„ There's a way to do it better - find it …“ Thomas A. Edison

Start Up Project AM_0SolEC
- Pitch Deck -

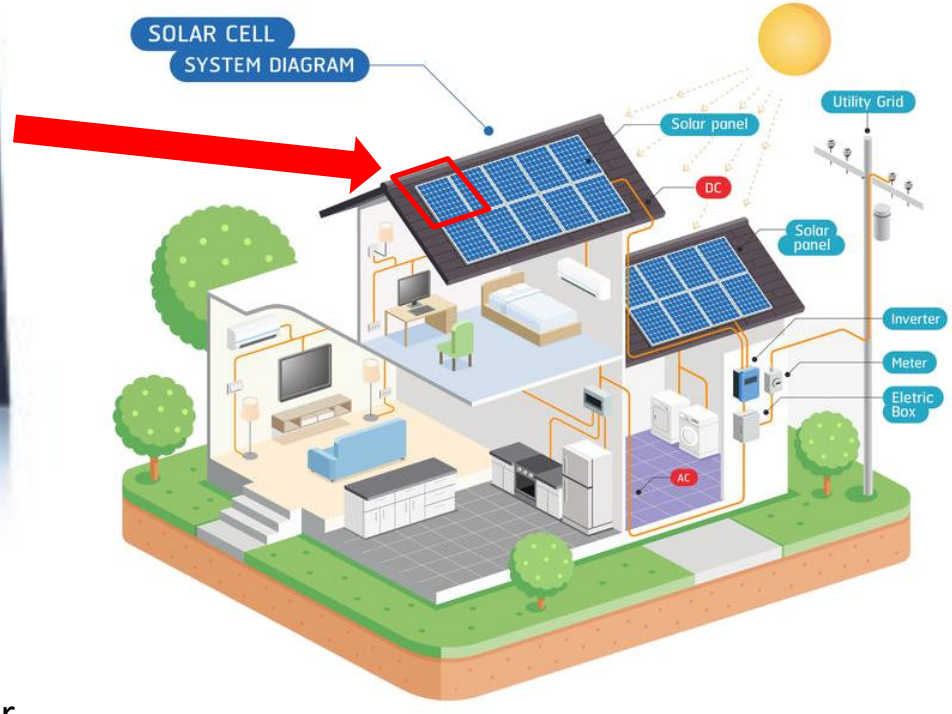
Development / Industrialization of
Prototype for PV Thin Film Modules
with Significantly Improved Properties

Customer’s Problem Statement

- Affordable, Stable Power Supply Round the Clock:
  - offered through competitive prices
  - ideally, combined - in descending order - with:
    1. consuming as less space as possible
    2. high energy yield under varying conditions
    3. storing excess power physically as well as virtually
    4. almost no green house gas emissions
    5. materials and components suitable for cradle-to-cradle product life cycles
    6. no negative environmental impact through emissions, pollution and / or waste

PV Module Types as part of a PV System

- Thin Film vs. Crystalline:
- e.g. PV Roof Top Inst.:



Thin Film:

AM_0SolEC

vs.

First Solar,
Heliatek Solar,
Solar Frontier

Crystalline:

Competitors only

☺ *replace Crystalline by* ***AM_0SolEC*** *Thin Film*

Market - Target Customers & Their Benefit

- Direct Customers are B2B:

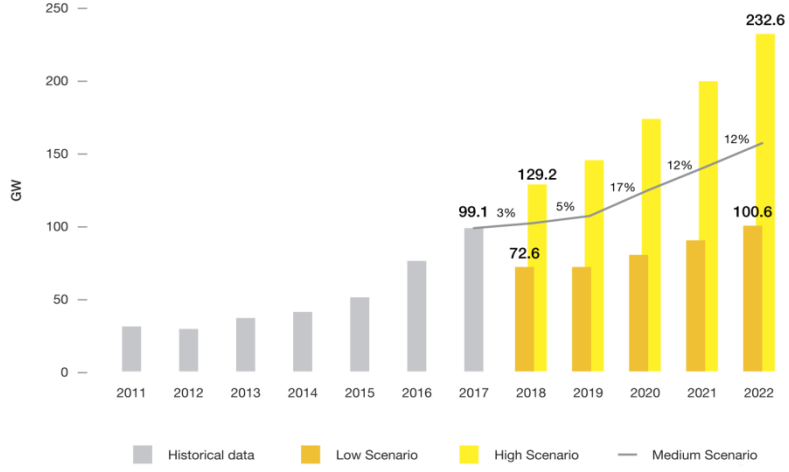
Project Developer	Gross Seller	Architecture Office	Mobility
Industrial Rooftop	Project Developer	Private Customer	Car / Aircraft
Solar Farm / Utility	Private Customer	BIPV **(*)**	Wearable Electr.

(*) Building **I**ntegrated **P**hoto**V**oltaics

- Customer Benefit:

Market - Size vs. AM_0SolEC's Positioning

- SPEA Outlook:



  - „low scenario“ outlook:
    - 4% market share PV thin film thereof AM_0SolEC shall own 8%
    - 17Mio € Europe / 24Mio € USA

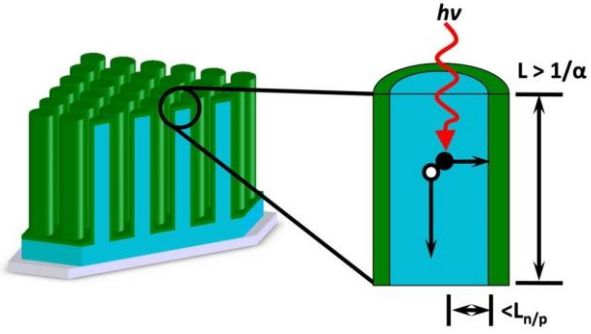
- Total Market Size:
  - “low scenario” assumpt.:
    - yearly growth rate ≈ 8,4%
    - average price 0,40€/W_p
    - from 29,1 Bn € to 40,2 Bn €
  - AM_0SolEC's place / niche:
    - premium segment positioning with target price of 0,83€/W_p
    - main segment conventional PV with diversification into BIPV

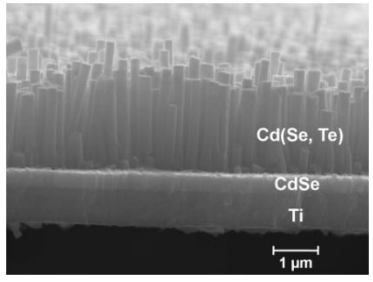
Market - The Competitor’s Success Factors

- PV Modules Based on Poly-Crystalline Cells:
  - (e.g.) PERC concept with efficiency ≤ 19%
  - low price strategy based on an appealing efficiency trade-off
- PV Modules Based on Mono-Crystalline Cells:
  - (e.g.) HIT / PERC + bifacial concept with efficiency ≤ 23%
  - mainly premium segment for best-in-class modules
- Thin Film Based PV Modules:
  - CdTe / CIS based with efficiency ≤ 17%
  - cost leadership combined with utility or roof top project biz

Market - AM_0SolEC's Disruptive Approach

- current Radial Solar Cell:

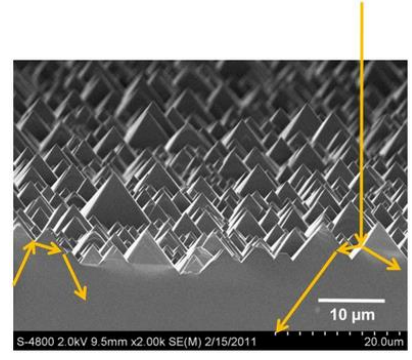




- growth regime / deposition with (e.g.) CVD is very costly
- very demanding process control

Disruptive Approach

- Innovative 3D Grating:
  - no etch or growth process
  - up to **27% module efficiency** possible



- maximizing path way of incident light into a solar cell vs. short diffusion length of free carriers

