Growing the Solar Industry in Minnesota

AGENDA

Comments about solar

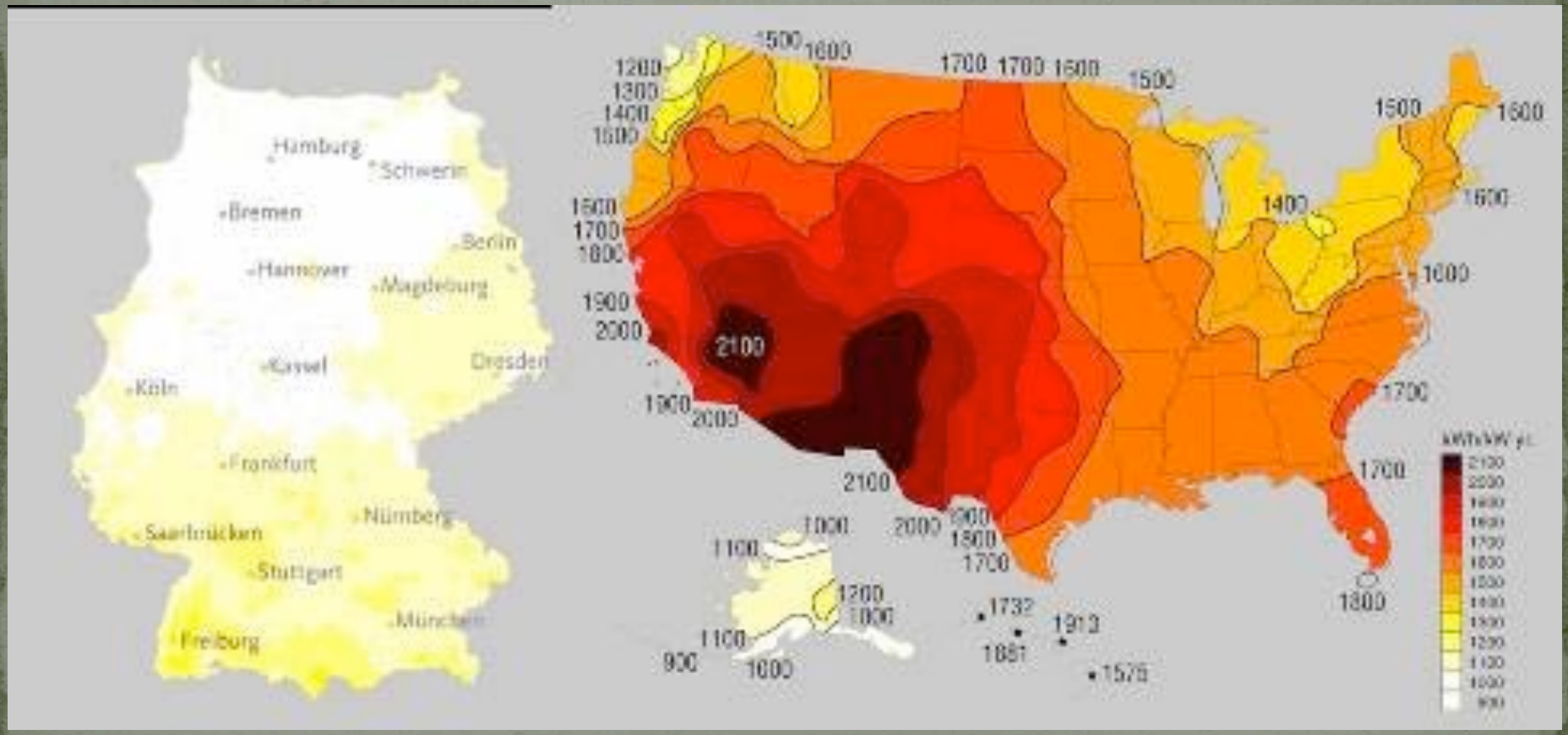
Business models

Incentives

Photovoltaics

- Photo → light
- Volts → electric force
- = Magic !!

