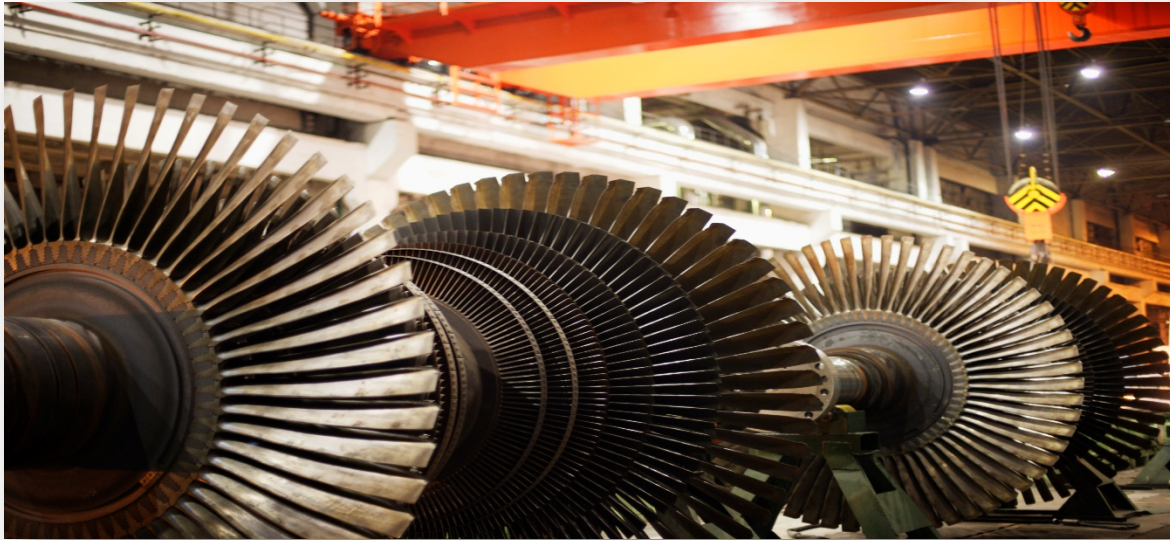
## Focus Areas

- Collate and assess demand impacts across different climate regions and conditions across the world over past months
- Evaluate load class impacts to improve forecasting methods and extrapolate demand impacts to other seasons
- Review mitigation methods/tools for operational issues including high voltage, reverse power flow, etc. and develop process for identifying solutions

## Key Deliverables

- Pandemic impacts on demand for different conditions, load class composition
- Forecasting methods and practices for future seasons/pandemic situation
- T&D operational impacts, experiences and mitigation solution framework

# Deferred Work and Resource Adequacy



## Focus Areas

- Risk associated with deferred work and need to reschedule priority projects
- Impact of altered demand and generation availability on resource adequacy and operations
- Risk-based framework to prioritize outage requests based on demand and other uncertainties such as renewables scenarios

## Key Deliverables

- Scenario development practices for operational planning during periods of extreme uncertainty
- Impact of delayed maintenance and capital projects on asset availability/performance
- Risk-based outage screening framework and examples of how to apply



## Focus Areas

- Assess structural changes and how they will impact future demand based on surveys/meter analysis
- Energy systems analysis to understand implications of changing demand for generation mix, emissions/air pollution, etc.
- Identify impact on electrification, efficiency, renewables deployment/curtailment
- Assess impact of changes on policy targets, clean energy and other goals

## Key Deliverables

- Analysis of changes in economic growth, energy/electricity demand by sector, generation capacity mix, CO2 emissions for different scenarios
- Implications for sustainability strategies

# Asset Management Strategy



## Focus Areas

- Remote monitoring strategy and implementation plan to aid asset health assessment and compliance (monitor and prioritize equipment needs)
- Utility challenges related to supply chain uncertainty and spares practices
- Impacts on spares policy
- Analytical approach that can be used to determine optimal spares, where they should be located and adjust existing inventory levels

## Key Deliverables

- Equipment monitoring strategy and implementation – what needs to be done and best place to implement
- Guidelines for managing pandemic impact on stock and spares planning and management
- Analytical methodology that accounts for pandemic risks, assesses impact and helps members determine optimal stock and spares policies

# Project Focus - Prioritization



Description	Rank-B
2-18-Evaluate recommendations and strategies for Distribution Control Centers and Field	3.78
9-47-Online repository for sharing all reports, tools, engagement opportunities, and m	3.55
2-11-Identify and document a summary of the leading practices, procedures, mitigatio	3.25
6-36-Evaluate the impact of delayed maintenance and capital projects	3.23
3-21-Identify and document of work-practice improvements using social distancing.	3.15
4-24-Investigate technologies to allow mentors to monitor and impact trainee actions	3.09
4-25-Prepare a video or computer-based training modules on ways to perform tasks wh	3.09
4-26-Provide lessons learned on training methods using social distancing.	3.08
2-12-Identify and document enhanced design requirements for primary and backup co	3.00
5-27-Summary of demand impacts of COVID-19	3.00
7-41-Executives Summary of Key Insights	2.91
9-46-Bi-annual project meetings	2.91
8-43-Determine Asset Management Guidelines for managing pandemic impact on stock	2.82
8-44-Prepare an analytical methodology that accounts for pandemics and helps memb	2.82
7-39-Summarize scenario results for changes in economic growth, energy/electricity de	2.78
9-45-Quarterly project updates/engagement webcasts for each workstream	2.75
2-14-Evaluate and document results, risks to consider and recommended security and t	2.70
3-19-Develop demonstration video with field crews and the use of technologies for imp	2.64
6-35-Scenario development for operational planning during periods of extreme uncert	2.62
5-29-Capture the impact of pandemic on load class composition.	2.60
8-42-Develop an equipment monitoring strategy and implementation – what needs to l	2.60
5-28-Evaluate the performance of operational load forecasting tools and recommendat	2.56
5-30-Evaluation of the extrapolated impact of pandemic restrictions on future seasons	2.55
6-37-Develop a risk-based outage screening framework.	2.55
2-17-Produce documentation of refined restoration plans and lessons learned from tab	2.54
3-20-Determine the performance of existing technologies for improving communicatio	2.50
5-31-Document issues outlined and further analysis of regions where issues arose, inclu	2.40
2-15-Produce an evaluation framework to help utilities self-assess associated risks of th	2.30
7-38-Interactive webcasts over 6 to 9 months to review modeling and analysis	2.22
2-13-Identify and document key new automation algorithms and tools for system moni	2.00
2-16-Identify functional requirements for virtual command and control centers	2.00
3-22-Evaluate lab test results of the safety performance of hand sanitizers.	2.00
7-40-Capture implications for sustainability strategies	2.00
4-23-Develop a video interview with a distance training expert along with a video dem	1.91
5-33-Summarize case studies of distribution feeder impacts of changed demand profile	1.88
5-34-Develop an emergency critical load connection screening tool (software).	1.71
5-32-Develop a framework tool (software) for analyzing and prioritizing mitigation opti	1.43

A blue-tinted photograph of four people, two men and two women, standing in a row. They are dressed in professional attire, including lab coats and a hard hat. The text 'Together...Shaping the Future of Electricity' is overlaid in white on the image.

**Together...Shaping the Future of Electricity**