

Minnesota Made

Solar as a Development Tool

Jack Kluempke

Solar Business Advisor

Minnesota Department of Commerce, Division of Energy Resources



Minnesota Made Solar Value Chain

- **Original Equipment Manufacturers (OEMs)**
- **Component OEMs**
- **Component Suppliers**
- **Wholesalers/Distributors**
- **Sales/Installation/Maintenance/Service**



Minnesota Made

OEMs – Solar PV and Thermal Original Equipment Manufacturers.

Solar PV

- tenK – Silicon Energy

Solar thermal water heating

- Solar Skies

Solar thermal space heating

- RREAL – Energy Conservation Products - Heatwave



Minnesota Made



Other OEMs

- Backup Power Source in Slayton
 - Manufacturing battery storage devices
- Mouli Engineering in Eagan
 - Producing the Solar Pod



Minnesota Made

Component OEM's

The solar industry value chain extends far beyond OEM manufacturers.

- Glass
- Hardware
- Electrical components
- Aluminum Frames
- Gaskets
- Sealants



Minnesota Made

- Atlas Manufacturing located in Minneapolis
 - Supplies enclosures for other solar OEMs.
- Crenlo - a Rochester based company
 - Inverter housings out of sheet metal.
- American Polywater - a Stillwater based company
 - Makes sealants and lubricants for the solar industry.



