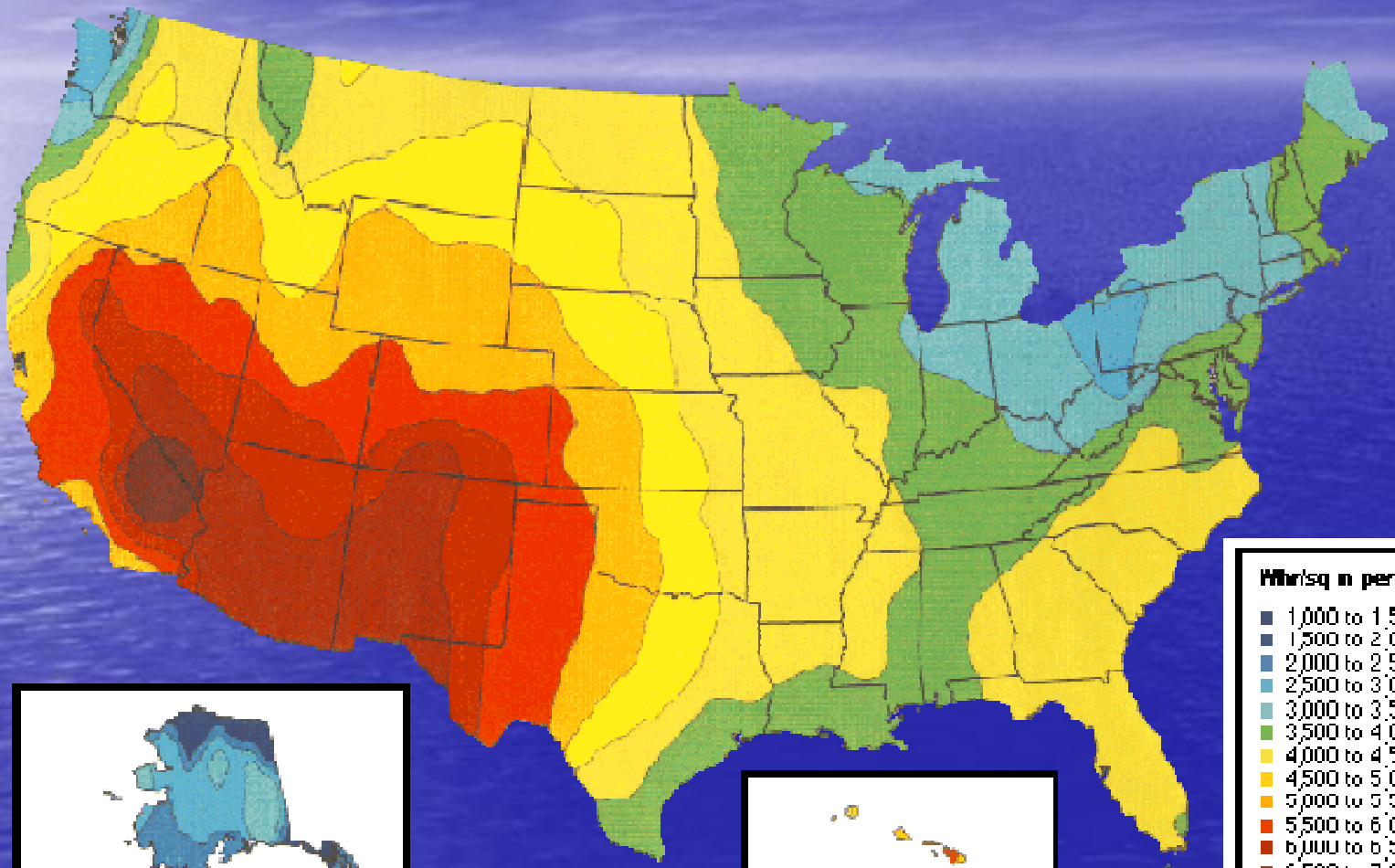
Solar Power

Alden Hathaway, SVP Business Development
Sterling Planet, Inc.

President and Founder
Philos Energy International, Inc.

Average Solar Insolation

1961-1990



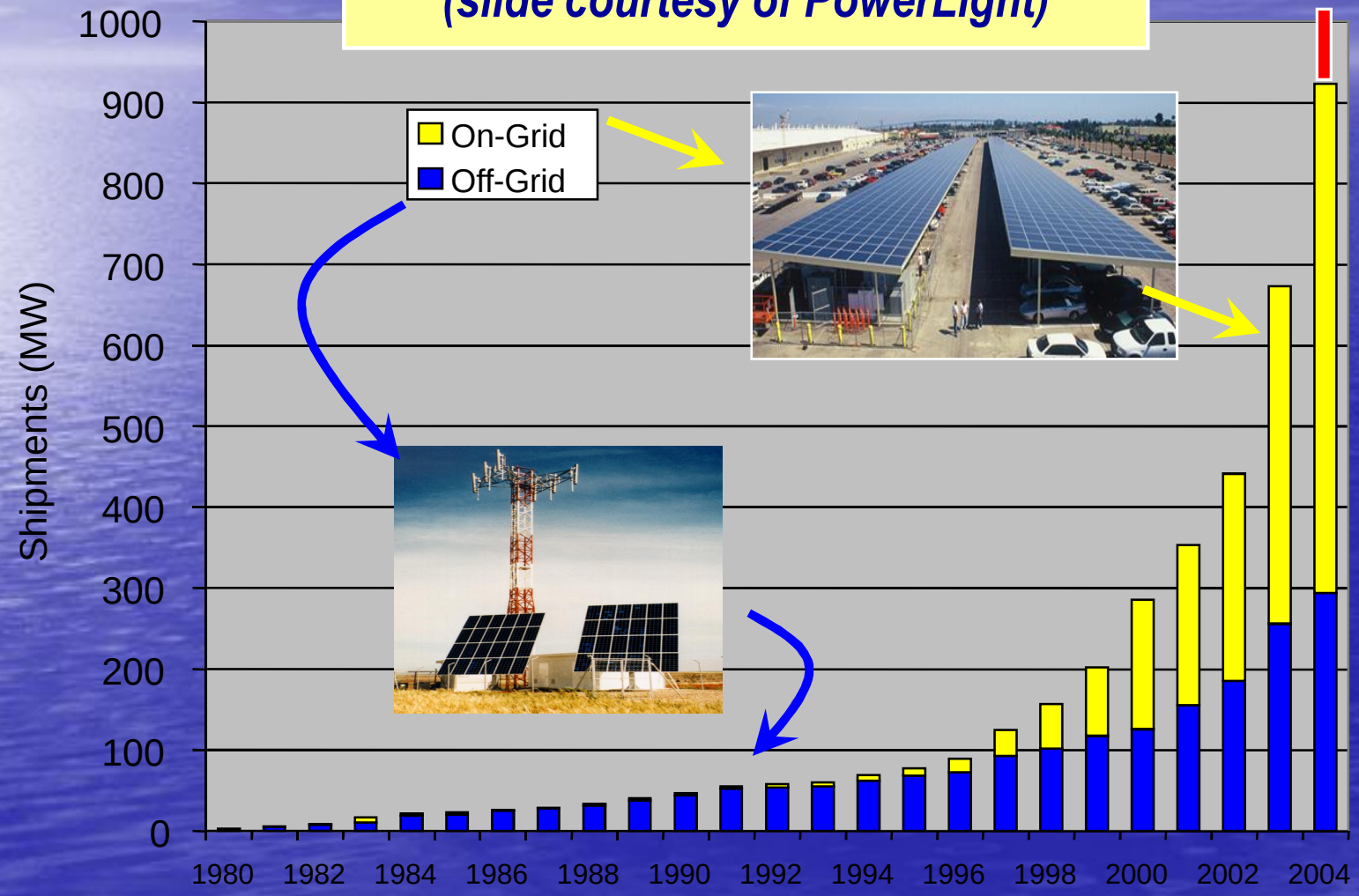
Source: ETA Engineering

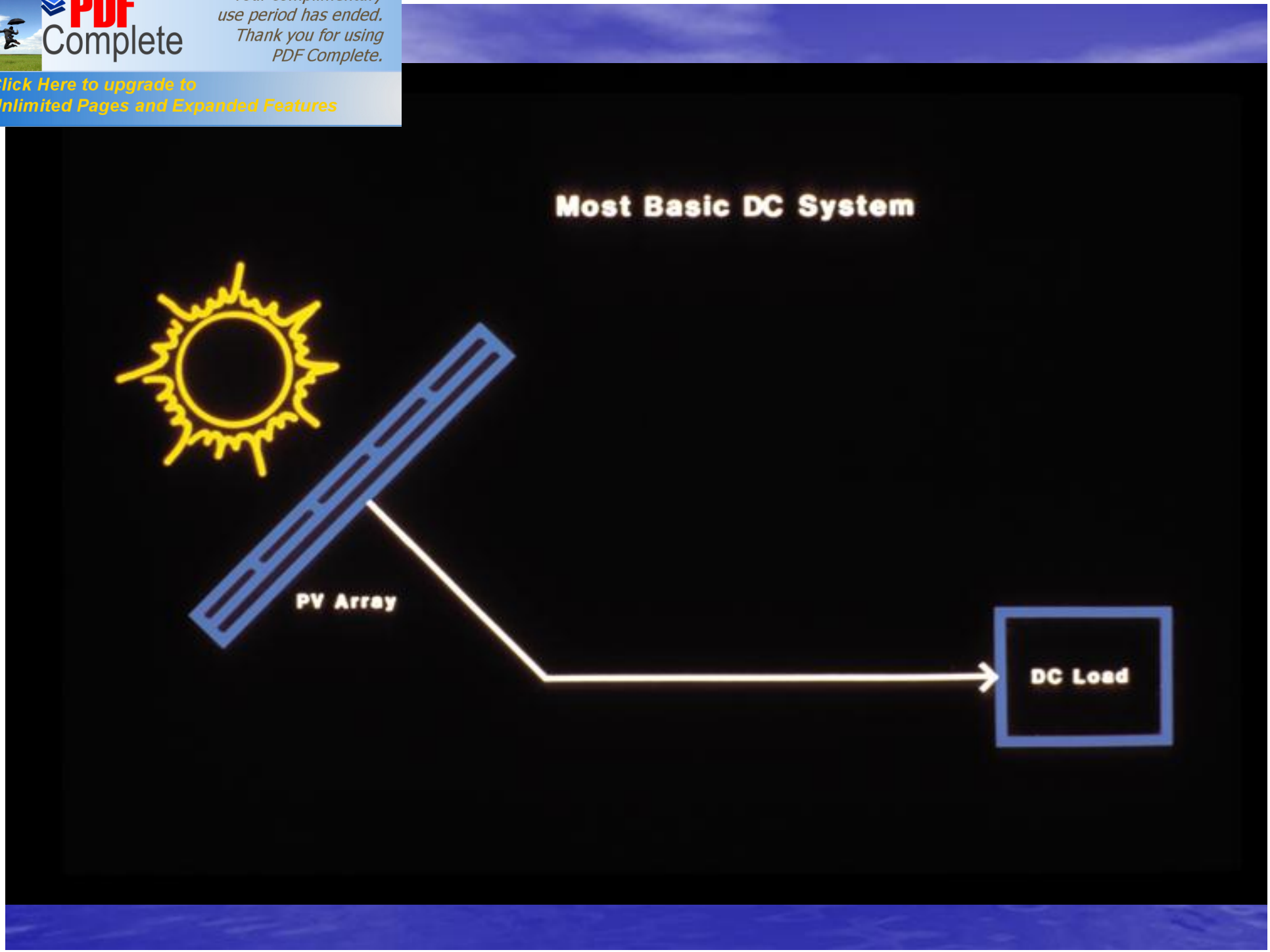
Photovoltaics (PV) 7 Yr Growth:

