

# **Solar Light for Africa, Ltd.**

## **Exploring Partnerships in Electrification and Education**

The University of Cincinnati

November 22, 2011



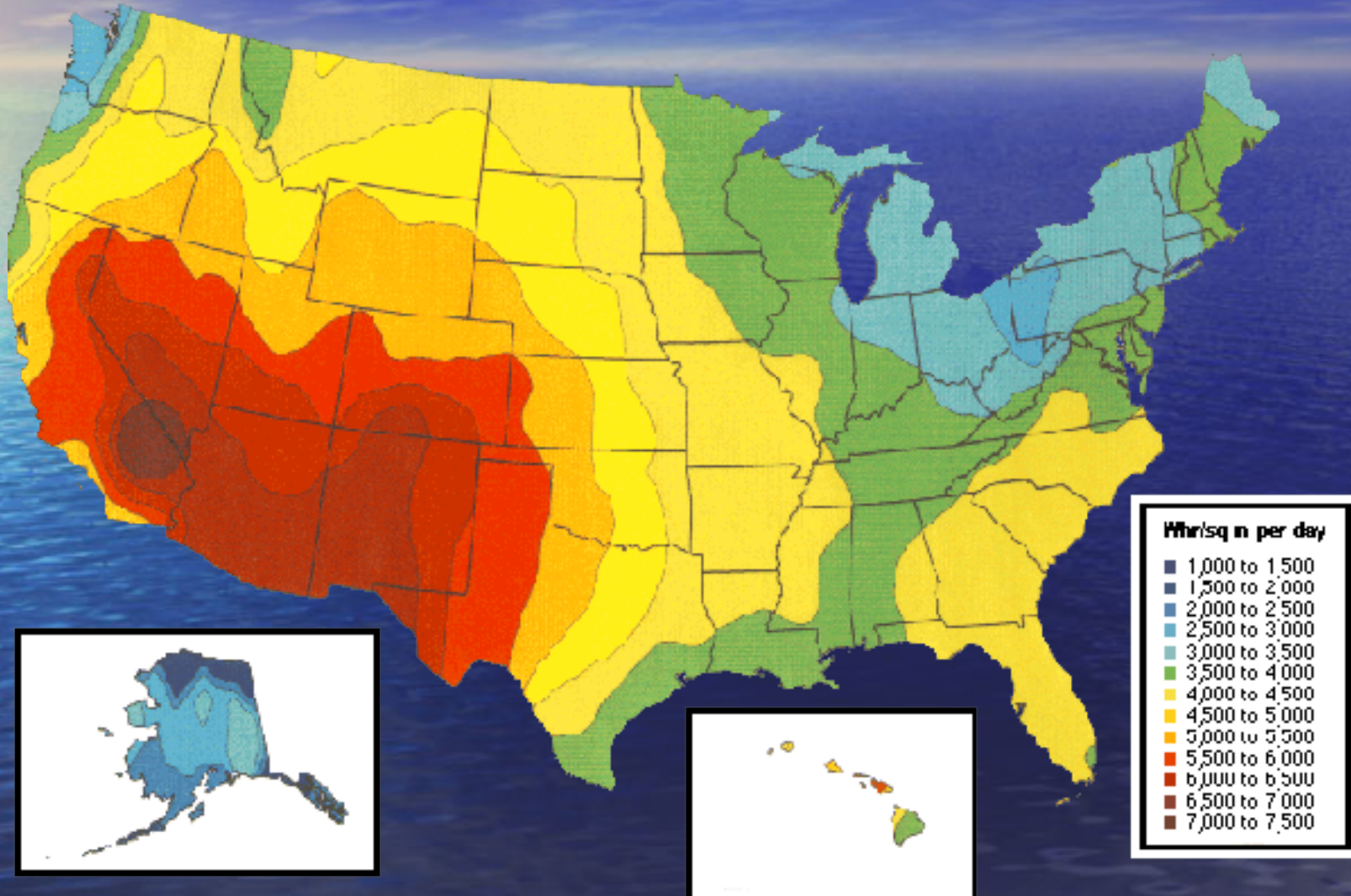
# Solar Power

Alden Hathaway, P.E. CEM  
Co - Founder  
Solar Light for Africa

SVP Business Development  
Sterling Planet, Inc.