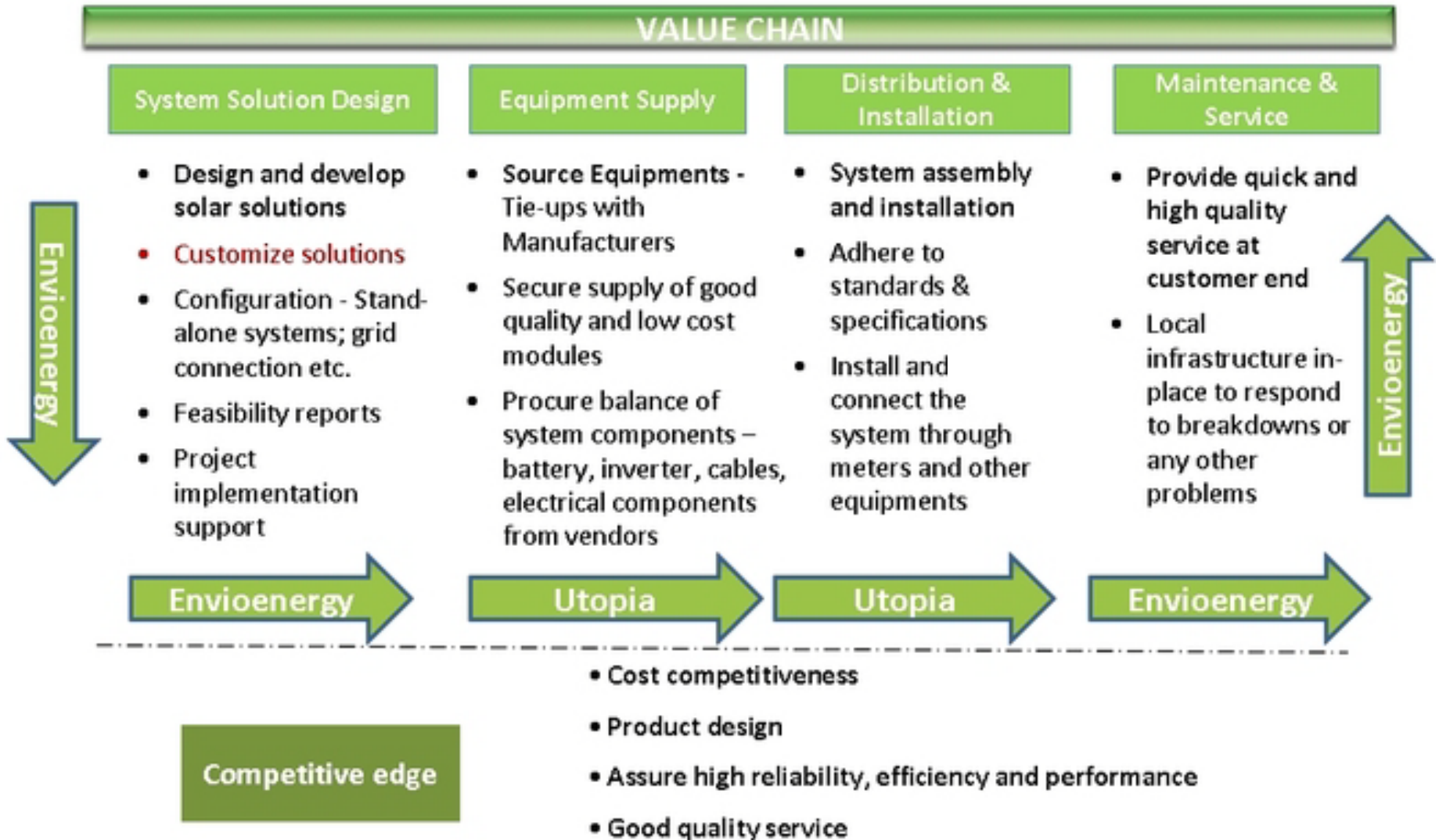
Minnesota Made

Component Suppliers

- Fastenal out of Winona for nuts and bolts
- DigiKey in Thief River Falls for electrical components
- Control Concepts Inc. of Chanhassen
- Midwest Safety Solutions of Prior Lake



Minnesota Made: 150+



Minnesota Made

Wholesalers/Distributors

- Elk River Winlectric in Elk River
- Werner Electric in Cottage Grove
- Simpleray in Saint Paul



Minnesota Made

Sales/Installation/Maintenance/Service

- Installers
- Electricians
- Plumbers
- Engineers
- Finance
- Roofers
- Integrators
- Sales
- Marketing
- Accountants



Minnesota Made

National Solar Jobs Census 2013

Baseline survey conducted by The Solar Foundation came out on February 11th.

thesolarfoundation.org



Minnesota Made

- 864 solar workers
- 73% employment growth over 2012
- Statewide job growth of 2% over same period
- Anticipation of additional 250 jobs in next 12 mos.
- That's another 28% job growth in 2014
- 1 in 4 employers expecting to add jobs



