

EUROPEAN ENERGY VENTURE FAIR 2005

Solarion GmbH



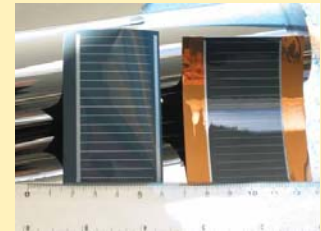
**The European Energy
Venture Fair 2005**

**September 27th 2005
Zurich, Switzerland**



Solarion's Business concept

- **Mass-production** of flexible Thin-Film Solar Cells (TFSC) on the basis of copper-indium-gallium-diselenide (CIGS).
- The flexibility is achieved by depositing the solar cell material on **polymer substrates** (polyimide).
- The growth of CIGS is accomplished by a **innovative ion-beam-process**.
- **Roll-to-roll production** technology is used for higher cost-reduction.
- Mass-production is based on **existing pilot production**.
- History:
 - 2000 - Formation
 - 2002 - Start of pilot production
 - 2003/04 - Process-optimization (up-scalable web-coaters)
 - 2005 - Device optimization (eff. 6.4%), small scale production turnover > 1M€ 04/05, products for ESA, Alcatel Space
 - IPR - 7 patents certified or pending



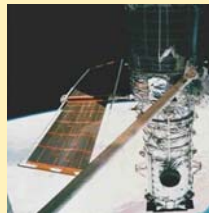
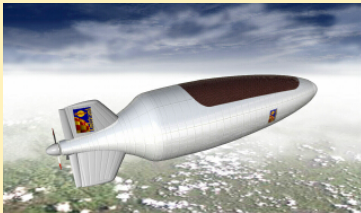
Flexible solar cells – what products are achievable?

- Advantages of flexible TFSC:
- ultra-thin (< 50 μm), light-weight (< 70 g/m^2)
 - rollable and unbreakable
 - high efficiency potential (19.8 % - glass, 13.4 % - PI)
 - high cost reduction potential (< 1 €/W)

➤ The question is not:

What can you do with flexible solar cells?
but
What can you **not** do with flexible solar cells?

Aerospace industry



Telecommunication



Automotive



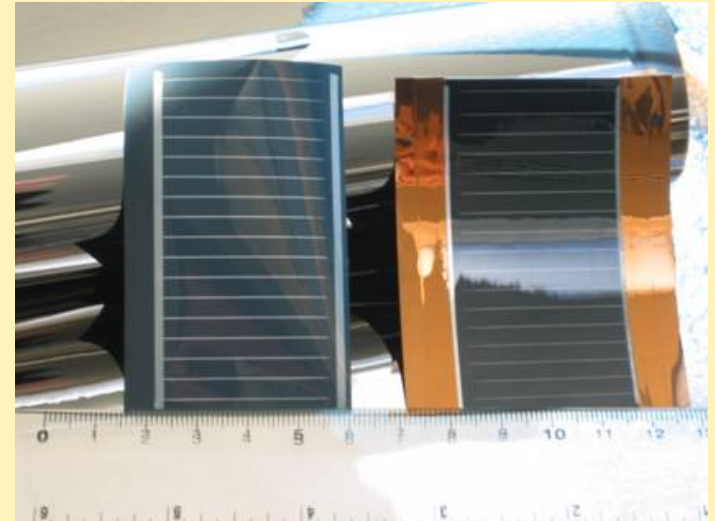
Textile



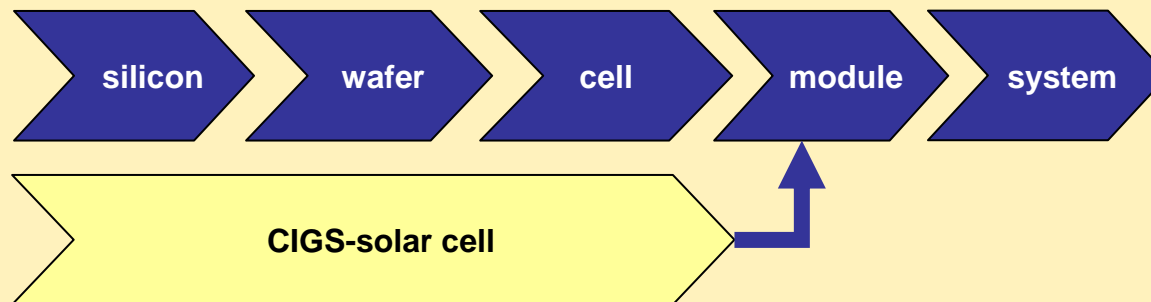
- But:
- development costs are high and specific for niche-markets
 - long time for market penetration