Solar Resource: Germany vs. US

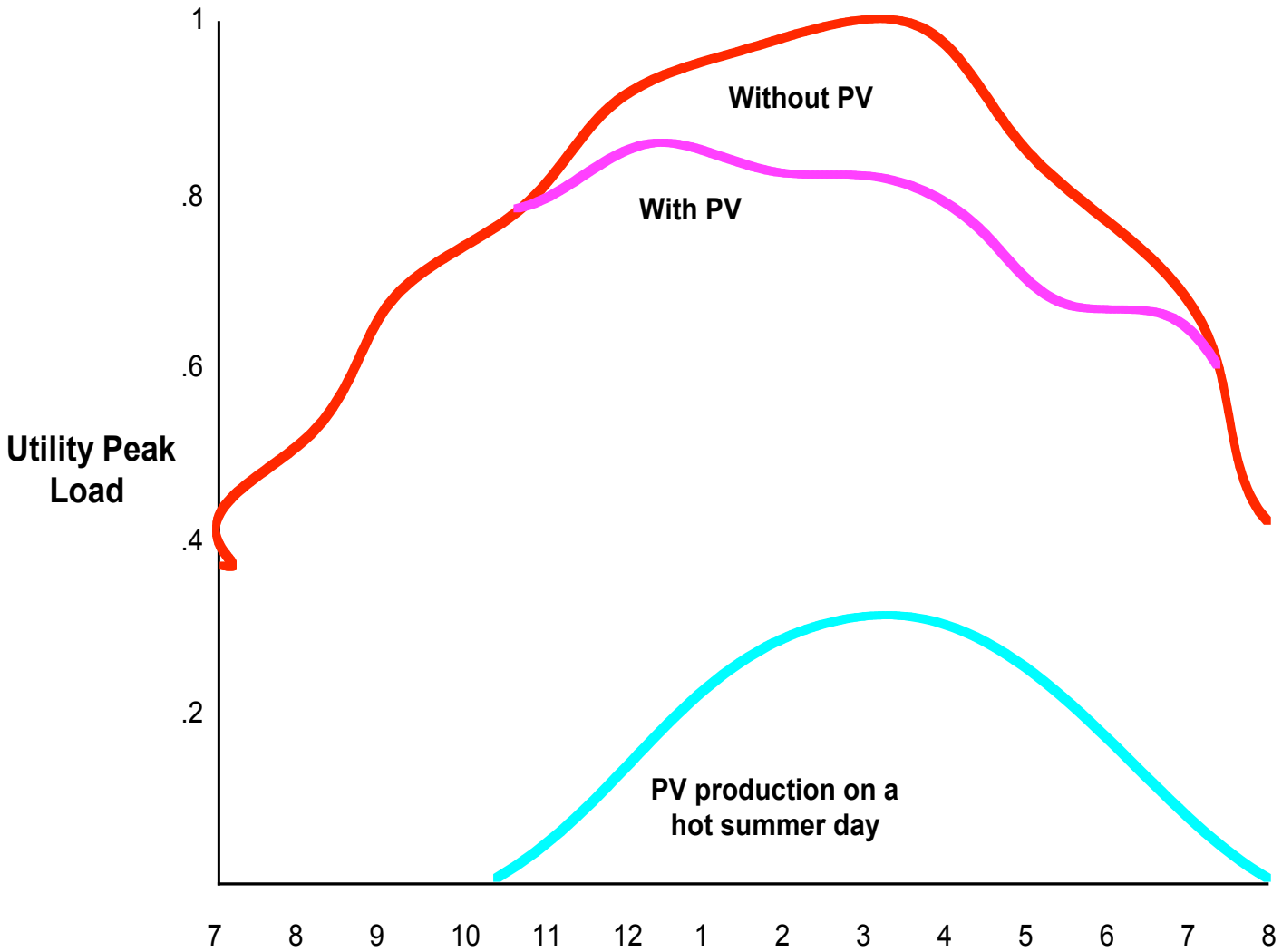