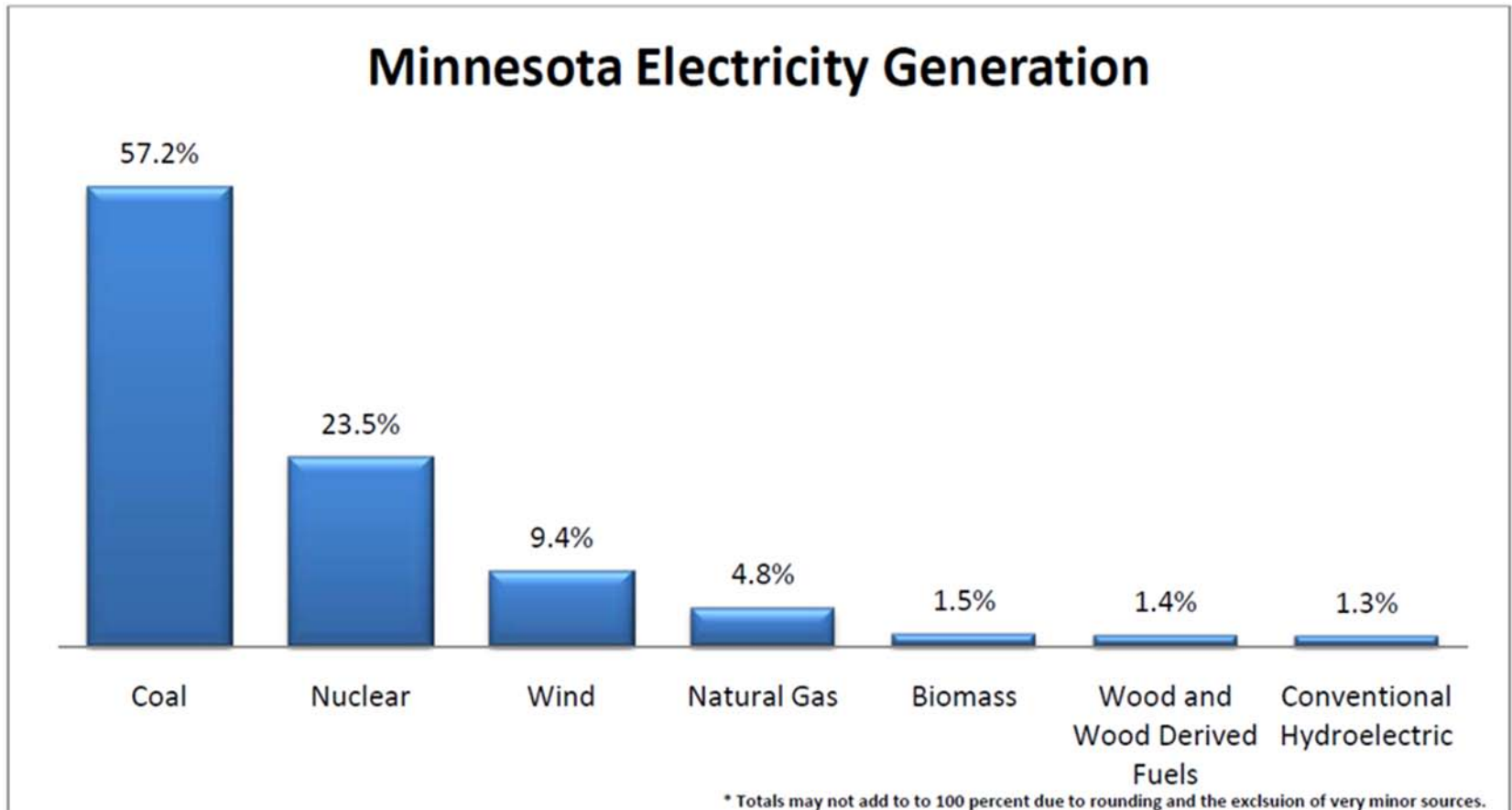
Minnesota Made

Interesting finding:

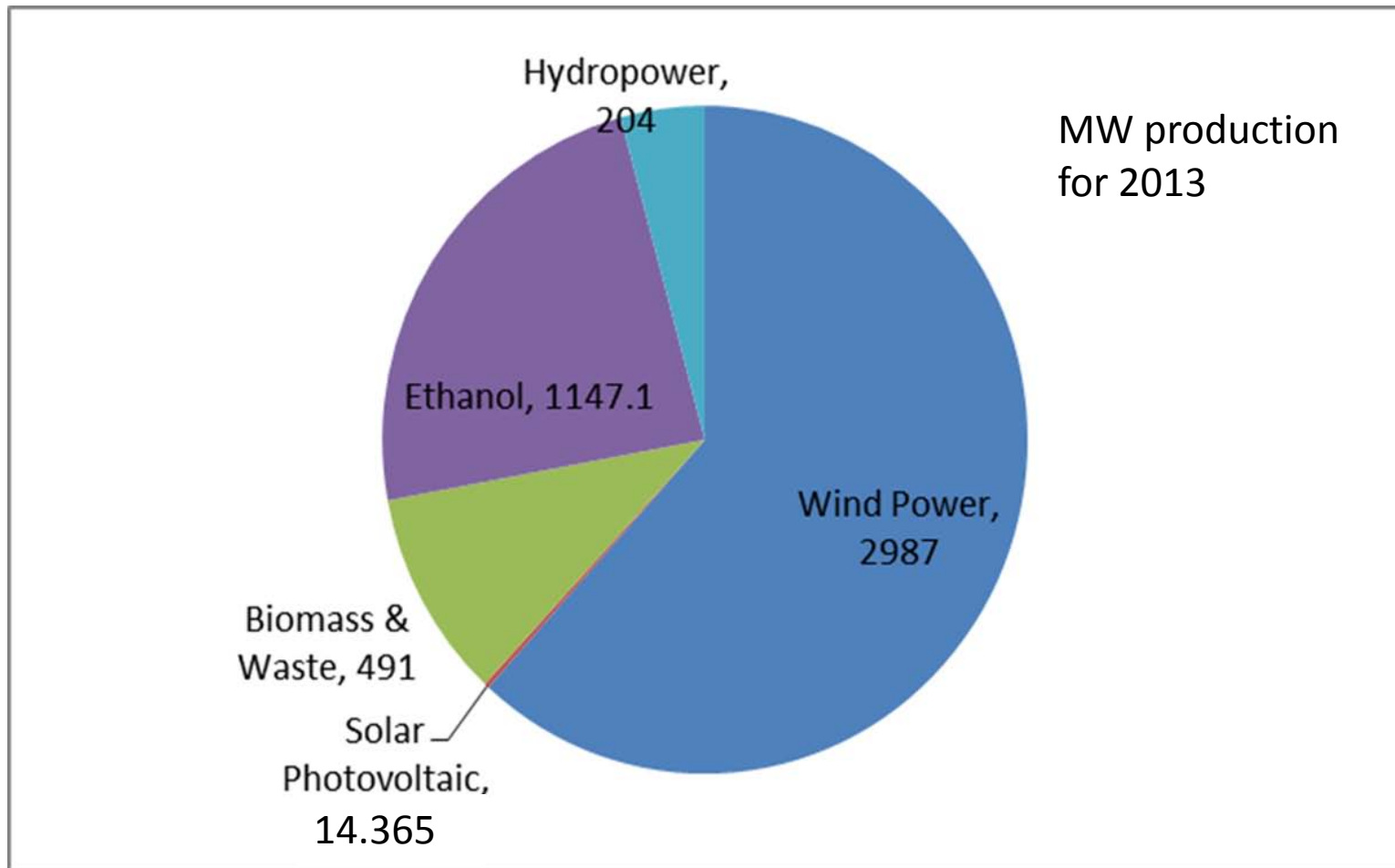
- Minnesota firms are more likely to be engaged in both solar and non-solar activities.
- Only 20.5% earning all of their revenue from solar goods or services.
- Compared to 44% nationally.



