ALASKA VILLAGE ELECTRIC COOPERATIVE

Energizing Rural Alaska since 1968

DEVELOPING AND INTEGRATING RENEWABLES IN RURAL ALASKA

WIND-DIESEL WORKSHOP

NOVEMBER 8, 2018

Meera Kohler, President/CEO
Alaska Village Electric Cooperative

Alaska Village Electric Cooperative
Member owned, not-for-profit

58 Alaska communities

90 full time employees

95 village plant operators

11,400 services

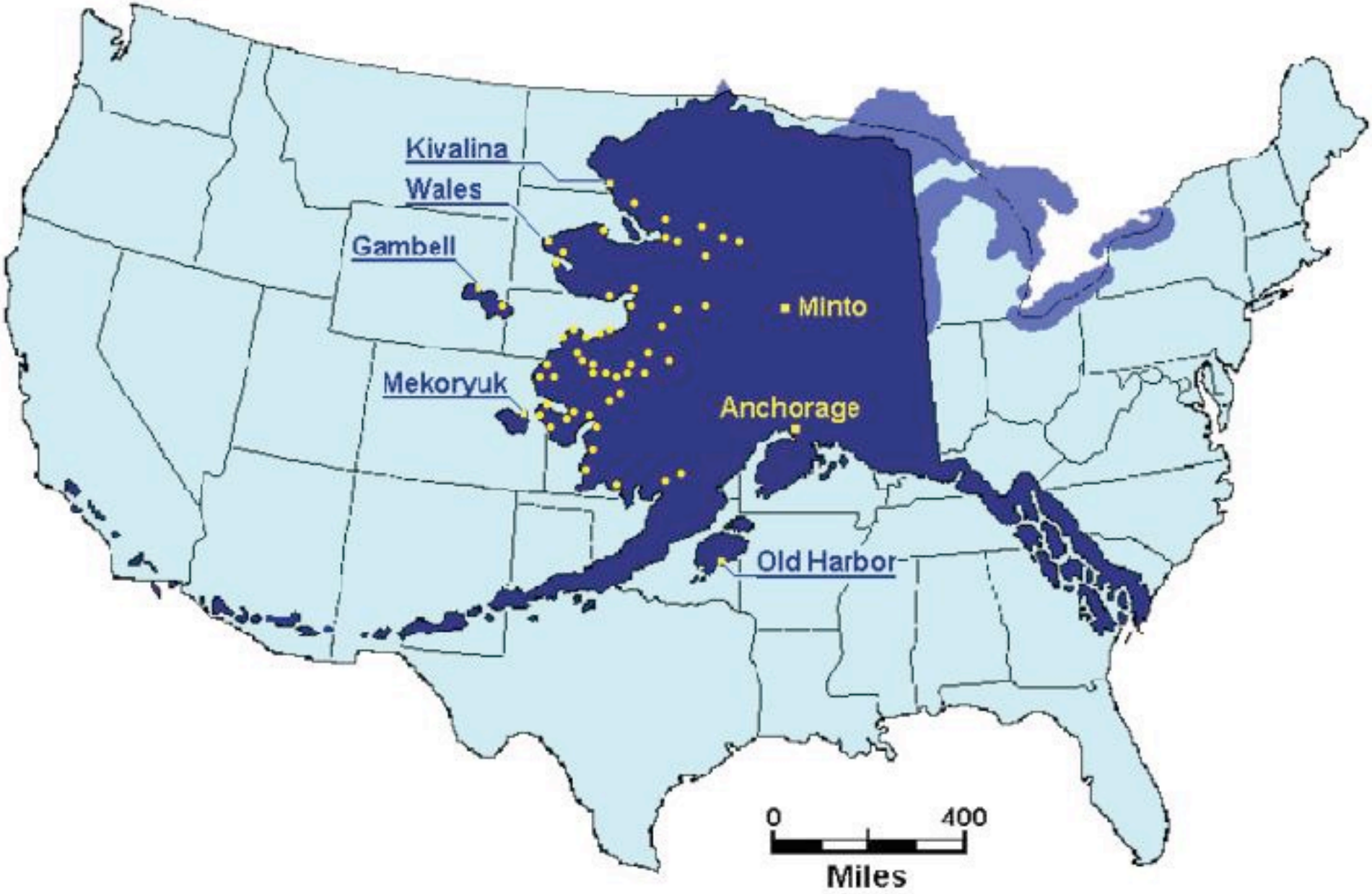
48 power plants

8.5 million gallons of diesel

36 wind turbines serving 20 villages

2 Solar PV projects

Two tug and barge sets

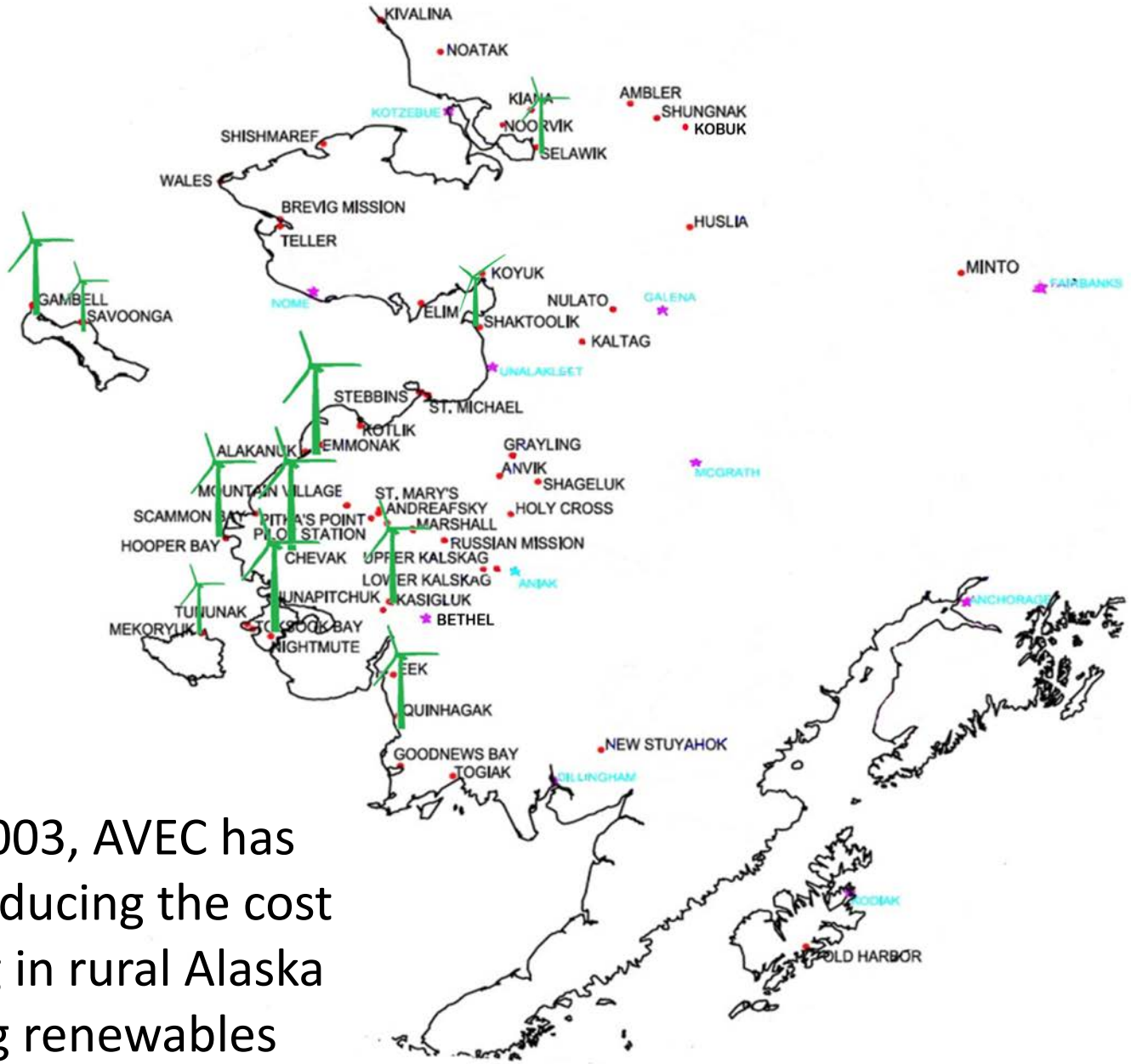

Kivalina
Wales
Gambell
Minto
Mekoryuk
Anchorage
Old Harbor
0
400
Miles

Electricity in rural Alaska is expensive – why?

- Small population – AVEC's average village is ~400
- Small loads – AVEC's average village load is ~140 kW
- No economies of scale. Expensive power = less consumption
- Utilities are capital intensive. $17,000 per meter in the village
- Remote and difficult to access. Shipping costs $1.75/pound
- Fuel is expensive – delivery and storage often exceeds diesel cost
- Operations and maintenance is more expensive

AVEC strategies to reduce power cost

- Add cost-effective new communities
- Interconnect villages to improve economies of scale