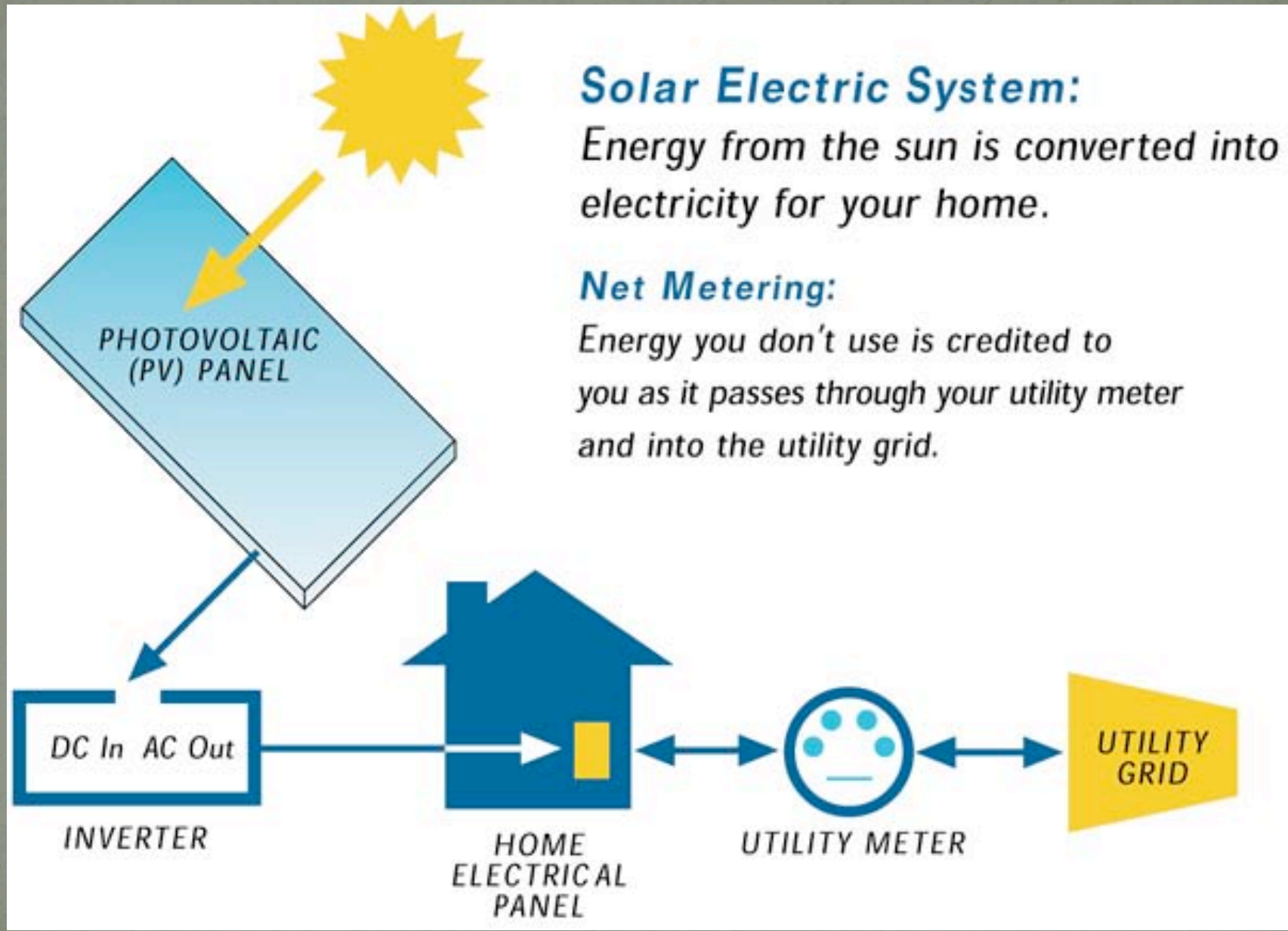
“Highest Best Use”

