Resilience Applications for Low-income Communities

Thursday, July 11
9:00am – 10:30pm
Speakers and Moderator

- Moderator: Krystal Laymon, US DOE
- Speaker: Jeni Hall, Energy Trust of Oregon
- Speaker: Laurie Schoeman, Enterprise Community Partners
- Speaker: Michael Walton, Green Spaces
Snapshot: Federal Resiliency Activities

JUNE 2019
WIP's mission is to enable strategic investments in energy efficiency and renewable energy technologies through the use of innovative practices across the United States by a wide range of stakeholders, in partnership with state and local organizations and community-based nonprofits.
Puerto Rico Solar Photovoltaic (PV) Pilot Program

- Puerto Rico’s State Office of Energy Policy requested DOE WAP funding be dedicated, to provide photovoltaic (PV) and battery storage to WAP-eligible single-family homes.

- DOE’s SEP 2 solar PV and battery storage in Mona Island, a natural reserve where research is conducted. Remaining funds used for residential PV project.
CNMI’s Energy Division was able to receive support from the State Energy Program to deliver over 950 relief care packages to those affected by the storm.

Care packages included portable burner butane stoves so people could still cook food for their families, baby wipes, and toilet tissue.
Statewide Assistance for Energy Reliability and Resiliency, (SAFER²) Wisconsin

Overview:

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<td>Cost Match: 20%</td>
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Project Goals:

Wisconsin will provide technical assistance to local governments to advance energy resilience planning.

- Create baseline and track progress via pre- and post-project surveys to all county and tribal Emergency Management Directors
- Host regional educational roundtable events and cross-jurisdictional tabletop exercises
- Develop an energy assurance website with resources for technical assistance
- Create a local government Energy Resiliency Handbook

Impact:

- Communities improve plans by using the outage templates and lessons learned in the Energy Resiliency Handbook
- Forming partnerships with local governments and having ongoing collaboration will improve energy emergency resiliency, mitigation and response statewide
Financing Advanced Microgrids, New Jersey

Overview:

<table>
<thead>
<tr>
<th>DOE Funding: $299,840</th>
<th>Partners: New Jersey Institute of Technology, Rutgers University, New Jersey Clean Cities Coalition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Match: 29%</td>
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Project Goals:

NJ will address a significant gap in the current process of developing advanced community microgrids; the lack of clear guidance on the procurement and financing process.

- Utilize “real-world” data from the 13 NJ Town Center Distributed Energy Resource (TCDER) microgrid feasibility studies as they enter the procurement and financing process
- Develop a local government procurement guide to financing advanced community microgrids
- Guide stakeholders through the process to maximize the economic and resiliency benefits of the microgrid

Impact:

- Jurisdictions across the US will have access to a guide grounded in legal, economic and regulatory realities that improves understand the process of procuring and financing advanced community microgrids
- Advancement of shovel-ready projects that are in need of financial options for construction and economic optimization
Established more than 50 new authorities and requirements across FEMA:

- Building Resilient Infrastructure and Communities (BRIC)
- Building Codes and Enforcement
- Wildfire Prevention
- Hazard Mitigation Grant Program for Earthquakes
Now Released!

Clean Energy for Low Income Communities Accelerator (CELICA)
Online Toolkit
Clean Energy for Low Income Communities (CELICA): Outcomes

Partners successfully leveraged resources to commit **up to $335 million** to help **155,000 low income households** access energy efficiency and renewable energy benefits, and demonstrated promising program models for:

**Single Family**

*Example: State of Connecticut* and CT Green Bank’s bundled energy efficiency and solar program has been so successful that solar PV systems are owned by households in low income communities as much as those in non-low-income areas.

**Multifamily Affordable**

*Example: District of Columbia* is incentivizing building owners to serve 100,000 low income households with 240-300MW solar PV.