# Average Solar Insolation

1961-1990



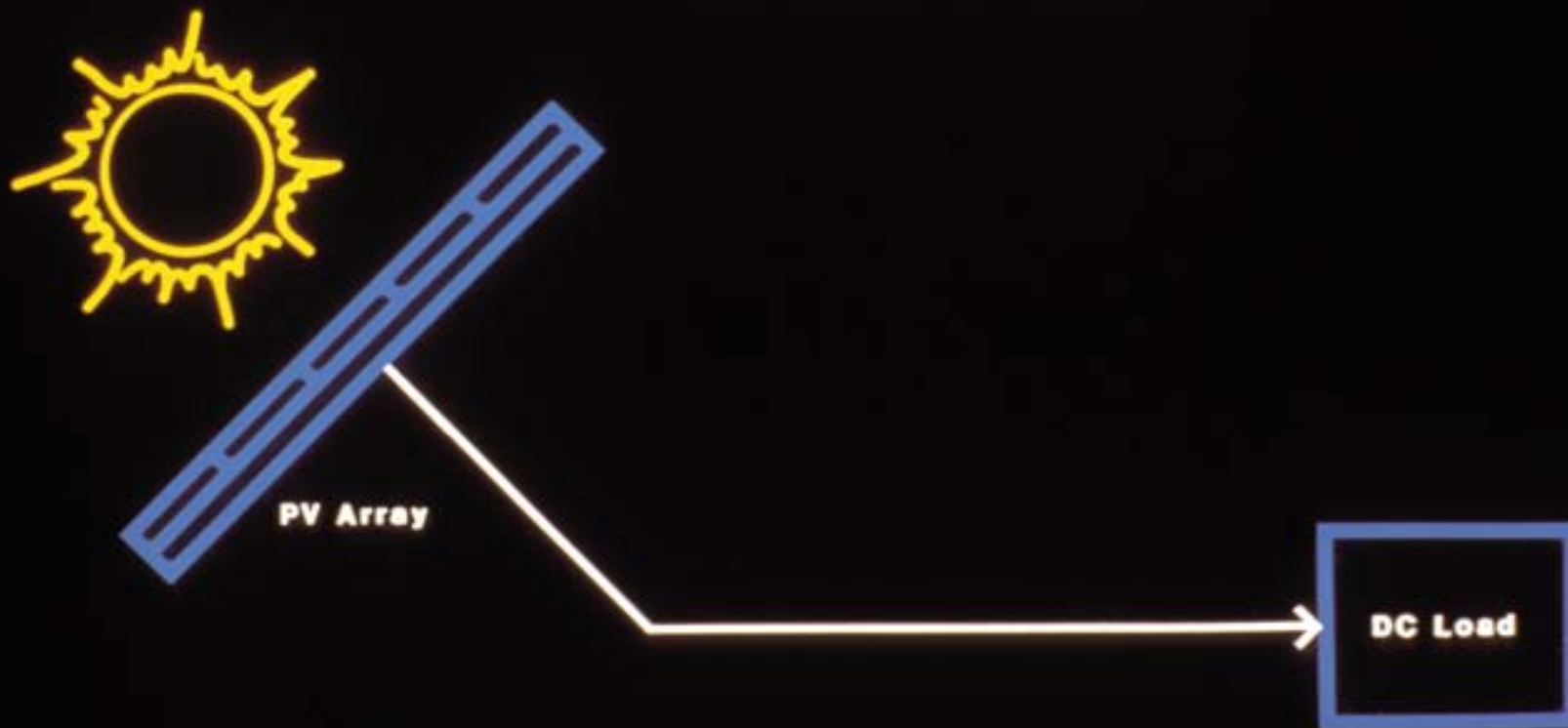
Source: ETA Engineering



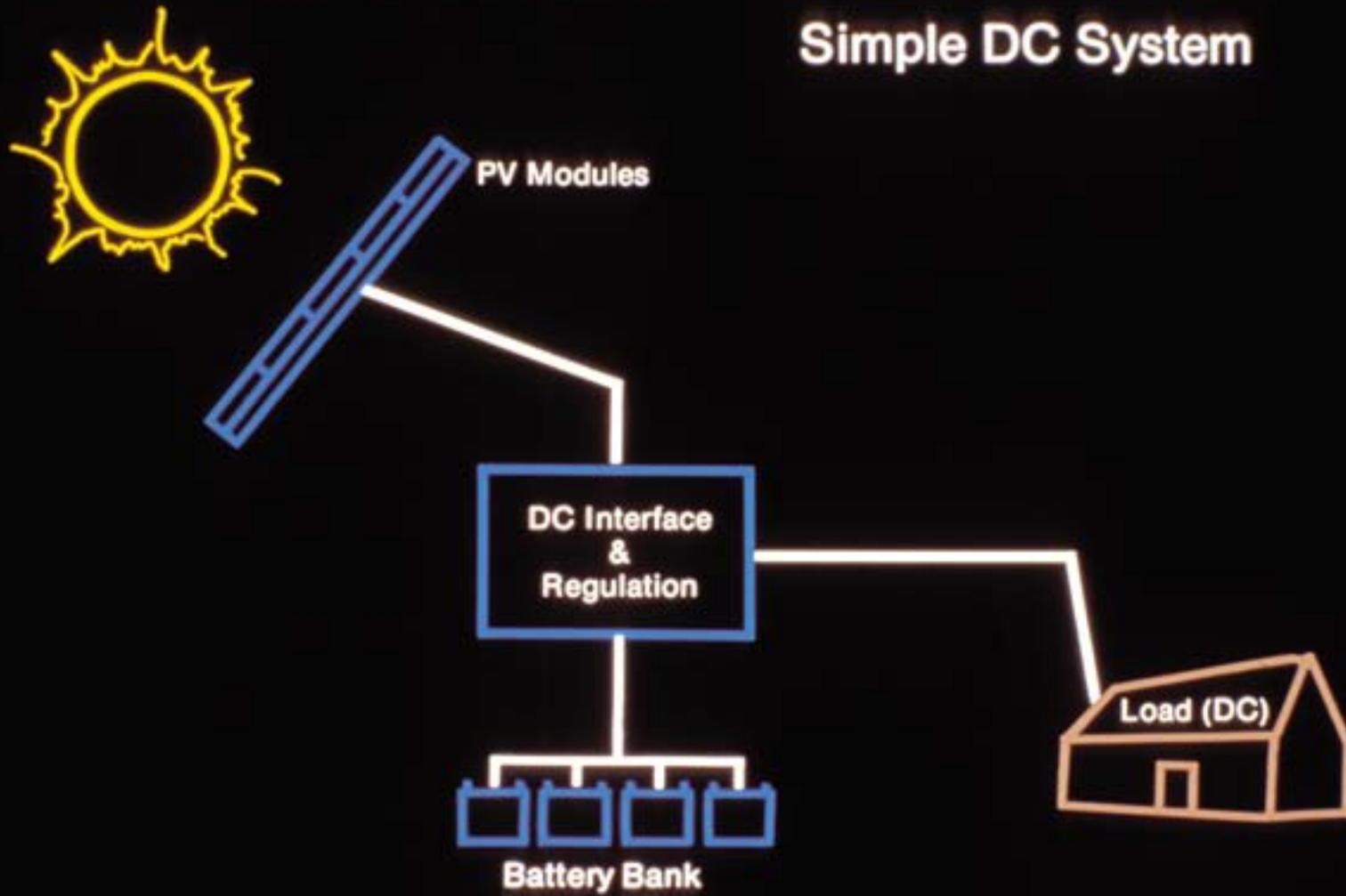
**Photovoltaics (PV) 7 Yr Growth:**  
**Industry: 35%/yr**  
**On-Grid: 55%/yr**  
*(slide courtesy of PowerLight)*



