PHILIPS

PV Module Scale Inverters

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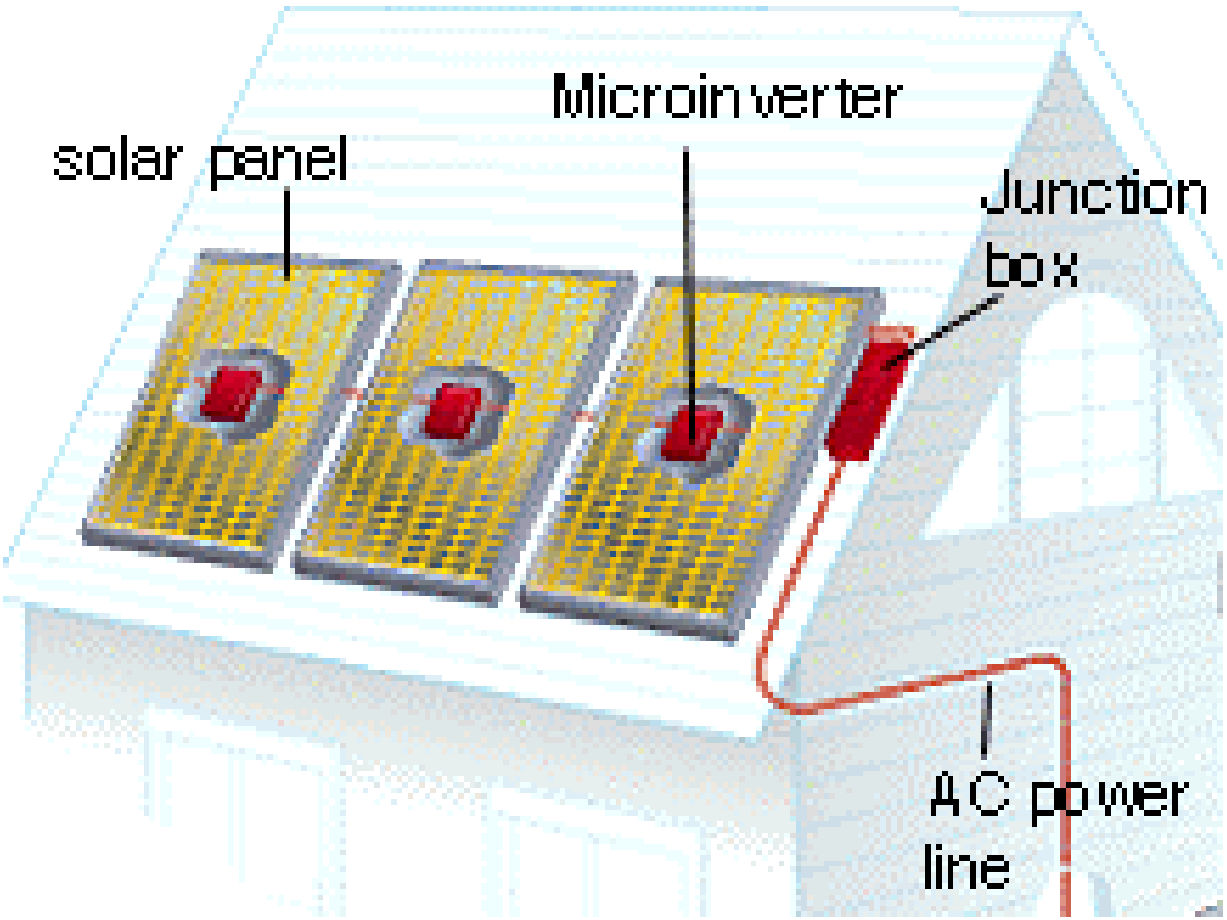
PV Module Scale Inverters

