

## U.S. Photovoltaic Roadmap –Perspective from a Manufacturing Industry

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United Solar Ovonic



**12 MW rooftop system in Zaragoza, Spain**

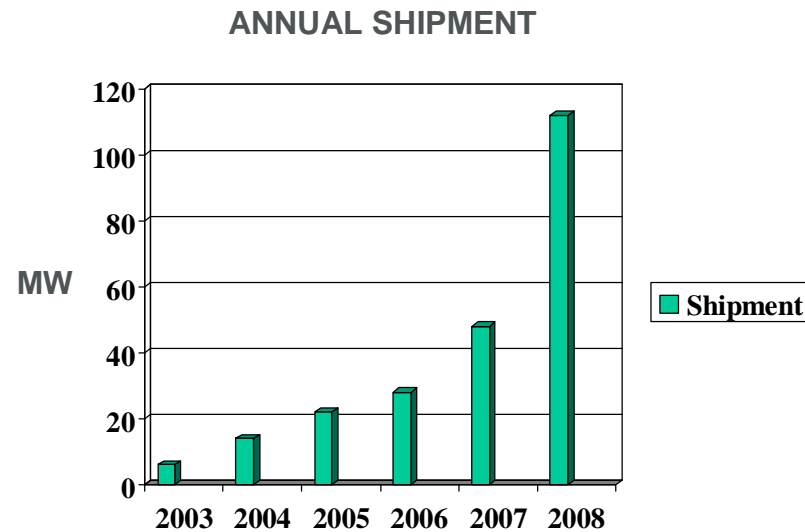


**The Zephyr airship**



Ø **United Solar Ovonics is a wholly-owned subsidiary of Energy Conversion Devices**

- § World's largest manufacturer of flexible solar cells
- § Unique roll-to-roll process based on thin film silicon multi-junction technology
- § Manufacturing plants in MI employing about 1000 people



## Flexible products for rooftop market

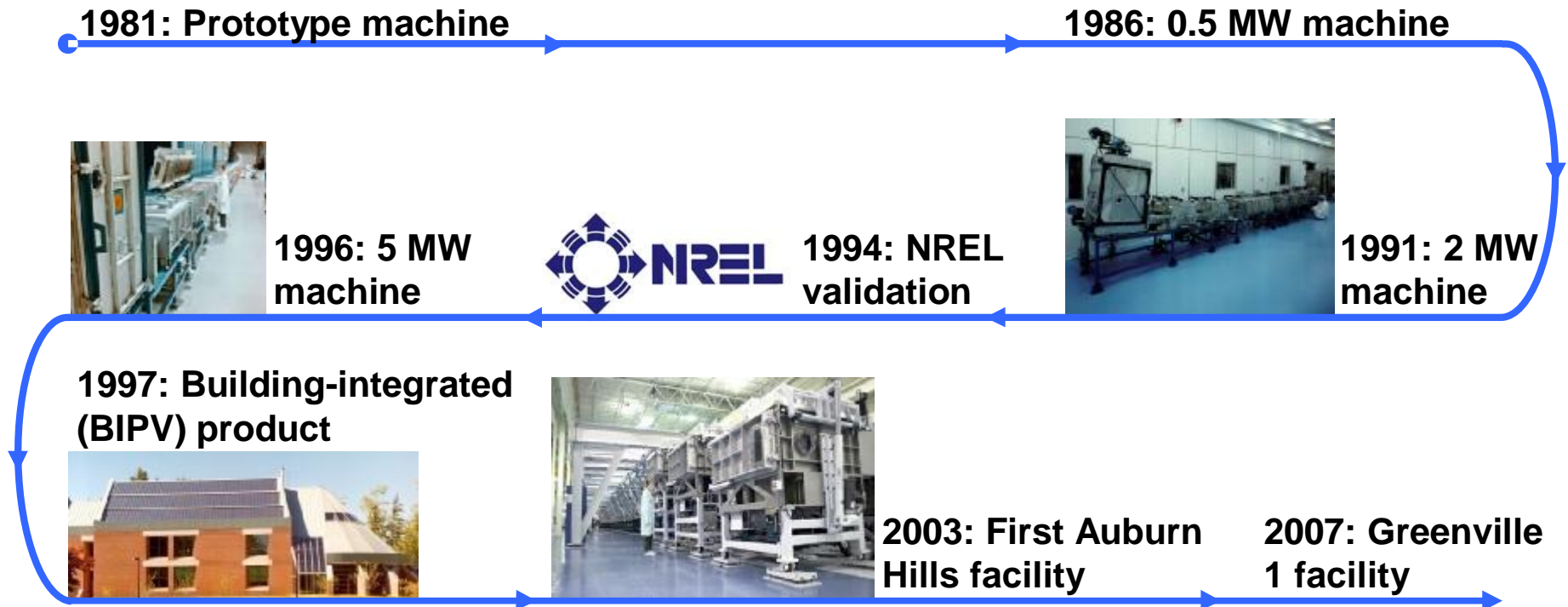
### Value Proposition:

