

**ENERGY SOVEREIGNTY
RESEARCH WORKSHOP**

NTUA GENERATION, INC.

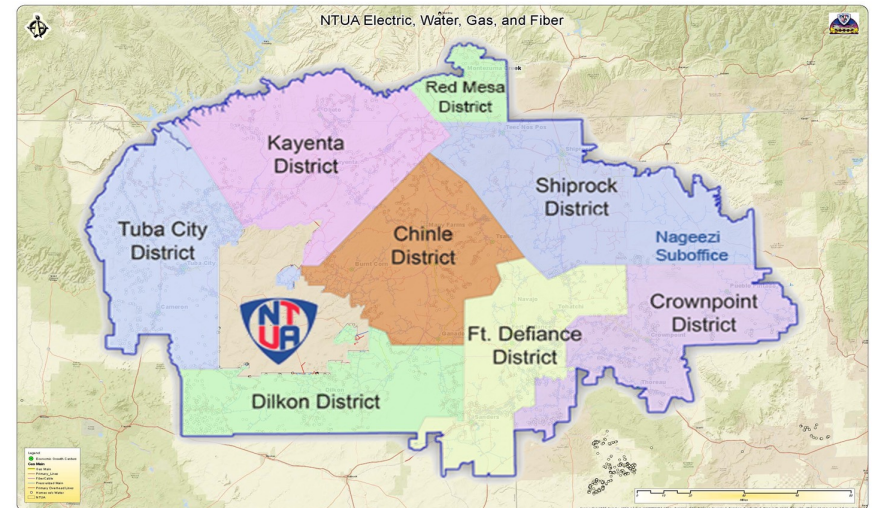
TOGETHER  WE SHINE

NAVAJO TRIBAL UTILITY AUTHORITY

NTUA was launched as a tribally-owned nonprofit in 1959 to address the absence of utilities on the reservation through the operation, maintenance, and expansion of utilities, including low-cost off-grid residential solar services for Navajo resident

Today, NTUA provides a range of services on the Navajo Nation in Arizona, New Mexico and Utah

- Electricity
- Natural Gas
- Water & Sewer
- Communications
- Off-Grid Photovoltaic



NTUA OFF GRID SOLAR UNITS

- Serving families in the most remote areas of Navajo Nation
- Residential solar units are for customers that are located 2 miles or farther from electric distribution lines
- 3 kW stand-alone photovoltaic solar system
- 463 residential customers
- Technologies: remote monitoring and state of the art components and battery technology
- NTUA provides operation and maintenance to the solar units



NTUA OFF GRID SOLAR UNITS



CHALLENGES

- Resources to install off grid solar units
- Access to remote locations on the Navajo Nation (road washouts, weather, geographical constraints)
- Cell phone and internet access in remote locations
- Funds to install interior house wiring
- Continued operation and maintenance of the units

NTUA GENERATION, INC. (NGI)

- NTUA created NGI for the purpose of investing in and developing wholesale energy projects within and outside the Navajo Nation
- NGI owns Kayenta I, Kayenta II and Red Mesa solar projects
- Sites are selected by considering daily average solar radiation, ease of access to the local electrical system, and environmental considerations



