



PRESENTED BY GDS ASSOCIATES, INC.

CONSIDERATIONS AND BEST PRACTICES FOR SOLAR PV

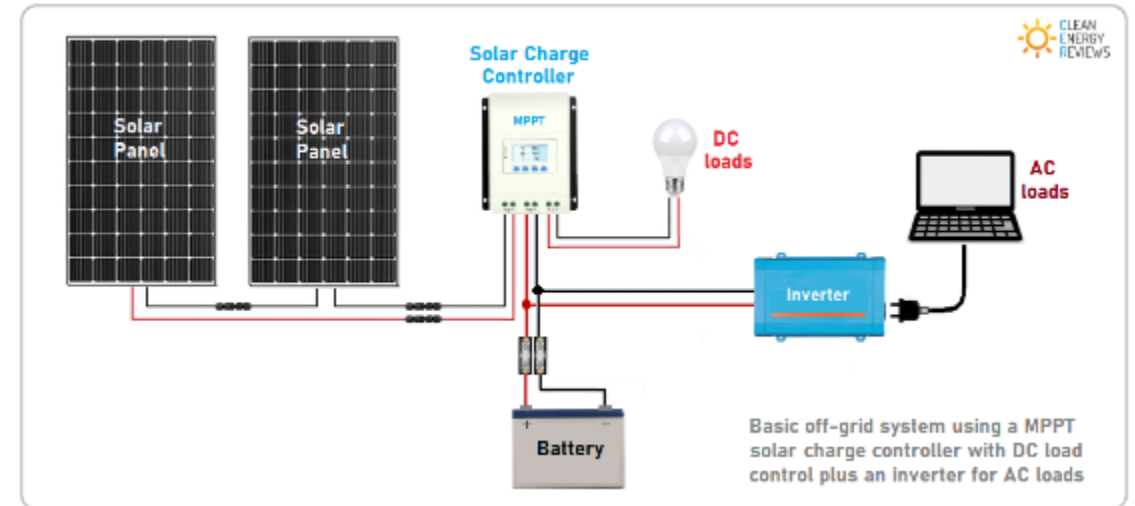
Bethany Reinholtz

MREC Annual Conference February 2024

UNDERSTANDING SOLAR PV

□ Equipment

- *Modules*
 - Standard
 - Bi-facial
- *Combiner box*
- *Inverters*
- *Meter*
- *Disconnect*
- *Batteries* – required if you want to have electricity when power goes out
- *Charge controllers*



