Solar Paint
A Hunter Based Solution to Clean Energy
Dr Ben Vaughan
"The amount of solar energy reaching the surface of the planet is so vast that in one year it is about twice as much as will ever be obtained from all of the Earth's non-
Solar Power

Thermal

Photovoltaic
Traditional Solar vs. Solar Paint

- 8-12% Typical Efficiency
- 20 Year lifetime

VS.

- 1-5% Typical Efficiency
- 1-5 Year lifetime

A clear winner... but perhaps
Solar Paint Cell Structure

The active layer is 1000 times thinner than...
Inner Workings of a Cell

- Photon Absorption
- Exciton Diffusion
- Exciton Dissociation
- Charge Transport
- Charge Collection

Anode

Donor (p-type) Material

Accepter (n-type) Material

Cathode

hv
How Research Cells are Made
Solar Paint is Water Based

Dissolved Polymer
Water and Surfactant

Stirring

Macroemulsion

Sonication

Miniemulsion
Large Area Solar Paint

Roll-to-roll (R2R) coating is:
• Fast: 1 to hundreds of metres a
• Low cost compared to batch proce
Our Pilot Scale Facility

- unwinder
- web guide
- corona treatment
- tacky roller
- slot die system
- gravure/flexo system
- ovens
- control panel
- rewinder
An OPV Module
How we make them
What is the Goal?

Stage 1: 1% Solar Paint Module
Stage 2: 3%, 1 Year Lifetime Solar Paint Module
Stage 3: 3%, 3 Year Lifetime Solar Paint Module
We've had some success already
Module Architecture

2.0 Watts

7.7 Volts

0.32 Amps
Cost Driven Design

- Efficiency (%)
- Lifetime (y)
- Initial System Cost ($/m²)

- LCOE ($/kWh)

- OPV (2%), OPV (3%), OPV (5%), Rooftop PV, Utility-scale PV, Solar Thermal, Wind, Biomass, Landfill gas, Nuclear, Coal, Natural gas.
Encapsulation
Making it last

$75

$5
A New Solar Business Model

VS.

• Locked in for 20 Years
• High up-front cost
• Relies on government
• Upgrades every 3 Years
• Low up-front cost
• Self-sustaining

Similar to a mobile phone contract
Potential First Markets

Greenhouses

Disaster Relief
In the next 3 years we could have a solar industry in the Hunter Valley producing recyclable solar modules that generate electricity cheaper than nuclear, gas or coal.

This is only the beginning.