Market - AM_0SolEC's Competitive Position

- Aforementioned Innovative 3D Grating:
  - combinatory approach - protect claimed IP through patents:
    - modify one volume production proven manufacturing process being necessary to get the required semi-finished products
    - existing machines & components to be adapted to the 3D target process
- Thin Film Solar Cell Manufacturing:
  - 100% use of through volume production validated processes:
    - basically, no technical and financial transfer risk into mass production
    - near-term goal to achieve with commercially viable conditions ***> 30% efficiency***
    - *mid-term goal for ≈ 40% technologically achievable, but now hardly competitive*

Market - AM_0SolEC's Differentiation

- Platform Approach:
  - using that 3D grating approach as a platform for other business options
- Platform Business Options:
  1. Li⁺B: shorter charging cycle times
  2. ICs: high temperature electronic
  3. BIPV: optical integrability **(*)**
  4. Mobility: Cars, Aircraft, Wearable
  5. use in CPV and / or hybrid PV

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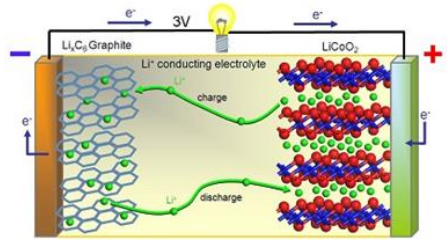

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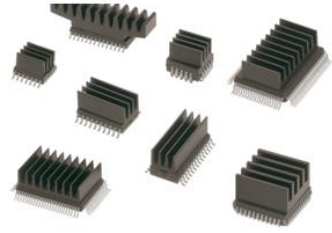

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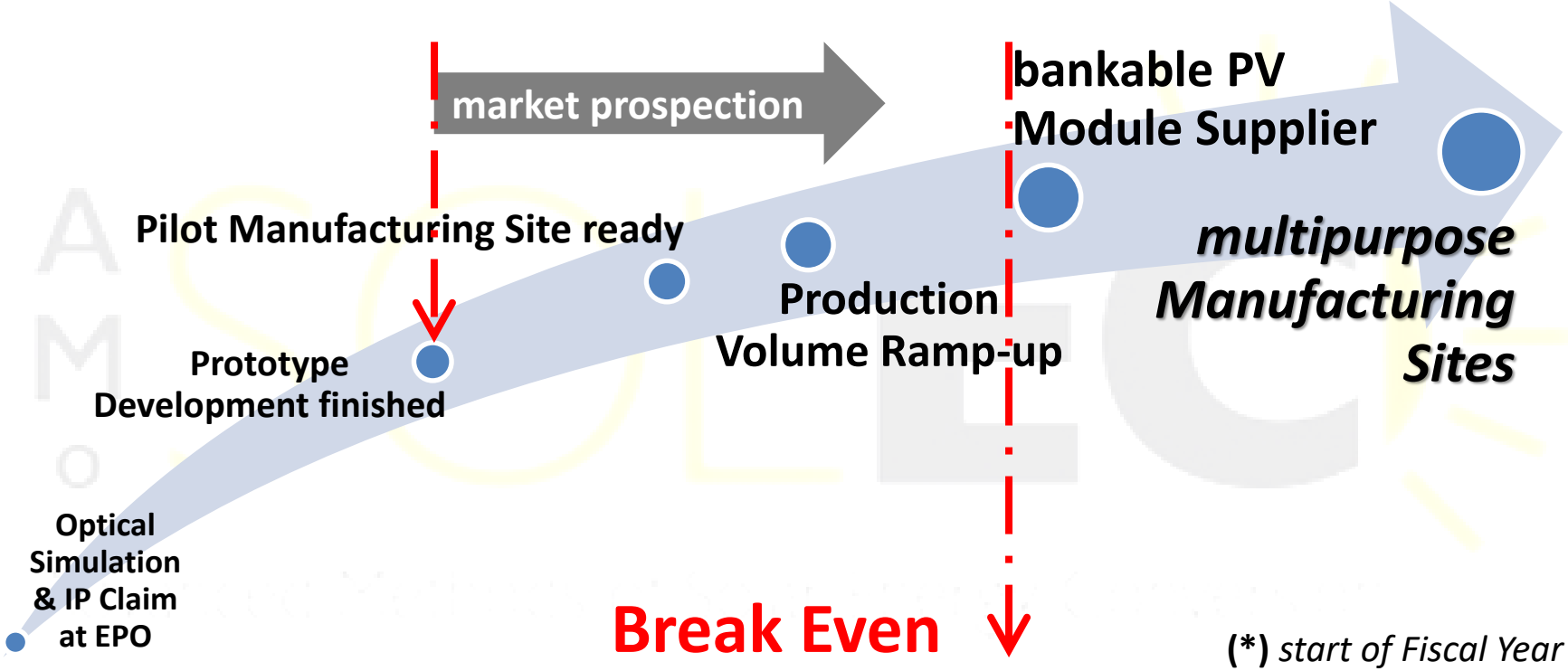
(*) *installable power in [GW] w/o facades in Germany, France, Italy, UK, Spain: 300 - 900, depending on transparency degree*