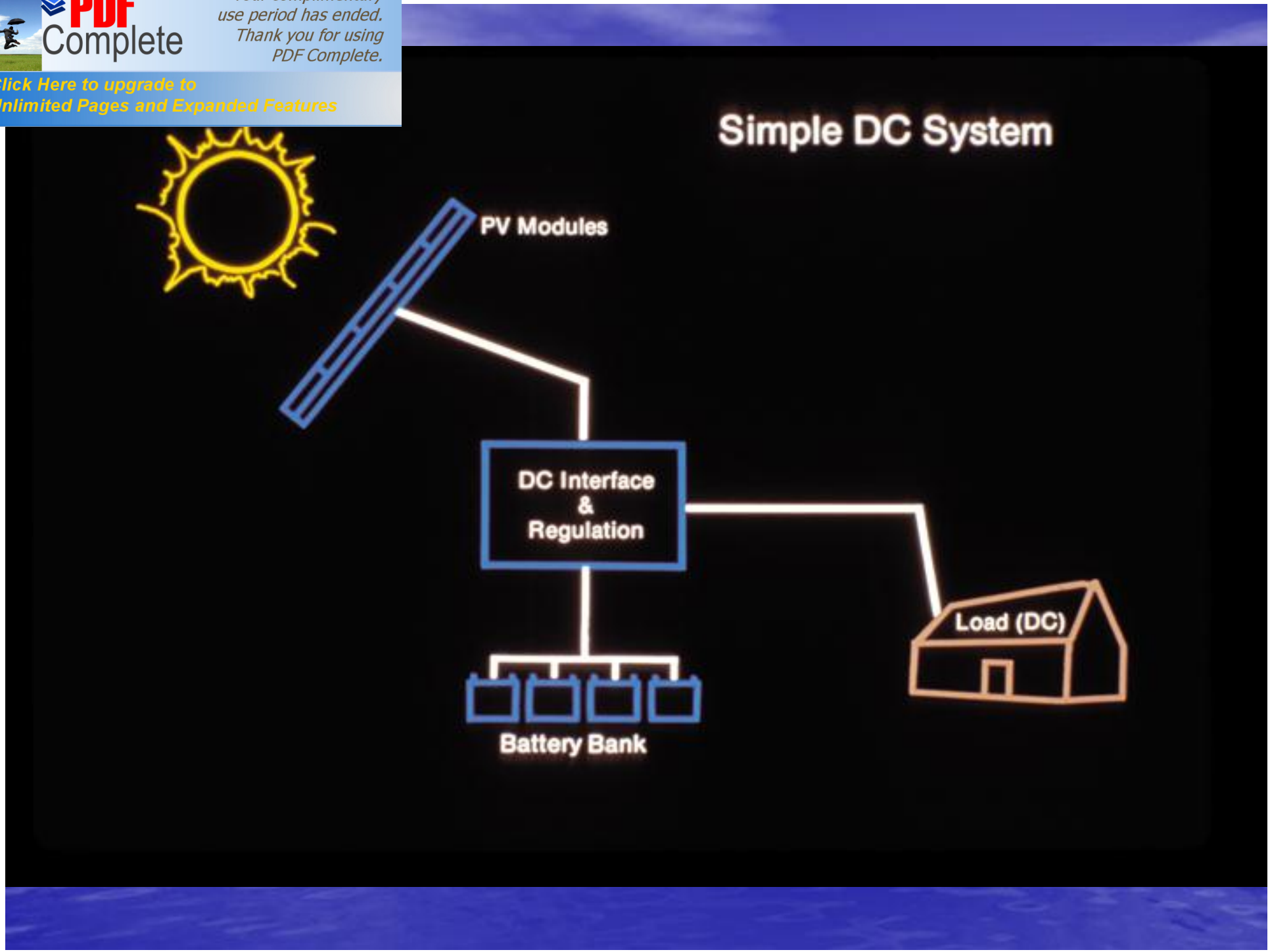
Industry: *35%/yr*

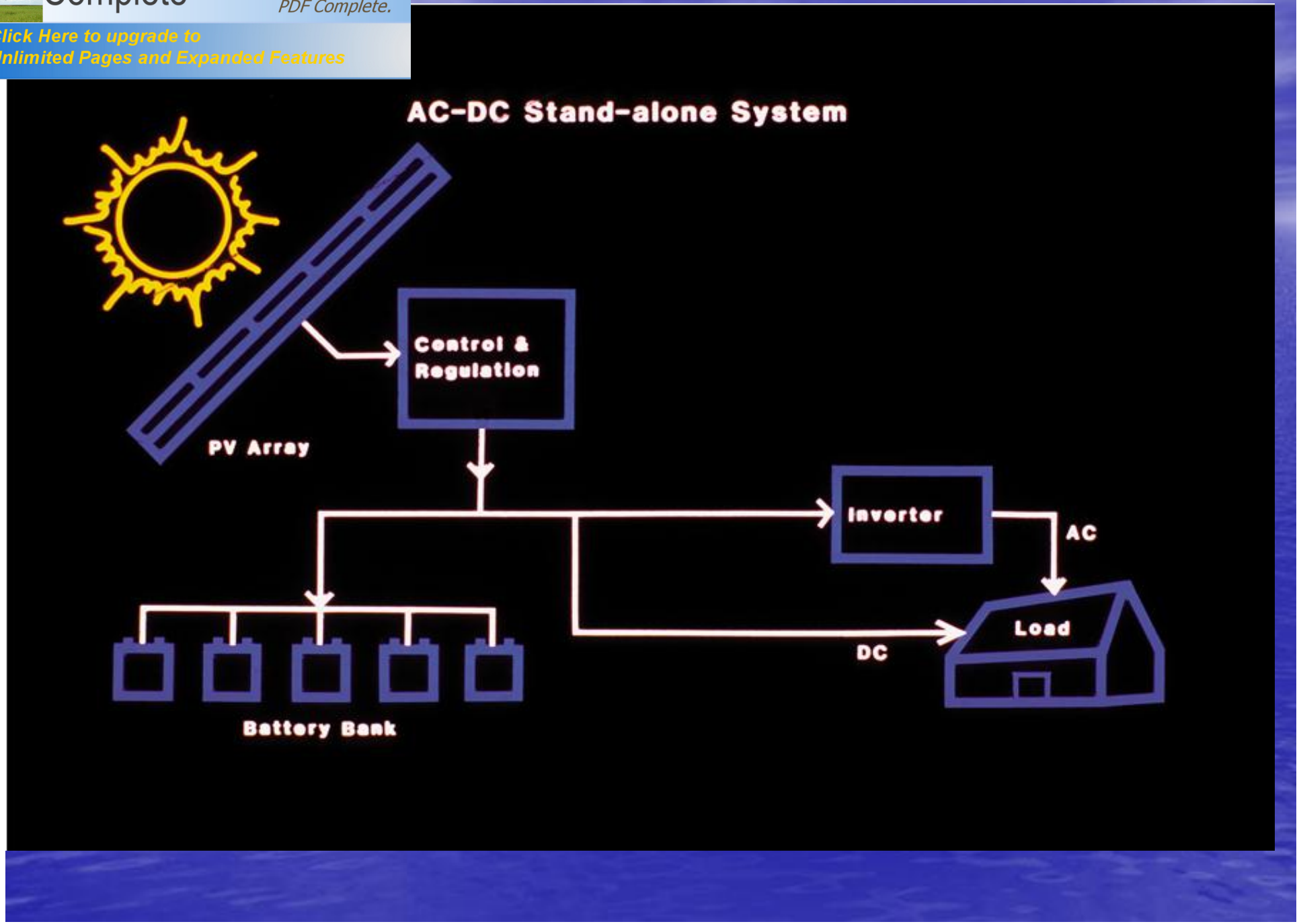
On-Grid: *55%/yr*

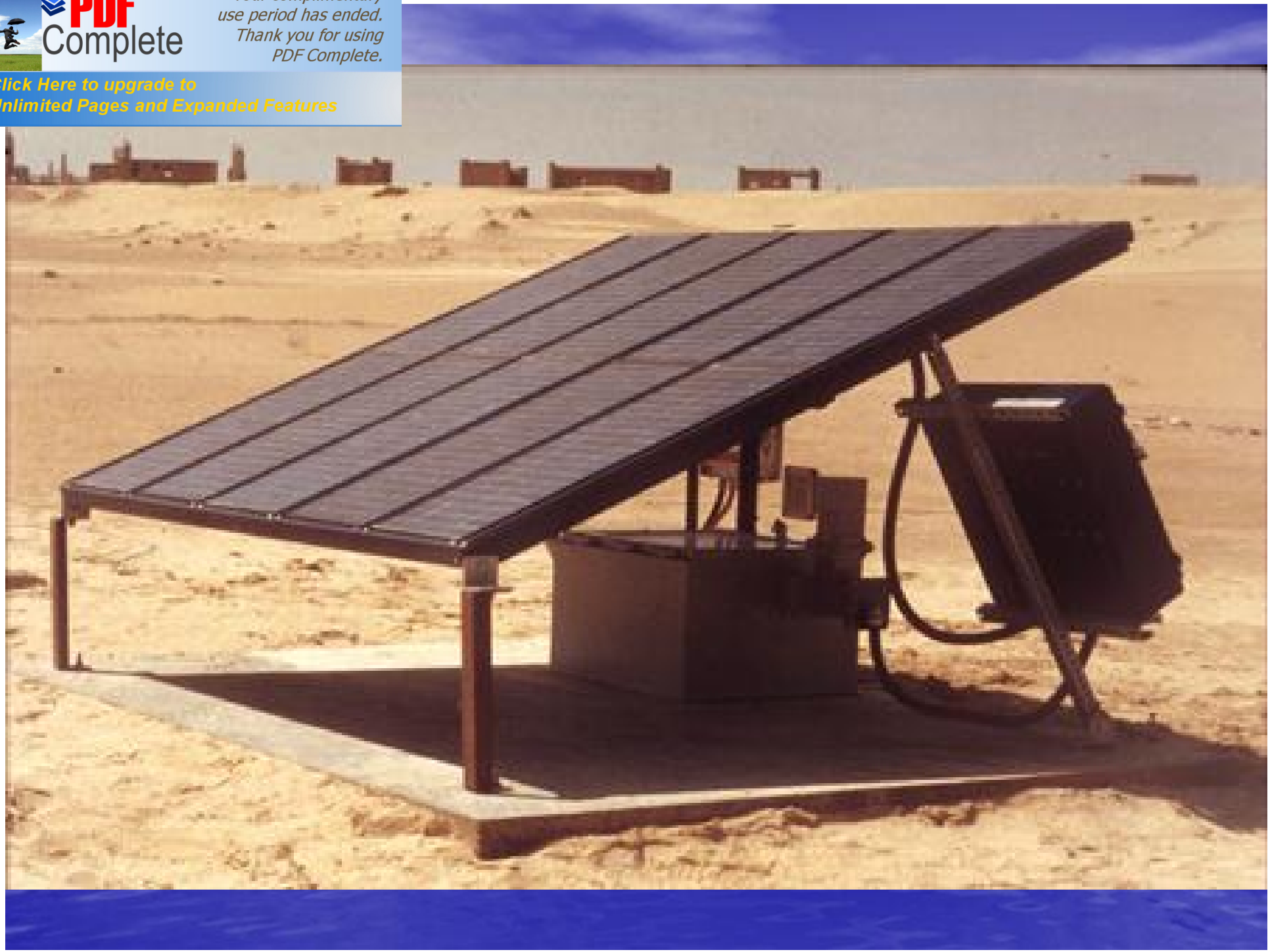
(slide courtesy of PowerLight)