Minnesota Made



Minnesota Made: Renewables



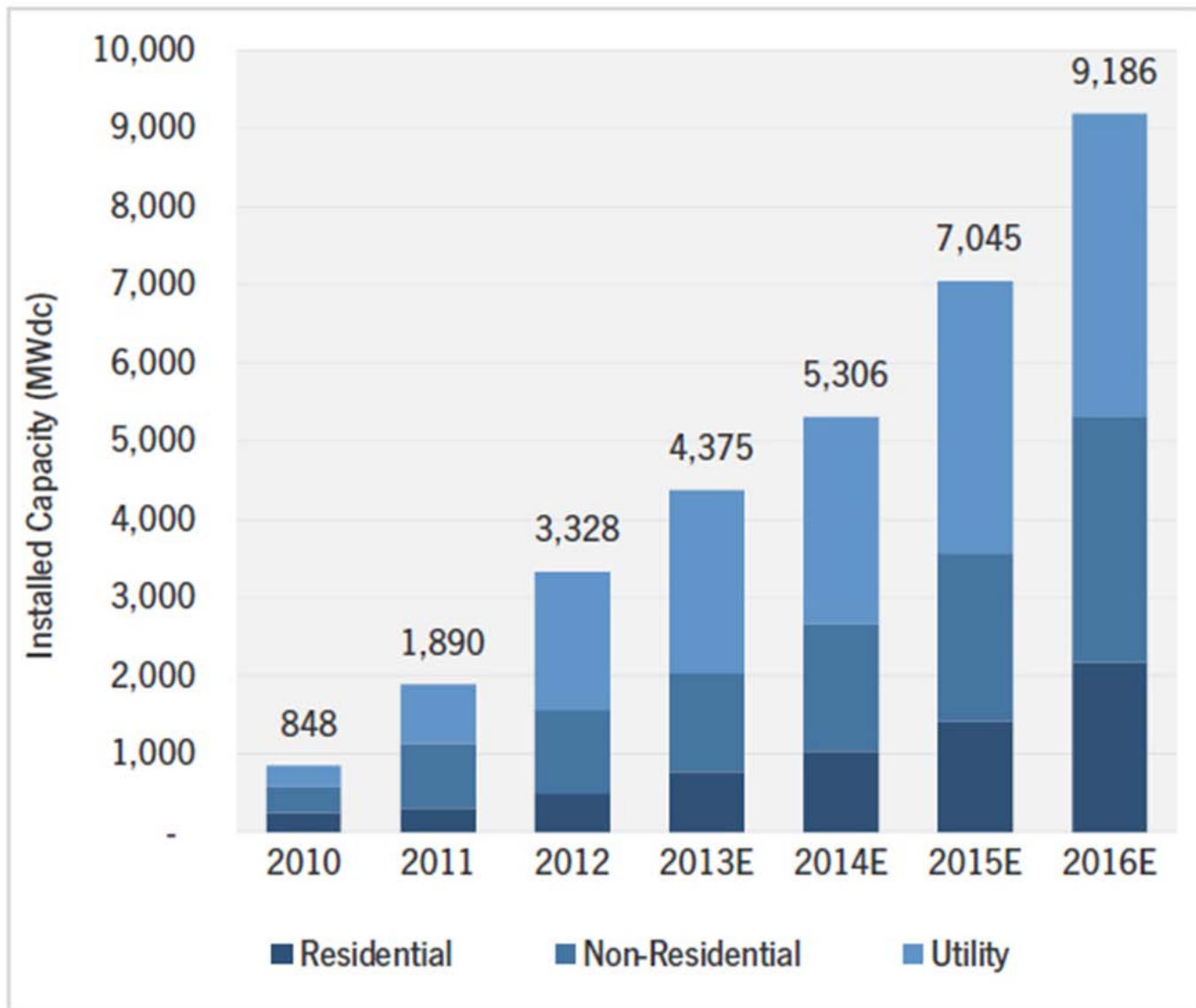
Minnesota Made

Solar Energy Standard

- 1.5% solar by 2020
- Applies to Public Utilities (IOUs)
- Approx. 400 MW by 2020 (estimate)
- 10% carve out for smaller solar (< 20 kW)
- Goal of 10% solar by 2030



Figure 2.8 U.S. PV Installation Forecast, 2010-2016E



Complete forecast through 2017 by state and market segment available in Full Report