Solar Energy is variable → Primary
Fossil Fuel is stored → Backup

→Solar Energy is our Paycheck
→Fossil Fuel our Savings Account

Summer Peak Shaving




Solar Electric System:
Energy from the sun is converted into electricity for your home.
Net Metering:
Energy you don't use is credited to you as it passes through your utility meter and into the utility grid.
PHOTOVOLTAIC (PV) PANEL
DC In AC Out
INVERTER
HOME ELECTRICAL PANEL
UTILITY METER
UTILITY GRID

The Two Sides of Solar

Reduces Demand

Produces Energy

My Business Model:
→ Design/build

- Marketing
- Sales
- Design
- Installation
- Customer service

My Business Model:
→ Design/build

- Site evaluation
- Concept development
- Sales process
- Design
- Installation
- Customer service

Date:**2/28/2008**

Assumptions (Inputs)

Total Installed Cost ($):	$82,000
Allocation to Business (%):	100
Annual KWH Output:	11,000
Price/kwh ($)	$0.0900
Energy Inflation Rate (%):	5
Loan Downpayment (%):	100
Down Payment ($):	$82,000
Amount of Loan ($):	$0
Interest Rate (%):	4
Loan Term (Years):	5
Month Installed:	0
Net Federal Tax Rate (%):	30
Net State Tax Rate (%):	8
O & M Cost ($/kwh):	$0.020
O & M Inflation Rate (%):	2
State Rebate (%):	20.00
State Tax Credit (%):	0
Federal Tax Credit (%):	30
Basis for Depreciation	$51,800