NGI OPERATING PLANTS

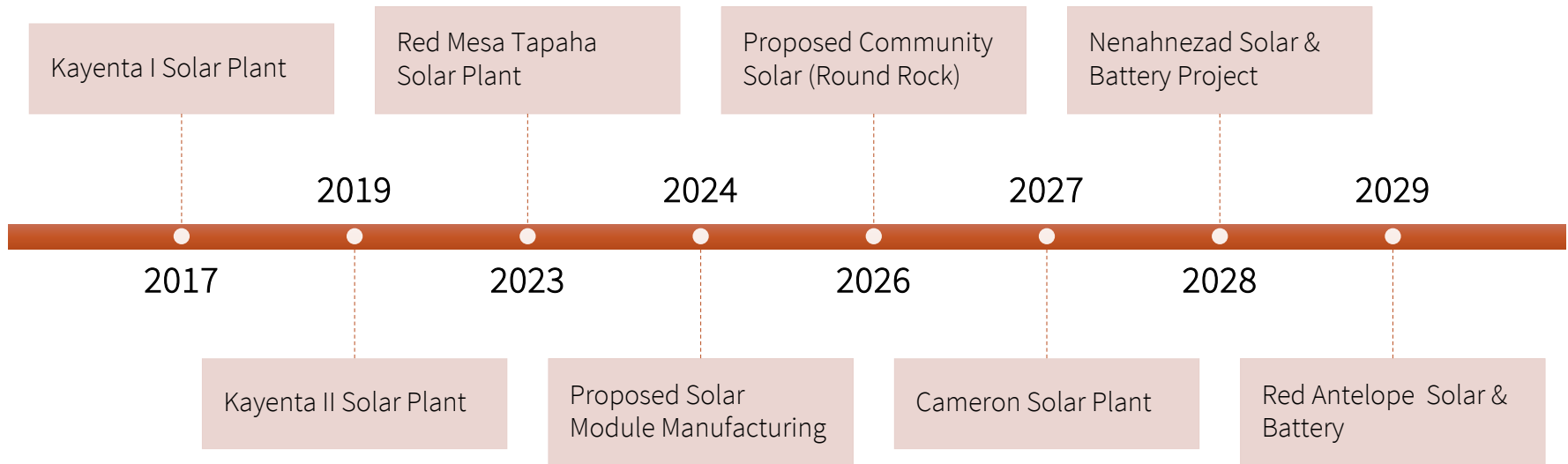


	Kayenta I	Kayenta II	Red Mesa
Energy	27.3 MW	27.5 MW	72 MW
Acres	183 acres	183 acres	550 acres
Commercial Operation Date	April 2017	August 2019	April 2023
PPA Customer	SRP	SRP	UAMPS
Interconnection	NTUA	NTUA	PacifiCorp
Original Plant Cost	\$52 MM	\$38 MM	\$125 MM
O&M Provider	NovaSource	NovaSource	SOLV

NGI TIMELINE

“NTUA Generation has been working diligently to explore renewable energy development opportunities on the Navajo Nation with the promise of new jobs and clean green energy”

NTUA General Manager, Walter W. Haase



CHALLENGES OF NGI SOLAR PLANTS

Dust & debris
accumulation

Weather
conditions

Inverter failures

Solar plant
degradation

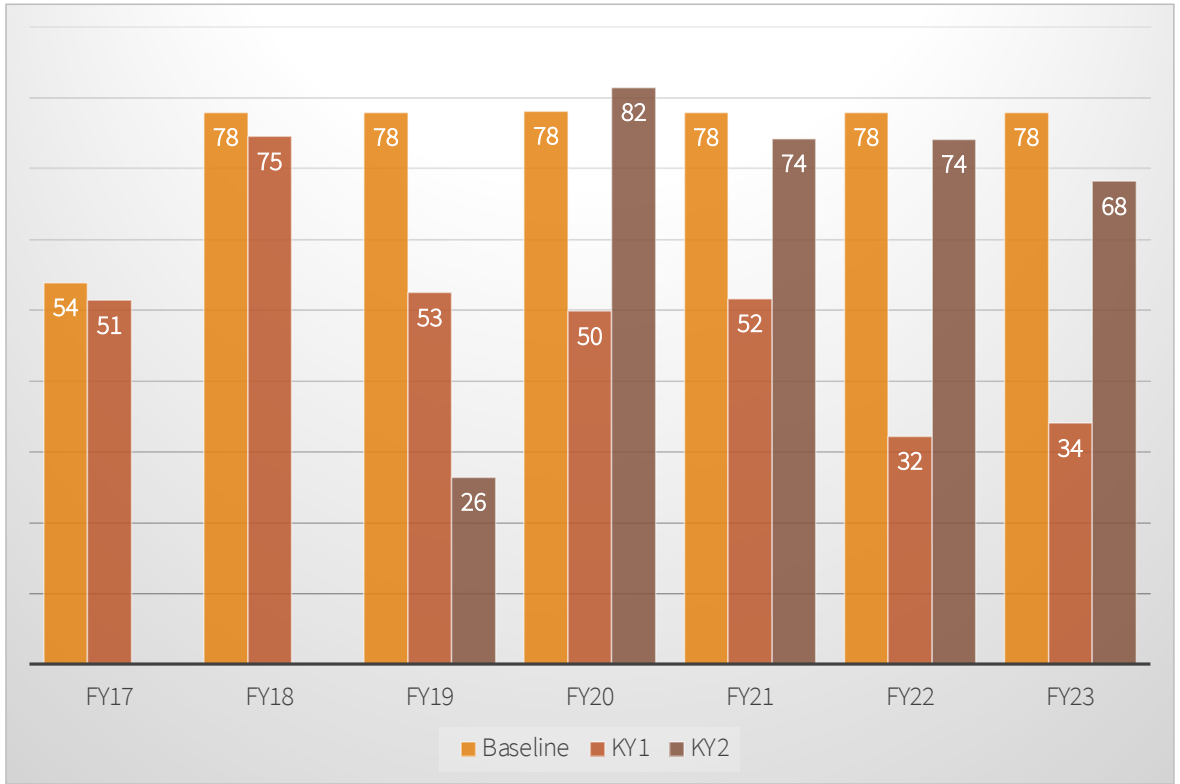
Maintenance

Grid
failures/outages

System design

Ageing of
equipment

KAYENTA I & II ENERGY



IDENTIFIED RISK AND CHALLENGES BUILDING RENEWABLE ENERGY PROJECTS

- 1 • Land use & environmental concerns
- 2 • Complex permitting processes & regulatory challenges
- 3 • Integration with existing grid infrastructure (interconnection, substation)
- 4 • Interconnection sensitivities & delays
- 5 • Supply chain, market volatility
- 6 • Technical challenges (i.e. inverter efficiency, energy storage)
- 7 • Budget, financing, partnerships, funding opportunities, tax credits
- 8 • PPA agreement, imbalance calculations

“Every 24 hours,
enough sunlight
touches the earth to
provide enough
energy for the entire
planet for 24 years.”

MARTHA MAEDA





THANK YOU

Carrie Vega

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Deputy Chief Financial Officer

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TOGETHER  WE SHINE