Business concept – mass production

- Concept: 2006/07 Preparation of mass-production,
II/2007 Mass-production of flexible TFSC,
capacity: 300.000 m², > 21 MW p.a.
- Product: competitive single TFSC (< 1€/W) as a
substitution to rigid silicon solar cells
- Advantage: cheap, flexible and adaptable size,
spin-off capability (synergy/ marketing),
additional applications for niche-markets



➤ Value Chain:





Target market – grid connected PV with high growth rate

➤ Situation:

Growing world-wide demand for renewable energy

PV: shortage of silicon results in overcapacities

near future: PV must be competitive to fossil electricity generation plants

➤ Market 2007:

Grid-connected PV-market with 20-30% yearly growth (volume: 50 Bill. €, 2020)

One high-price niche-market: space industry

Competitive product is sold to established module manufacturers

Cooperation with 1-3 manufacturers (negotiations are ongoing, long-time contracts)

➤ Additional Market 2008/2009 (financed by cash-flow):

Attractive niche-markets by own module manufacturing

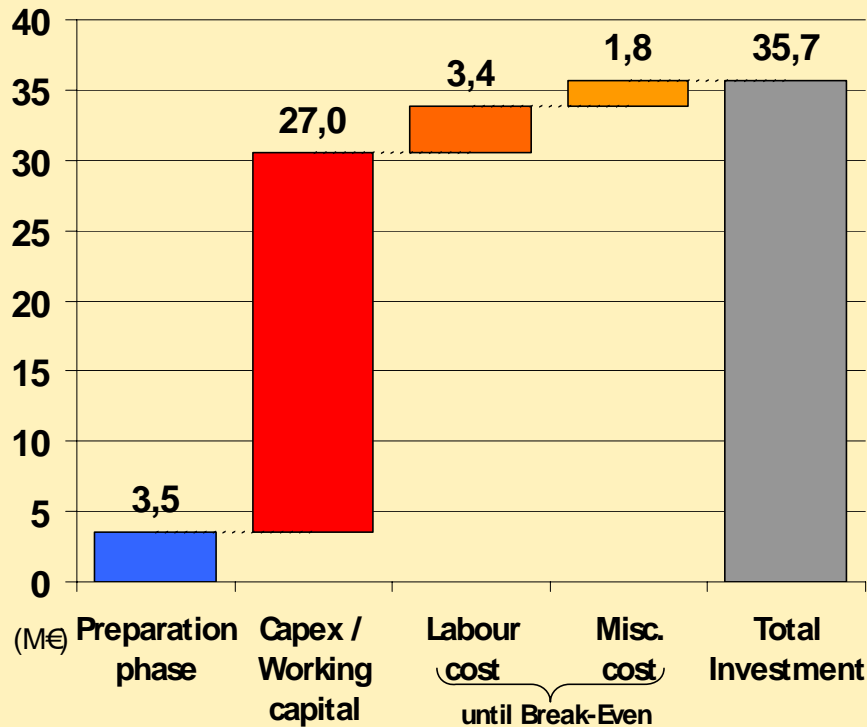
Additional growth by replication/ joint venture

➤ Approximately 2015:

Product is competitive with fossil electricity plants by using economies-of-scale

