Building Integrated Photovoltaic (BIPV)

Jan-Willem Tolkamp, International Account Manager BIPV

‘Solar power on buildings’ conference, 20th October 2010

see it. feel it
Index

1. From PV to BIPV
2. The BIPV product line
3. Solving the BIPV Puzzle
4. Case Studies
Solar Energy in buildings

- Steady
- Local
- Unlimited
- Decentralized
- Easy
- Clean
- Quiet
Why photovoltaic in building envelopes?

- Large unused surfaces on high rise buildings
- Unlimited power of the sun → need for green power
- Add new feature to facade and roofing material
  - **PROTECT** against climatic conditions - sun, wind, heat, rain
  - and **PRODUCE** electricity
- The potential is almost endless
THE BIPV PRODUCTLINE
## BIPV materials

<table>
<thead>
<tr>
<th></th>
<th>Custom Laminates</th>
<th>Thin Film Membranes</th>
<th>Optisol® glass/glass modules</th>
<th>Thin Film Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniform appearance</td>
<td>Uniform appearance</td>
<td>Architectural appearance</td>
<td>Uniform appearance</td>
<td></td>
</tr>
<tr>
<td>Custom sizes &amp; shapes</td>
<td>Standard sizes &amp; shapes</td>
<td>Custom sizes &amp; shapes</td>
<td>Standard sizes &amp; shapes</td>
<td></td>
</tr>
<tr>
<td>High visibility in facades</td>
<td>Limited visibility</td>
<td>High visibility in façades &amp; roofs</td>
<td>High visibility in façades &amp; roofs</td>
<td></td>
</tr>
<tr>
<td>Opaque or semi-transparent</td>
<td>Non-transparent</td>
<td>Light transmission flexible</td>
<td>Opaque or semi-transparent</td>
<td></td>
</tr>
</tbody>
</table>
Product Segment
Optisol® - Power Producing Glass

OPTISOL® – basic element

- Float glass
- PV-cells
- Low iron glass

OPTISOL® – insulating glass

- Float glass
- Thermo coating
- Argon gas
- Sealing
- Spacer
- Sealing

OPTISOL® basic element
Custom Laminates – Power Producing Panel

1. Front Glass
2. Solar Cells
3. Junction Box
4. EVA Foil
5. Back Foil
SOLVING THE BIPV PUZZLE
BIPV project phases

**Design / Feasibility Phase**
- **ACTOR**
  - Building Owner
  - Architect
- **SUPPORT**
  - Scheuten Solar
- **TASK**
  - General PV information
  - Benefits of PV
  - Managing BIPV expectations
  - Design & technical support
  - Managing BIPV expectations

**Tender / Planning Phase**
- **ACTOR**
  - Architect
  - Construction contractor
- **SUPPORT**
  - Scheuten Solar
- **TASK**
  - Design & technical support
  - Managing BIPV expectations

**Quotation / Contracting Phase**
- **ACTOR**
  - Construction contractor
  - Electrical contractor
- **SUPPORT**
  - Scheuten Solar
- **TASK**
  - Pricing
  - Module & system engineering
  - Manufacturing & delivery

**After Sales Phase**
- **ACTOR**
  - Electrical contractor
- **SUPPORT**
  - Scheuten Solar
- **TASK**
  - Monitoring & maintenance
Scheuten Solar Products:
- BIPV module production
- PV system engineering
- Monitoring, maintenance
4.1. Greenhouse - Netherlands

- Agricultural industry
- Cooling phase required during cultivation phase of orchids
- Supplier of screen system contacted Scheuten
- Using PV panels to cover and operate screens
- Weight and width restriction for PV module
4.1. Greenhouse - module

- Custom laminate glass – foil module
- 1600 x 206 mm
- 50Wp per module
- 6kg per module
- Return tab in the module
4.1. Greenhouse - summary

- 3,000 modules
- 100 kWp per 2.5 hectare greenhouse area
- integrated in screen storage box to allow easy unrolling of screens
- Power production exceeds daily system consumption
- excess electricity will be fed into grid
4.2. Public school - France

- 1st project with Optisol LS technology
- Agricultural school – new building compound with innovative and sustainable materials
- High level of attention by representatives of the department, city and the school
- Hesitation and skepticism towards BIPV especially from Bureau de Controle etc.
- Project and France specific testing (ATEX)
- Time pressure due to school opening in September 2009
4.2. Public school - modules

Glass - glass modules
- 6-2-6mm make-up
- 2402 923 mm
- 77 % cell coverage
- 250 Wp per module
- 77kg per module

Insulated glass modules
- 5-2-5 / 12 air / 55-2 make-up
- 2402 x 923 mm
- 77 % cell coverage
- 253 Wp per module
- 133kg per module
4.2. Public school - summary

- 334 glass/glass + 50 insulated modules
- Total 100 kWp
- Total 851 sqm
- Fitted into a wooden beam structure
- Module and system connection realized by façade and electrical contractor based on system design proposal of Scheuten Solar
- Short communication lines allowed delivery within 8 weeks
4.3. Hospital - Belgium

- Involvement during design phase
- Supporting architect on aesthetics as well as technical issues
- Module and system engineering
- Mounting detailing to allow system cable entering into the building
4.3. Hospital - modules

- Insulated module with Optisol - L
- 5-2-5 / 12 Argon / 55-2
- 1945 x 1148 mm
- Trapezoid module form
- 25 - 112Wp per module
- 40 – 75 % cell coverage
- 134kg per module
4.3. Hospital - summary

- 236 insulated modules
- Total 46 kWp
- Total 480 sqm
- Façade spreads over 4 floors
- Degrading cell coverage to have sun protection at façade top and vision area at bottom
- Semi-structural montage – vertically clamped with horizontal joint
4.4. Heron Tower London

- Involvement during design phase
- Supporting architect, Cladder and Electrical installer on aesthetics as well as technical issues.
- Module and system engineering
- Mounting detailing to allow system cable entering into the building
4.4. Heron Modules

- Large modules Optisol - L
- 8-2-8 mm
- 3475 x 1333 mm
- Screenprinted cells on back
- 230 Wp per module
- 38 % cell coverage
- 185 kg per module
4.4. Heron Tower - summary

- 667 modules, covering 6 elevator shafts
- Total 3050 sqm
- CO2 reduction 850 tons/year
- Façade spreads over 46 floors
- Aesthetics more important than output. High transparency and screenprint inside the shaft.
- Semi-structural mounting in prefabricated 3-module façade elements
Conclusion on solving the puzzle

- Complex BIPV projects run through the stages of design, engineering, production and mounting.
- Scheuten Solar can build on years of experience in the glass and solar industry.
- By managing expectations and advising how to integrate BIPV in challenging designs Scheuten Solar helps solving the BIPV puzzle.
- It takes patience and know-how to complete successful BIPV façade or roofing projects.
- But then the results are integrated solar systems which are aesthetic, safe, reliable and of course durable.
Thank you for your attention