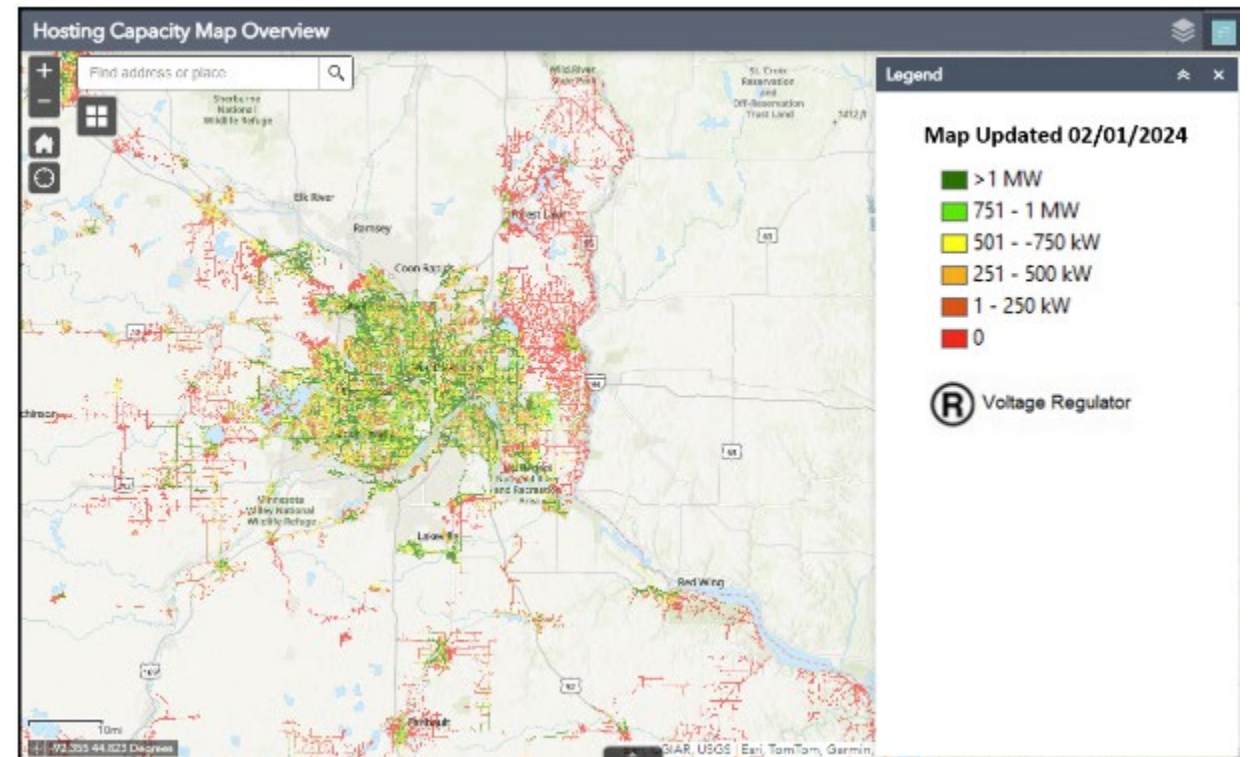
SITING YOUR SYSTEM

- **South facing**
 - *Allows for most production, may not be feasible*
 - *East and west also common*
- **Mounting**
 - *Roof or ground mount*
 - *Fixed or tracking*
 - *Single or dual tracking*
- **Secondary uses?**
 - *Livestock shade*
 - *Other*
- **Accessibility**
 - *Cleaning, maintenance, connection to grid*



SYSTEM SIZING

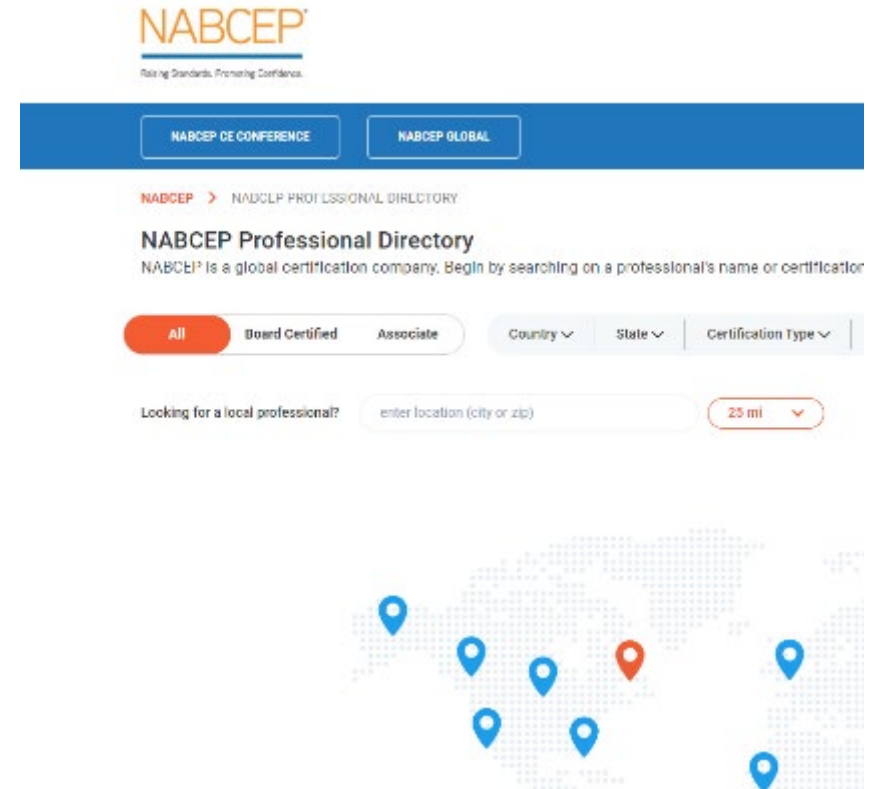
- ❑ How much load do you want to offset?
- ❑ Are load reductions possible?
- ❑ Funding/grant regulations
- ❑ Utility limitations
- ❑ Net metering limits/rules
- ❑ Interconnection agreement