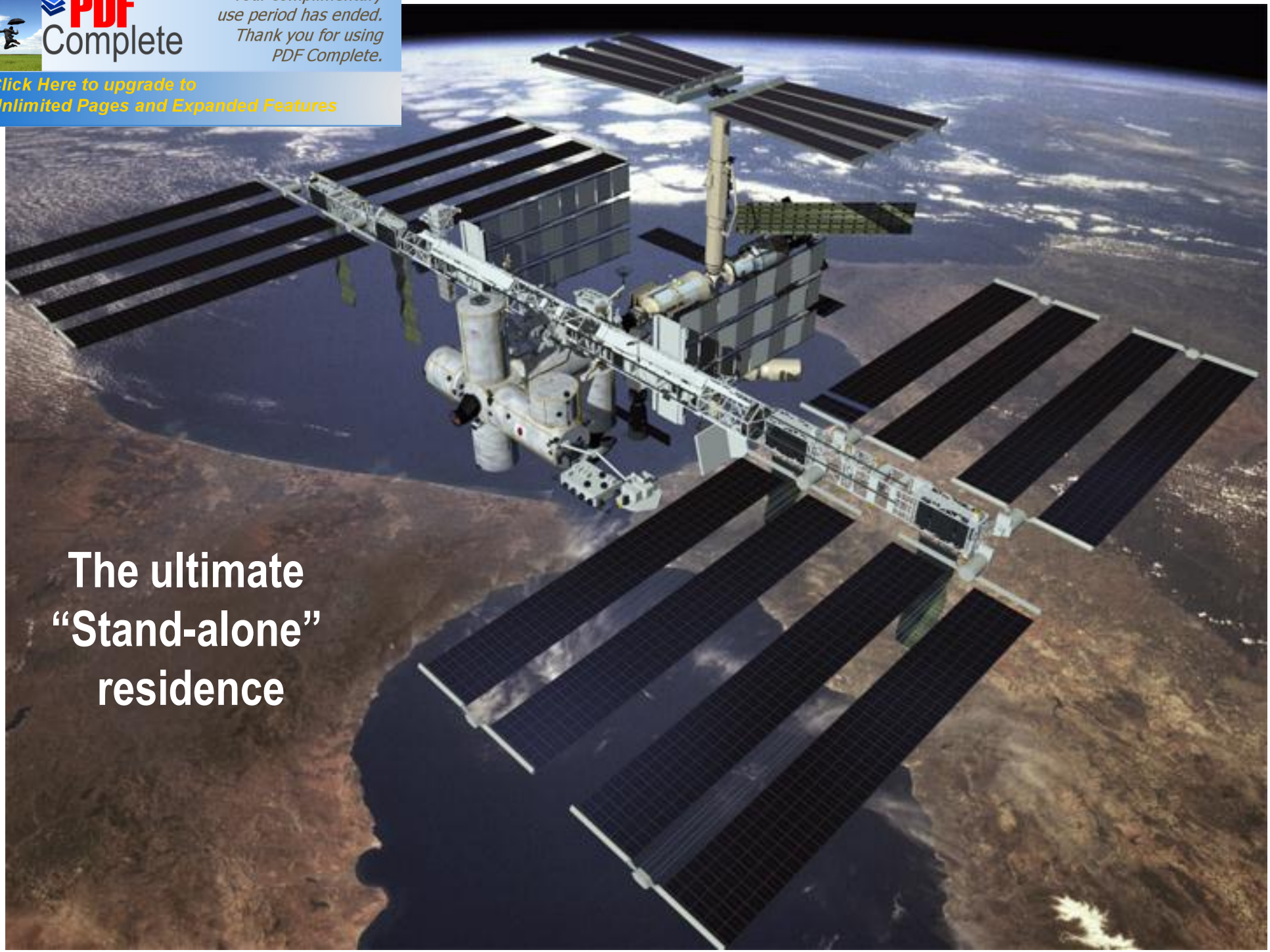




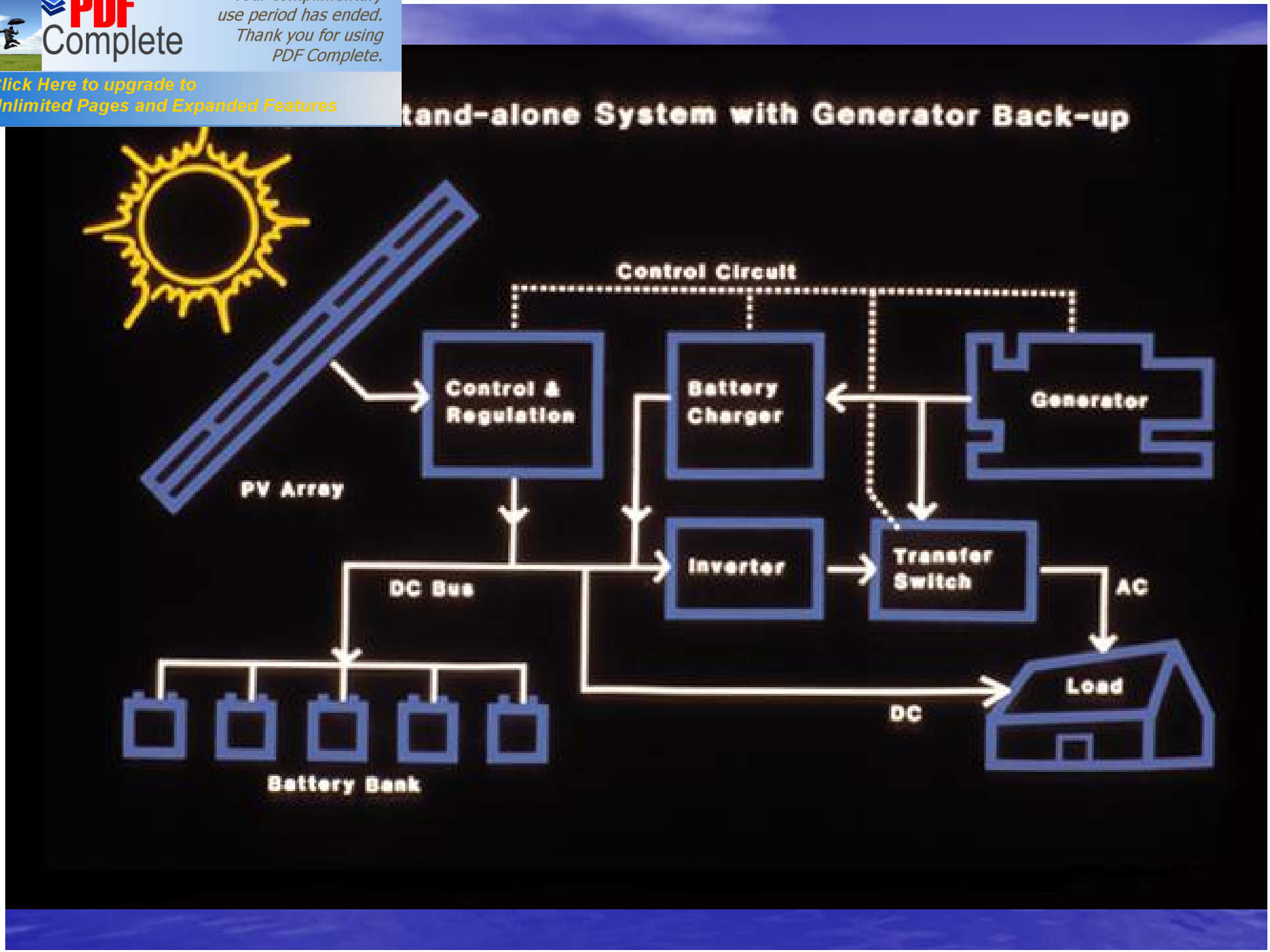


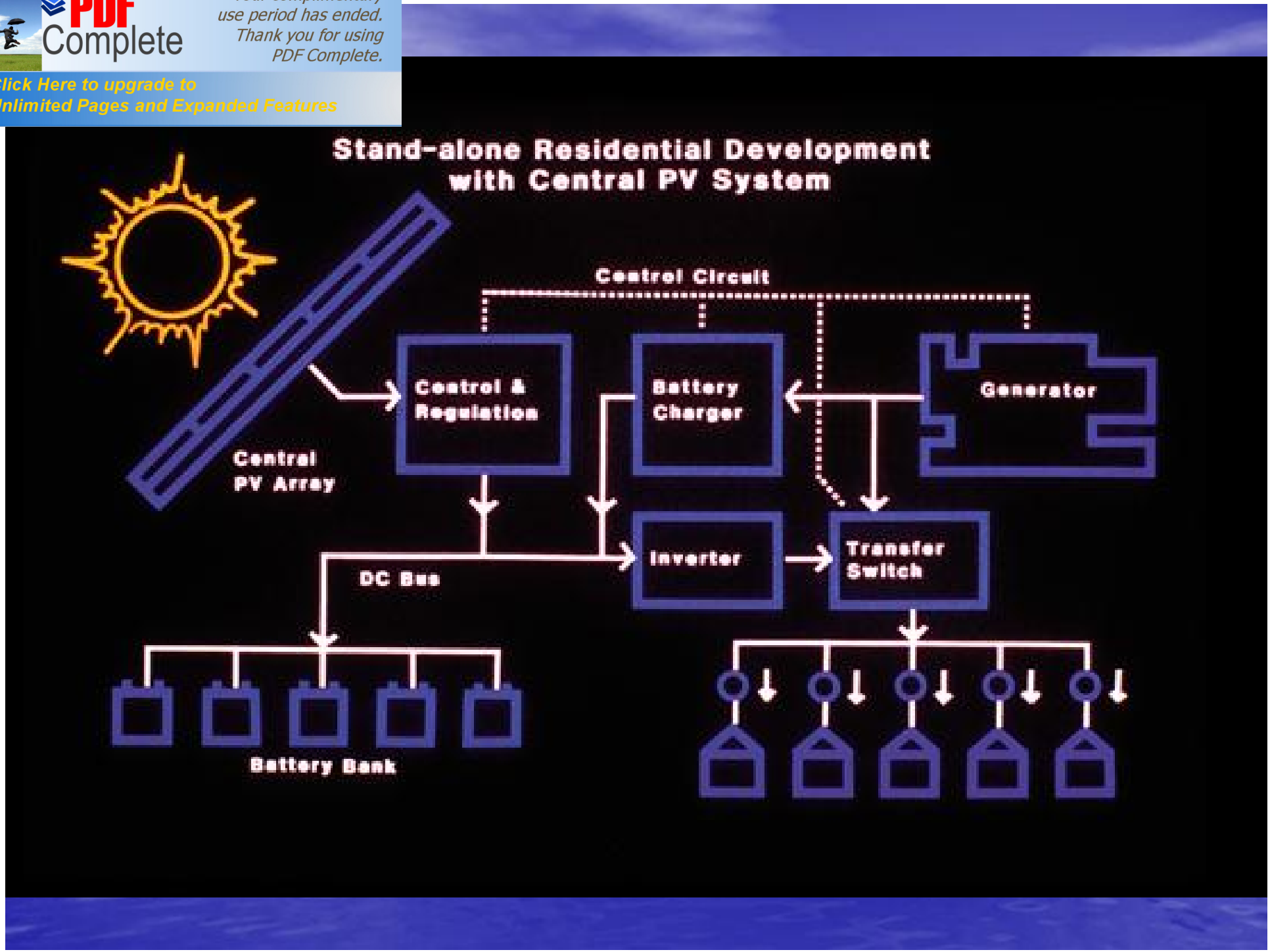


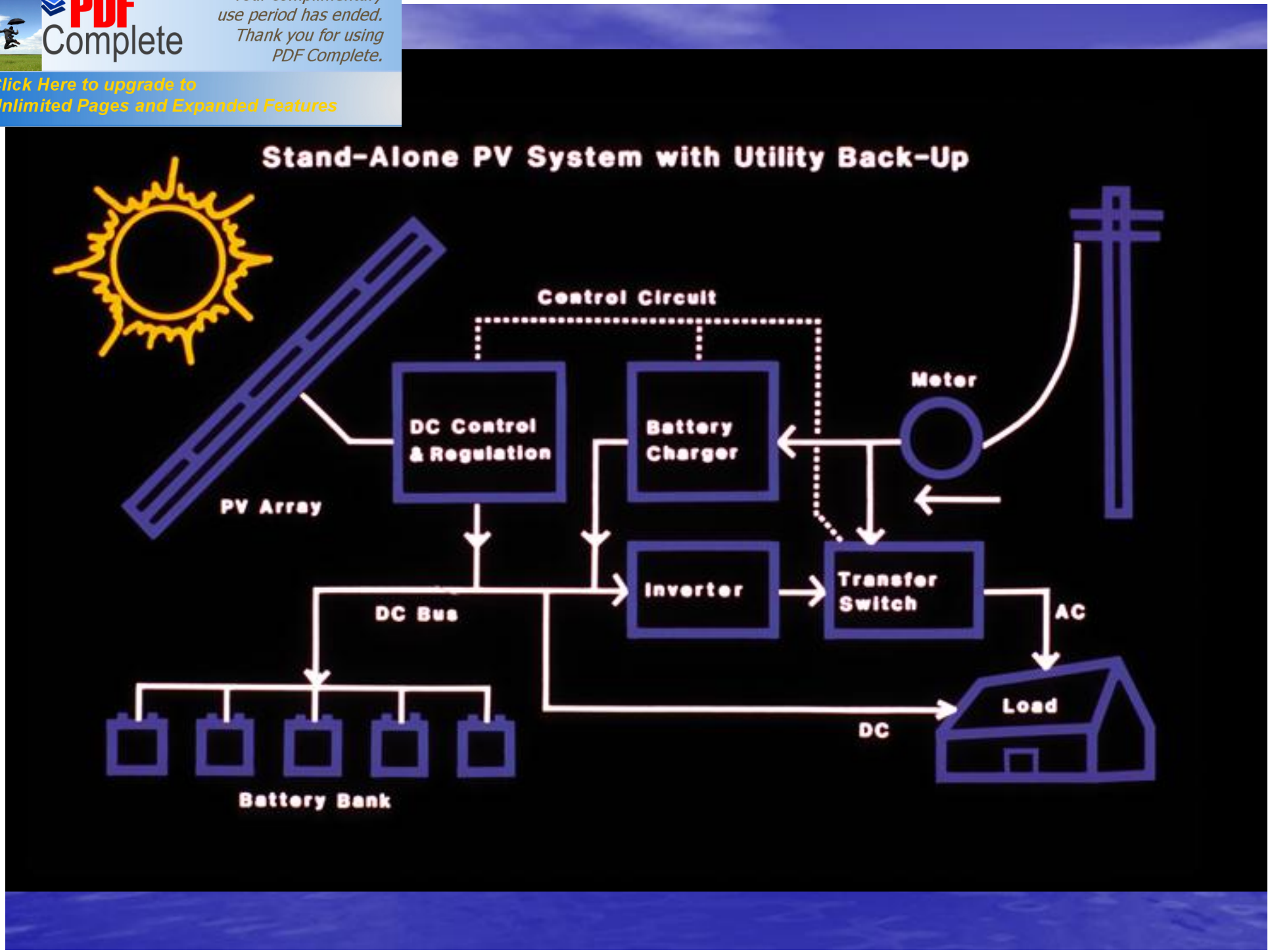