AM$_0$SolEC's Pathway to Success

- Roadmap from IP claim at EPO to > 100MW Capa.:



Financials - Medium Term Revenue Model

- B2B Customers Only:

Project Developer | Gross Seller | Architecture Office | Mobility

- Pricing Strategy vs. Market Entry Strategy:
  - assumption to go for penetration strategy first:
    - limited in time special offers being max. 10% below final target pricing corridor
    - incremental increase towards target price corridor within two fiscal years
  - however skimming strategy might be workable too
- Main Revenue Share with Key & Global Accounts

Financials - Long Term Revenue Models

- B2B as well as B2B2C Customers:

Project Developer	Gross Seller	Architecture Office	Smart Grid Operators
Private Households	Utilities	Car / Aircraft	Wearable Electronics

- Emphasis on:
  - customer centric services vs. pure hardware provider:
    - partnerships w/ project development EPCs & utility operators to offer PPAs etc.
    - block-chain based micro-PPAs for small to middle-sized roof top PV systems
- Main Revenue Share through Solutions

Financials - Gross Profit in [€]

highly confidential data

- Key & Critical Assumptions Regarding:
  - value based price corridor - see waterfall chart - ranging:
    - from
- Seed Capital for Prototype Development: 1.8 Mio€

Current potential Patent Portfolio

- snapshot for the first 3 out of up to 14 patents:

Team - Founder

- Theoretical Background:
  - German Dipl.-Ing. in semiconductor technology & micro-systems TU Dresden
  - part-time MBA at ESCP-EAP Paris / France
- Professional Experience since more than **22** Years:
  - 12 years in semiconductor frontend foundries or their context
  - 8 years at photovoltaic manufacturing sites or their context
  - 3 years as operations manager of a team comprising roughly 130 employees
  - consulting service for a 220MW integrated PV manufacturing site CEEG / Algeria
  - consulting service bulk chemistry storage facility OLED-TV site Samsung / Korea
  - roughly 5 years worked abroad
  - English & French fluent

Team - Two Vacancies ***not*** filled yet !!!

- Machine Construction Engineer:
  - know-how in editing & supervision SOW contents w/ OEMs:
    - ideally, combined w/ a business degree & operations management experience
- Controlling & Finance:
  - seasoned professional regarding cash-flow management
  - into-depth knowledge in project / contract based accounting

Thanks a Lot for Your Attention !!

Q&A

Prototype Development - Risk Assessment

- Risk Matrix regarding Prototype Development:
  - including:
    - prototype industrialization
    - entry into markets

probability of occurrence	very low	low	medium	high	very high
very likely				unfair competition	
quite likely		low purchase negotiation power	hiring skilled workforce might be complicated	organic photovoltaics	initially high CAPEX for capacity increase
possible			competitors take over at very early stage	prototype development costs higher than expect	low interest at risk capital provider side
quite unlikely			prototype development phase longer than exp.		low product acceptance in targeted markets
very unlikely				efficiency lower than theoretically calculated	

negative impact on / consequences for project