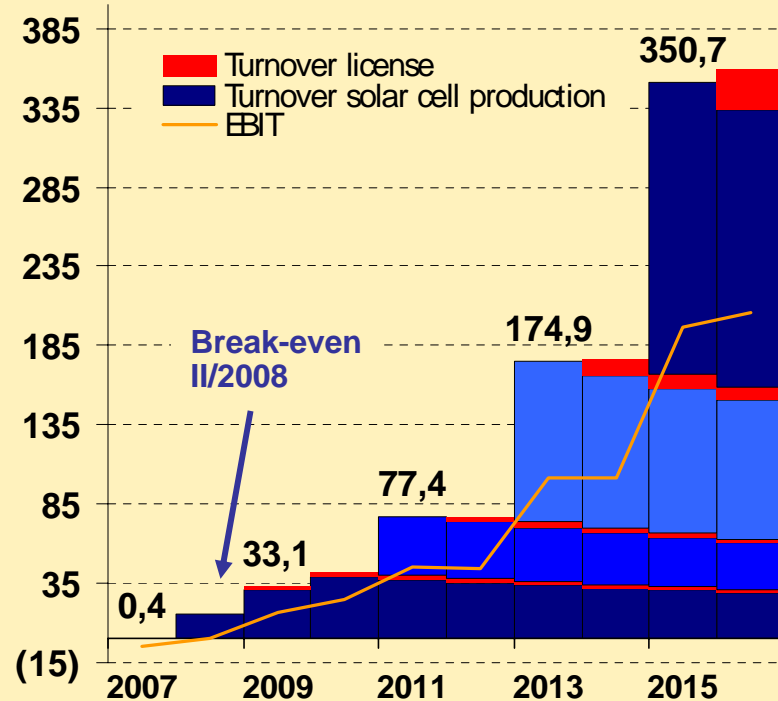
Business concept – key financials

Investment needs



Preparation phase needs to be financed by VC, Capex for mass production should be financed by debt and equity (e.g. 70/30)

... and investment results



Cash-flow from one production line will be sufficient to finance next production line (replica) after 3 years



The company Solarion – team of excellence

- Mass-production based on experience of pilot-production and know-how of key-employees
- Key management

Karsten Otte, PhD Technical manager, founder/ shareholder	Alexander Braun, PhD Development Manager	Axel Schindler, PhD Founder/shareholder
<ul style="list-style-type: none"> - in charge of the company's whole technical and operative field and organisation - long-time experience in the PV-industry/ negotiations/ international project management - inventor of 8 patents, author of 50 publications - prior to Solarion: project management at IOM in the PV-field 	<ul style="list-style-type: none"> - in charge of development projects - long-time experience in project management - inventor of several patents and author of numerous publications - prior to Solarion: development manager at the IOM 	<ul style="list-style-type: none"> - leading position at IOM - supports the company by technological advice - long-time experience and knowledge (30 years) in vacuum-based surface technologies and world-wide management projects - world-expert in the area of surface modification by using ion-beam and plasma technology

- number of employees:

Currently: 9 —————> **Preparation phase: 20** —————> **Mass-production: 130**

- Management will be extended by fulltime CFO and depending on growth status by COO; set-up of staff profit-sharing scheme
- Advisory council is almost complete: Prof. Rauschenbach (Development), Dr. Hentsch (Industry), tbc (Marketing)

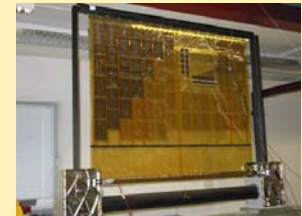
Business concept – Summary

- Fundraising round A: ca. 3 Mill. € (2001) for pilot-production;
current investors: INNVO and S-UBG
development costs so far: 6.5 Mill. €

- Fundraising round B: ca. 35.7 Mill. € for
I: preparation phase: 3.5 Mill. € (closing: IV/2005)
II: mass-production: 32.2 Mill. € (IV/2006)

- Fundraising round C: growth can be financed by own profit

- Three possible strategies:
 - a: get the profits: IRR of 30...60%
 - b: exit by IPO in 2008
 - c: trade-sale



Deployable solar-module



Flexible solar-module



20cm solar cell band

Support by network of partners



HTS



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