Workshop: “RE in SIDS: How to Strengthen Resilience & Accelerate RE Deployment”

Panel Session 1: How to increase resilience in the power sector?

1. Overview of CARILEC

**Services Provided**

- Training & Development
- Networking and Knowledge Sharing: Conferences & CAREC
- Technical Studies and Surveys
- Disaster Restoration Coordination (CDAP)
- Advocacy
CARILEC: Renewed Vision

To be the Premier Association of Energy Service Providers and their partners, facilitating the development of world class sustainable electric energy solutions for all peoples of the Caribbean Region

Renewed Bye Line:
An Association of Electric Energy Solution Providers
Renewed Mission

CARILEC will enhance the effectiveness of its members by providing industry related services, creating regular networking, training and knowledge sharing opportunities; supporting mutual assistance programs and accelerating the Caribbean Region’s energy sector transition, through innovation and advocacy.
We foster and celebrate team work across the Caribbean region and beyond; bridging gaps between private and public sector, local, regional and international organizations, technical and policy expertise.

We are catalysts for change in our region: we create multiples opportunities for our stakeholders to experience and adopt the latest technologies and opportunities in the fields of energy solutions.

We cultivate trust from all our stakeholders by maintaining highest quality of service and integrity standards.

We ultimately work for the benefits of the people of our region and the welfare of our planet: we orient our decisions to increase the prosperity and sustainability of the Caribbean way-of-life.
<table>
<thead>
<tr>
<th>Strategic Objectives 2018 to 2022</th>
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<tbody>
<tr>
<td>1. Re-position CARILEC as the premier facilitator of energy solutions in the Caribbean region.</td>
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<td>2. Revise CARILEC business model for greater sustainability, resilience and impact.</td>
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<td>3. Restructure Secretariat and build capacity at institutional and individual levels.</td>
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Demystifying Resilience

The term ‘resilience’ has a number of definitions. With regards to hazard events, it has been defined as “the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events” (McAllister, 2013).
Demystifying Resilience

The Electrical Power and Research Institute (EPRI) has identified three elements that define the concept of grid resilience:

1. *Prevention*
2. *Recovery*
3. *Survivability*
Demystifying Resilience

1. *Prevention* - the protection of the grid from damages.

2. *Recovery* - the rate at which the grid is restored.

3. *Survivability* - the ability to provide an essential level of electricity service to allow communities to continue functioning in instances where the normal power sources are disrupted.
Drivers for Enhanced Resilience in the Caribbean Power Sector:

• Vulnerability to the effects of climate change and natural hazards.

• Vulnerability to oil price shocks due to dependence on imported fossil fuels for power production despite tremendous renewable energy resources.
Drivers for Enhanced Resilience in the Caribbean Power Sector:

• The very high cost to rebuild the electricity grid annually.

• Critical services infrastructure interdependencies (telecommunications, water, electricity and transport) and the associated impacts of supply disruption.