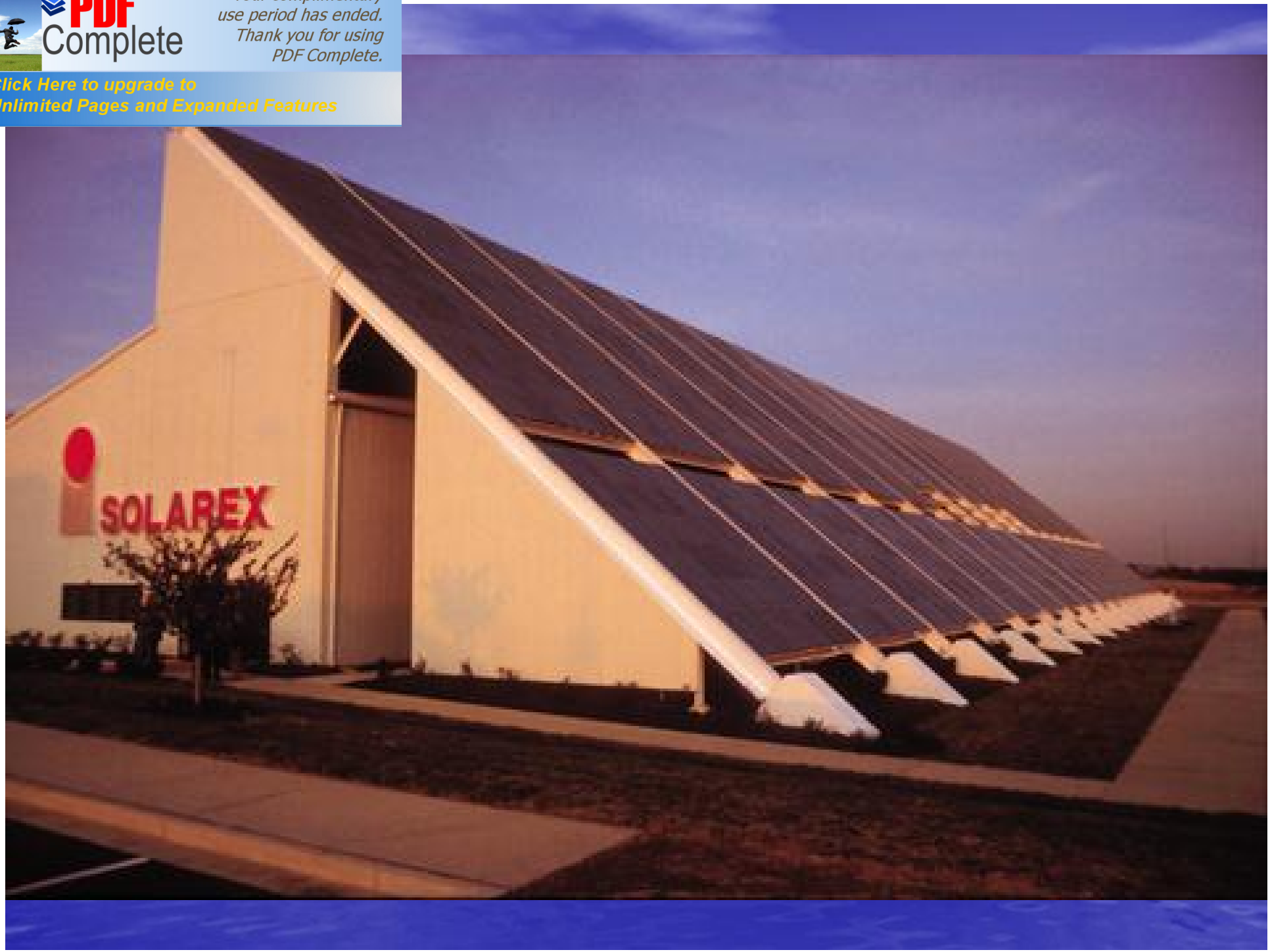


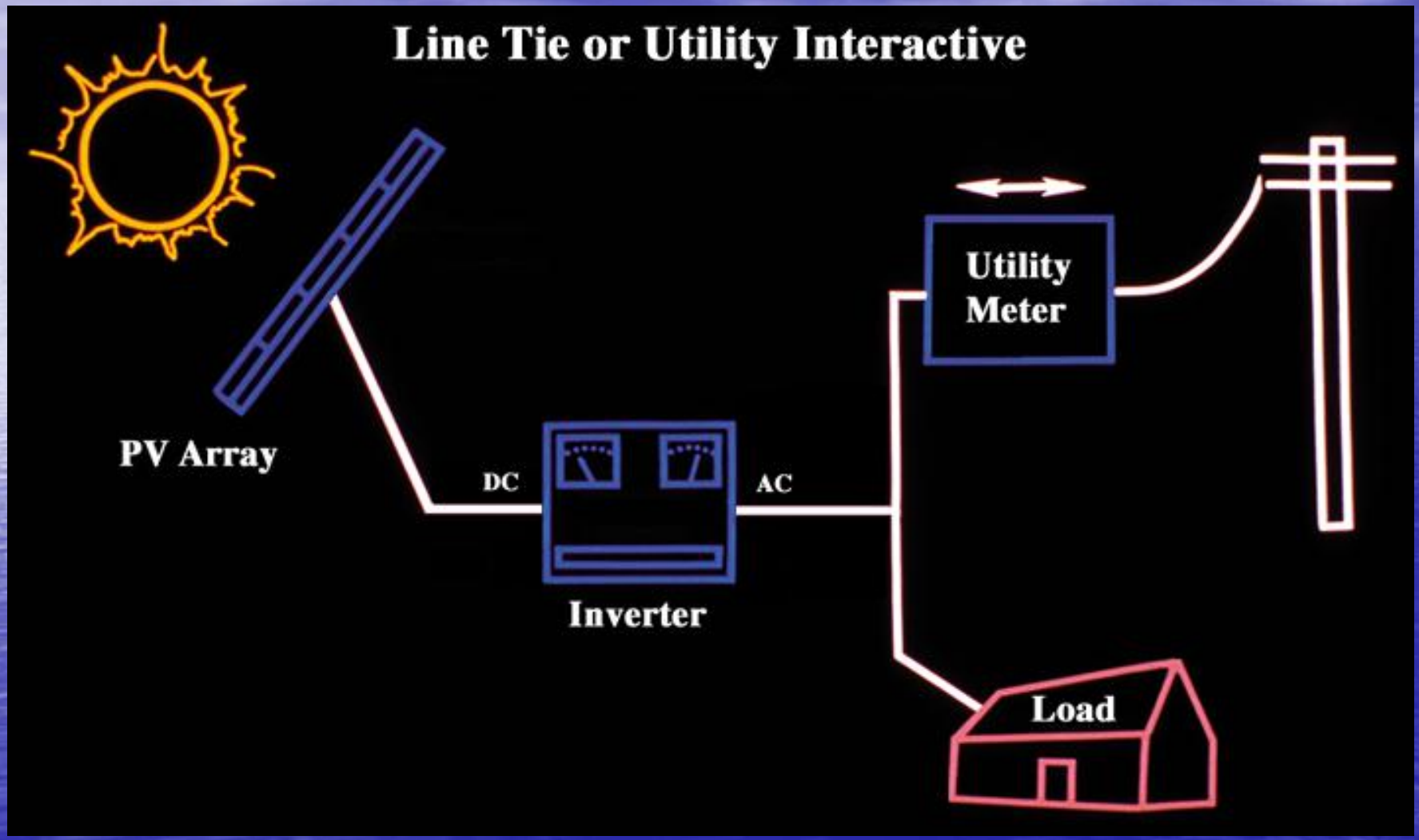
On the National Mall Earth Day – 2001 – Zero Energy House







