Who Is National Semiconductor?

- 50 Years of Building
  - Great Customer Relationships
  - Innovative Products
  - Shareholder Value

- World-class Analog IC and Power Engineering, aggressively expanding
  - Renewable Energy
  - Energy Efficiency
  - Battery Charging
  - LED Lighting
  - Smart Grid
The Innovation

- Intersolar
- EE Times
- EDN
- Wall Street Journal
- InterPV
- Energy Daily Elektra
- Prism Awards
- Climate Change Business Journal
- Golden Mousetrap
The Customers

• Over 600 Customers
• More than 100MW
The Market Need

Panel Potential
85% Initial, -1/4%/Year

Finance Threshold
77% Initial, -1%/Year

Current Trend
25%
25%
50%

Operational Year

$0
$100,000
$200,000
$300,000
$400,000
$500,000
$600,000
$700,000
$800,000
$900,000
Why PV Systems Under-perform

- Small mismatches
  - Have Large Penalty
- Monitoring alerts poor performance
  - Doesn’t correct or diagnose

- Panel variation
- Orientation
- Inter Row shading
- Degradation
  - Corrosion, Cabling, Connectors
  - Cells
- Ground faults

- Soil, debris
- Reflection
- Shade
- Cloud shadows
Maximizing Performance

Shared Voltage

PV Module

PV Module

Injection Boost

Volts

Shared Current

0 20 40

250

200

150

100

50

0

PV Module

PV Module

PV Module

MPPT

DC

AC
Active Power Management Umbrella

- Weather Station
- Power Optimizer
- Smart Panel
- PowerString
- Smart Combiner
- System Manager
- Solar Operations Center
- Internet
- SolarMagic by National Semiconductor
Commercial Rooftop Installation Case Study – 22.6% Gain

- 30kW array
- 17 strings of 12 panels
- Limited shading
- 22.6% production gain
- Performance Ratio: 67% ⇒ 82%

“...the addition of SolarMagic has dramatically boosted system performance,” said Jigar Shah, founder of SunEdison. “SolarMagic is helping us get 22.6 percent more power out of the same panels, making the system even more productive and cost effective.”

Jigar Shah, Solar Visionary