Definition

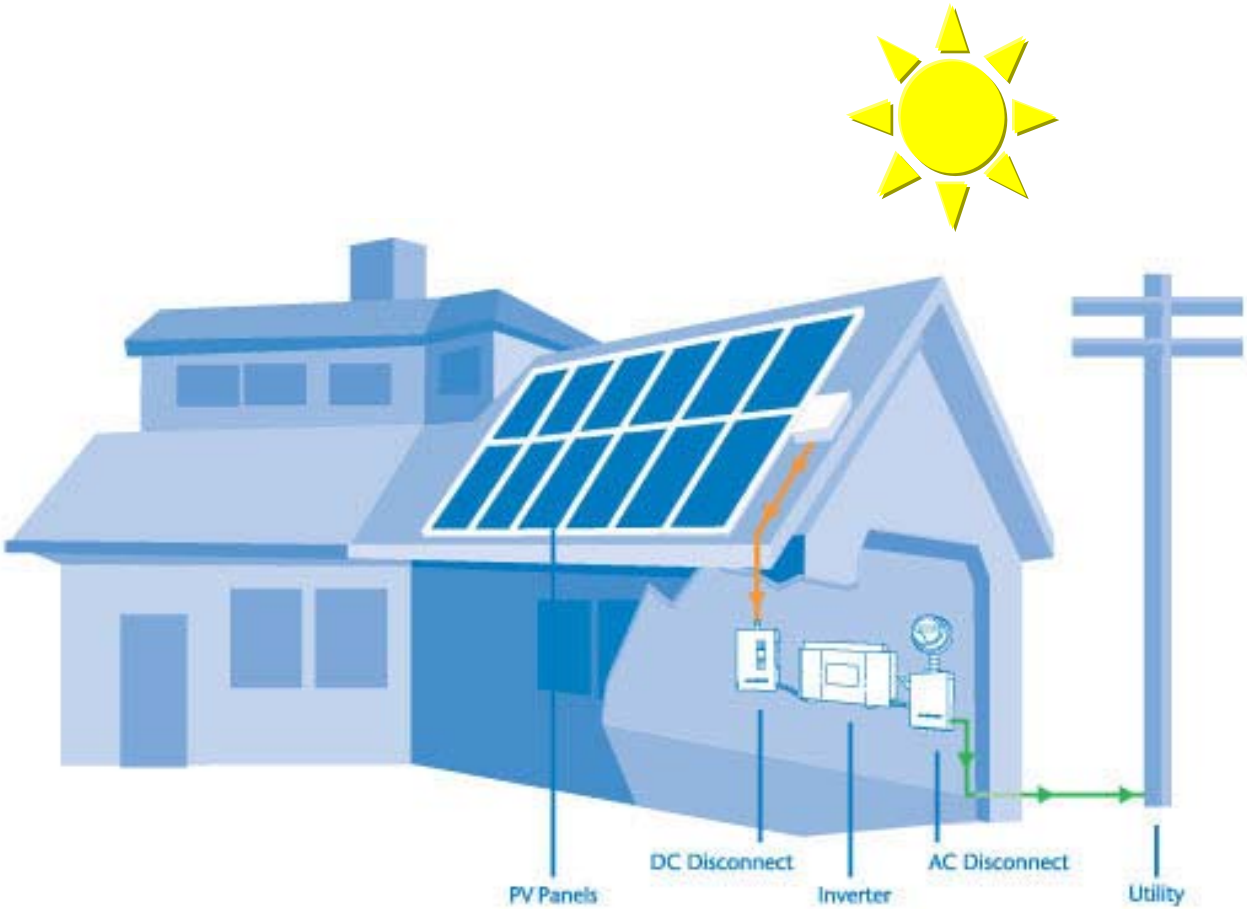
- Mounted on or near PV module(s)
- Power output depends upon PV module(s)