## Most Basic DC System



## Simple DC System

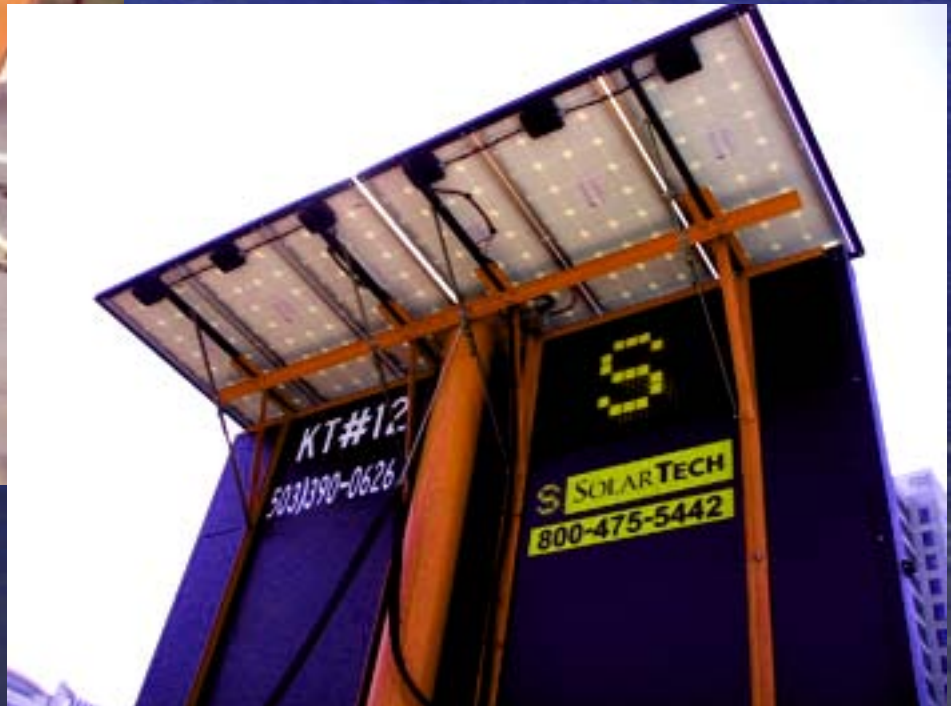








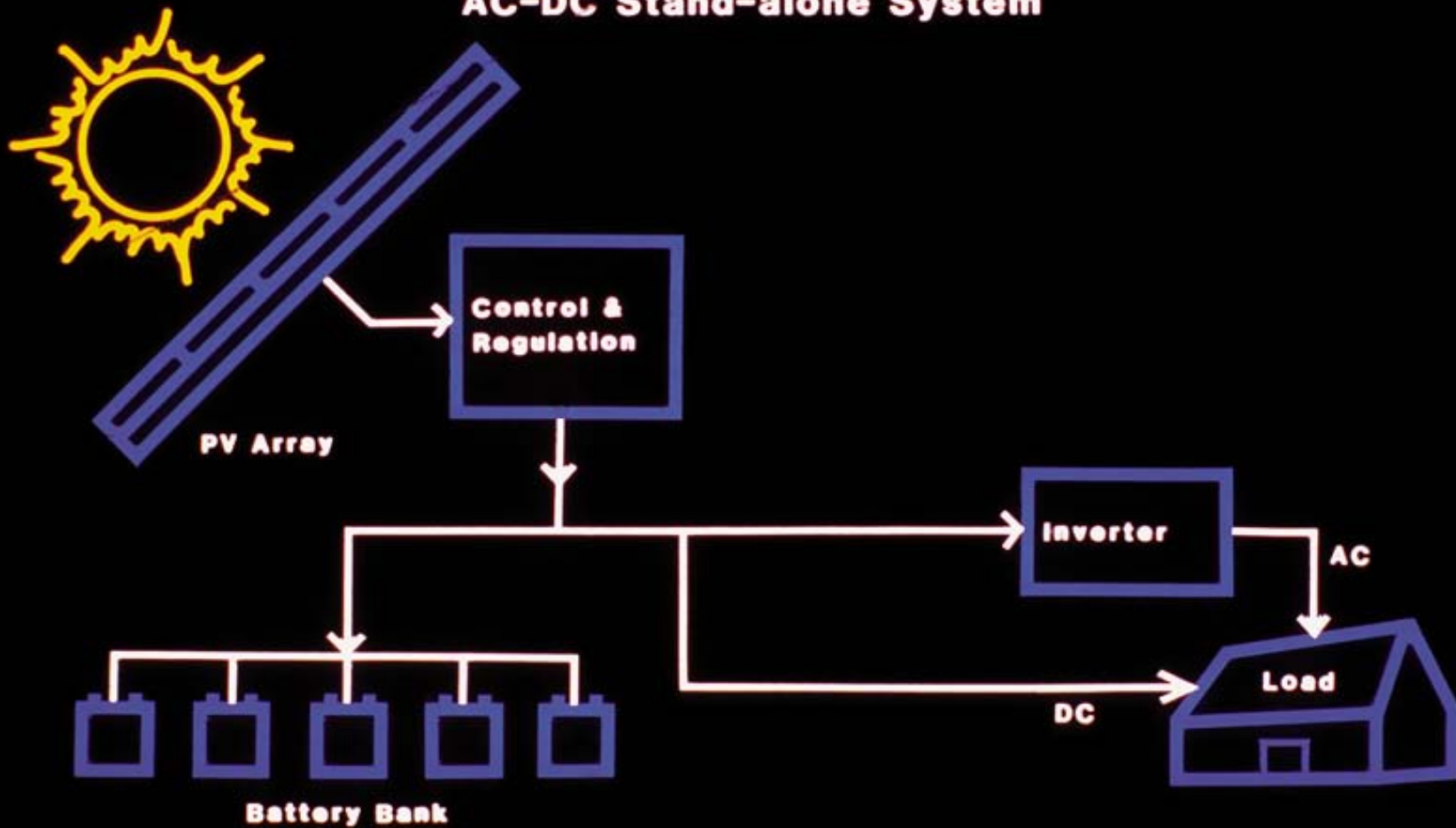








# AC-DC Stand-alone System