- Requires no roof penetrations
- Generates more electricity in real world conditions
- Lightweight, durable, flexible
- Ideal for Building Integrated (BIPV)
- Easy to install
- Removable
- No polysilicon needed



*Photo courtesy Solar Integrated*

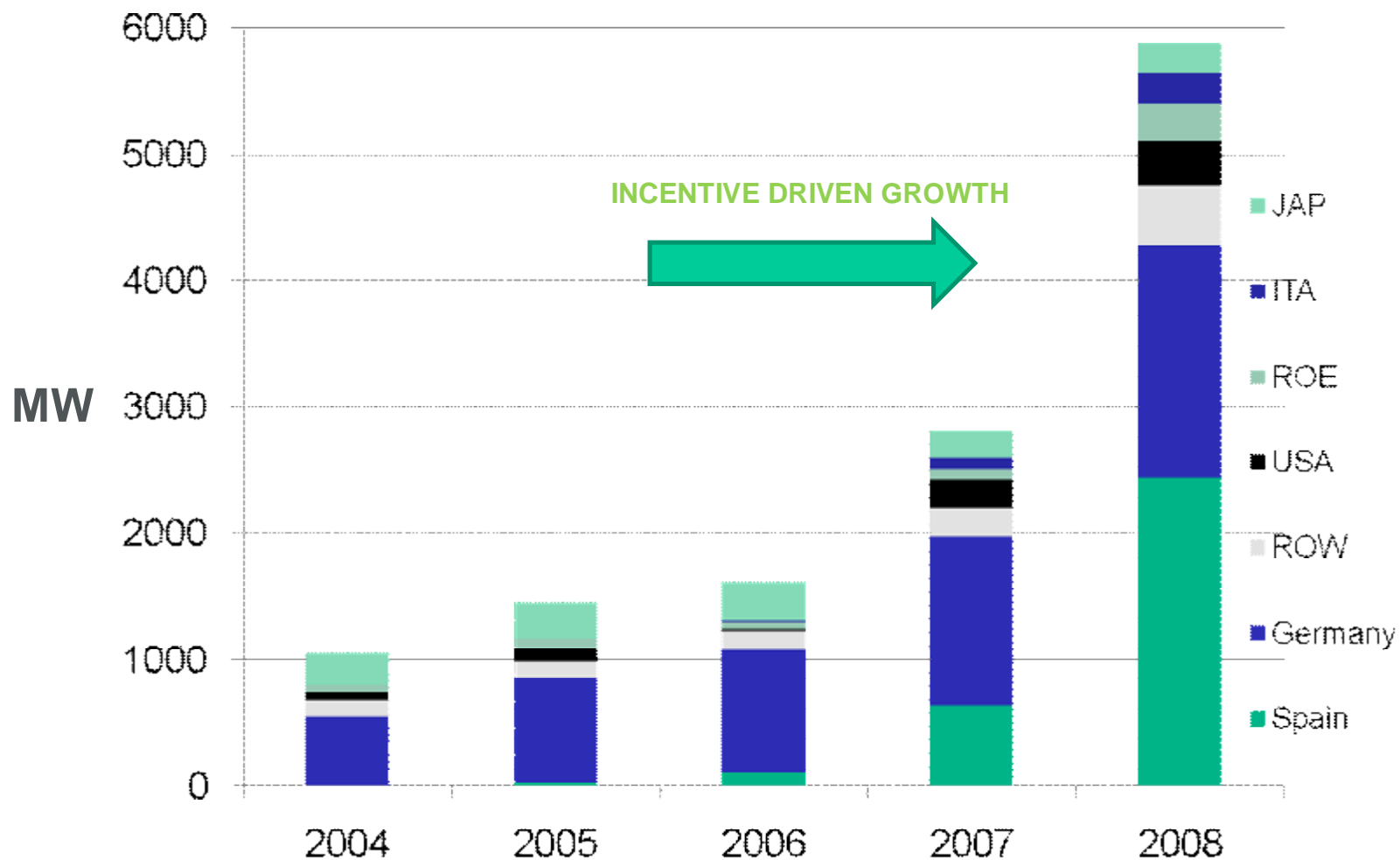
## From Innovation to Commercialization



**TODAY: Greenville campus expanded to 180 MWs**



## GLOBAL ANNUAL SHIPMENT



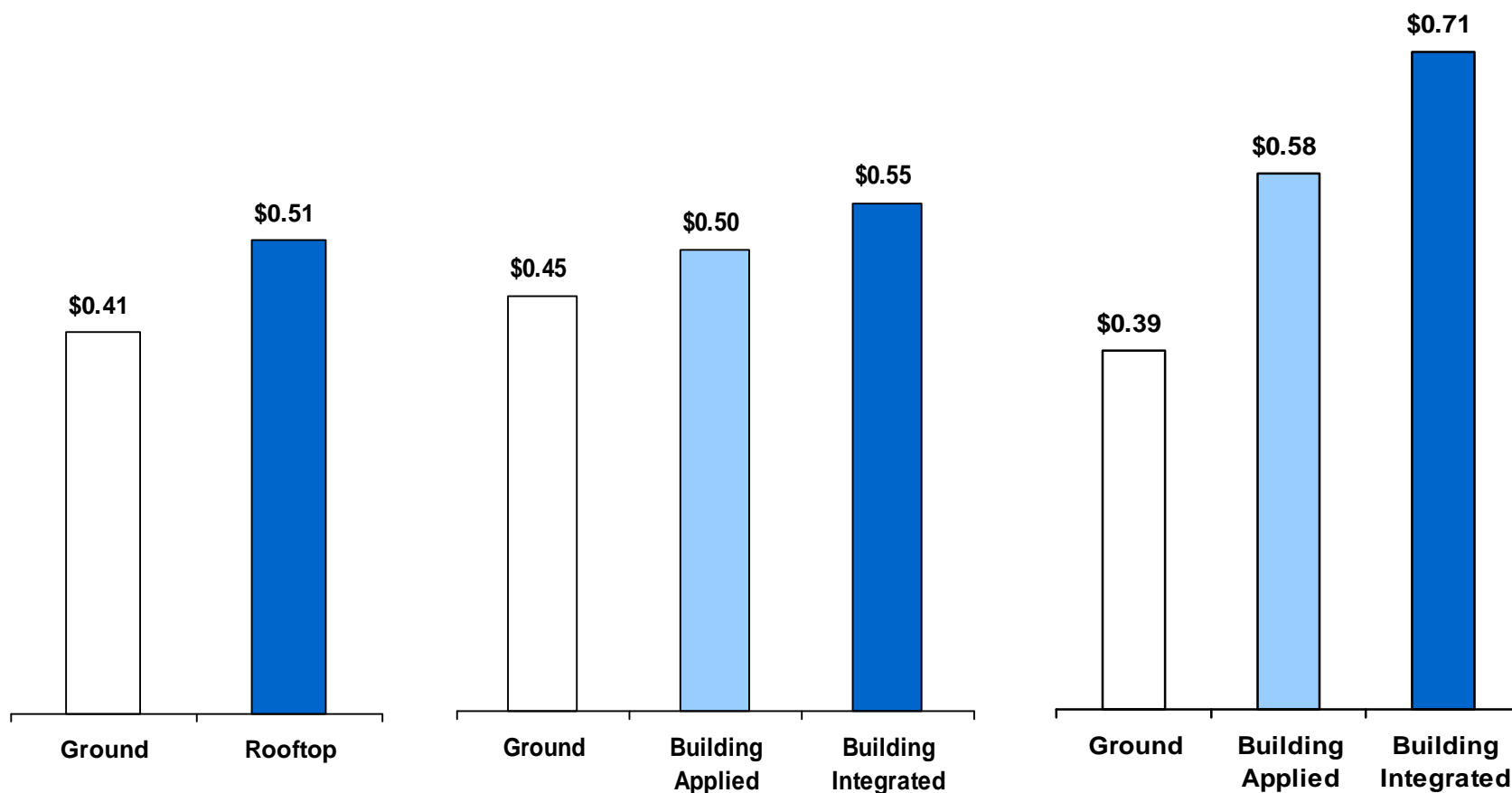
INCENTIVES ARE NEEDED TO CREATE DEMAND CREATION