Residential Grid-Tie PV System

Conventional DC System

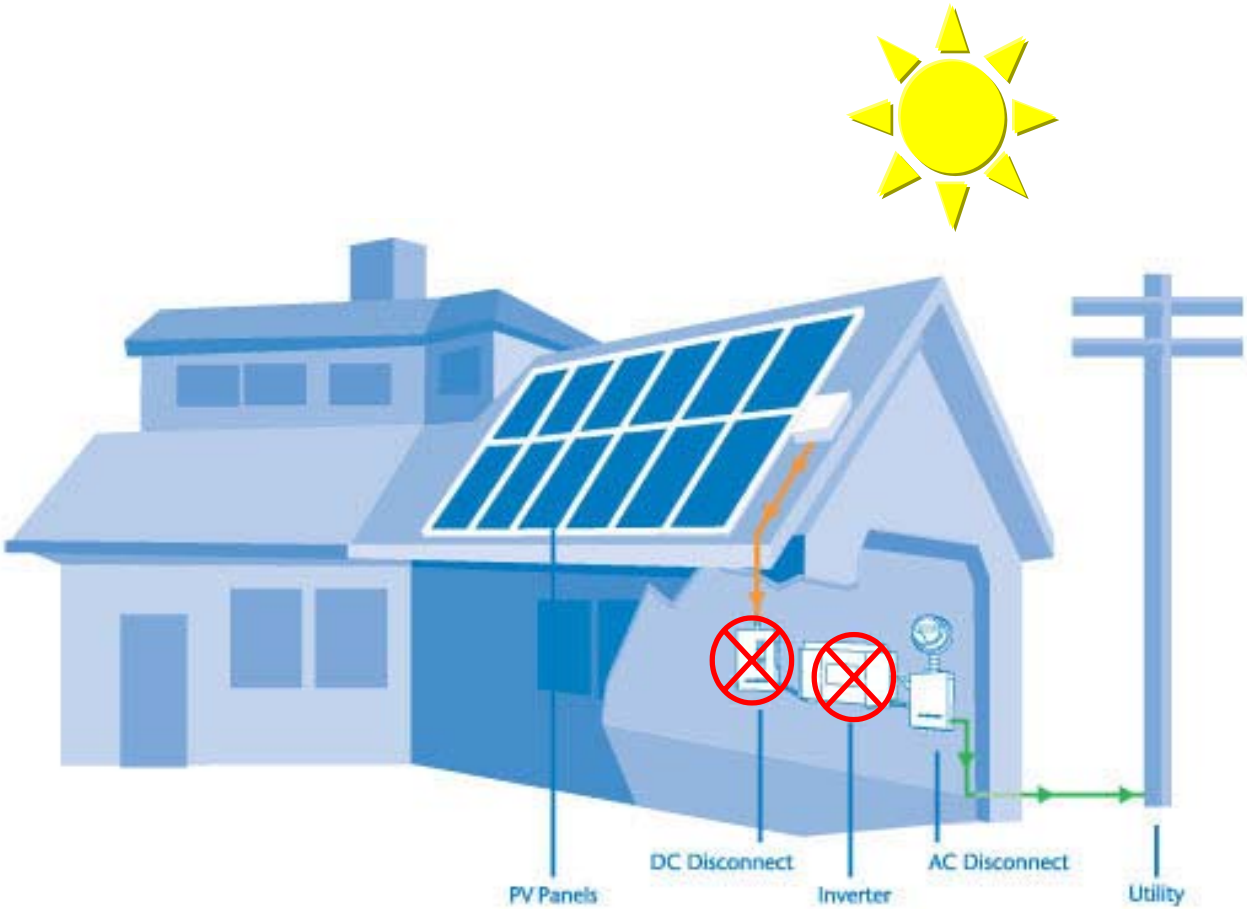
1. DC PV modules
2. DC subassemblies
   - Cables, combiner boxes and switches
3. Grid-tie inverter
   - Single or multi-string
4. AC switch
5. Revenue grade meter



Residential Grid-Tie PV System

AC Module System

1. AC PV modules
   - Integral grid-tie inverter
2. Junction box
3. AC switch
4. Revenue grade meter



AC Module with Micro Inverter

Comparison with Conventional DC Systems

<u>Advantages</u>

- Simplified system design
- Maximum sunlight harvesting
- System redundancy
- Ultimate in scalability

<u>Disadvantages</u>

- Cost ($/$W_{ac}$)
- Functional confirmation
- Replacement of inverter
- Inverter reliability unproven

Micro Inverters

Past Products

- Trace MicroSine™
  - 1998-2002
  - 90W inverter
- Standardized, Low Cost AC PV System
  - 1995 –98 NREL PVMat project
  - 250W inverter
  - Partners:
    - Advanced Energy Systems Inc.
    - Solar Design Associates
    - Solarex Corp. (BP Solar)
- SunSine™300 AC module
  - 1995-98 PVMat project
  - 300W inverter
  - Ascension Tech. (RWE Schott Solar)
- SunSine™300 (Gen. II)
  - 1998-99 PVMat project
  - Inverter cost and size reductions
  - Efficiency improvements