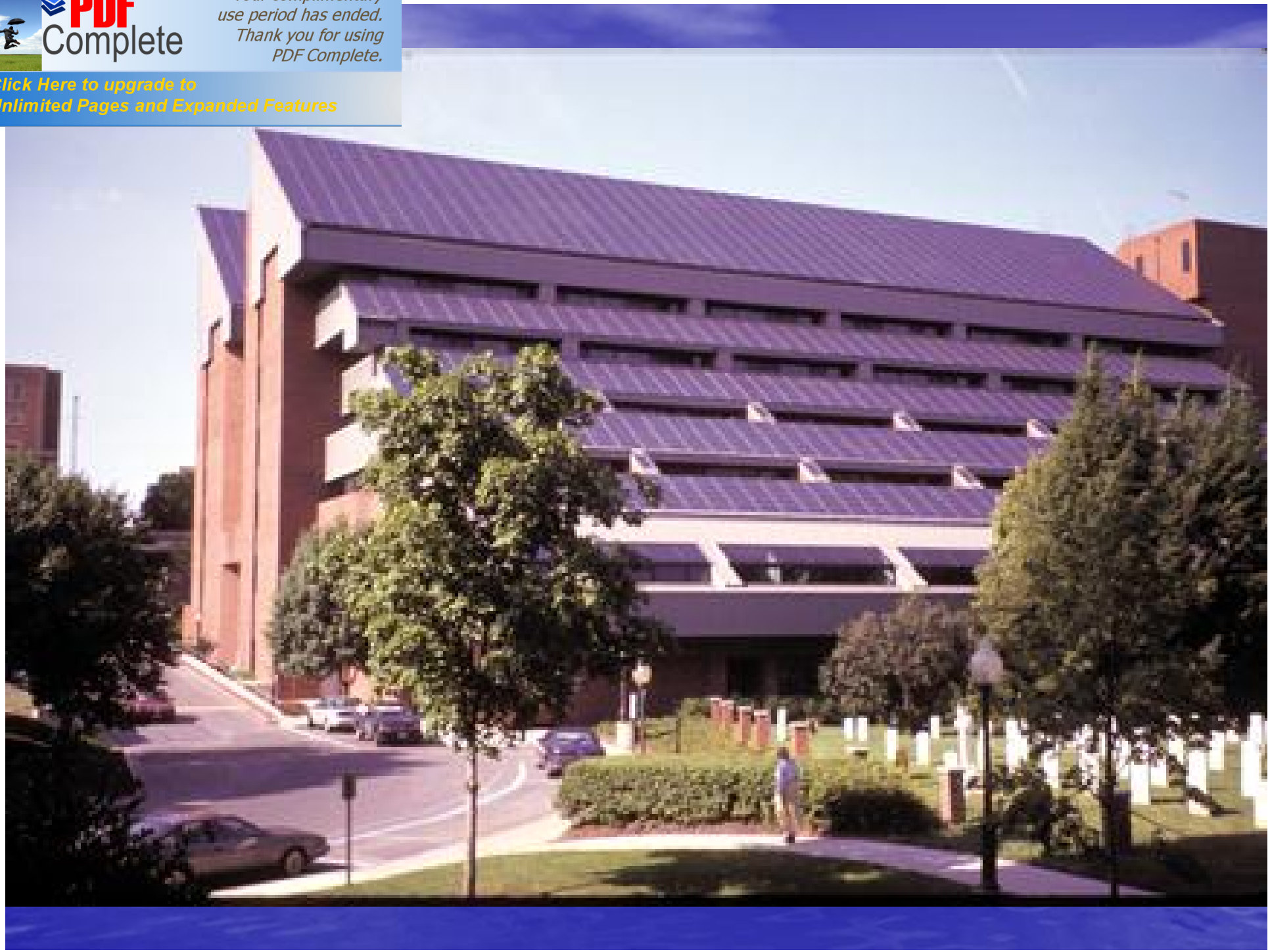


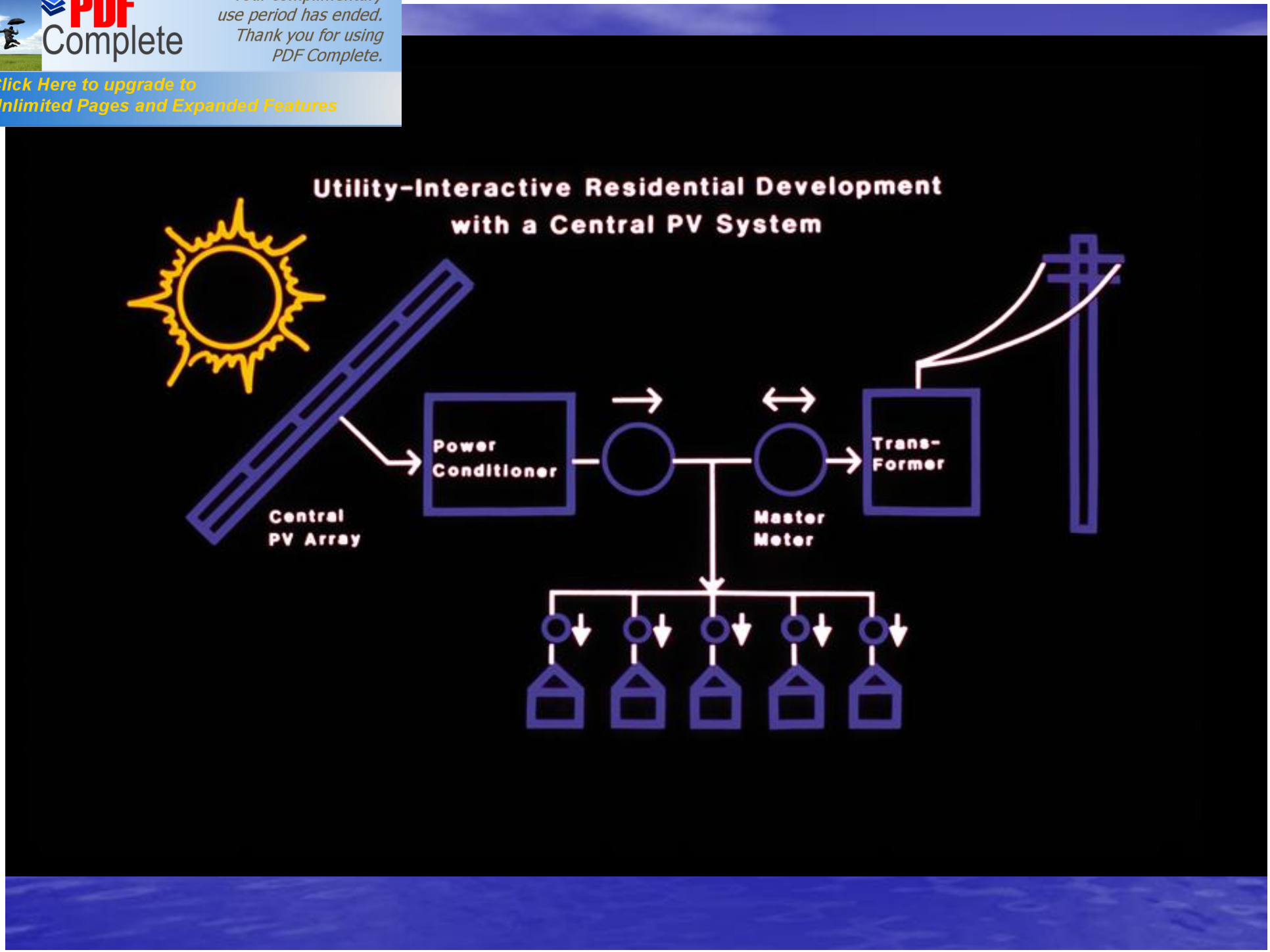


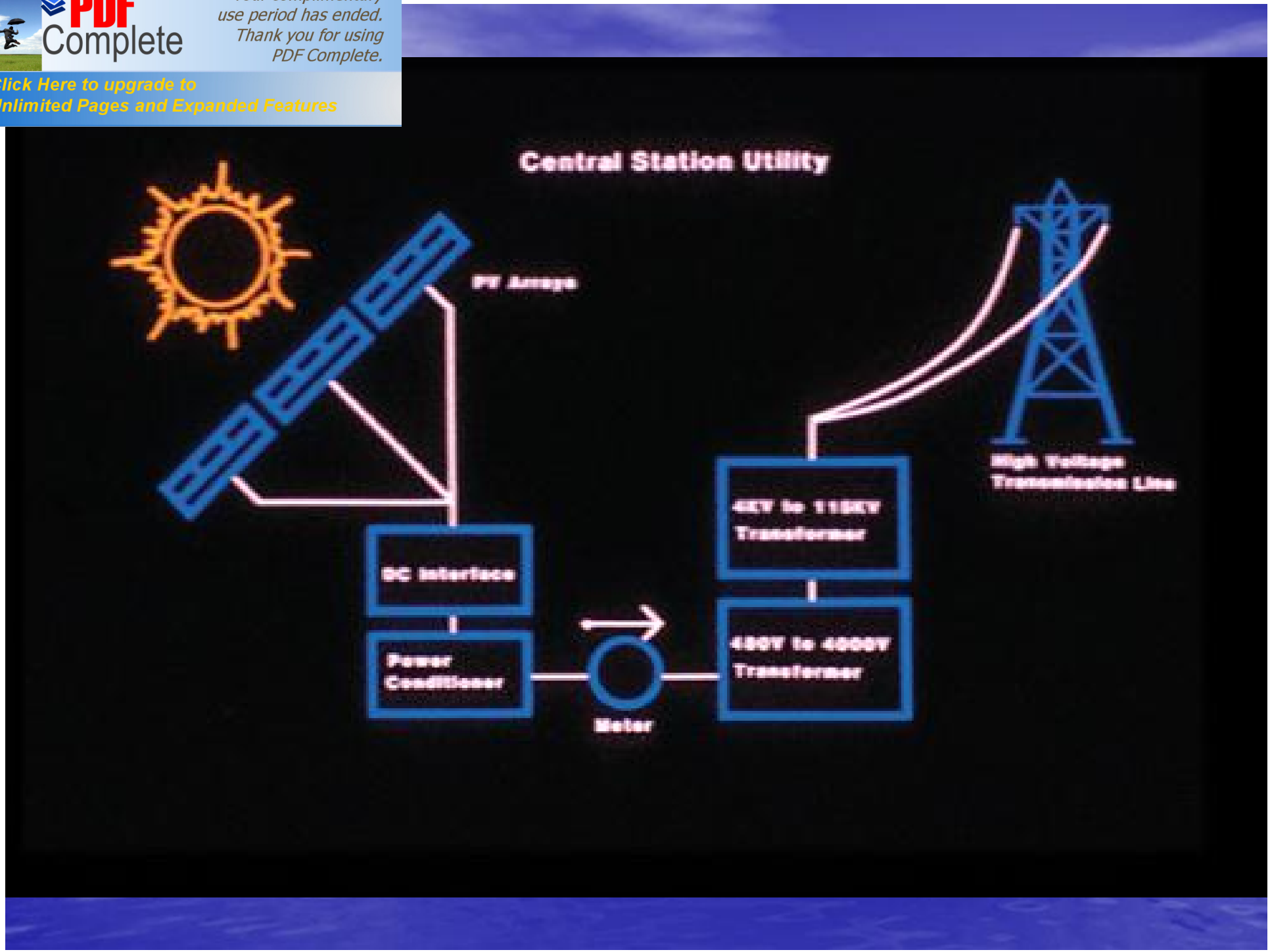
Solar Home in Hillsboro, VA

Combination of Amorphous Silicon Standing Seam Modules and Monocrystalline Modules

6.0 Kilowatt Solar System combined with energy efficiency provided 93% of our home energy needs.

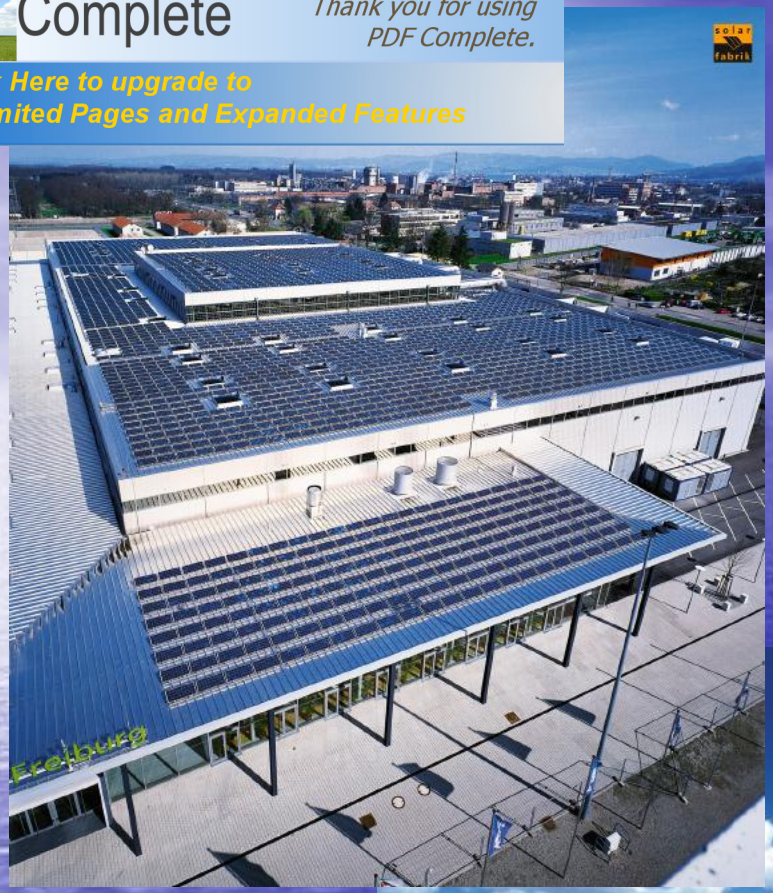






grass Solar, LLC

Phase I:	240 kW Merchant Solar Plant,	Completed
Phase II:	1.0 MW Merchant Solar Plant,	Completed
