

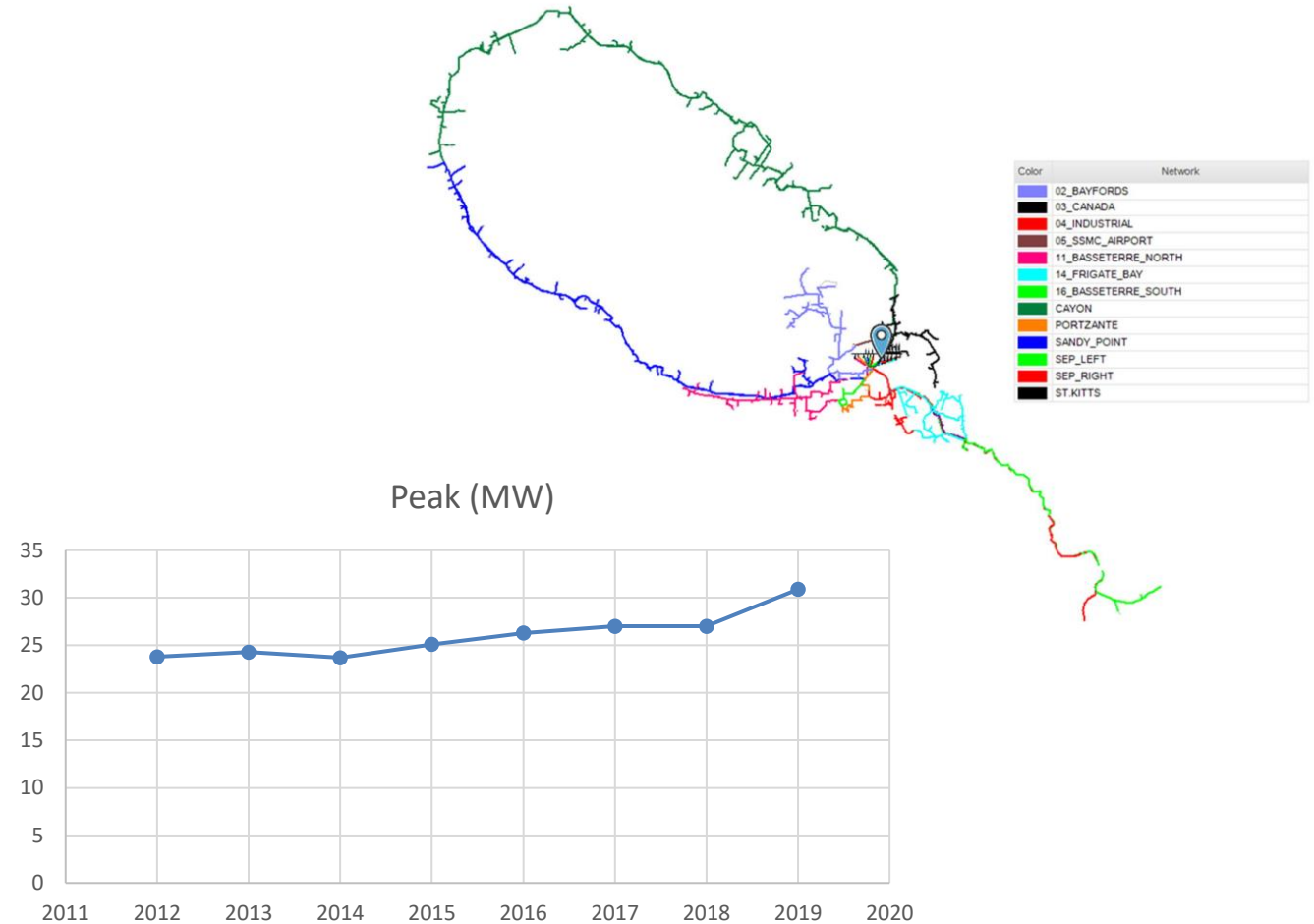
Grid Integration of Renewable Energy

Perspectives from the St Kitts Electricity Company (SKELEC) Ltd

CARICOM Renewable Energy Dialogue 18.11.20

SKELEC's existing power and energy characteristics

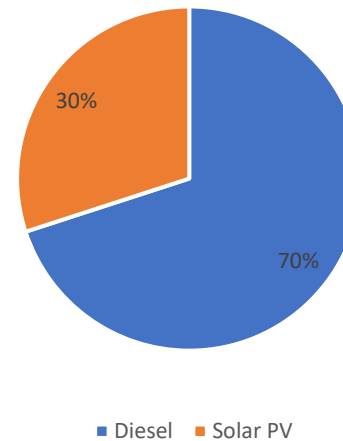
- 44.9MW (nameplate) installed diesel generation capacity.
- 18MW baseload
- 30MW peak
- 12 x 11kV distribution feeders



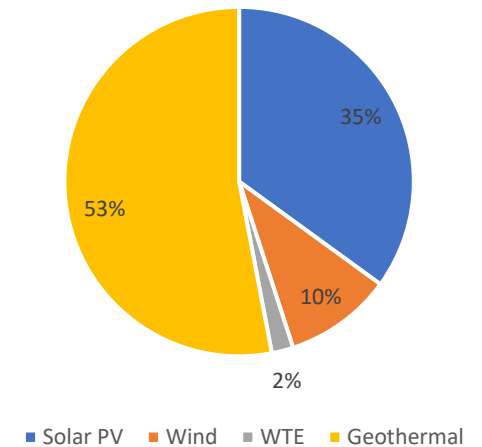
SKELEC's future power and energy characteristics

- Evolution presently towards increased **efficiency, resiliency, reliability, flexibility** and **sustainability**.
- 35.6MW + 44.2MWh centralized solar PV + BESS to be integrated in the near future.
- ~ 600 kW rooftop solar PV to be deployed as a low income household microgrid.
- Wind and geothermal also to be integrated in the future.
- Considerations for St Kitts – Nevis grid interconnection.
- Entire 11kV distribution network to be placed UG.

Percentage of annual electricity generation by technology 2022



Percentage of annual electricity generation by technology 2030



SKELEC's preparatory steps towards increasing RE integration

Low Hanging

- **Energy Efficiency** efforts - ongoing LED streetlight retrofit project and LED bulb distribution to homes and businesses.
- **Grid loss reduction**
- **Metering and billing accuracy improvements:** AMI implementation.

Further Reaching

- RE grid **integration studies and designs.**