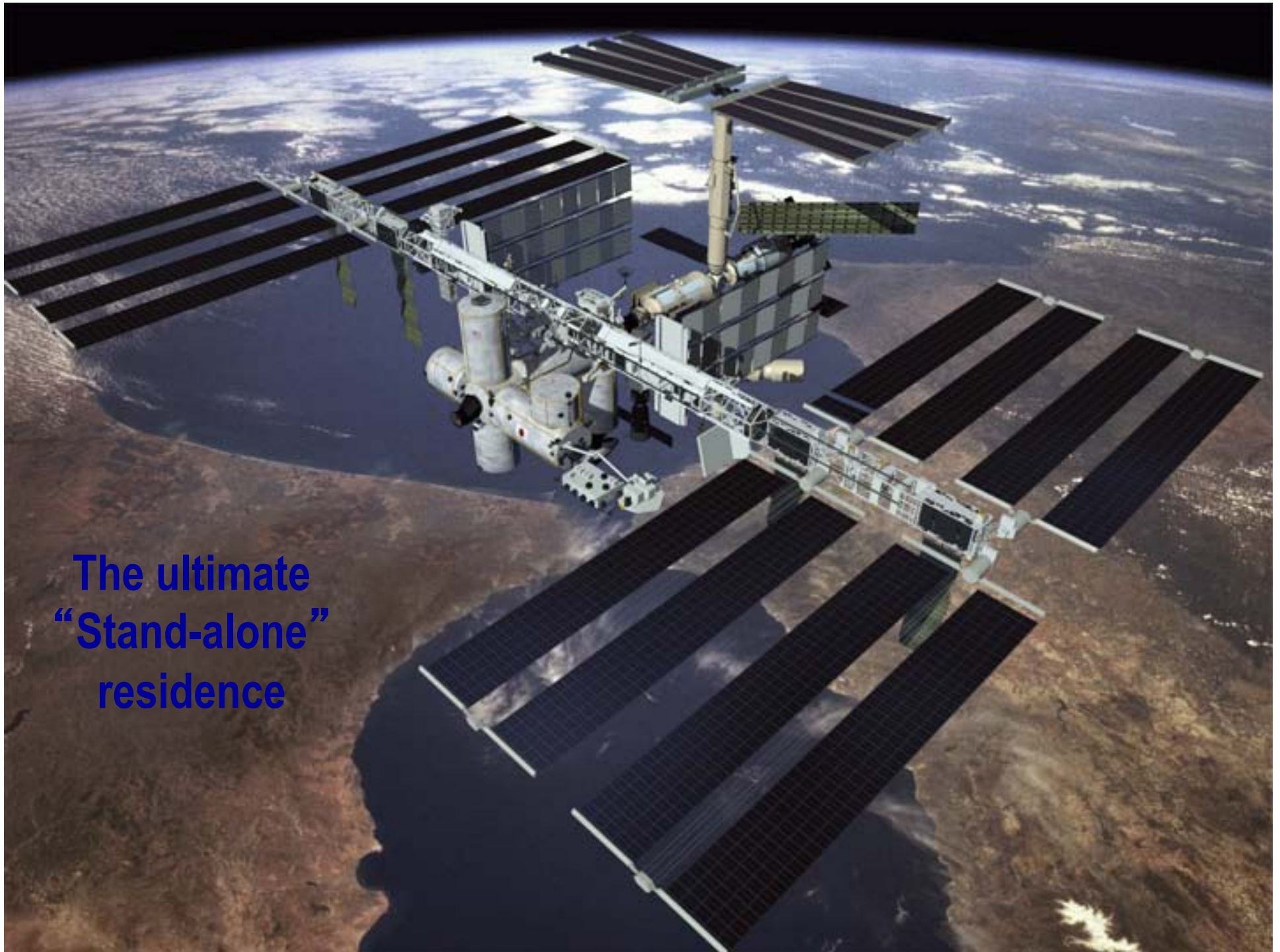






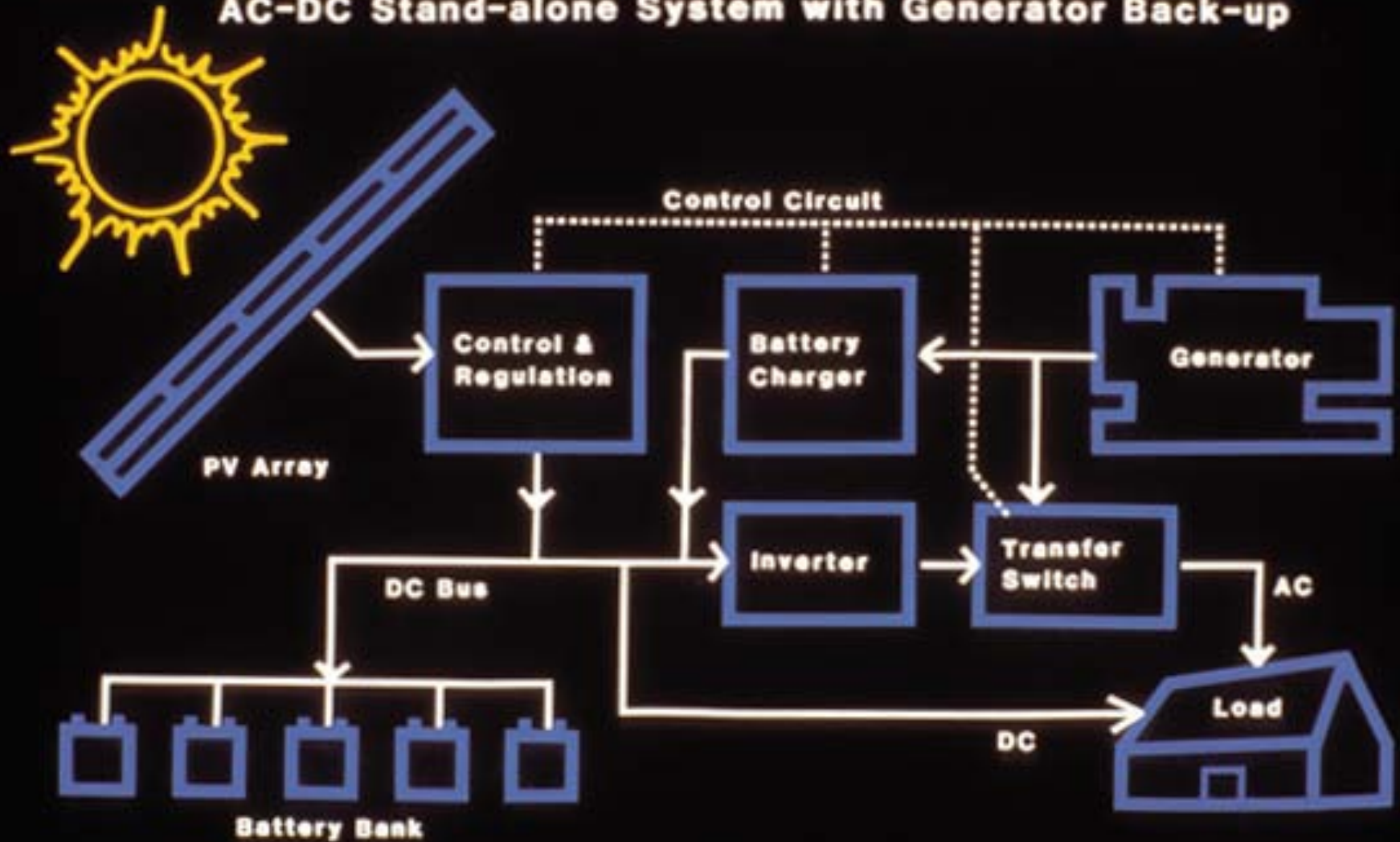






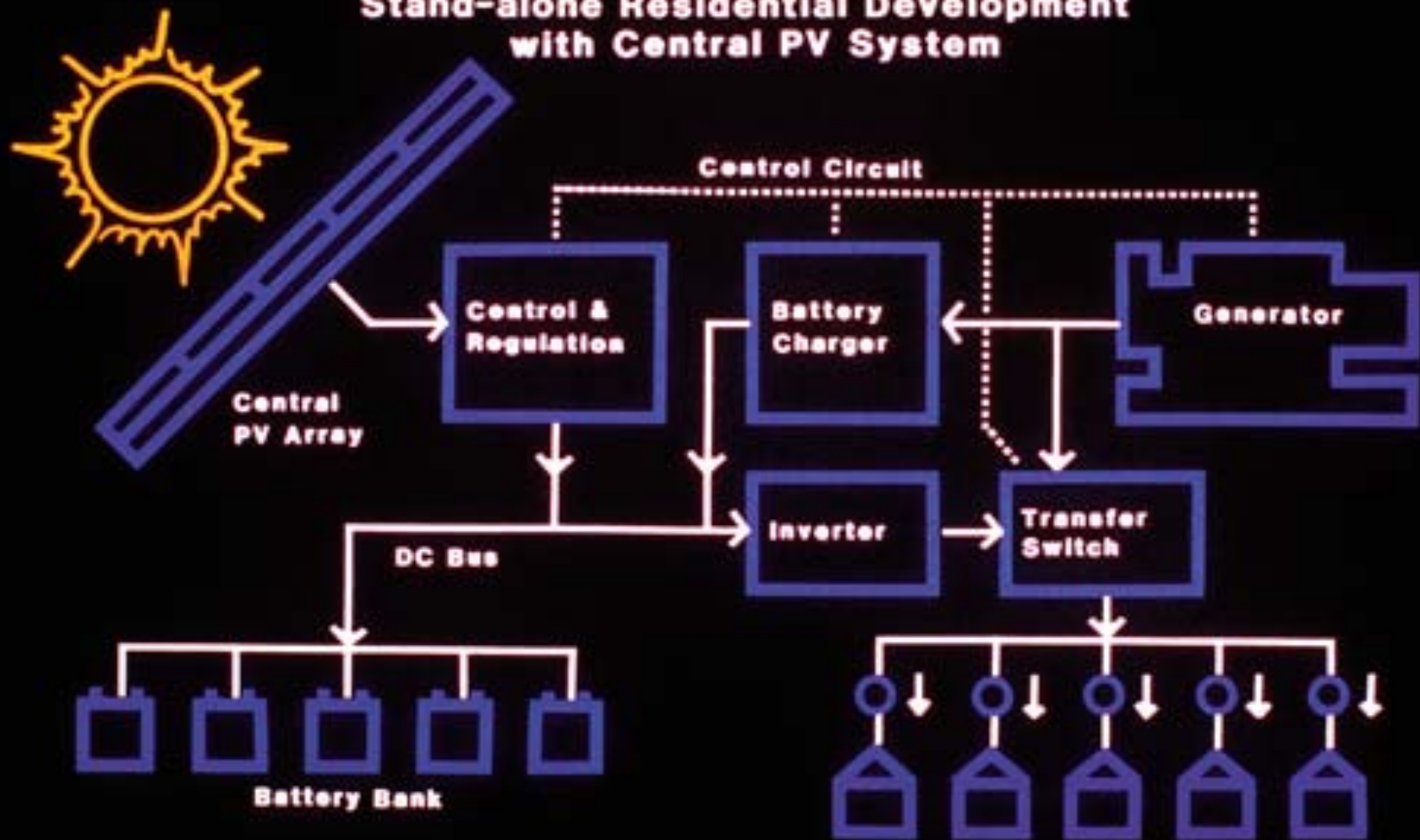
The ultimate  
“Stand-alone”  
residence