SunSine I (rear view)

Micro Inverters

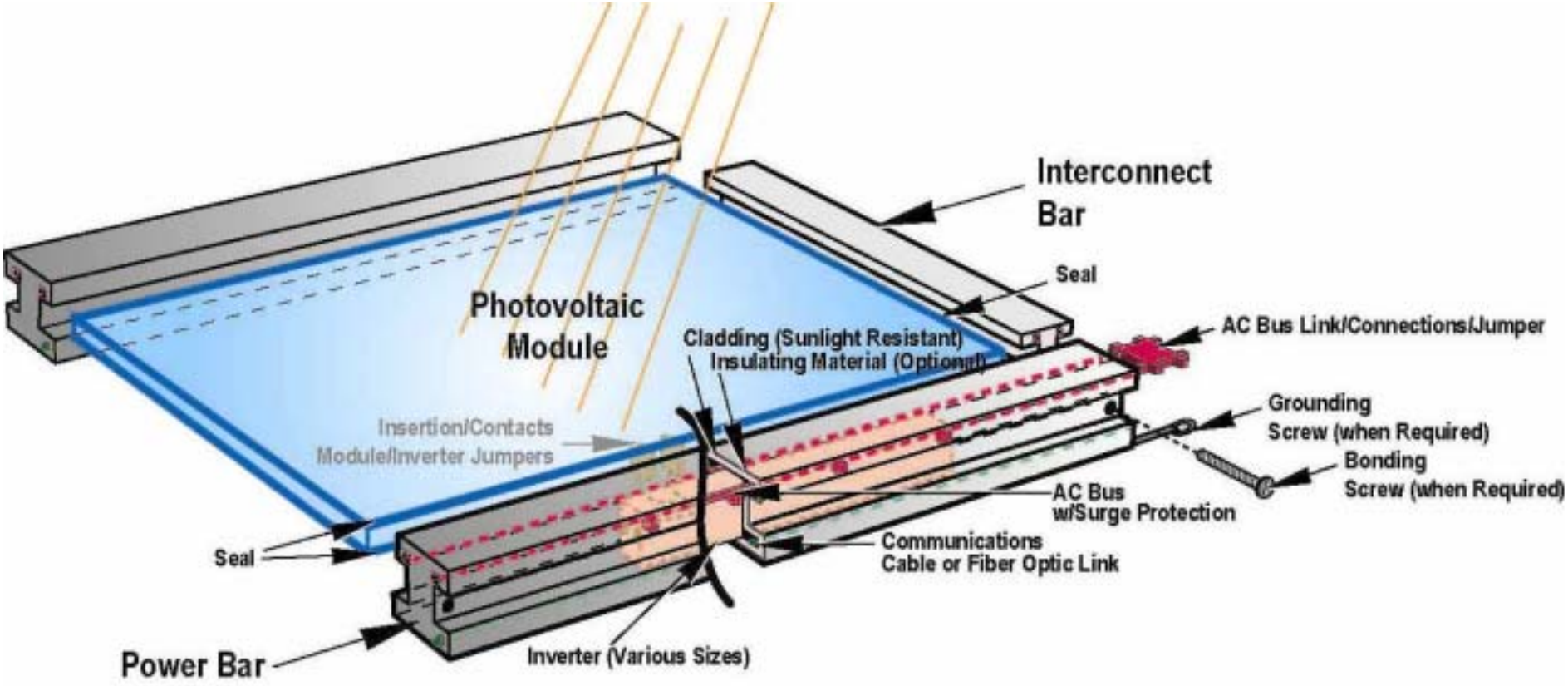
Current Products

- Pacific Solar Pty Ltd.
  - Australian firm
- SunEmpower™ system
- 240W inverter
  - Fits in proprietary mounting structure

Micro Inverters

Future Concept: "AC PV Building Block"

- Patented by Sandia National Laboratories
- Truly integrated assembly
  - Micro inverter part of "Power Rail"



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