Annual Cash Flow Model

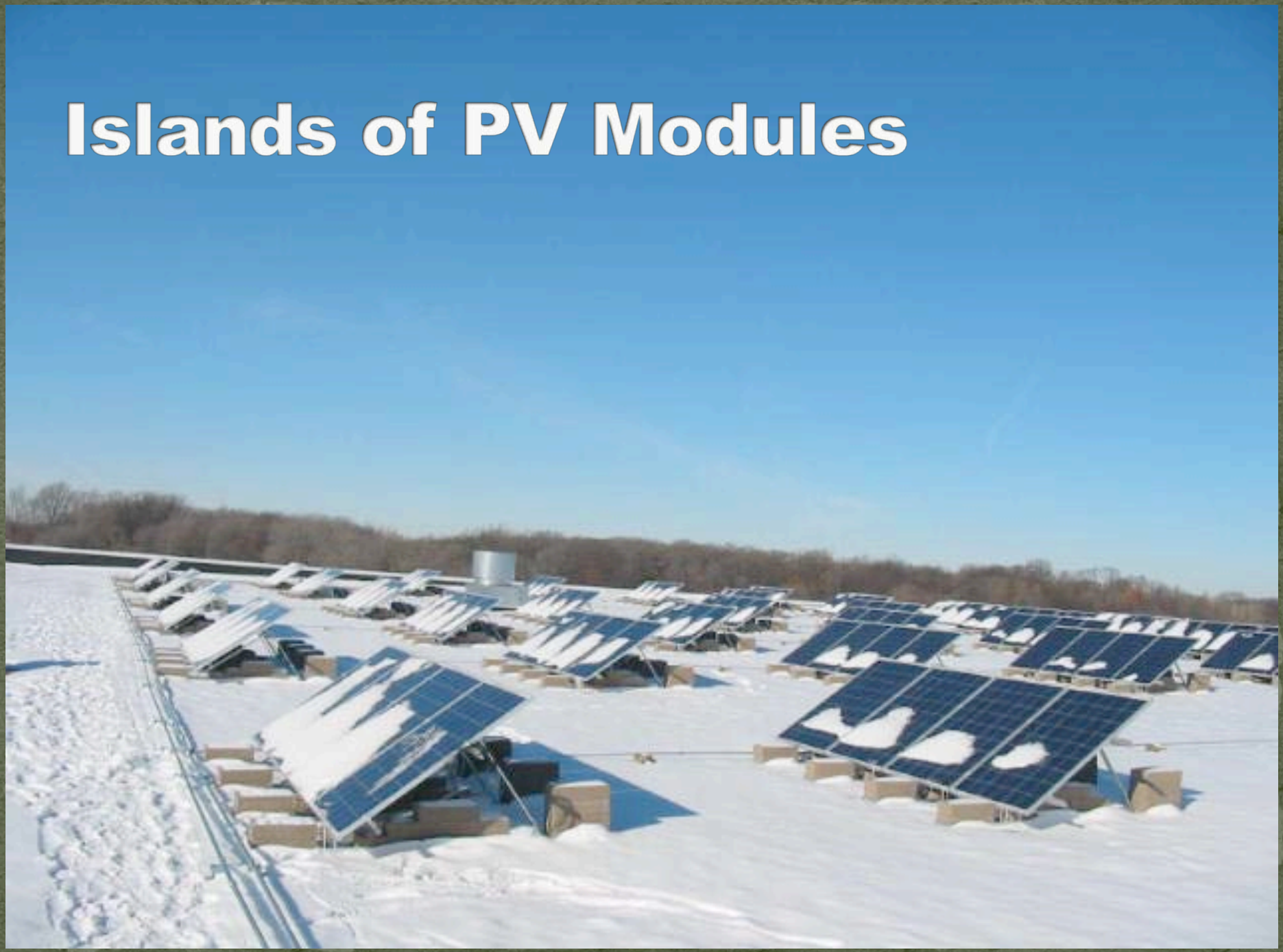
Year	Net Energy	O&M Costs	Net Deprec.	Net Loan Payments	Annual Cash Flow	Total Cash Flow
0					($41,440)	($41,440)
1	$990	($10)	$15,747	$0	$16,727	($24,713)
2	$1,040	($10)	$787	$0	$1,817	($22,896)
3	$1,091	($10)	$787	$0	$1,869	($21,027)
4	$1,146	($10)	$787	$0	$1,923	($19,104)
5	$1,203	($10)	$787	$0	$1,981	($17,123)
6	$1,264	($10)	$0	$0	$1,254	($15,869)
7	$1,327	($10)	$0	$0	$1,317	($14,553)
8	$1,393	($10)	$0	$0	$1,383	($13,170)
9	$1,463	($10)	$0	$0	$1,453	($11,717)
10	$1,536	($205)	$0	$0	$1,331	($10,386)
11	$1,613	($10)	$0	$0	$1,603	($8,784)
12	$1,693	($10)	$0	$0	$1,683	($7,100)
13	$1,778	($10)	$0	$0	$1,768	($5,333)
14	$1,867	($10)	$0	$0	$1,857	($3,476)
15	$1,960	($10)	$0	$0	$1,950	($1,526)
16	$2,058	($10)	$0	$0	$2,048	$523

Commercial Model: Design → Bid

- Design by others

- Competitive Bidding
- Installation
- Customer service

Islands of PV Modules



Market Growth
Is my model replicable?

- **Early adopter design/build**
- **Early business design/build**
- **Commercial design → bid**

Challenges for Solar Biz

1. Lower cost
2. Quality control
3. System performance
4. Business development

What Roles for Solar Biz?