Phase III:	5.5 MW Merchant Solar Plant,	Bid Submitted



ntegrated Design

ntegrated Roofing Systems

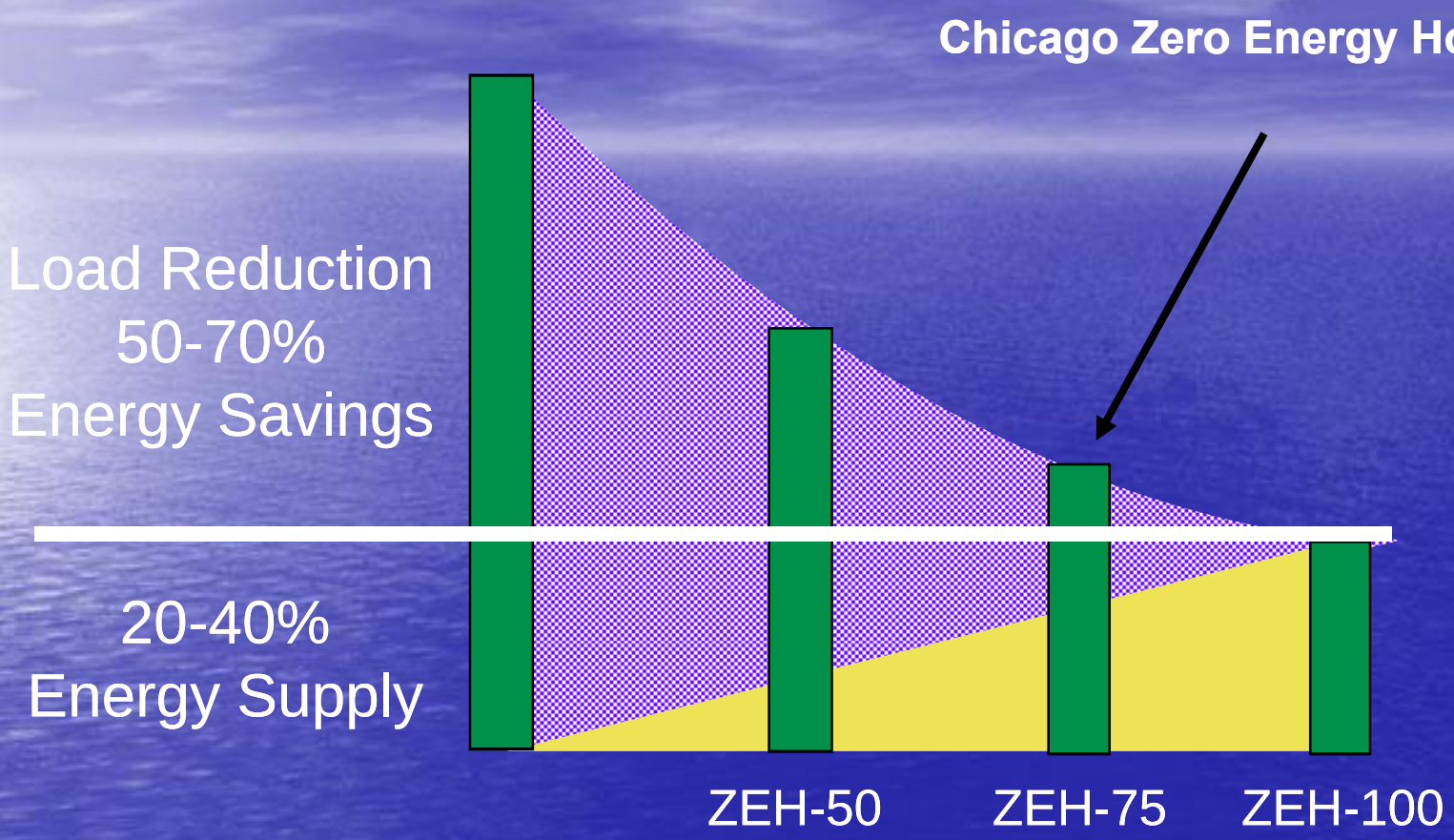
Hurricane Rating: Cat 3; Working on Cat 5 Rating for Guam Military Base

Solar power curtain wall and daylighting

r together w/ Energy Efficiency Zero net Energy Houses (ZEH)

(Boston Edison House, Solar Design Associates)

iciency and Solar



EH Solar Homes Program - Using Solar Shingles

nergy House—even in Maine!