- Improve generator efficiency whenever possible
- Add renewables where economically feasible
- Capture and sell recovered heat, excess wind energy



Since 2003, AVEC has been reducing the cost of living in rural Alaska by using renewables

A Snapshot of Wind Production in 2016

Community	Pop.	mWh Sales	Average kW load	kW Wind Installed	Wind Percent
Selawik	876	2,700	325	260	2.23%
Kasigluk +1	1,163	2,900	348	300	18.86%
Toksook Bay +2	1,288	3,300	401	400	19.27%
Hooper Bay	1,178	3,200	386	300	15.88%
Savoonga	718	2,300	265	200	7.74%
Gambell	713	1,800	223	300	34.07%
Chevak	989	2,400	288	400	28.86%
Mekoryuk	210	800	106	200	13.86%
Quinhagak	724	2,000	248	300	31.27%
Shaktoolik	282	1,000	120	200	36.69%
Emmonak +1	1,571	4,400	542	400	28.86%

We are installing larger wind turbines

900 kW EWT machines installed October 2018 in

Bethel (average load 4,500 kW)

St. Mary's/Mt. Village (average load 570 kW)

Also planned for

Stebbins/St. Michael (average load 370 kW)

We are partnering with Alaska Center for Energy and Power, the Office of Naval Research and others to develop supercapacitor based technology to optimize intermittent energy production in islanded micro-grids such as ours.

We are connecting communities to bring efficiencies and develop local, regional and, eventually, statewide grids.