EPSCoR Webinar

OCTOBER 25, 2019
Safety Briefing
Introduction

- Quik Quarter/Thrifty Nickel
- Air Force / VA Tech / UNM – EE
- Intel
- MODE / Emcore / SolAero
- Novalux
- Cell Robotics
- FootPrints
- TriLumina
- City of ABQ
- Emera / Emerging Technologies
Emera Inc. is a geographically diverse energy & services company
Headquartered in Halifax, Nova Scotia
www.emera.com
- $8.4B Market Capitalization*
- $5.9B in Revenue
- $29.6B in Assets
- Ticker Symbol: EMA (TSX)

We invest in electricity generation, transmission and distribution, gas transmission and distribution, and utility energy services with a strategic focus on transformation from high carbon to low carbon energy sources

*All figures in US dollars as at Dec 31, 2017
Where we operate

US, CAN & CAR
The Problem

- Renewable Penetration not progressing at Scale or Pace necessary
- Military / Critical Site Security requires Resilience
- Technology Piecemeal – No Systems Approach
- Fragmented Business Models
Our Approach

- Energy Expertise
- Sandia National Labs
- UNM
- Utility Experience
- Disrupters
- Blank sheet of paper
- Motivated Resources
- Take advantage of trends in cost / approach
Key Attributes

- **New Mexico** – SNL, KAFB, UNM, NMSU, PNM, Developers/Builders
- **Energy Efficiency** – Per Second data by Building, N’Hood, Community, Grid
- **High Renewable Content** – 60% to 100% vs. 10%
- **Safer** – Innovative Protection for people / forrests
- **Resilient** – Critical DOD/DOE Assets – Robustness, Redundancy, Resourcefulness, Response, Recovery
- **Cyber Secure** – built in with SNL CRADA PTS
- **Underserved Communities / Equity** – Rural, Indian Nation, Capital
- **Work Force Development** – Certificate Level Techs / “On-Ramps”
- **Developing Countries Strategy** – The big NEXT problem
- **Standardization** – all equipment same / rule of aggregation
- **Scalable Biz Model** – Utilizes existing infrastructure
- **Building on decades of experience** – SNL DETL, PSEL, SSM, Storage
- **Collaboration** – DOE/DOD/Universities/Utilities/Legislature
- **Credible** – SNL/AF
- **Interoperable** – Grid Edge implementation
Differentiation

- DC vs AC
- Decentralized vs Centralized
- Modular/Standardized vs Custom
- Front of the Meter vs Behind the Meter
- Networked vs Non-Networked
- New DERs Easy vs New DERs Hard
- Utilize Existing Infrastructure
Current and Future **Trends**

Disruption: Decarbonization, Digitalization, Decentralization
Digital Energy Platform
EMERA NANOGRID

- Emera Control
- Emera Converter
- Gas Generator
- Wind Generator
- Solar Generator
- Battery

- AC System
- DC System
- DC-AC Converter
BLOCK Home Infrastructure

Indicative size and shape
BLOCK is a neighborhood energy system that combines high levels of renewables and superior reliability with proprietary technology* to deliver and share energy within communities of any size.

* ETL has filed several patent applications for its system.
Our first Demonstration Project is fully integrated into the Kirtland Air Force Base, Sandia National Laboratories DETL and Department of Energy Solar Test Facilities

- Start-up and Commissioning Testing of first nanogrids has commenced
- Anticipate connection of first nanogrids to central box in coming few weeks
- Fully commissioned by end of year
# Project Timeline

## KAFB DEMO PROJECT

<table>
<thead>
<tr>
<th>#</th>
<th>PROJECT DEVELOPMENT</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
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<tbody>
<tr>
<td>1</td>
<td>Project Plan</td>
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<td>14</td>
<td>21</td>
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<tr>
<td>2</td>
<td>Design &amp; specification</td>
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<td>3</td>
<td>Engineering</td>
<td>4</td>
<td>11</td>
<td>18</td>
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<tr>
<td>4</td>
<td>Site security &amp; preparation</td>
<td>25</td>
<td>1</td>
<td>8</td>
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<tr>
<td>5</td>
<td>Components supply (PV, power electronics, protections, conductors)</td>
<td>11</td>
<td>18</td>
<td>25</td>
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<tr>
<td>6</td>
<td>Controls solution (load monitoring, controls &amp; user interfaces)</td>
<td>22</td>
<td>29</td>
<td>1</td>
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<tr>
<td>7</td>
<td>Construction (pre-fabrication of boxes, community center)</td>
<td>5</td>
<td>12</td>
<td>19</td>
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<tr>
<td>8</td>
<td>Component testing</td>
<td>15</td>
<td>22</td>
<td>29</td>
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<tr>
<td>9</td>
<td>Installation (equipment and interconnection)</td>
<td>6</td>
<td>13</td>
<td>20</td>
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<tr>
<td>10</td>
<td>Commissioning &amp; Start-up</td>
<td>20</td>
<td>27</td>
<td>30</td>
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</table>

*Complete indicates tasks completed as of Q3.*
The 5 Rs of Resiliency

- Robustness
- Redundancy
- Resourcefulness
- Response
- Recovery

Event
First Three Commercial MicroGrids
First Three Commercial MicroGrids
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