Minnesota's Solar Capacity

and Annual Installations
as of September 30, 2013

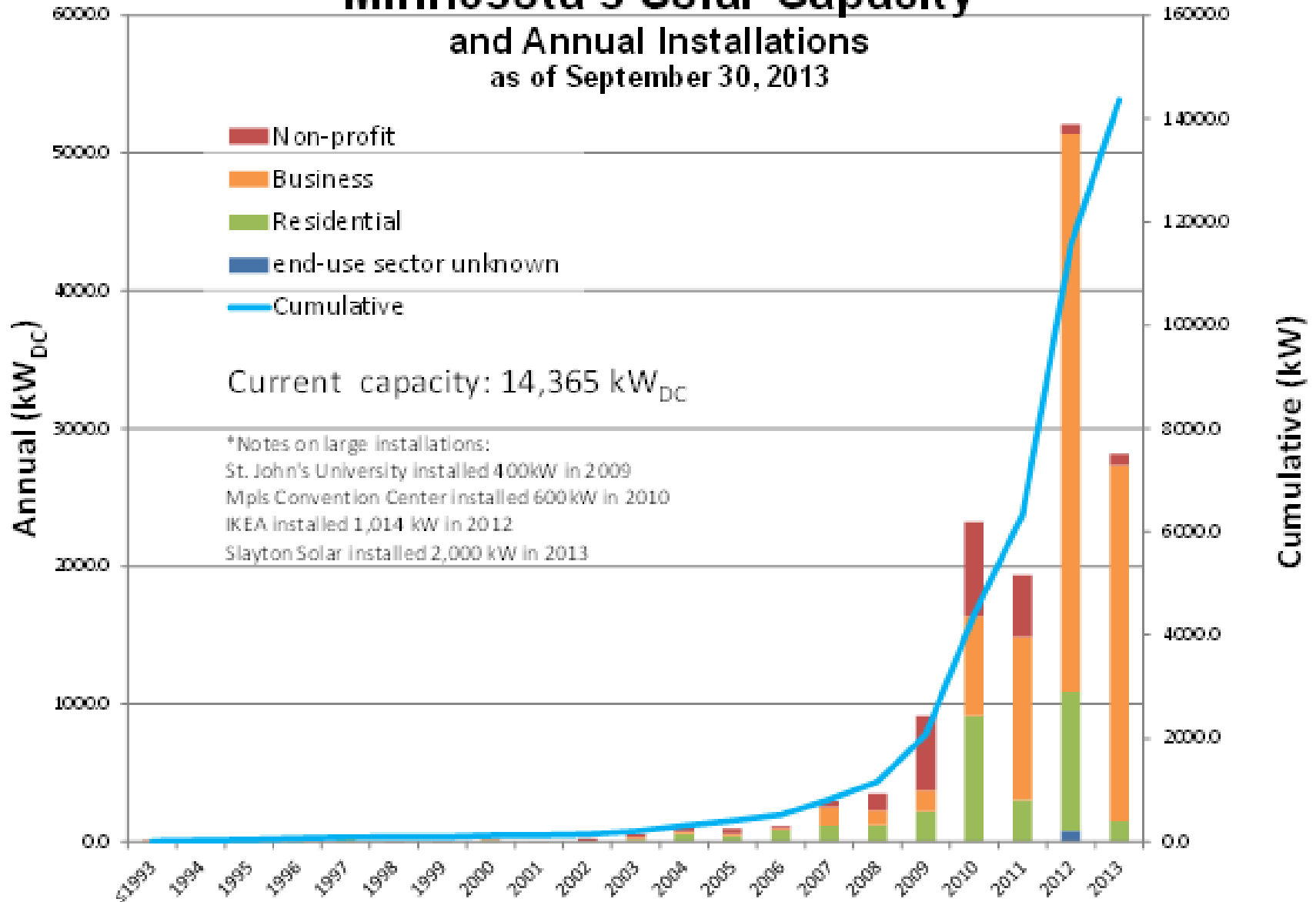
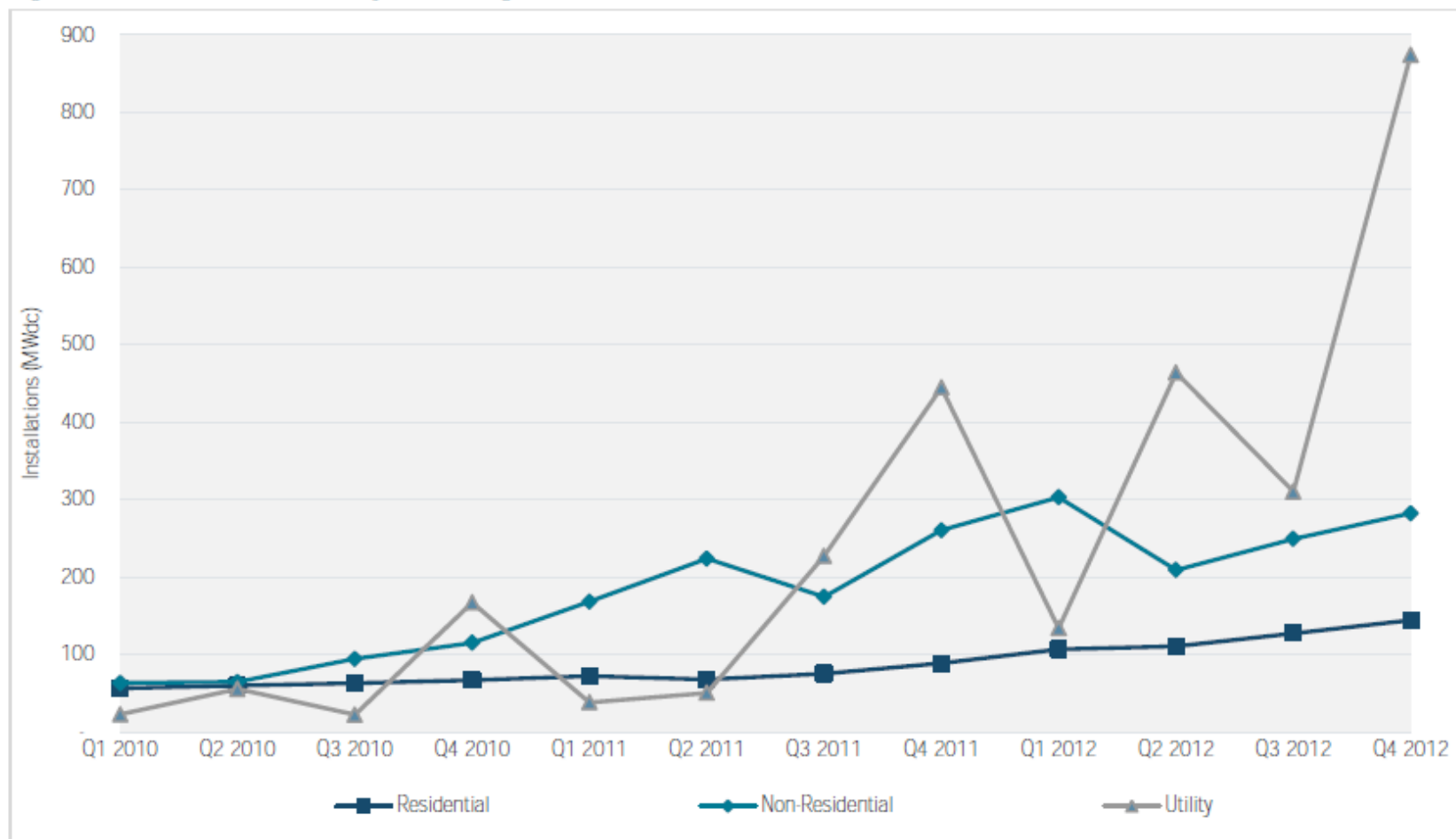