<https://wi.my.xcelenergy.com/s/renewable/developers/interconnection/hosting-capacity-map>

BEST PRACTICES

- ❑ Qualified installer
 - *NABCEP*
- ❑ More than 1 quote
- ❑ Condition of roof
- ❑ Maintenance
 - *Panels*
 - *Batteries*
- ❑ Insurance
- ❑ Verify qualifying equipment



PV SYSTEM COSTS

- **\$2.15-\$4.00/watt**
 - *Varies based on*
 - equipment selection
 - installer
 - *Does not include batteries*
- **Batteries**
 - *Can double cost of system*



— SYSTEM PAYBACK

- **How was it calculated?**
- **Is it reasonable?**
 - *Current electric rate*
 - *Electric inflation rate*
 - *Incentives/Rebates/Tax Credits*
 - *Depreciation*

EXAMPLES

□ 176 kW with Microinverters

- \$468,900
- \$2.66/watt
- Electric rate = 0.098/kWh
- Payback = 8.8 years
- Assumes:
 - 30% tax credit
 - 5 year depreciation
 - Utility rebate
 - Electric rate increases 2% every year
- Simple payback = 22.4 years

□ 140 kW, standard inverters

- \$300,000
- \$2.14/kW
- Electric rate = \$0.107/kWh
- Payback = 6.3 years
- Assumes:
 - Tax credit
 - 5 year depreciation
 - Utility rebate
 - Electric increases 2% every year
- Simple payback = 16 years

□ 132 kW, standard inverters

- \$284,200
- \$2.15/kW
- Electric rate = \$0.108/kWh
- Payback = 6.3 years
- Assumes:
 - Tax credit
 - 5 year depreciation
 - Utility rebate
 - Electric increases 2% every year
- Simple payback = 16.4 years

EXAMPLES

□ 12.96 kW

- \$47,649
- \$3.67/watt
- Electric rate = 0.1334/kWh
- Payback = 1.8 years
- Assumes:
 - 50% tax credit
 - REAP grant 50%
 - Electric rate increases 5% every year
- Simple payback = 20.9 years

□ 77.76 kW

- \$239,108
- \$3.07/kW
- Electric rate = \$0.0755/kWh
- Payback = 1.7 years
- Assumes:
 - 50% tax credit
 - REAP grant 50%
 - Electric increases 5% every year
- Simple payback = 31.3 years

□ 21.6 kW

- \$81,387
- \$3.77/kW
- Electric rate = \$0.1334/kWh
- Payback = 2.2 years
- Assumes:
 - 30% tax credit
 - REAP grant 50%
 - Electric increases 5% every year
- Simple payback = 22.3 years

MAYBE SOMETHING SMALLER TO START?

- ❑ Solar fencer
- ❑ Livestock waterer/pumping
- ❑ Electricity for remote areas
- ❑ Irrigation systems