## Rooftop & BIPV Receive Higher Government Incentives

Germany

Italy

France



(In US¢ / kWh) with  
Euro=\$1.3



## **WHY INCENTIVES?**

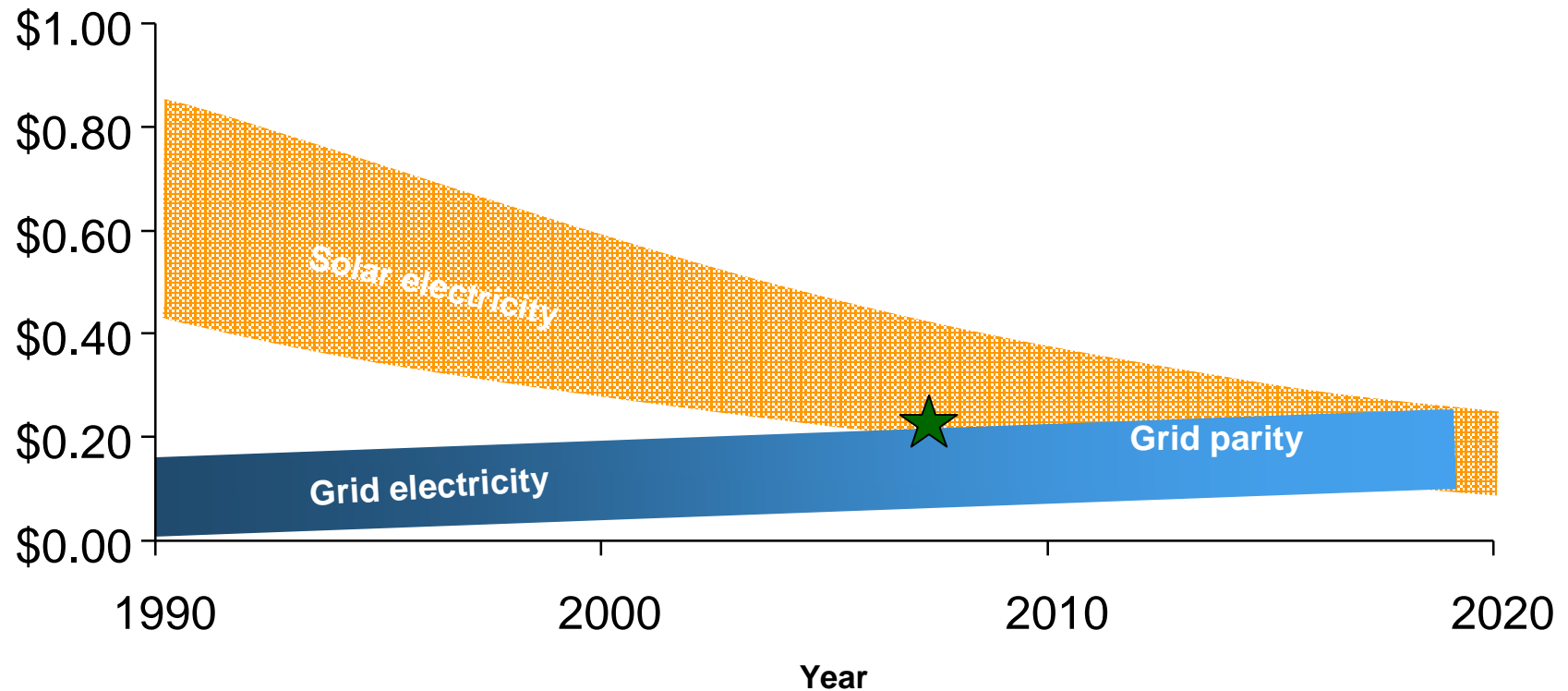
### **Benefits of PV roof top solar systems**

- **Immediately available – traditional power plants take years for approval, design and construction**
- **Roof top solar systems generate electricity at the point of consumption**
- **Optimize land use – taking advantage of unused space on roof**
- **Reduces strain on antiquated grid**
- **No transmission and distribution losses – one study estimated 6-8 % electricity generated in power plants is lost in transmission and distribution.**
- **Improves air quality – reduces CO2**