- **Building staff knowledge base and capacity:** Ongoing **CDB-OECS sponsored NABCEP** Solar PV certification facilitated by **Green Solutions International- GSI.**
- **Continuously build grid resilience and flexibility**
- Develop **smart grid unifying : hybrid generation (Solar PV+ Wind + flexible efficient low carbon thermal generation) + BESS + EMS + grid SCADA**
- Deploying **EV fleet and facilitating EV proliferation** (charging points etc.)

Lessons Learnt thus far

- Importance of enforcing **standards** in RE plant design and build (E.g. IEEE 1547, UL 1741, NEC 690).
- Ensure **quality** in design and construction of RE plant; build to **withstand** Caribbean island hurricane force winds and corrosive environments.
- Build grid **resiliency** to withstand hurricanes (no point having RE plant with no grid).
- **BESS** are necessary for increasing **penetration** of **variable RE** into island grids without compromising **power quality**.
- Importance of automated **energy management systems** for system optimization and stability.
- Build for the future by improving existing or planned diesel generation **efficiency** and **flexibility**.
- Coupled with RE technologies, **EV proliferation** will contribute significantly towards achieving iNDC for reduction in carbon emissions.
- Reach for low hanging fruit such as **energy efficiency**, technical and nontechnical **loss reduction**.
- Engender **employee** buy in and championship of the energy paradigm shift through **training** and **awareness**.
- **Build** local **knowledge base** and **skill level** in RE technologies.