• The socio-economic and financial effects of lengthy power outages on the economies of SIDS
Table 1 showing a partial list of CARILEC Member utilities that received restoration assistance from CARILEC 2003-2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Disaster (H=Hurricane; TS = Tropical Storm)</th>
<th>Utility(ies) Affected</th>
<th>Severity of Impact to Electricity Infrastructure</th>
<th>Approx. Duration of Restoration Assistance</th>
<th>Joint Manpower Assistance Provided by CARILEC</th>
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<tbody>
<tr>
<td>2003</td>
<td>H Fabian</td>
<td>Bermuda Electric Light Company Ltd</td>
<td>Significant</td>
<td>3 weeks</td>
<td>41 Linesmen from 6 utilities</td>
</tr>
<tr>
<td>2004</td>
<td>H Frances</td>
<td>Grand Bahama Power Company</td>
<td>Significant</td>
<td>6 weeks</td>
<td>37 Linesmen from 4 utilities</td>
</tr>
<tr>
<td>2004</td>
<td>H Jeanne</td>
<td>Grand Bahama Power Company</td>
<td>Significant</td>
<td>3 weeks</td>
<td>19 Linesmen from 5 utilities</td>
</tr>
<tr>
<td>2004</td>
<td>H Frances</td>
<td>*Bahamas Electricity Corporation</td>
<td>Significant</td>
<td>9 days</td>
<td>8 Linesmen from 1 utility</td>
</tr>
<tr>
<td>2004</td>
<td>H Ivan Grenada</td>
<td>Grenada Electricity Services Limited</td>
<td>Significant</td>
<td>6 weeks</td>
<td>75 Linesmen from 9 utilities</td>
</tr>
<tr>
<td>2004</td>
<td>H Ivan</td>
<td>Caribbean Utilities Company Limited</td>
<td>Significant</td>
<td>6 weeks</td>
<td>14 Linesmen from 2 utilities</td>
</tr>
</tbody>
</table>
Table 1 showing a partial list of CARILEC Member utilities that received restoration assistance from CARILEC 2003-2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Utility Name</th>
<th>Damage</th>
<th>Duration</th>
<th>Linesmen from Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>H Ike</td>
<td>*Turks and Caicos Utilities Ltd</td>
<td>Significant</td>
<td>4 weeks</td>
<td>39 Linesmen from 8 utilities</td>
</tr>
<tr>
<td>2011</td>
<td>H Irene</td>
<td>*Bahamas Electricity Corporation</td>
<td>Significant</td>
<td>3 weeks</td>
<td>20 Linesmen from 2 utilities</td>
</tr>
<tr>
<td>2014</td>
<td>TS Fay Gonzalo</td>
<td>Anguilla Electricity Company Limited</td>
<td>Significant</td>
<td>1 week</td>
<td>10 Linesmen from 1 utility</td>
</tr>
<tr>
<td>2014</td>
<td>TS Fay</td>
<td>Bermuda Electric Light Company Ltd</td>
<td>Significant</td>
<td>2 weeks</td>
<td>19 Linesmen from 4 utilities</td>
</tr>
<tr>
<td>2016</td>
<td>H Matthew</td>
<td>Bahamas Power and Light Company</td>
<td>Significant</td>
<td>5 weeks</td>
<td>35 Linesmen from 7 utilities</td>
</tr>
<tr>
<td>2016</td>
<td>H Matthew</td>
<td>Grand Bahama Power Company</td>
<td>Significant</td>
<td>2 weeks</td>
<td>10 Linesmen from 2 utilities</td>
</tr>
</tbody>
</table>

*Bahamas Electricity Corporation (BEC) is currently Bahamas Power and Light (BPL)
*Turks and Caicos Utilities Ltd is currently Fortis TCI Limited
Fig 1. A resilient system vs a less resilient system. (Source: Clark-Ginsberg, 2016)
Barriers to Enhanced Resilience in the Caribbean Power Sector:

• Lack of financial capacity

• Lack of enabling policy & regulatory mechanisms to facilitate an adequate level of resilience improvements: build back better (RE, microgrids, et.)

• Lack of Regional Capacity to: (1) respond to (multi-island impacts); and (2) reduce the restoration time for electricity customers
Barriers to Enhanced Resilience in the Caribbean Power Sector:

• The lack of technological innovations in and modernization of the power sector result in reliance on outdated, sometimes inefficient and unreliable power infrastructure.

• Fragmentation, lack of economies of scale and opportunities for system interconnection
5. Current Efforts & Plans for the Future

**CARILEC** - leveraging a collaborative, and integrated approach to build resilience:

- **RMI & CWR** (Survivability - CAREC)
- **CARICOM** (C-SERMS, IRRP, IUS, Energy Resilience Task Force, Knowledge Management & Data sharing; Finance and Policy)
- **CDEMA** (Response Time & Cost)
- **Caricom and OOCUR** (regulatory Reform)
5. Current Efforts & Plans for the Future

CARILEC - leveraging a collaborative, and integrated approach to build resilience:

- **CANTO** (Telecommunication, Smart Grid)
- **Association of Caribbean States** (Response Time & Cost)
- **CHTA** (Response Time & Cost)
- **IDB** (Survivability – CCA & SE programme)
- **WB & CDB** (Projects conceptualized)
The Caribbean power sector must act now to enhance its resilience, tomorrow will be too late!
THANK YOU!
CARILEC

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