➡ **DEPLOYING 100 MW OF PV TO ELECTRIFY 200  
COMMERCIAL BUILDINGS/SCHOOLS CAN CREATE  
2400 GREEN JOBS**

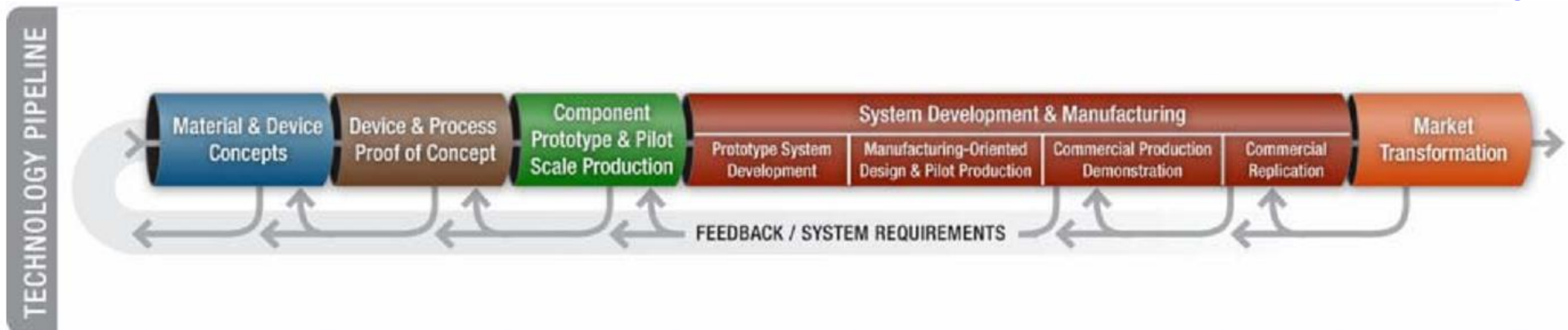
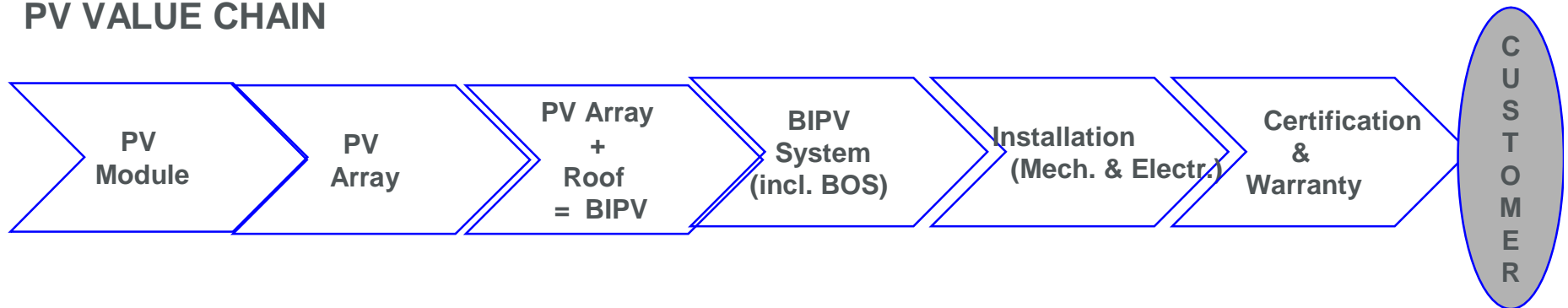
Cost per kW hour  
(in constant  
2005 US dollars)