# AC-DC Stand-alone System with Generator Back-up



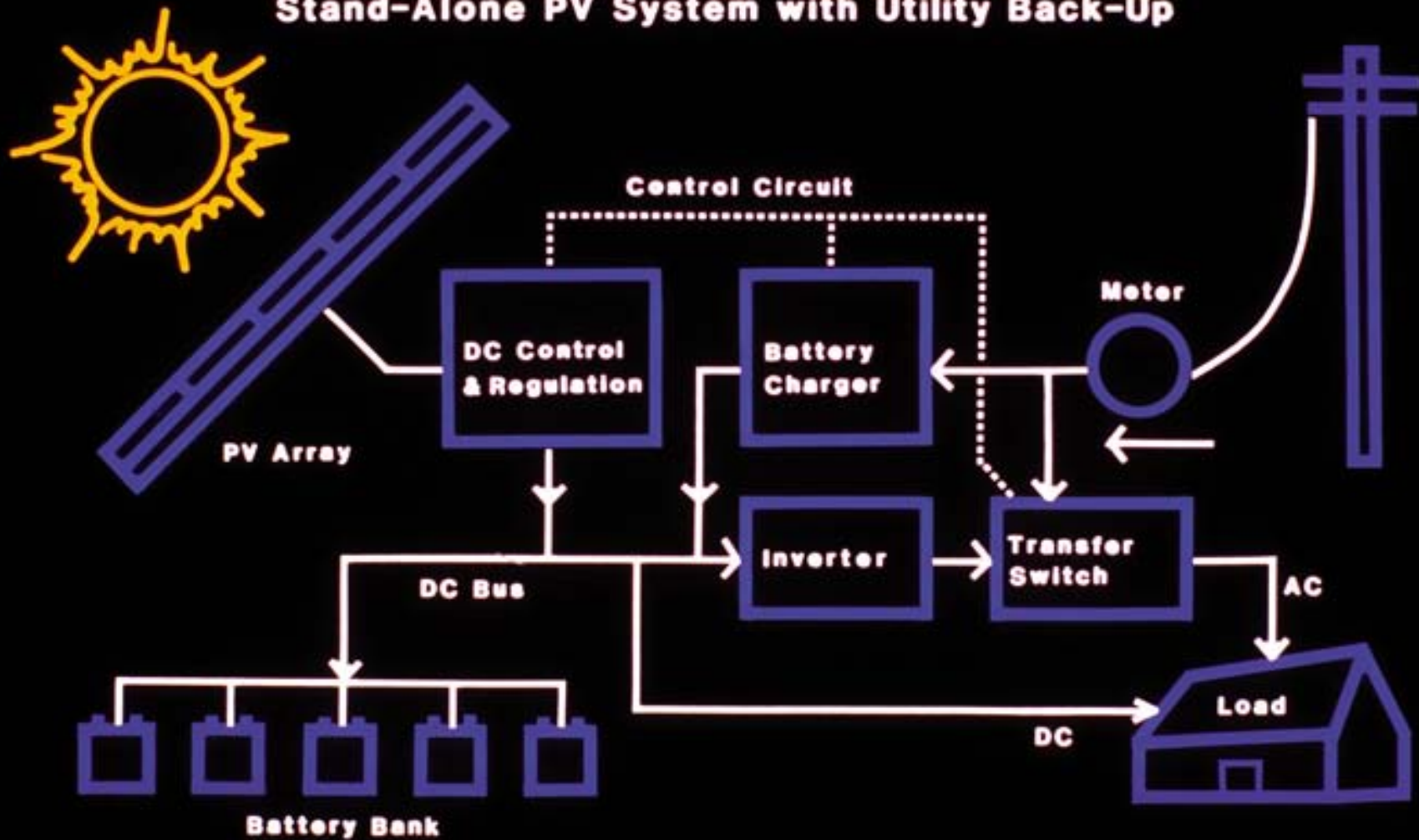


## Stand-alone Residential Development with Central PV System





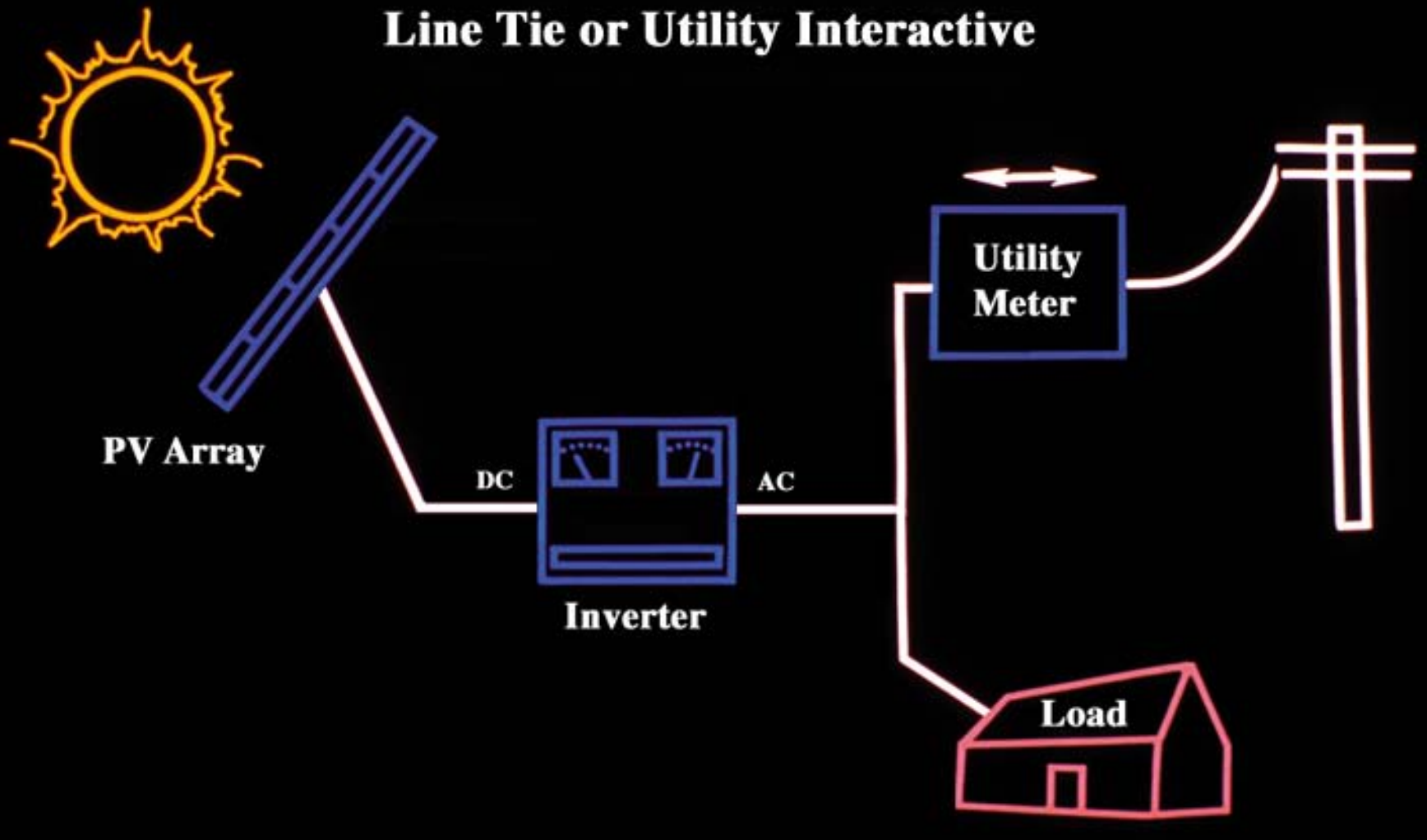
## Stand-Alone PV System with Utility Back-Up