1. Quality control
2. System performance
3. Business development
4. Aggregators

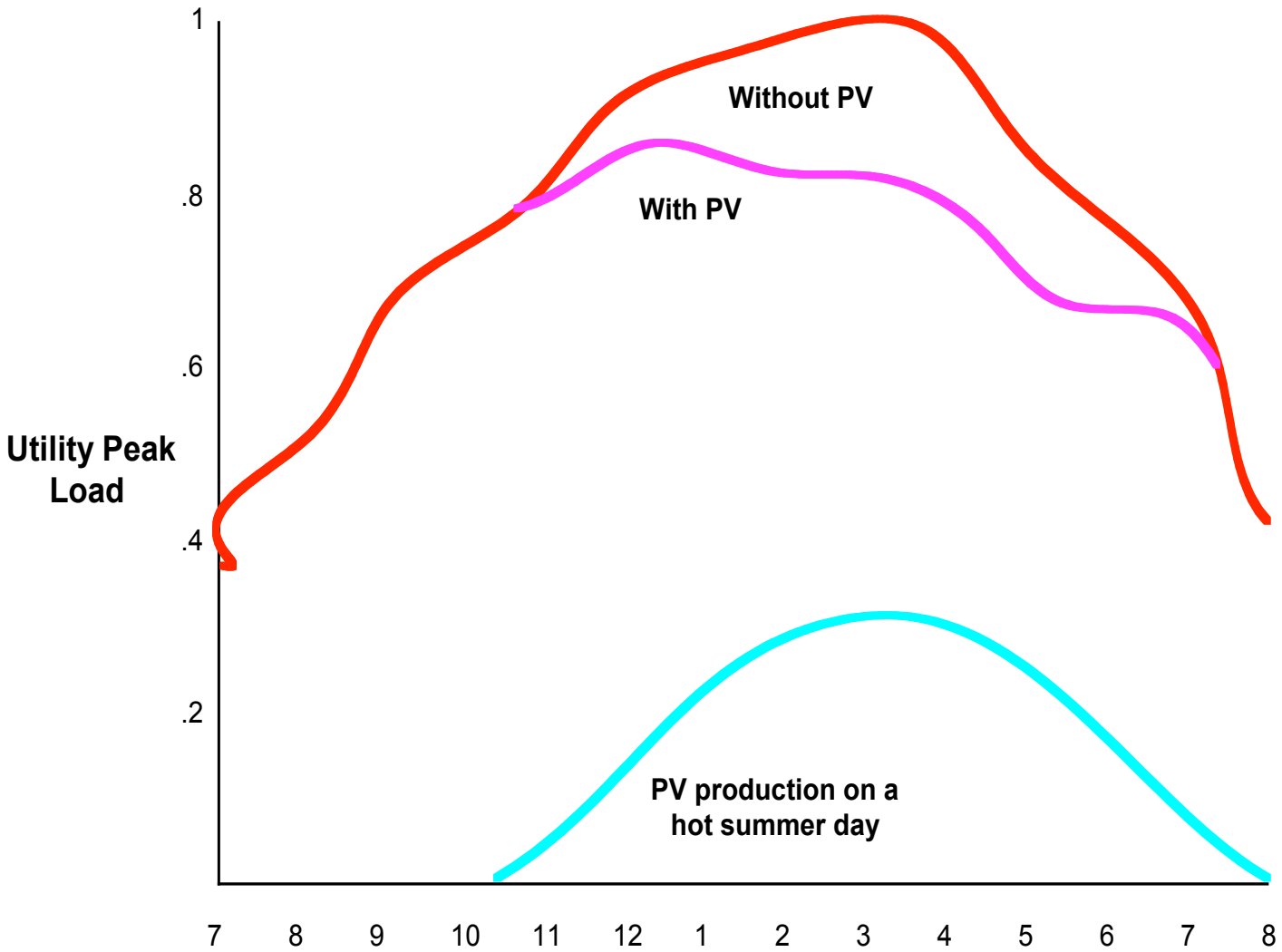
Utilities: Are we friends again?