Using Polycrystalline Roof-Integrated Modules

The Lord House—Solar Design Associates
www.solarhouse.com

t – June, 2005

www.ert.net/solarhome

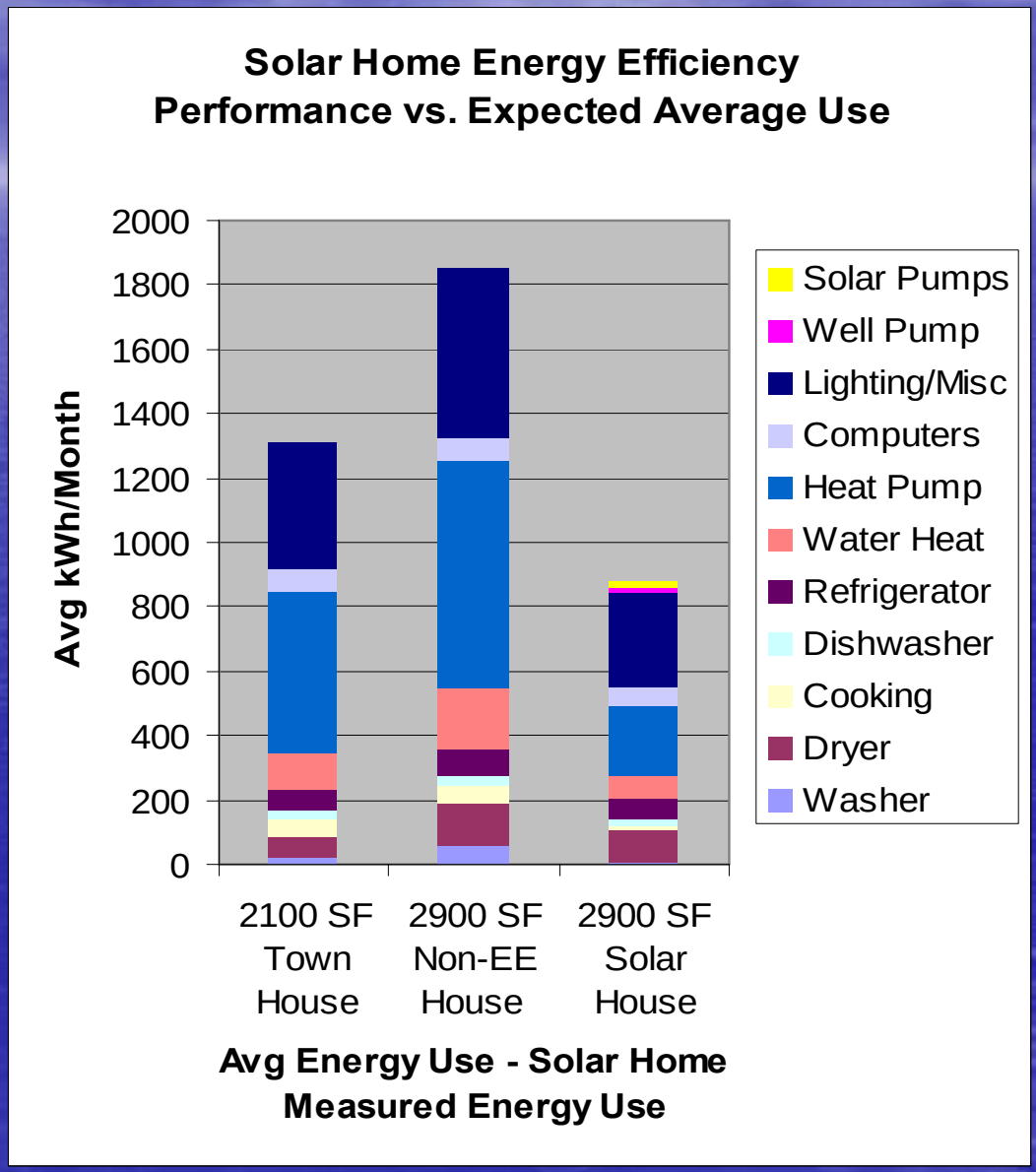
The Solar Roof features 36 PVL 128 Laminates from Uni-Solar ï 4.0 kW
Also, Passive Solar Overhangs; Double Paned Windows with Bali Insulating Shades

PV Laminate – Standing Seam Pan

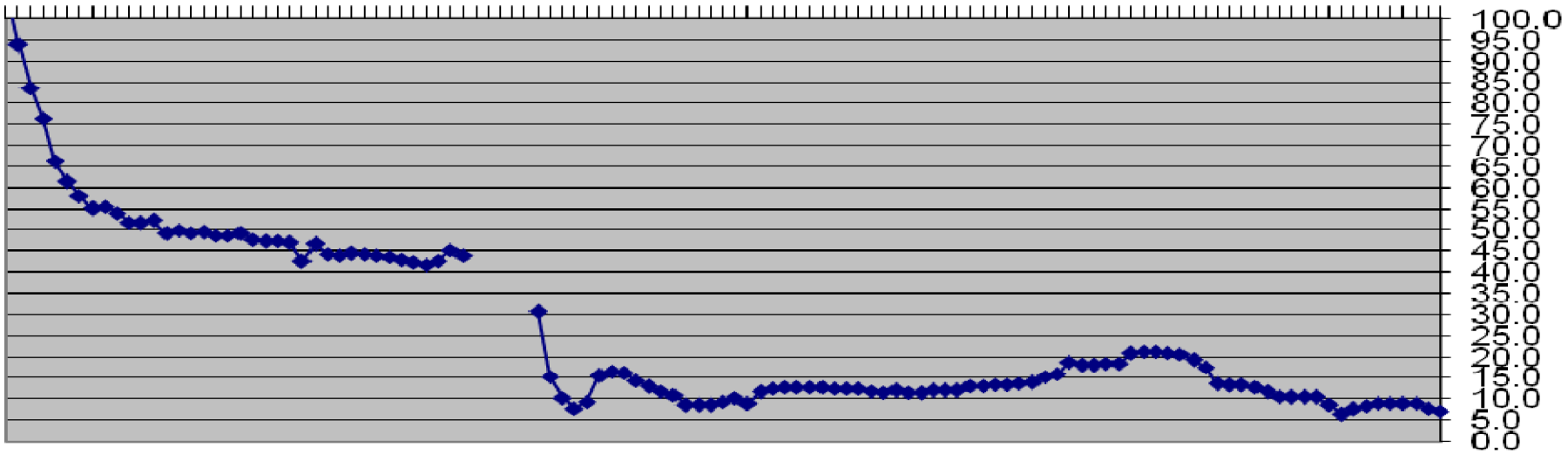
The Uni-Solar PVL is applied to the Standing Seam Pan on site by the roofing contractor.

o Zero Energy

A non EE house will require twice the solar power capacity to be Zero Energy, increasing the house cost by almost 30%. By incorporating energy efficiency we keep the increase for both solar and EE to 15% of house cost.