FUNDING OPPORTUNITIES

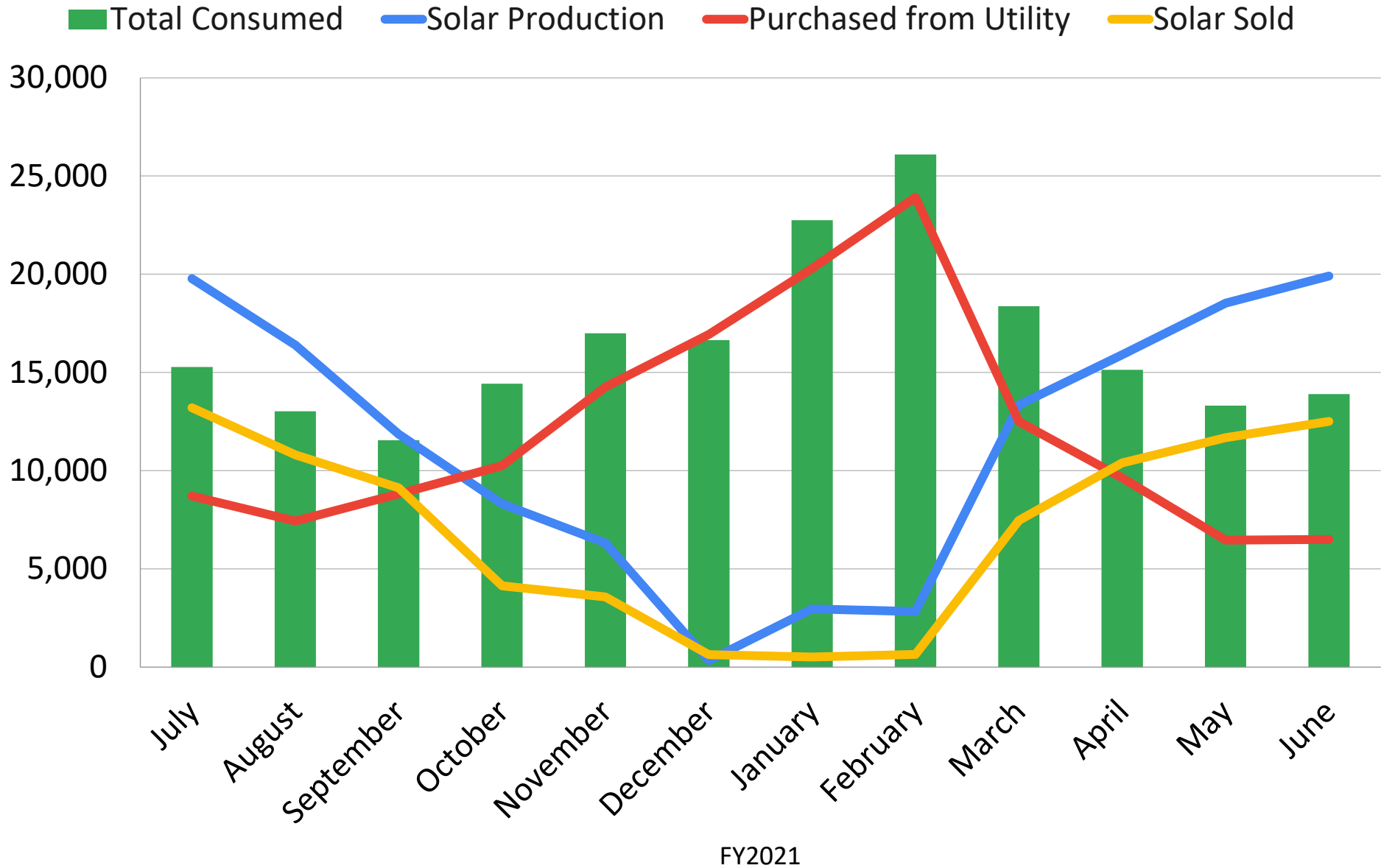
- **Utility or state incentives**
- **Federal grants**
 - *USDA-REAP*
 - *NRCS-EQIP*
- **Tax credits**
- **Accelerated depreciation**
- **Net metering**