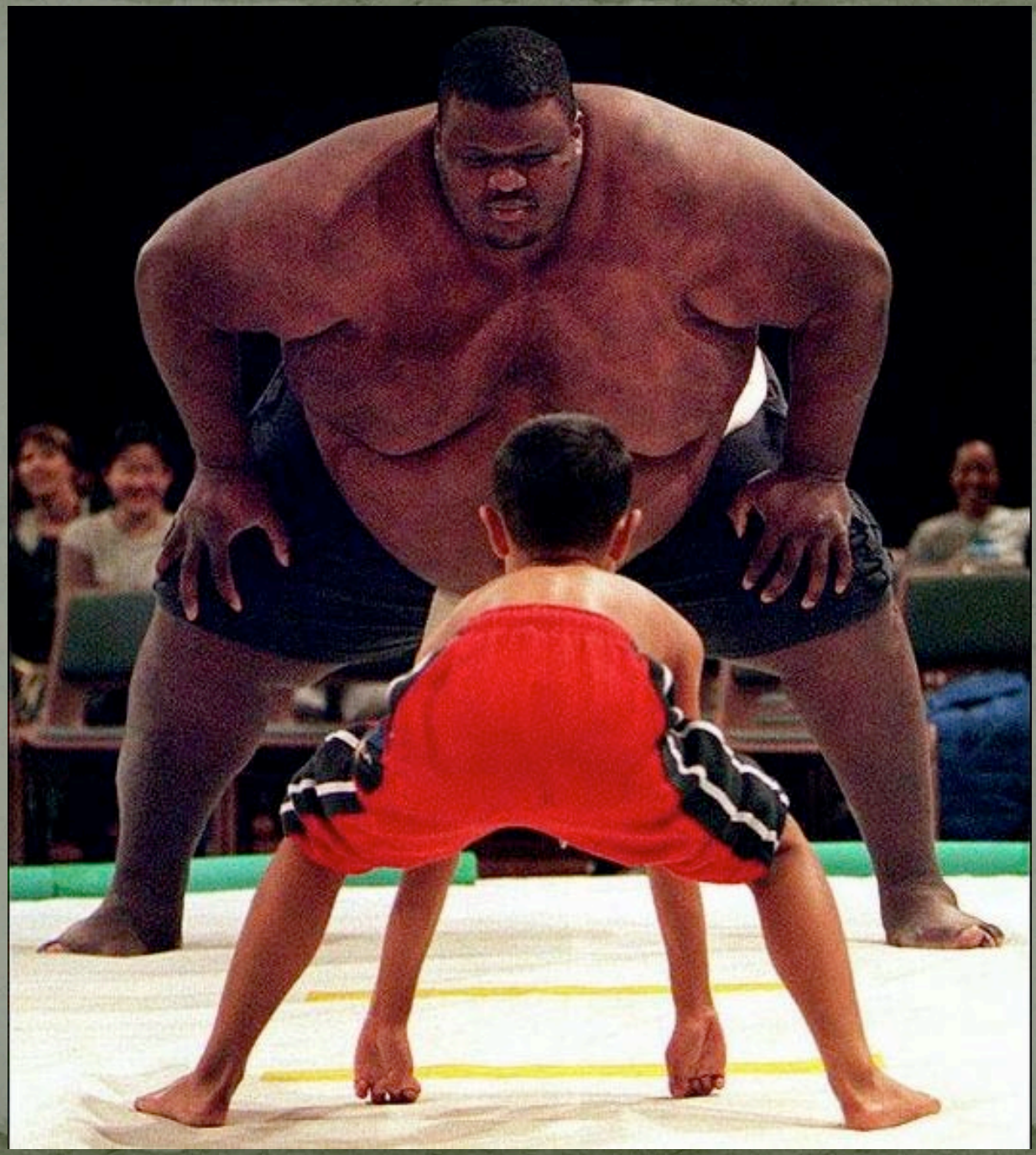
- "25 by 25" is on **their** backs
- 30% by 2020 for Xcel Energy – 11 yrs!
- They know it can't be ALL wind-based
- Utilities can buy solar attributes they need, at an agreed-upon market value
- Use this to leverage capital

The Attributes of PV:

- No emissions during operation
- No fuel cost!! Ever!!
- Very low maintenance cost
- Grid support at critical times
- Reduced risk of carbon costs
- Levelized peak power cost
- Lower transmission costs?

Summer Peak Shaving



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New Incentive Structure

- Performance-based

  = fair competition

Solar Incentives Should:

- put local resources to work
- create jobs at ALL levels
- be well-integrated with:
  - → construction industry
  - → energy conservation
- encourage utility partnerships
- bring orderly industry growth
- be scalable

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