Making high-quality, high-power solar cells and modules using U.S.-based technology at affordable costs to address the world’s energy needs.
The world is increasingly flat in Clean Technology. While local and regional markets exist for Clean Tech, national and international markets contain key drivers that impact market acceptance and economic viability that provide opportunities to achieve significant business viability and scale. For entrepreneurs located in Atlanta or Research Triangle, what are some key considerations in addressing markets, raising capital, hiring employees and building company infrastructure to address growing national and international markets?

- Consideration of market opportunities and drivers in terms of the SE, US and international, Paul Quinlan
- Joulex's strategy and experience (from the perspective of an energy management software company), Player Pate
- Suniva's strategy and experience (from the perspective of a solar cell/module manufacturer), Anthony Coker
GEORGIA GETS POWERED BY SUNIVA

90 kW rooftop installation on Georgia Tech’s Clough Center
Atlanta, Georgia
(installation by Radiance Solar)
GEORGIA GETS POWERED BY SUNIVA

1 MW grid-connected ground mount installation, Georgia's largest privately owned PV system
Blairsville, Georgia
(Installation by ESA Renewables)
GEORGIA GETS POWERED BY SUNIVA

29 kW installation on Legacy Properties in downtown Atlanta, Georgia
(Installation by Inman Solar)
GEORGIA GETS POWERED BY SUNIVA

1.2 MW canopy installation at MARTA’s Laredo bus station
(2nd largest solar canopy at a transit system in the US)

Decatur, Georgia
(Installation by New South Construction)
WHO WE ARE

Manufacturer of high-efficiency crystalline silicon PV cells and modules

- **High-Efficiency Cells:** 19% in production now; over 20% in laboratory; roadmap to over 22% by 2014
- **High-Power Modules:** Up to 16+% in production; modules ranging from 235-315 watt
- **Buy American Compliant:** Our “Buy American” compliant modules are one of the highest U.S.-content modules on the market
- **Market focus:** Commercial and utility applications in the U.S., Asia and Europe
- **Top-Tier Customers:** Solar City, Martifer, Sunetric, Inman Solar, Orion, AGT, UPS
- **Manufacturing Capacity:** 170 MW in the U.S.; 400 MW in Asia
- **Cost Competitiveness:** Cost competitive with top-tier Asian manufacturers

**Headquarters:** Norcross, Georgia (suburb of Atlanta)

**Incorporated:** 2007; Spun-out from Georgia Tech’s UCEP PV Center

**Employees:** Approximately 200

**Investor Backing:** Warburg-Pincus, New Enterprise Associates, Goldman Sachs, HIG Ventures, Apex Venture Partners
Some questions to consider on the topic:

- Given the perspective of being based in Atlanta or RTP, what has your experience been in addressing markets, raising capital, hiring employees and building company infrastructure for achieving the results to date?

- What key elements have come together that have led to your company's success?

- What impact has the company had on the local economy?

- What, if any, support has been obtained from local, state and federal sources and how has that support affected your business?

- What impediments to growth have you faced, and how have they been overcome?

- What advice would you provide entrepreneurs who want to start and build new Clean Tech companies based in the South?
CURRENT INDUSTRY EFFICIENCIES OF DIFFERENT PHOTOVOLTAIC TECHNOLOGY COMMERCIAL MODULES

Wafer-based PV

13-19%

Suniva

11-15%

Thin Film PV

10-11%

7-12%

4-8%

Note: In January 2012, First Solar broke the world record in CdTe technology with cell and module efficiency at 17.3 & 14.4% respectively. This information is not included here because production at these efficiencies will not begin until 2015.
COSTS: SILICON

1H 2011 $80/kg

2H 2011 $24/kg

Result: Shortage likely as companies lack motivation to produce!
COSTS: WAFER

Comparison - Mono Wafer vs. Multi Wafer

- Photon Mono
- Bloomberg Mono
- Photon Multi
- Bloomberg Multi

Average Monthly Price ($/Watt)

Due to aggressive capacity expansions, the industry is currently going through a supply-demand mismatch.

Competitive pricing leads to Chinese Tier-2 crystalline PV modules prices dropping to US$0.96/W
2011 saw significant decrease in install costs compared to 2010:

- Residential – 3.6%
- Commercial – 13.9%
- Utility scale – 21%
Cumulative installed global capacity is at over 67.4 GW!
The US market finally passed the 1GW of PV installed in a year mark!

PV installations grew 109% in 2011 over 2010.

The dollar amount of project finance investments reached an all time high:

- US Bancorp and Solarcity to fund 300MW to power military housing – this is expected to be the largest residential solar project in American history!

Solar is bankable!
Expiration of US Cash Grant 1603 on Dec 31st 2011.

- Expectations: 2013 (FY '13) U.S. budget provides for an extension of the U.S. Department of Treasury's Section 1603 program

US-China trade: anti-dumping/countervailing duty petition against China and Chinese c-Si cell & module manufacturers (filed by Solarworld and 6 other US manufacturers in Oct 2011)

- March 20, 2012- The Department of Commerce found that China has in fact unfairly subsidized its solar industry. The countervailing duties assigned to the Chinese solar vendors are as follows:
  • Trina 4.73 percent
  • Suntech 2.9 percent
  • All others 3.59 percent

- The anti-dumping case will be determined in May 2012 and this may have a bigger impact than the CVD imposed.
**HIGHLIGHTS:**

- **Introduction of Senate Bill 401 on Feb 7 2012**
  - Bill will permit 3rd party PPAs
  - 3rd party ownership has propelled adoption of solar energy in the US and will open up the GA market.

- **2009 - Public Service Commission (“PSC”) voted unanimously to increase the cap placed on the amount of solar energy being used to generate electricity for the Georgia Power transmission grid. The cap was increased from 500 kW to 2.5 MWs**

**LOWLIGHTS:**

- **Mismatch between solar resource potential and installation**
  - By 2010, total installed solar PV was less than 1MW (compared to NC which now claims about 3% of the US solar PV market share with 31MW installed in 2010)

- **GA is among a handful of SE states without a Renewable Energy Portfolio Standard (RPS)**
  - NC: 12.5% by 2015
SUSTAINABILITY – ENERGY PAYBACK

On-roof installation in Southern Europe
1700 kWh/m² yr irradiation on optimally-inclined modules

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<th>Technology</th>
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Poly-Si: hydropower
Wafer/cell/module: UCTE electricity
%: total area module efficiencies
EcoInvent 2.2 database
26 August 2011
mariska@smartgreenscans.nl