**Low Income Community Solar**

*Example: State of Michigan* Energy Office’s low income community solar program partnered with utilities to deliver $350/yr in additional savings for participating, previously weatherized, low income households.
Launched - Low-income Energy Affordability Data (LEAD) Tool

Goal: Help stakeholders make data-driven decisions on energy goals and program planning by improving their understanding of low income and moderate income household energy characteristics.

https://www.energy.gov/eere/slsc/maps/lead-tool
Questions?

Krystal Laymon
Office of Energy Efficiency & Renewable Energy
U.S. Department of Energy
Krystal.Laymon@ee.doe.gov
Jeni Hall

Energy Trust of Oregon
Agenda

• Market drivers in Oregon
• Research on the business case for solar + storage
• Lessons learned
• Looking to the future
About us

Independent nonprofit

Serving 1.6 million customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista

Providing access to affordable energy

Generating homegrown, renewable power

Building a stronger Oregon and SW Washington
A clean energy power plant

- **724** average megawatts saved
- **129** aMW generated
- **65** million annual therms saved

Enough energy to power **727,000** homes and heat **129,000** homes for a year

Avoided **29.3** million tons of carbon dioxide
Energy Trust Solar Incentive Program

- Closed network of trade ally contractors
- Residential & Commercial incentive
- Above code design & installation requirements
- Battery storage requirements
- 100% inspection rate for systems installed
- Consumer education
- Consumer protection
- Soft cost reduction
The future is already here—
it’s just not evenly distributed.

- William Gibson
Cutting-edge technology for over 60 years

Vanguard 1 satellite launched March 17, 1958.
Source: radiomuseum.org
Increasing solar+storage installations

Source: Energy Trust of Oregon annual report
Falling battery storage costs

Source: Rocky Mountain Institute, *The Economics of Grid Defection.*
No existing rate structure to capture value
Increasing Awareness of Resilience
"OSSPAC estimates that in the I-5 corridor it will take between one and three months after the earthquake to restore electricity, a month to a year to restore drinking water and sewer service, six months to a year to restore major highways, and eighteen months to restore health-care facilities. On the coast, those numbers go up. Whoever chooses or has no choice but to stay there will spend three to six months without electricity, one to three years without drinking water and sewage systems, and three or more years without hospitals. Those estimates do not apply to the tsunami-inundation zone, which will remain all but uninhabitable for years."
OSSPAC estimates that in the I-5 corridor it will take between one and three months after the earthquake to restore electricity, a month to a year to restore drinking water and sewer service, six months to a year to restore major highways, and eighteen months to restore health-care facilities. On the coast, those numbers go up. Whoever chooses or has no choice but to stay there will spend three to six months without electricity, one to three years without drinking water and sewage systems, and three or more years without hospitals. Those estimates do not apply to the tsunami-inundation zone, which will remain all but uninhabitable for years.
Neighbors Helping Neighbors

After a large earthquake, your community’s emergency responders will be overwhelmed and possibly victims themselves. You, your family, and neighbors will need to be your own first responders. Get together with your neighbors to talk about and plan for emergencies.

We are all in this together

No one survives and recovers from a disaster alone. Disasters have shown that where people are organized and prepared, families recover faster. Your neighborhood will recover faster if you organize now. Once you have organized, you can move to more ambitious projects like practicing emergency drills and helping build supply caches with your neighbors.

When disasters happen, we rely on the aid of others to help us through. Even with the best preparedness efforts, our neighbors and others in our neighborhoods will help us respond to and recover from a disaster.

Home and neighborhood hazard hunt

Make a game out of looking for hazards in your neighborhood and in your home. You can search online to find “home hazard hunts” and get the kids and neighbors involved.
Comparison of the history of subduction zone earthquakes along the Cascadia Subduction Zone in northern California, Oregon, and Washington, with events from human history. Ages of earthquakes are derived from study and dating of submarine landslides triggered by the earthquakes. Earthquake data provided by Chris Goldfinger, Oregon State University; time line by Ian P. Madin, DOGAMI.
Solar + Storage Research

- 10 sites serving low income communities
- Define & measure resilience
- Identify & address barriers
- Gain visibility into the storage market
Lessons