## CHALLENGE FOR PV -HOW TO REACH GRID PARITY





## PV VALUE CHAIN

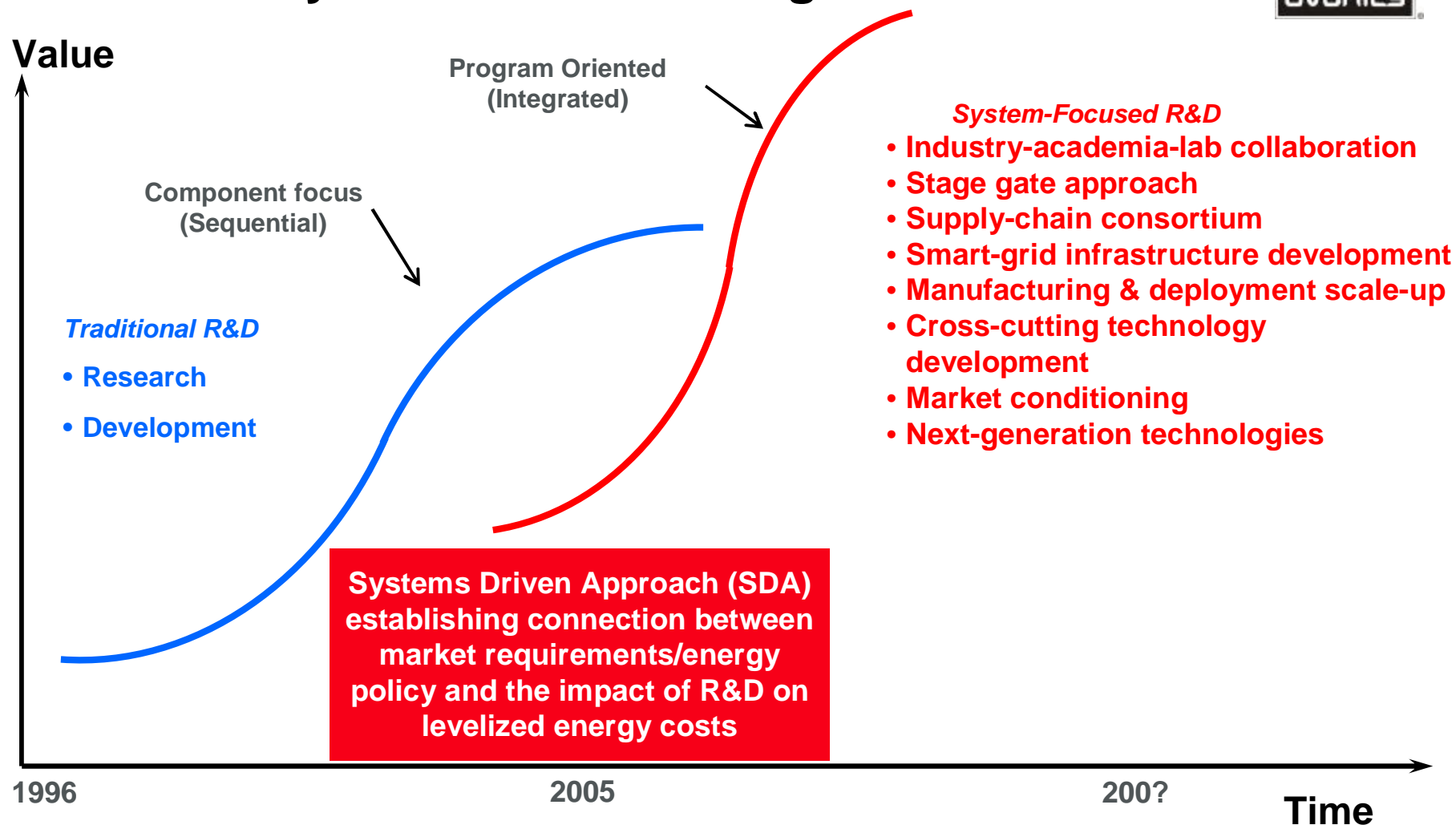


**CUSTOMER CARES ABOUT LCOE (c/kWh) ONLY;  
INNOVATION MUST FOCUS ON THAT.**

## **ROLE OF GOVERNMENT TILL GRID PARITY IS REACHED**

- **DEMAND CREATION; INCENTIVE, ITC, GRANTS**
- **REMOVE BARRIERS; UNIFORM CODES, NET METERING**
- **SUPPORT R&D TO REACH GRID PARITY: SYSTEM DRIVEN APPROACH**
  - **Build on the foundation**
  - **There are several disruptive technologies that have already been introduced**
  - **There are many choices to reach the holy grail of “grid parity”**