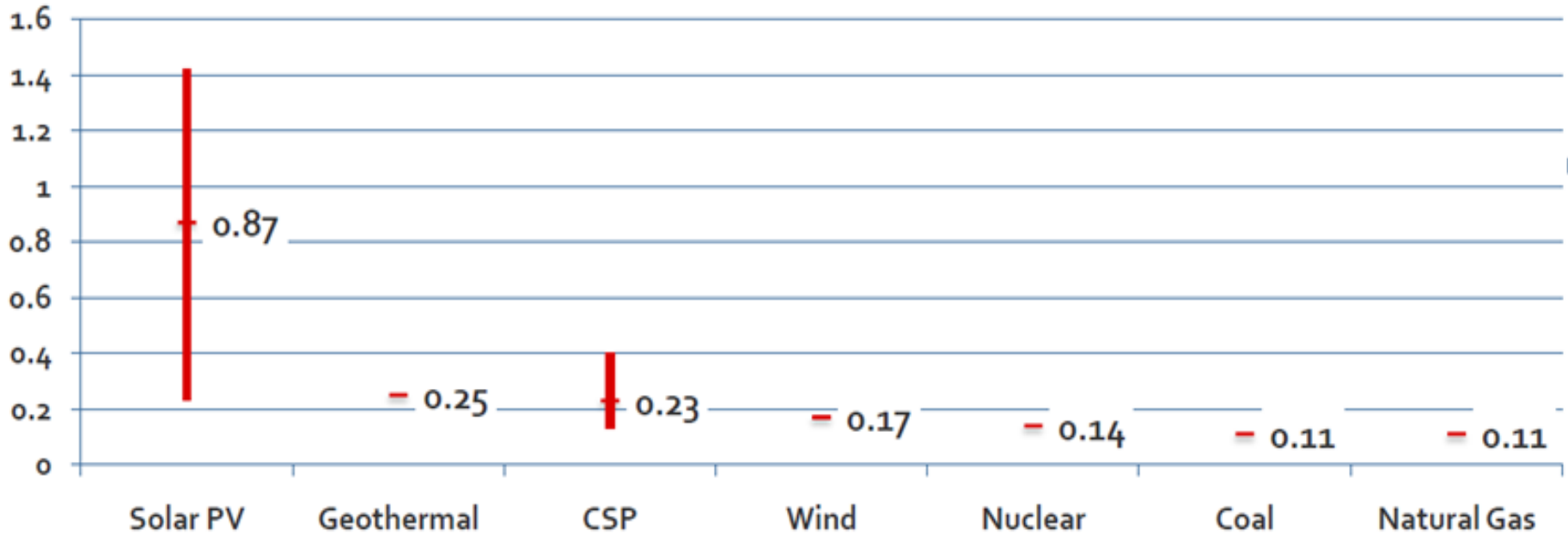
Figure 2.6 U.S. PV Installations By Market Segment, 2010-2012