• No existing "neural networks"
• All people no process
• Storage has a Cinderella problem
• Storage adds value*
• Net Zero buildings impact the grid
• Solar contractors are not ready
• Customers are not ready
• O&M is a blackbox

*it depends
Lessons: Multifamily Affordable Housing

• Large opportunity both for resilience and for grid benefits
• First cost is a challenge
• Tenant rent & utility subsidies
• How the building is metered matters
• Utility rates can drive value or be a barrier
Looking forward

• Expand research to do a deeper dive on more sites
• Publish a report early next year

• HB2618: Solar Rebates for All
• Utility battery storage programs
• TOU Rates & utility capacity deficits
• "Smart Grid Test Beds"
• Public Safety Power Shutoffs
• Voluntary Green Building Standards
Enterprise: Who We Are

Create opportunity for low- and moderate-income people through fit, affordable housing in diverse, thriving communities.
Enterprise Multifamily Tools For Resilience
## Faces of Resilience

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>People</td>
<td>The extent of personal discomfort, harm, injury, or loss of life.</td>
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<tr>
<td>Physical Assets</td>
<td>Loss or damage to structural and architectural building components, MEP and IT equipment, utilities, landscaping, contents.</td>
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<tr>
<td>Operations</td>
<td>Disruption to building operations and functionality, occupancy, egress/ingress, critical systems, or lab activities.</td>
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<tr>
<td>Revenue</td>
<td>Loss of revenue due to business interruption, specifically in relation to tenants.</td>
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<tr>
<td>Reputation</td>
<td>Negative media attention or impact on industry reputation in the aftermath of an impactful shock or stress.</td>
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</table>
Guiding Principles of Strategies of MF Building Resilience

- Resilience is a smart investment
- Resilience should be a part of the capital improvement planning process
- Use lessons learned from extreme weather events to rebuild smarter
- Connected communities are more resilient
Ready to Respond: Strategies for Multifamily Building Resilience

19 practical strategies for building owners to make their properties more resilient against the effects of extreme weather events typical to the Northeast United States.
Getting Started: Decision Making Process

**Identify your hazard exposure**
Understand your previous experience with climate and emergency hazards, the location and climate zone of your site and your community, and your future anticipated risk. See the Hazard and Risk matrix on page X to identify your hazard exposure.

**Assess your risks**
Assess potential threats, and anticipate their impact on infrastructure and residents to determine where to focus your attention. See the Hazard and Risk matrix on page X to identify your hazard exposure.

**Determine your resilience strategies**
Once you understand the hazards and risks, you can assess which resilience strategies make sense for your building. The chart on page X will guide you.
Determine your Resilience Strategies

<table>
<thead>
<tr>
<th>Resilience Strategies</th>
<th>Decision Matrix</th>
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<tr>
<td><strong>Protection</strong></td>
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<tr>
<td>Dry Positioning</td>
<td>5.0, 8.6, 10.7</td>
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<tr>
<td>Site Surface Protecting</td>
<td>5.0, 8.6, 10.7</td>
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<tr>
<td>Resident Monitoring</td>
<td>5.0, 8.6, 10.7</td>
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<td>Automobile Valves</td>
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<td>Net-Priorities</td>
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<td><strong>Facilitation</strong></td>
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<td>Elevator Efficiency</td>
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<td>Resured Equipment</td>
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<tr>
<td>Elevated Living Space</td>
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<tr>
<td>Surface Barrier Managed</td>
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<td>Window Blinds</td>
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<tr>
<td>Distributed Heating and Cooling</td>
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<tr>
<td><strong>Backup</strong></td>
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<td>Redundant Backup Route to Critical Systems</td>
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<td>Emergency Lightway</td>
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<td>Access to Mobile Water</td>
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<td><strong>Community</strong></td>
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<td>Building Community Tax</td>
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<tr>
<td>Creating Community Resilient Systems</td>
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<td>Developing an Emergency Management Manual</td>
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<td>Organization for Community Resilience</td>
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<thead>
<tr>
<th>Building Tasks</th>
<th>Units</th>
<th>Hours</th>
<th>Your Role</th>
<th>Initial Challenges</th>
<th>Projector</th>
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Flood Prevention – High Cost

Elevated Equipment
Hey New York, are you flood-ready?

