



SOLAR 2010
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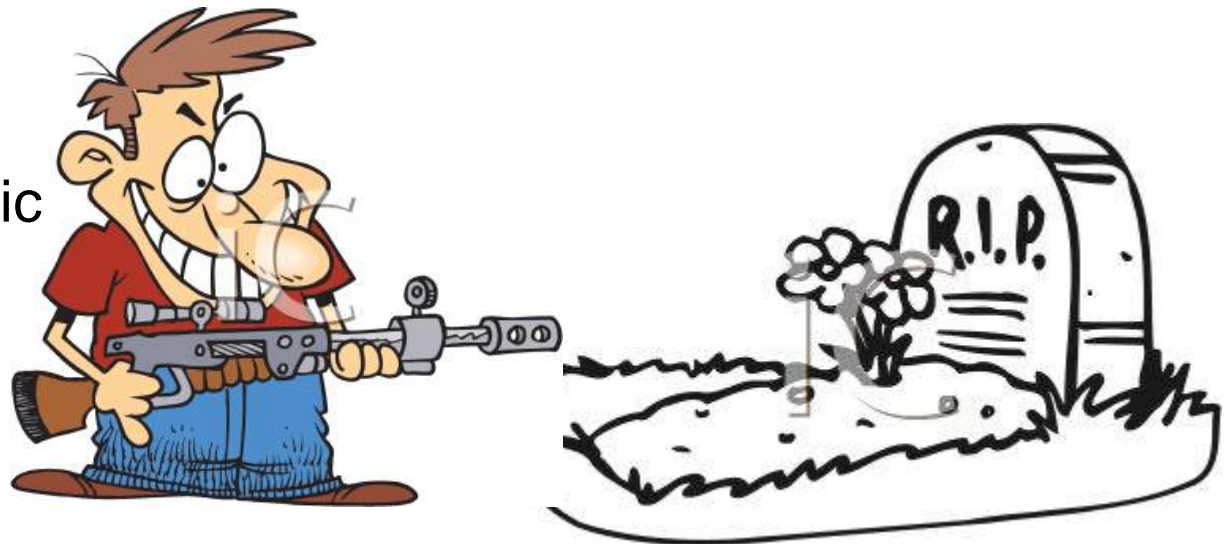
An Integrated Design Approach to Optimize Photovoltaic Systems
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Problems Hurting The Solar Industry

- Poorly defined photovoltaic (PV) designs result in unhappy Clients
- Money before values
- Opportunists seek short term gains \$\$\$ at the expense of the industry and public
- Honest mistakes - Unsophisticated design/build by PV contractors
- Reputations lost
- Uneducated public





Objective, the Installer, Manufacturer and Client

The objective of an Integrated Design Approach is to:

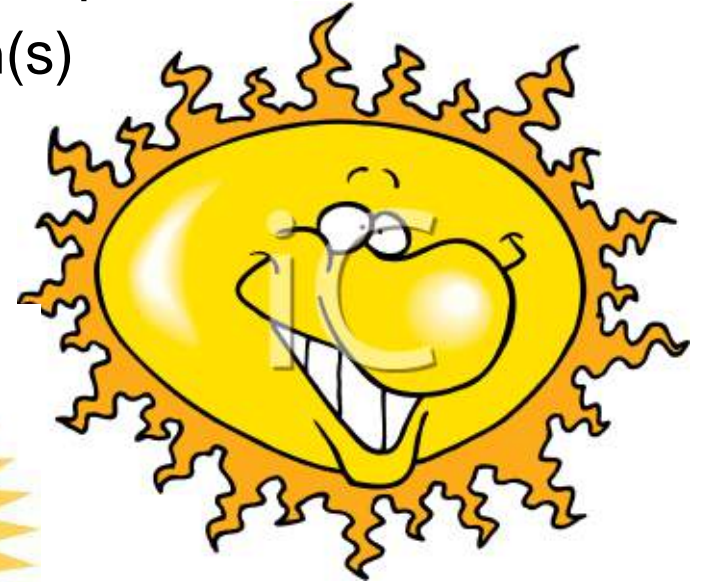
1. Eliminate misunderstandings between the installer, manufacturer and the Client
2. Assist the Client in selecting and obtaining the proper PV system for their particular need





HT Solar Proposed Methodology

1. Project Definition
2. Set Criteria and Constraints; Define Scope of Work
3. Analyze Possible Alternative Solution(s)
4. Endorse the Project
5. Basis of Design





Project Definition to Understand Project Dynamics

Listen to your Client's needs and wants in order to understand their issues and/or concerns. These are Client specific.

This process defines:

1. The Client's requirements and expectations
2. Establishes baseline criteria for function, performance and maintainability





Criteria & Scope of Work

Criteria & Scope of Work are set by each project's definition.

Understanding the Client's needs, wants and constraints assures a successful Criteria & Scope of Work definition that achieves the project's objectives. These objectives are the drivers that measure the project's success.

Set Criteria through the following (*minimum requirement*):

- Energy Audit
- System Capacity
- Economic Study
- Provide Alternatives





Analyze Possible Alternative Solution(s)

There are multiple solutions but the '**Best Solution**' is dependent upon the most significant driver identified through the Project Definition and the Criteria and Scope of Work.





Endorse the Project for Success

Endorsement is defined as: *The Commitment of the Partnership to Successful Project Performance*

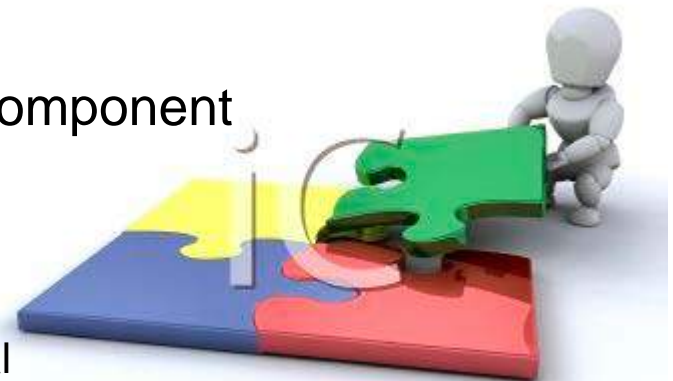
- The Client/Contractor Partnership
- Partnership is strengthened through effective and timely communication and involvement by both parties through all project phases





Basis of Design

1. Construction Sequence
 - A detailed sequence of how the system will be constructed
2. Site Plan and Elevations
 - Showing the location of system components
3. Single Line Diagram
 - Electrical diagram showing the system components with a Bill of Materials (including quantities, sizes and manufacturer, etc.)
4. Equipment Data Sheets
 - Include the following for each system component
 - a. Product Literature
 - b. Product Specification Sheet
 - c. Product Warranties
 - d. System Operation and Maintenance Manual





Case Study

Utilizing the Integrated Design Approach with Success

Case Study: Self-service Carwash located in Imperial Valley, CA

Previous PV Design Results

- Lack of the elements from the proposed Integrated Design Approach resulted in a poor PV design and the bankruptcy of the previous Owner

HT Solar's Integrated Design Approach

New facility ownership and the implementation of the Integrated Design Approach resulted in a **Win** for the Client, the Utility, the Contractor and the Industry

- Results of the Integrated Design Approach
 - a. Peak demand shaving below 20 kW allowed the facility to operate in a non-demand rate schedule
 - b. 30-percent reduction in average daily energy consumption
 - c. 60-percent reduction in utility bill



Conclusion

An industry design standard ensures ***Best Design Practices*** that will contribute significantly to the success of the photovoltaic industry.





Questions

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