	Q1 2010	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012
Residential	56	60	63	67	72	68	75	88	107	111	127	144
Non-Residential	63	64	94	115	168	224	174	260	303	209	249	282
Utility	22	55	22	167	38	50	227	445	134	464	310	874

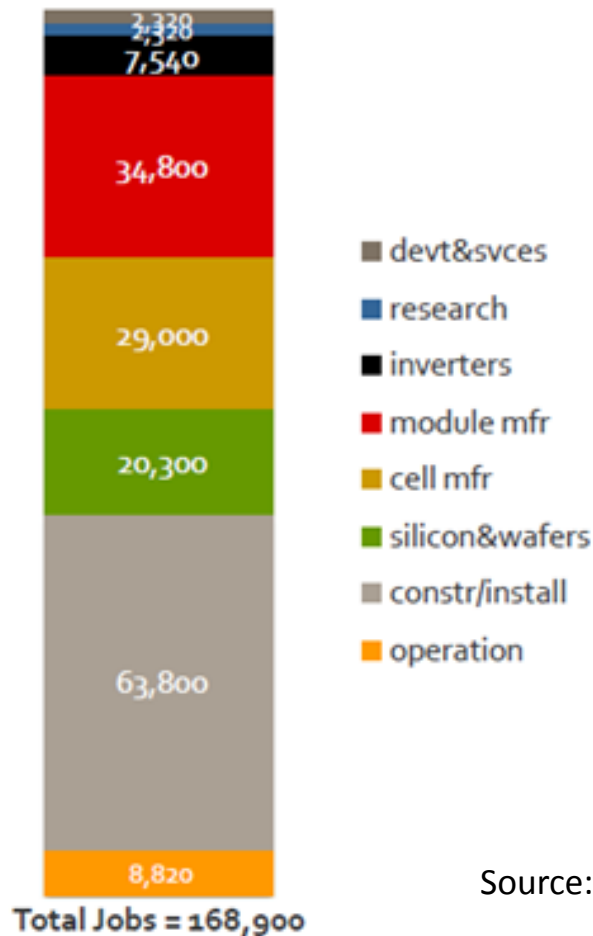
Jobs per MW: Solar PV is Universally Recognized as Creating More Jobs Per Unit of Energy Produced Than Any Other Energy Source.

Average Direct Job/Years Per GWh



Most of Global PV Employment is in Construction/Installation & Module Manufacturing.

Global PV and Direct & Indirect Employment



- 39% is local employment (site construction & roof installation plus development & services)
- Manufacturing of wafers, cells, and modules represents nearly 50%
- Operations is only 5% of the total, but this will increase as installed capacity increases

Source: New Energy Finance study (McCrone et al 2009), cited in NREL study

Minnesota Made

- Robust value chain
- The industry is growing rapidly
- Room for expansion and development



Questions and Feedback

Thank You

www.mn.gov/made-in-minnesota

Jack.Kluempke@state.mn.us