SCALEABLE TECHNICAL ASSISTANCE MODEL
Resilience Capital Needs Assessments-Mid Atlantic
KEEP SAFE

A GUIDE TO RESILIENT HOUSING DESIGN IN ISLAND COMMUNITIES
**REINFORCE SITE WITH INFRASTRUCTURE**

**STEP 3 - IMPLEMENT GREY INFRASTRUCTURE ON SITE**

- Consult a contractor, civil engineer, agronomist or the Agricultural Extension Service (SEA, by its Spanish acronym) to design grey infrastructure systems as outlined below.

- Be cautious when choosing where to deposit water. If water is contaminated with debris, do not deposit into a lake, river, or sea.

- Gray infrastructure may require special permits and a larger and more specialized professional team, can be more costly, and can be disruptive to the site if not properly designed and built.

**RETAINING WALLS**

Retaining walls are permanent barriers that prevent water from infiltrating the site. They are designed to transmit the weight of the terrain on a slope that otherwise would collapse. Without a retaining wall, excessive rain might destabilize the exposed terrain and cause a landslide. These structures are beneficial in areas where erosion is problematic or where critical infrastructure needs to be protected.

**DRAINAGE HAZARDS**

- Flooding
- Erosion
- Heat

**WHAT YOU NEED TO KNOW**

- Built with reinforced concrete.
- Usually sloped as an inverted T.
- The side of the terrain being stabilized, use a drain along the wall to keep water away from the structure.
- The drain consists of a PVC pipe surrounded by gravel and fabric that:

**DRY WELLS**

Dry wells are underground tanks, usually made of concrete, that store water to percolate or drain slowly to another site or sewer. Their design is similar to a pool.

**FRENCH DRAIN**

A French drain system slowly drains surface water and rain consists of a PVC tube with holes, different grades of rock or similar materials that allow percolation of water through the soil and out to a desired area.

**DITCH**

Ditches are channels that are used to divert or collect surface water and rainwater, incorporating construction practices that have been called "drainage" or "water harvesting" to avoid flooding but in recent years communities are adapting to "living with water" rather than draining it off-site. By allowing water to flow through sites.

**PERMEABLE SURFACES**

Permeable surfaces consist of a gravel, gravel-concrete, or other paving system that allows water to pass through and percolate slowly into the soil, instead of solid pavement that reduces the area of the terrain that naturally percolates water.

- Usually made of asphalt, concrete, or pavement surfaces.
- Areas with permeable pavement are usually utilized as an amenity for non-motorized vehicle recreation.

**NATURAL HAZARDS**

- Flooding
- Erosion

**WHAT YOU NEED TO KNOW**

- A simple dry well is a 4' x 6' deep and 3' diameter pit filled with gravel or aggregate covered with topsoil.
- A drain involves the installation of a flexible drain line that runs through the site from the source of water to the desired location.
Products for Affordable Housing Industry

• Lenders Financing Tool
• Portfolio Assessment and Risk Reduction
• Resilience Capital Needs Assessments-Florida/California
• Community Mitigation Input-Democratizing Disaster Recovery
• National Readiness and Mitigation Trainings
Building a Resilient Boston-A Call To Action

1. Consider Climate When Planning and Retrofitting
2. Plan Mitigation with Community Participation and Share Best Practices
3. Consider Intended and Unintended Practices

- Innovate Technical Assistance strategies
- Leverage funding like Community Reinvestment Act
Laurie Schoeman
Senior Program Director Resilience and Recovery
lschoeman@enterprisecommunity.org
Mission:
Advancing the sustainability of living, working, and building in Chattanooga and the surrounding region.
Programs:

BUILD IT GREEN
CHATTANOOGA GREEN PRIX
GREEN AND HEALTHY HOMES
MEMBERSHIP LUNCH & LEARNS
SUSTAINABILITY PROFESSIONALS OF GREATER CHATTANOOGA
GREEN SCHOOLS SUMMIT & DESIGN THINKING
MAIN X24
BUILDING RECOGNITION IN CHATTANOOGA (BRIC) AWARDS
CONSULTING/SPEAKING
RESILIENCE
(AS WE DEFINE IT)
RESILIENCE
The capacity to recover quickly from adversity.