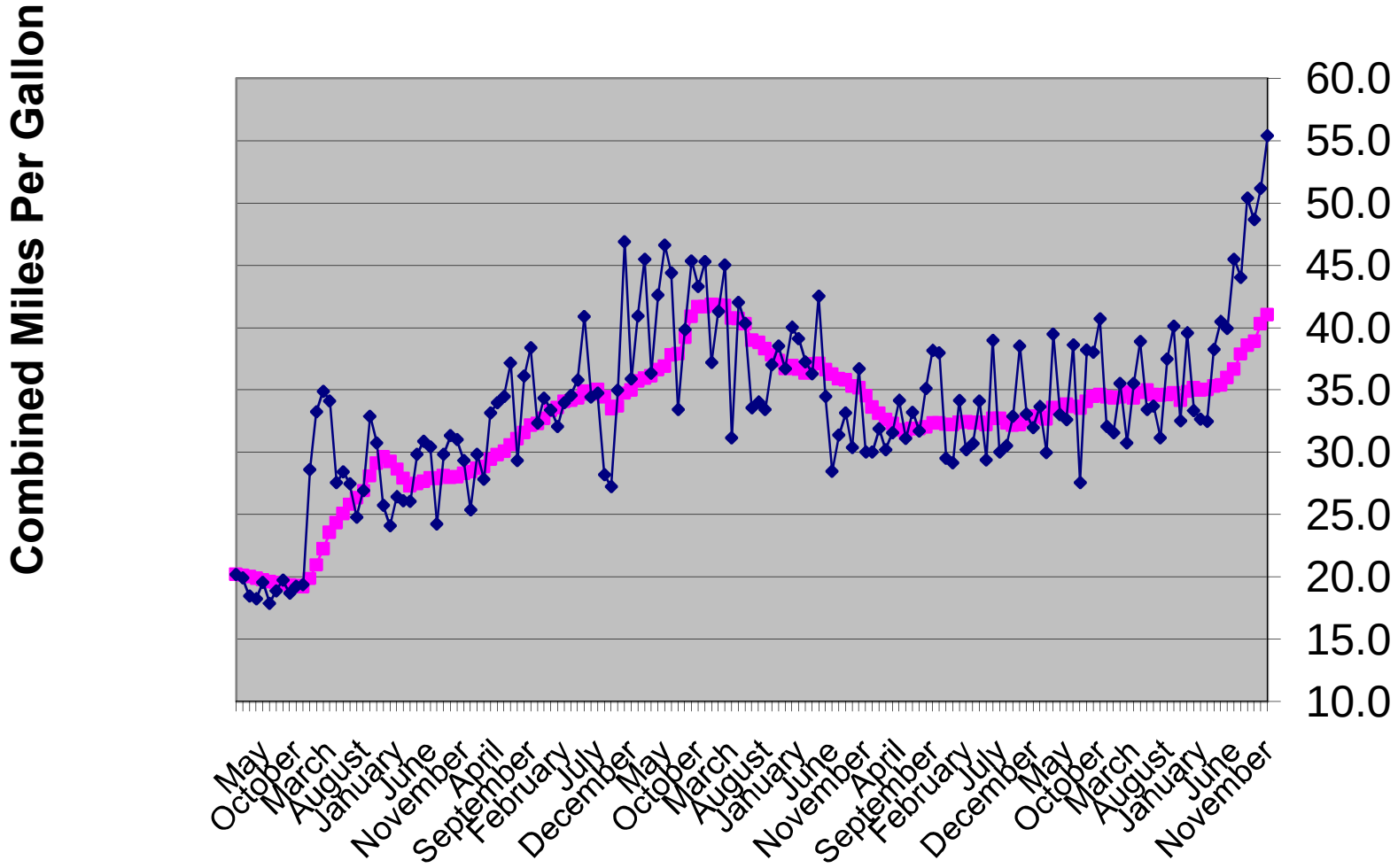


athaway Energy History
rage Monthly Electric Bill
1998 - 2007

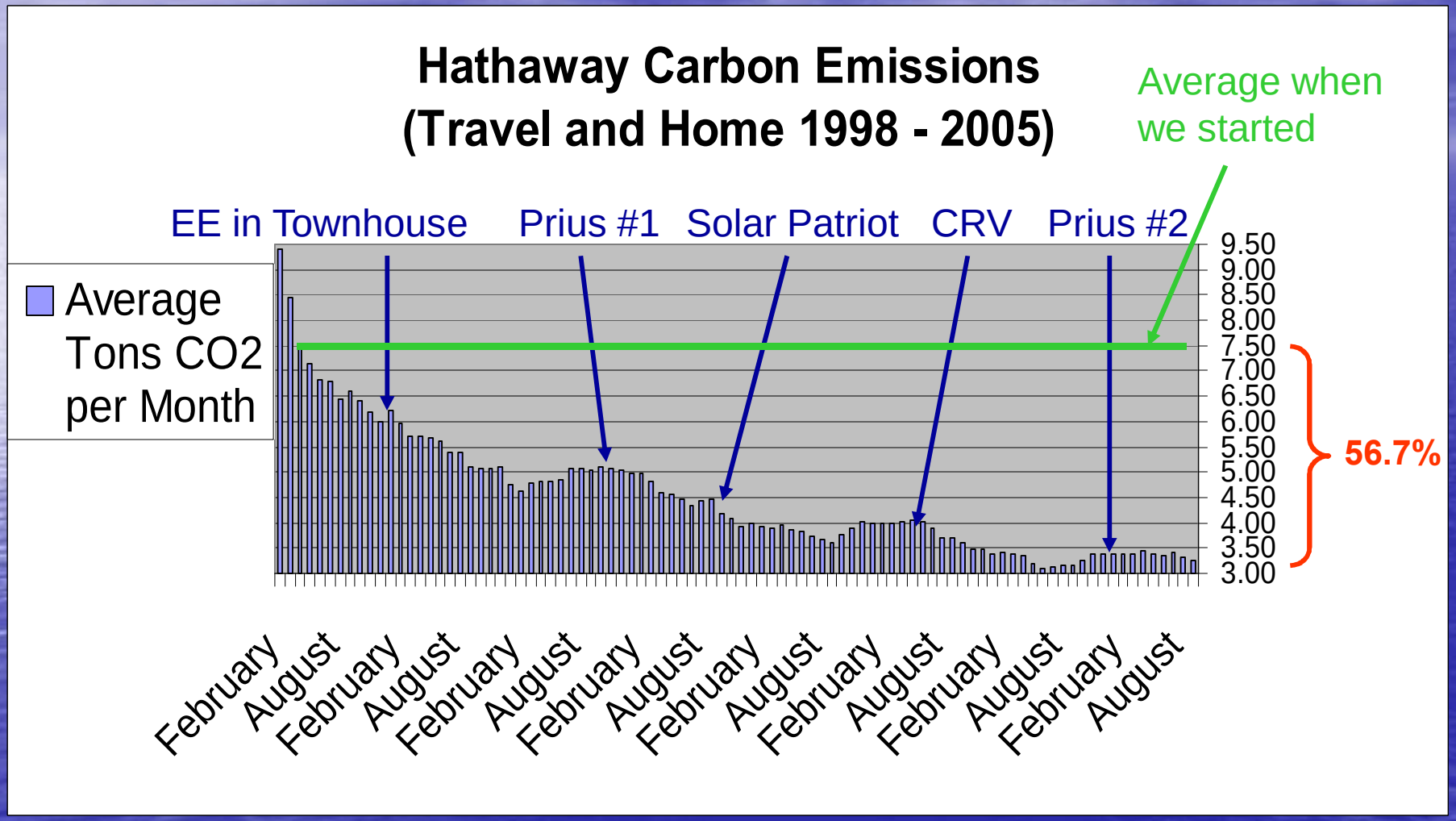


Average Energy Consumption in 3500 S.F. House:	100.0 kWH/Day
Average Household Energy Consumption in Solar House:	27.0 kWH/Day
Average Solar Energy Output since Turning Solar System On:	20.0 kWH/Day
Average Net Energy Consumed since Turning Solar System On:	7.0 kWH/Day

erage Automobile Fuel Economy 2000 - 2012



Our Carbon Impact



Hathaway Carbon Emissions due to Energy Reduced by nearly 57%

* Hathaway, Alden, Building an Affordable Solar Home, 2003, Chapter 10, pg 98; www.solarhome.beplaced.com

Philos Energy Int. Inc.

www.philosenergy.org

Exploring Partnerships in Electrification and Education

PHILOS
ENERGY INTERNATIONAL

- 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



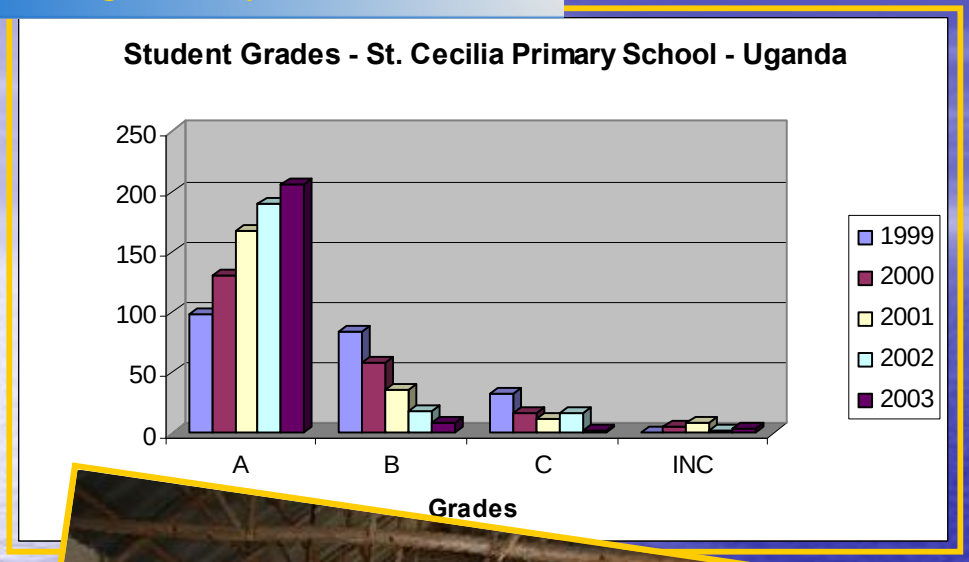
e Focus on Rural Facilities?

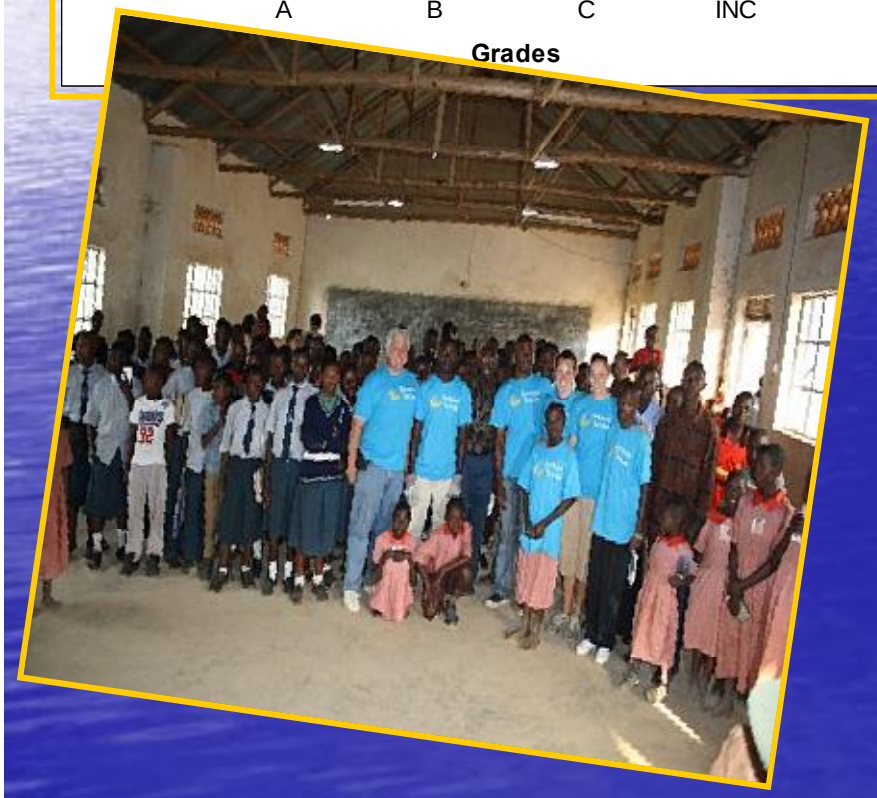
- Little or no access to grid
- Overhead transmission lines cover rural landscape as they make wholesale distribution access for the next town or city
- To provide opportunity for increased access to educational, economic, and health facilities close to home.

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





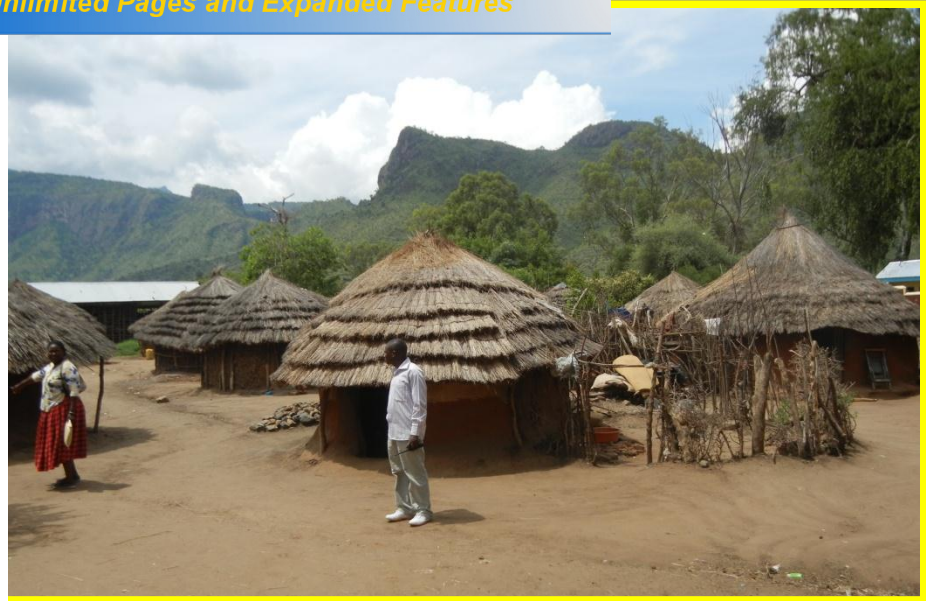
- The second part of the PEI mission – to electrify and to educate.
- Increased access to clean light for night-time study leads to better student performance.
- 2010 initiatives include evaluating the use of solar as a preventive measure against the upswing in dorm fires in recent years

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!

sion Program

2011



ps

- **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-**

The Value of Partnerships

- 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.

Alden Hathaway