# Solar System-Focused Integrated Innovation



# **Solar America Initiative (SAI)- Focus on c/kWh to reach grid parity**

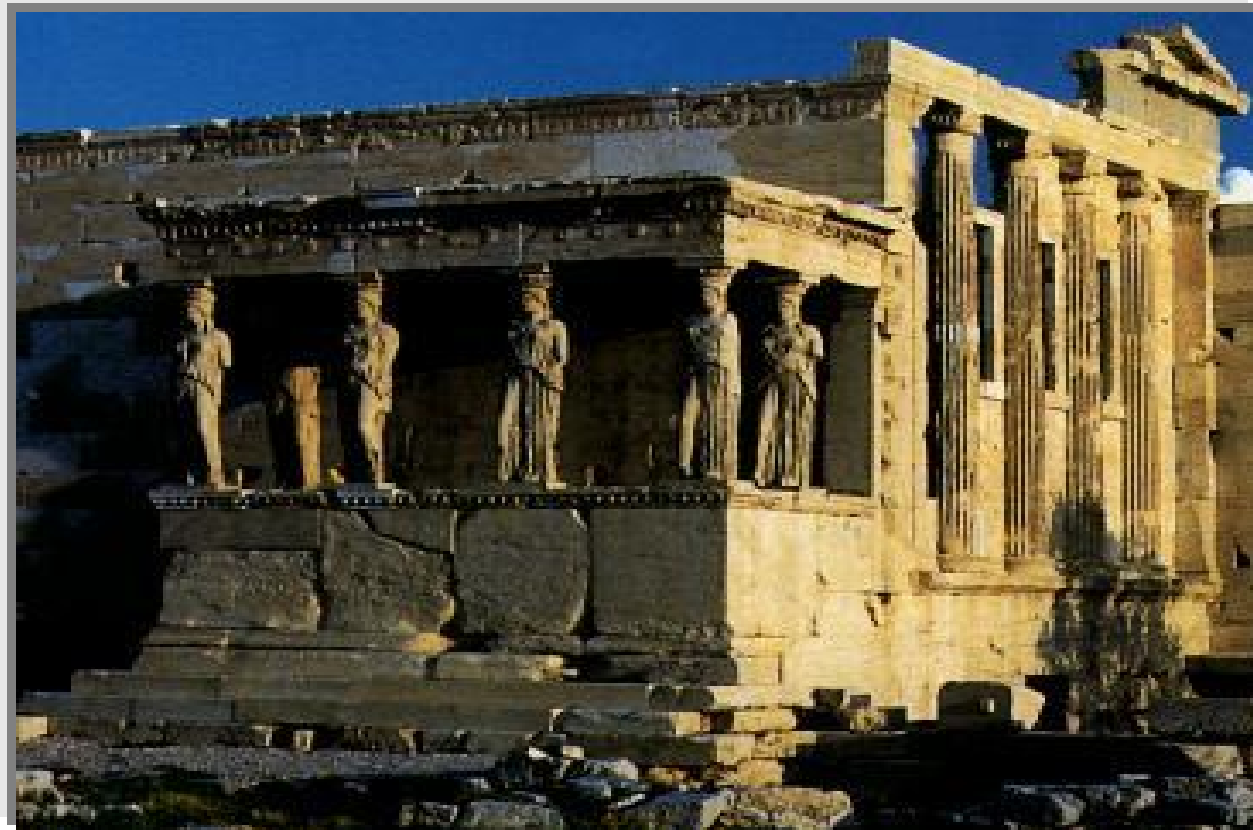
**Demonstrate Levelized Cost of Electricity (LCOE) of 10-15 c/kWh and 6-8 c/kWh by years 2010 and 2015, respectively, for BIPV systems on commercial/institutional buildings. This mirrors the goals that many industries had set as their internal benchmark. DOE facilitated industry-academia partnership to focus on the goal.**

## Breakdown of Targeted Cost Savings United Solar Ovonic Proposal

Item	Units	2006	2010
Modules	\$/W	3.30	2.48
Inverter & BOS	\$/W	0.94	0.81
Installation	\$/W	0.43	0.34
Deployment/indirect	\$/W	0.97	0.83
Installed Cost	\$/W	5.65	4.47
LCOE* (Phoenix)	¢/kWh	12.45	10.2

\* SAM MODEL

The focused program has accelerated the progress to grid parity;  
the program needs to continue to meet the 2015 goal.



*“In the end, more than they wanted freedom, they wanted a comfortable life-and they lost both comfort and freedom. When the Athenians wanted not to give to society but for society to give to them, when the freedom they wished for most was freedom from responsibility, then Athens ceased to be free” – Edith Hamilton*

**THANK YOU**