Economic Resilience

- Emergency Expense (Like an $800 electric bill)
- Lost job
- Lost business
- Lost industry
RESILIENCE
The capacity to recover quickly from adversity.

Social Resilience

• Trust
• Equity
• Access
• Civic Engagement
• Education
RESILIENCE
The capacity to recover quickly from adversity.

Environmental Resilience

• Climate Change
• Storms
• Drought
• Flooding
• Heat Island Effect
RESILIENCE
The capacity to recover quickly from adversity.

Time Horizon

• Short term
  -Disasters
  -Life Emergencies

• Medium term
  -Community stability: Housing, transportation, food, health, opportunity

• Long term
  -Climate change
  -Industry changes
  -Systemic racism
The Chicago heat wave in 1995 killed 739 people, many of which lived in isolated poverty. However, some neighborhoods with high poverty had some of the lowest mortality. The difference was social infrastructure. Neighborhood conditions that isolate people from each other on a good day can, on a really bad day, become lethal.

-Palaces for the People by Erik Klinenberg
In the early and mid-20th century, fewer than 20 percent of U.S. counties experienced a disaster each year. Today, it's about 50 percent. Federal aid isn't allocated to those who need it most; it's allocated according to cost-benefit calculations meant to minimize taxpayer risk.

-How Federal Disaster Money Favors The Rich by Rebecca Hersher & Robert Benincasa
CHATTANOOGA CONTEXT
Tennessee faces considerable and significantly increasing threat levels from extreme heat, drought, wildfire, and inland flooding between now and 2050. Tennessee scores an overall grade of C on the Report Card, with grades ranging from a D for inland flooding to a C+ for extreme heat, drought, and wildfire. The grades are relative to other states, and relative to the magnitude of the climate threats themselves. Tennessee has taken strong action to address its current climate risks, including a comprehensive Hazard Mitigation Plan and threat-specific programs like Firewise (wildfire), Silver Jackets (inland flooding), and the Tennessee Drought Management Plan (drought). Tennessee has also taken limited action to assess its climate change vulnerabilities for the transportation sector. Tennessee has not assessed climate change vulnerabilities for other sectors, and it has taken no action to develop or implement an adaptation plan.
Hot and Getting Hotter
The top 25 hottest and fastest-warming cities

Which are the hottest?  Fastest-warming

Chattanooga, TN

8th Fastest
0.82°F per decade
ECONOMY INDICATORS

Unemployment Rate
Children Under 6 With Parents in Labor Force
Employment Population
Ratio Job Count
Labor Force Participation Rate
Gini Coefficient
Households Receiving SNAP Benefits
Median Household Income
Poverty Rates
HEALTH INDICATORS

Cancer Rates
Obesity Rates
Asthma Rates
Poor Mental Health
Poor Physical Health
Health Uninsured
People Homicides
Teenage Pregnancy
HEALTH INDICATORS

Cancer Rates
Obesity Rates
Asthma Rates
Poor Mental Health
Poor Physical Health
Health Insurance
People
Homicides
Teenage Pregnancy
HOUSING INDICATORS

Median Home Value
Housing and Transportation Affordability Index
Housing Burdened
Homeowners Housing
Burdened Renters Median Rent
Housing Age
Owner Occupied Housing Units
Vacant Rental Units
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Vacant Rental Units
Extreme heat is a risk to human health, especially in vulnerable communities. Green infrastructure and parks can cool surrounding neighborhoods by providing shade and a gap in hot surfaces like pavements.

Our Cool analysis identifies areas of town where heat is most intense by mapping satellite imagery-derived daytime land surface temperatures. Combined with impervious surfaces areas such as roads and roofs that contribute to the urban heat island effect we highlight areas of town where parks and green space can help mitigate extreme heat.