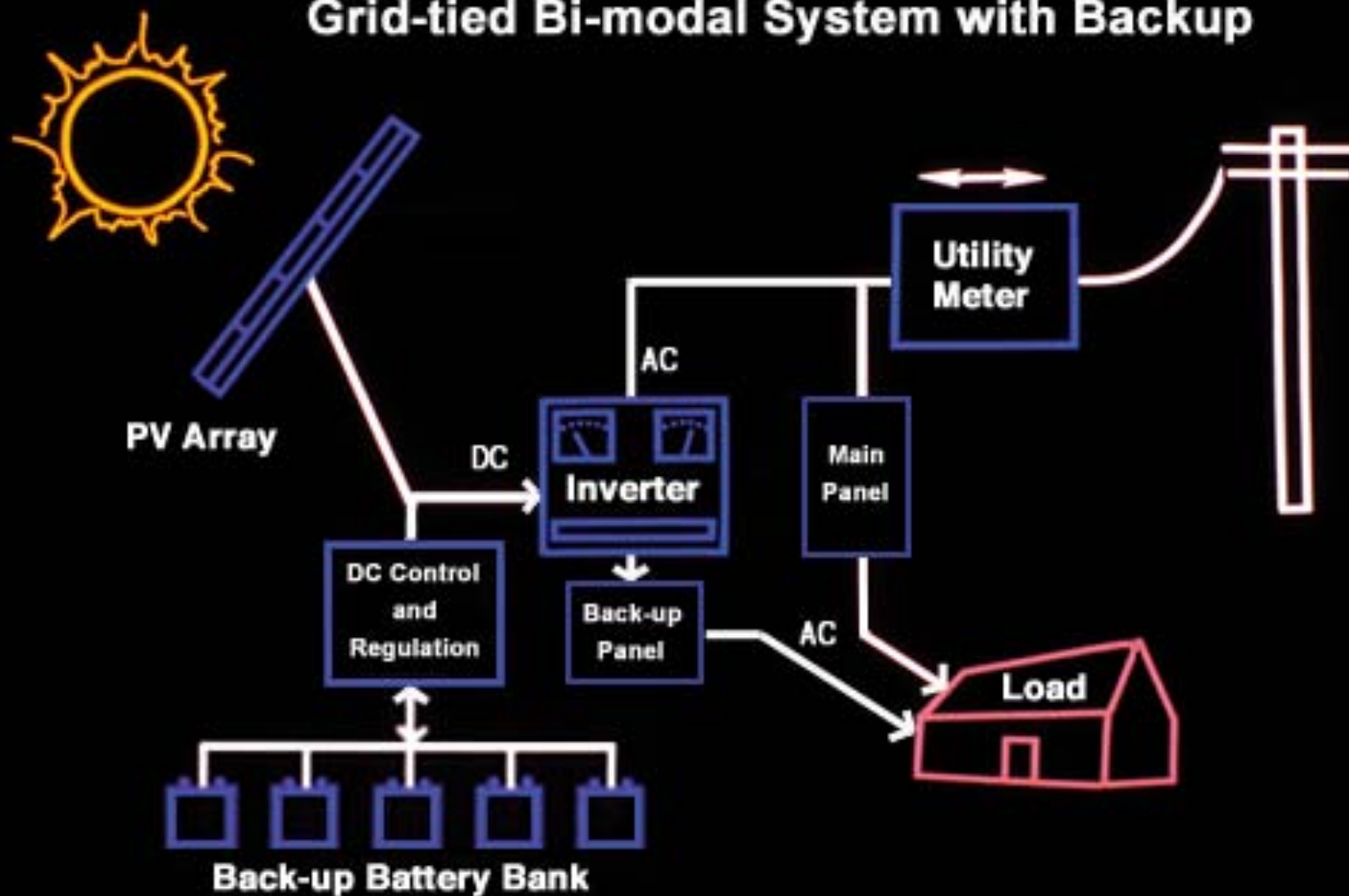




## Line Tie or Utility Interactive



# Grid-tied Bi-modal System with Backup



# Our ZEH Solar Home in Hillsboro, VA

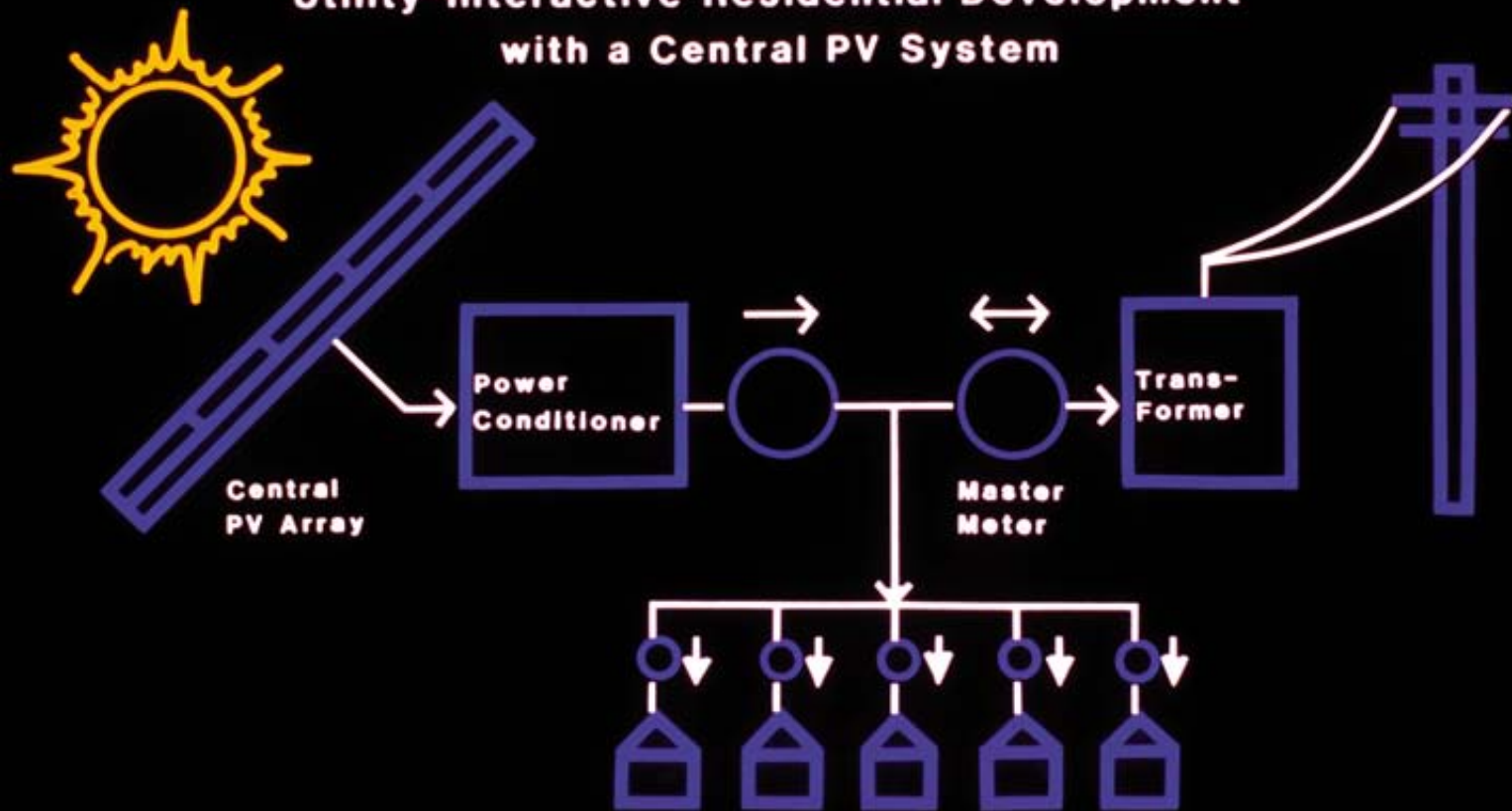
## Combination of Amorphous Silicon Standing Seam Modules and Monocrystalline Modules