EXAMPLE

☐ Northeast Wisconsin Technical School



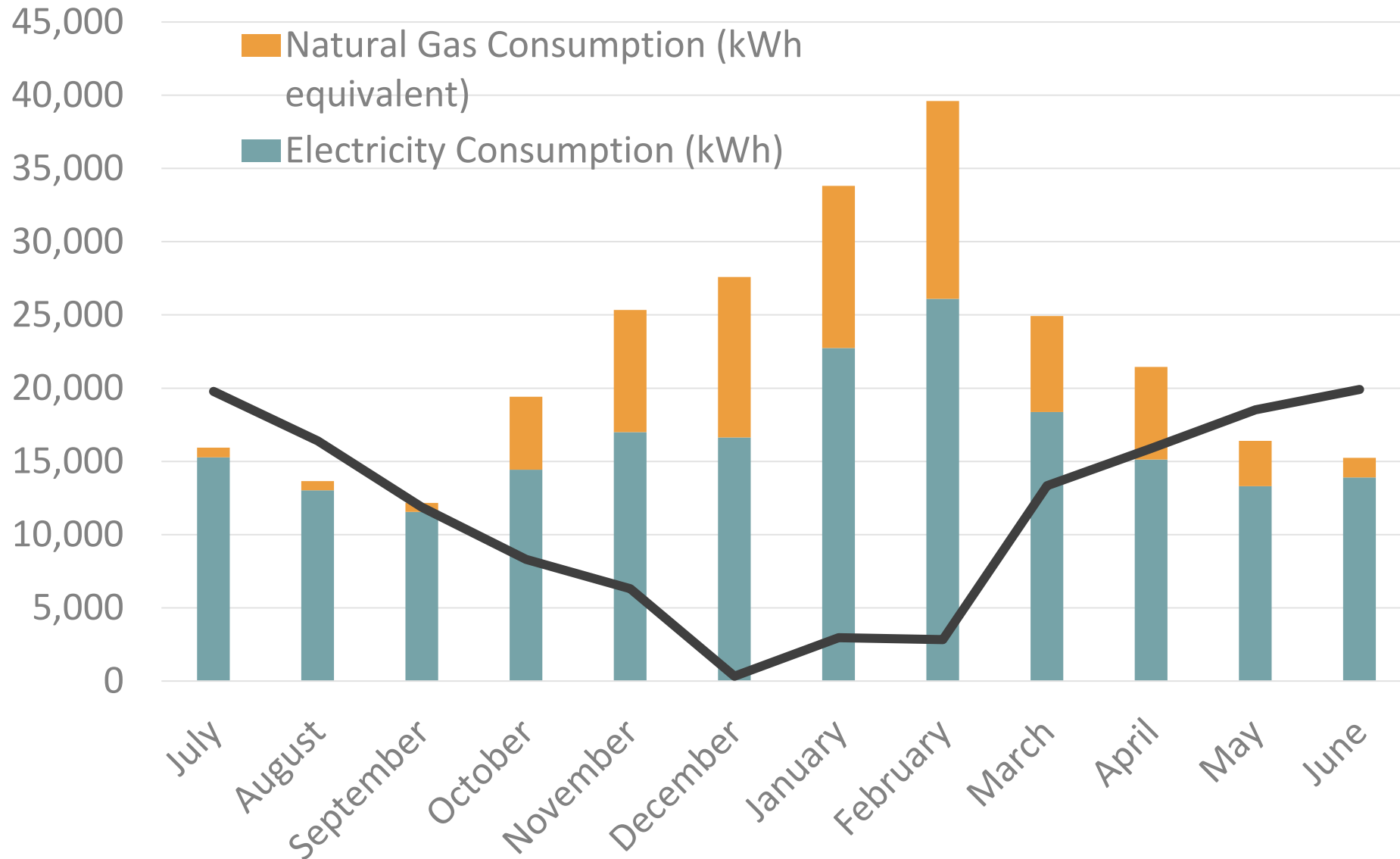
ELECTRICAL ONLY kWh



Solar Production is 69% of annual Electricity Consumption.

62% of Solar Production is sold to Utility

All Energy: Elec & Natural Gas



Solar Production is 51% of annual Energy (Elec & Nat Gas) .

35 kBtu/ft² EUI



THANK YOU

Bethany Reinholtz, CEM

920.246.8453

Bethany.Reinholtz@gdsassociates.com