Cool
HEALTHY CONNECTED CHATTANOOGA
Perks can play a critical role in supporting community health. Areas with low park access may lack opportunities for physical activity, for many vulnerable populations; the impacts of environmental injustice and pollution further exacerbate health inequities. The health analysis for Healthy Connected Chattanooga examines health inequities by mapping the following indicators, and then weighting and stacking them to create the overall result: overweight adults, adults not meeting physical activity recommendations, heart disease, diabetes, mental health, stroke, asthma, and COPD.
Delivering multi-benefit green infrastructure can help address longstanding inequities of opportunity and risk in vulnerable communities. For example, the strong correlation between urban tree cover and income level within cities means that low-income neighborhoods, where residents are less likely to have air conditioning and more likely to face heat-related health risks, also have the most intense urban heat islands. This analysis combines six socioeconomic indicators from the EPA Environmental Justice Screen: Screen (population density, minority population, low-income households, population with less than a high school education, linguistically isolated population, population under 5, and population over 64) to highlight socioeconomic vulnerability across the City of Chattanooga.
MEDIAN EARNINGS
1999 › $45,480 per year
2014 › $39,683 per year

AVERAGE EARNINGS
1999 › $65,308 per year
2014 › $56,896 per year

AVERAGE GROSS RENT
1999 › $669 per month
2014 › $743 per month
RESILIENCE IN CHATTANOOGA
CLIMATE ACTION PLAN OF 2009
City of Chattanooga, EPB, green|spaces, and other partners addressed 90% of plan action items.

Renewable Energy

- TVA closed nearest coal plant and is currently installing utility-scale solar reducing overall carbon footprint for Chattanooga region. Other sources include nuclear and hydro.
- SolSmart Gold Designation
- Community Solar
- First NZE Airport in US (Also leverages microgrid)
- VW investing in 9MW Solar
- First NZE Residential Development
CLIMATE ACTION PLAN OF 2009
City of Chattanooga, EPB, green|spaces, and other partners addressed 90% of plan action items.

Energy Efficiency

• City of Chattanooga achieved over 30% reduction for 2 Million SF from baseline energy consumption through Better Building Challenge
• Empower trained over 2000 residents w/ Basic Energy Workshops, still averaging over 100 per month, 5% avg savings.
• 250 Deep energy retrofits for low-income residents, 28% avg savings.
CLIMATE ACTION PLAN OF 2009
City of Chattanooga, EPB, green|spaces, and other partners addressed 90% of plan action items.

Other topics include:

• Waste Reduction
• Smart Growth Engagement
• Promote Local Growers
• Vehicle Miles Traveled
• Codes and Zoning
EPB SMART GRID
Chattanooga’s Municipally Owned Utility

Invested in first municipally-owned, PEER-certified gigabit fiberoptic smart grid and communication services for residents.

• Fastest, most pervasive gigabit fiberoptic network provides internet, phone, and television service, decoupling revenue and maintaining low electric rates.
• Uses algorithms to notify customers of abnormal usage spikes
• Uses aggregated data to inform efficiency work and policy
• Supports local building codes by providing DET testing w/ Smart Build
• Partners with ORNL to research uses for data stream. (modeling, microgrids, maintenance, etc.)
THRIVE 2055
Thrive Regional Partnership of 16 Counties in SE Tennessee, NE Alabama, NW Georgia

Economic and Community Development
Regional Transportation and Infrastructure
Conservation and Outdoor Recreation
Education and Workforce Development

Forces and trends report identified both the impact of natural hazards, ($259 Million and over 100 deaths) and the increased frequency of events as major considerations.
EMPOWER CHATTANOOGA
Community Events

“Change moves at the speed of trust.”
-Nathaniel Smith Partnership for Southern Equity

Empower began with a series of focus groups that were asked about challenges specific to their neighborhoods. While energy bills came up, other things like public parks, jobs for youth, education, and food insecurity were also leading topics.