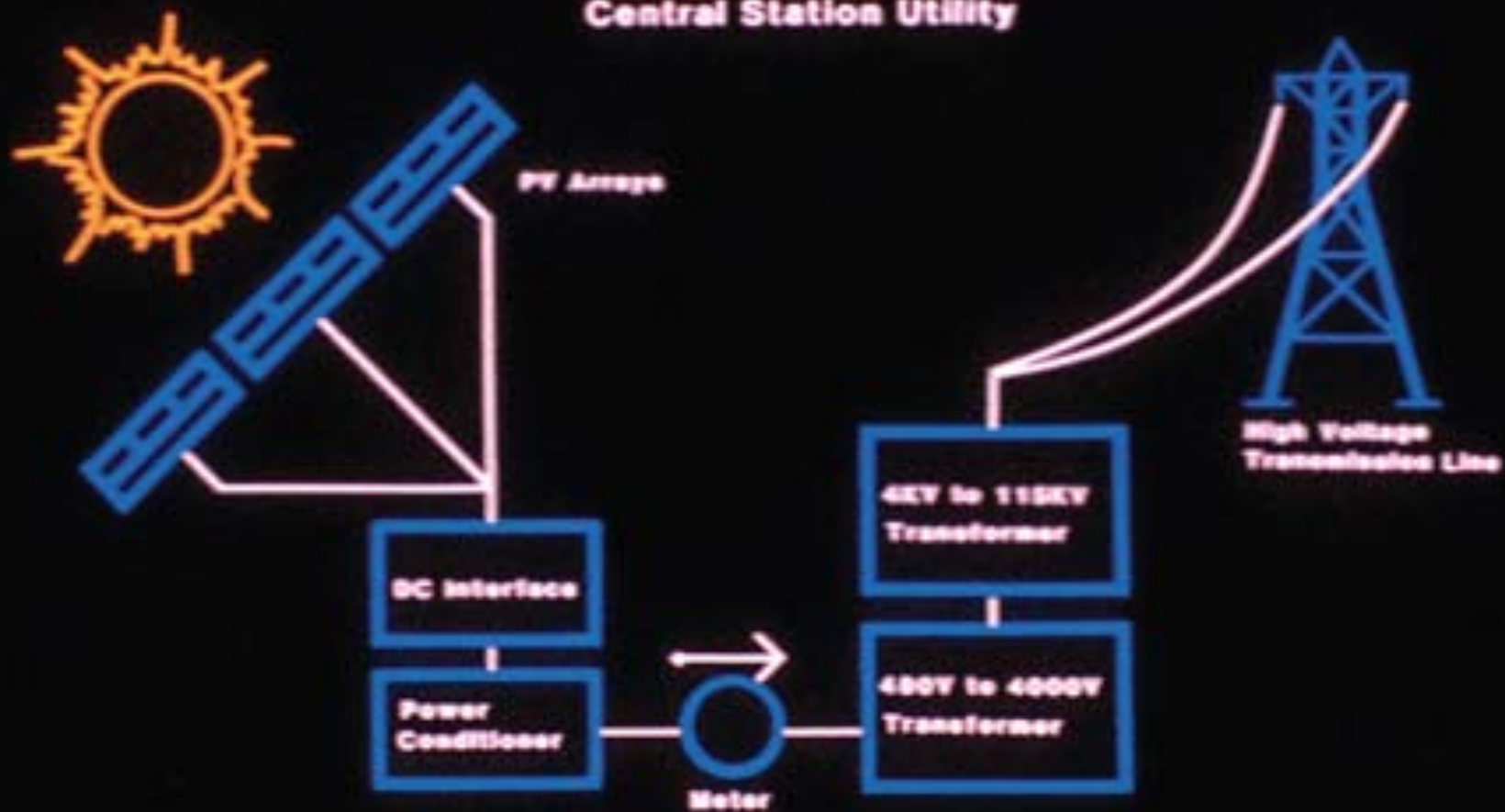
6.0 Kilowatt Solar System combined with energy efficiency provides 90% of our energy needs.



## Utility-Interactive Residential Development with a Central PV System



## Central Station Utility



# Wiregrass Solar, LLC



Phase I:	240 kW Merchant Solar Plant,	Completed
Phase II:	1.0 MW Merchant Solar Plant,	In Negotiations
Phase III:	7.0 MW Merchant Solar Plant,	Bid Submitted





# Building Integrated Design





# Solar Integrated Roofing Systems



**Hurricane Rating: Cat 3; Working on Cat 5 Rating for Guam Military Base**



Solar power curtain wall and daylighting

# Putting Solar together w/ Energy Efficiency Zero net Energy Houses (ZEH)

(Boston Edison House, Solar Design Associates)