Then, with the help of resident-led community advisory and action groups, Empower helped build social infrastructure by sponsoring, facilitating, and hosting community events that bring diverse residents together for a range of activities.
EMPOWER CHATTANOOGA
Basic Energy Workshops

Since 2014 greenspaces has been providing Basic Energy Workshops in low-income neighborhoods. Attendees receive a free energy savings kit provided by TVA.

Thanks to the efforts of Allen Shropshire, our new outreach coordinator hired in 2018 who grew up in Avondale and graduated from our inaugural Build it Green class, attendance at Empower workshops increased from 416 to 900 for a total of over 2000.

EPB helps us track the effectiveness of our program and found an average savings of 5% with single home savings as much as 40% which is hundreds of dollars a month.
EMPOWER CHATTANOOGA
Build it Green Workforce Development

The average age of workers in the construction industry is almost 50 and for every 5 retiring, there is just 1 person replacing them. The shortage of qualified labor has substantially increased construction costs in the Chattanooga market.

Launched in 2018 with Build Me a World, from a grant in partnership with EPB and the City of Chattanooga, Build it Green recruits at-risk young men and women (ages 18-36) from Empower neighborhoods for a 12 week, paid, leadership and workforce development program. 100% of trainees graduated or left early with a job.

All graduates received OSHA-10 Certification and lead paint abatement certification. 90% of graduates are currently employed.
EMPOWER CHATTANOOGA
Build it Green Work Team

Social enterprise employing Build it Green graduates in partnership with a local contractor to make energy efficiency improvements to homes of Empower Workshop attendees and nonprofit partners.

Work will include:

- Blown-in cellulose insulation
- Air sealing
- Painting
- Repairs
EMPOWER
Federal Home Loan Bank of Cincinnati
TVA/EPB Home Energy Upgrade

Home Energy Upgrade provides Deep Energy Retrofits to qualifying residents. Current program focuses on homeowners w/ income of 50% AMI or less and are either elderly or special needs.

Scope of work includes

•  Insulation
•  Airsealing
•  HVAC
•  Windows and Doors
•  Appliances
EMPOWER CHATTANOOGA
Green and Healthy Homes Asthma Program

118 estimated people hospitalized in Chattanooga for asthma each year costing $3.9M annually

1,435 estimated people visiting the ED for asthma each year costing $4.3M annually

Through this innovative program, green|spaces brought EPB, TVA, Lifespring, GHHI, Erlanger Children’s Hospital, and the City of Chattanooga to identify low-income patients with severe asthma, fund much-needed home improvements to improve air quality and energy efficiency, and then use health care savings to pay for those improvements. The team is currently piloting the project with 10-20 homes in 2019.
EMPOWER CHATTANOOGA
Chattanooga Green Prix

Launched in 2018, green|spaces purchased 9 kits of parts for elementary schools, middle schools, and high schools with support from the Lyndhurst Foundation, EPB, and TVA.

Students had to take these parts, build fully functional electric racecars, design and build their own body, and then race the cars around a track set up by the local Sports Car Club of America at Chattanooga State Community College.

The inaugural event was so successful, green|spaces raised enough funds to purchase kits for 25 more schools. Along with visiting schools, we had over 50 student-built EVs at the 2019 Green Prix
INTEGRATED COMMUNITY SUSTAINABILITY PLAN

Two year planning process focusing on resilient systems with focus on equity.

Long term thinking

Broad in scope

Integration of multiple systems

Collaborative

Public engagement and education

Implementation at different scales

Monitoring and evaluation
BUILD IT GREEN
CHATTANOOGA GREEN PRIX
GREEN AND HEALTHY HOMES
MEMBERSHIP LUNCH & LEARNS
SUSTAINABILITY PROFESSIONALS OF GREATER CHATTANOOGA
GREEN SCHOOLS SUMMIT & DESIGN THINKING
MAIN X24
BUILDING RECOGNITION IN CHATTANOOGA (BRIC) AWARDS
CONSULTING/SPEAKING

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