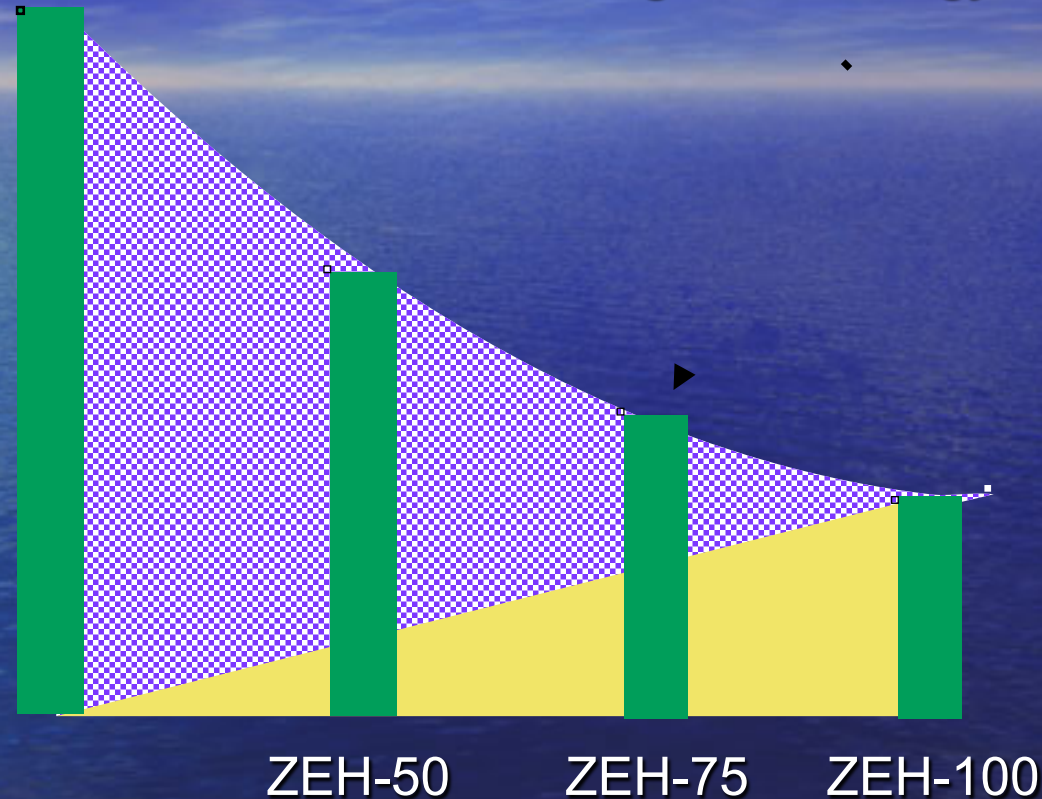


# Energy Efficiency and Solar

Chicago Zero Energy Homes Goal

Load Reduction  
50-70%  
Energy Savings

20-40%  
Energy Supply



# Chicago ZEH Solar Homes Program - Using Solar Shingles



# Zero Net Energy House—even in Maine! Using Polycrystalline Roof-Integrated Modules

The Lord House—Solar Design Associates  
[www.solarhouse.com](http://www.solarhouse.com)





Solar Patriot – June, 2005

[www.ert.net/solarhome](http://www.ert.net/solarhome)



The Solar Roof features 36 PVL 128 Laminates from Uni-Solar – 4.0 kW  
Also, Passive Solar Overhangs; Double Paned Windows with Bali Insulating Shades

# SLA: Since 1997

*Transforming Lives...Empowering Africa...One Light at a Time*

- Projects in seven countries; 2 countries planned in 2012
- Over 2550 solar systems in 14 years; 41 systems to be installed this year (and counting!)
- 4 utility-scale water projects; 5 villages electrified



# Why Do We Focus on Rural Facilities?

- Little or no access to grid
- Overhead transmission lines cover rural landscape as they make wholesale distribution access for the next town or city
- To provide opportunity for increased access to educational, economic, and health facilities close to home.



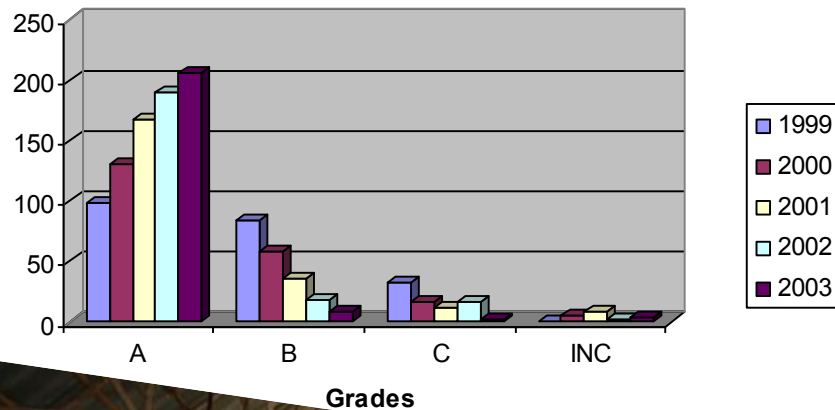
# Impacting Health



- Clean water at 3 large Ugandan health facilities – decreased incidence of waterborne disease
- Access to electric diagnostic tools which require batteries/ recharging or outlets
- Refrigeration of vaccines
- Operation of laptops to monitor case loads/internet access

# Education

Student Grades - St. Cecilia Primary School - Uganda



- The second part of the SLA mission – to electrify and to educate.
- Increased access to clean light for night-time study leads to better student performance.
- 2010 initiatives include evaluating the use of solar as a preventive measure against the upswing in dorm fires in recent years



# A Chicken Story



- One light in a hen house yields doubled egg production and thus, increased income.
- With increased income, owner goes to market and purchases seeds to grow cash crops; continues increased egg production and begins to yield harvest, yielding more cash to put into farm...
- Begins to teach community her techniques. She and husband establish an educational facility to continue training the community in agricultural techniques.
- We think we even have the answer to the “Chicken and Egg” question – the chicken came first – then the light – then a BUNCH of eggs!

# Youth Mission Program



# Karamojo 2011





# Partnerships



- **Liberia Partnership: St. James Episcopal Church, Leesburg, VA; Episcopal Diocese of VA; Episcopal Diocese of Liberia; Liberian International Development Foundation - First Installation at Bromley School for Girls, near Monrovia – 2008; plan to return in 2010 to electrify teachers' residence, depending on availability of funding and equipment.**
- **Tanzania Mission Partnership: St. David's Episcopal Church, Roswell, GA; Episcopal Diocese of Atlanta; Diocese of Central Tanganyika – First two years' work at Msalato Theological College: 2009-2010**
- **USAID Partnerships in Uganda, Tanzania, Rwanda, Ethiopia: 2004-2006**
- **Discovery Channel Education Partnership for Ugandan Schools: 2001-2002.**

# Equipment

- 64-watt Thin Film PV panels (United Solar Ovonic) – evaluating future purchases; this product is no longer made.
- Deep Cycle Batteries, procured in country, if available.
- Inverters: Sinergex 1000/1500
- Charge Controllers: Apollo Solar T80
- Other items procured in country



# Why Faith-Based Partnerships and Educational Partnerships Work

- Educational institutions and faith-based institutions have a good reputation for working within local communities to learn the best ways to engage and assist.
- Educational institutions have the capability to seek out the best ways to build a learned society – and technological and economic development.
- Faith-based organizations often have missionaries or local priests which provide trusted points of contact, building relationships and cross-cultural trust and community development.



# Moving Forward with Philos Energy International

- Alden and Carol Hathaway to start new organization to assist in Solar Electrification of the Developing World;
- “Our Energy for Theirs”
- Energy Savings in United States pledged to aid Developing Countries.

## Fundraising Plan - PEI

- Students provide Energy Audit Assistance to prospective donors to support Developing ;
- Students install up to 10 Compact Fluorescent Lamps in heaviest used lamps and light fixtures, Lo-Flow Shower Heads and Water Heater Wraps (\$45 value – provided by PEI – local utilities);
- Energy Savings from measures above plus other energy audit ideas save approximately \$10 - \$15 per month;
- Donors pledge first year energy savings (\$120 - \$180) for student to travel on a PEI/SLA Mission;
- Students sign up for twenty audits or more

**Questions?**

**Alden Hathaway**

**Co-founder**

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