

NoGrid

a modular and green energy solution

29th, September 2016, Noordwijk

Solartechno Europe B.V.

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Our activities

Distribution



- Trading of PV modules
- Distribution of PV components to small and medium size installers
- Training of installers

Project management



- Turnkey Installation of medium size and large PV systems:
 - On grid
 - Off grid

Consulting



- Technical , market & economical consulting in the PV industry
- Business plans and evaluation of investment in photovoltaic systems
- Repetitive customers like McKinsey, Goldman Sachs BCG and large investors (Clearwater, Silver Lake)

Core Team



Marco Ghirardello: 49 years, Italian / Dutch Aerospace Engineer, full time MBA. Since 2002 in the solar industry starting as business developer manager at Shell Solar, later CEO of ENERRAY S.p.A., now owner of Solartechno Europe B.V.



Steven van Dooren: 28 years, Dutch, Business Development Manager for The Netherlands and international sales agents. Holds a BSc and a MSc in Business Economics.



Rocco Cifarelli: 33 year, Italian, Project Engineer. Started as an intern grew to Project Engineer, 2 years experience in Solar industry. Holds a BSc Environmental Engineering and a MSc Nuclear & Energy Engineering



Ina Speksnijder: 45 years, Dutch, Head of Administration. Former entrepreneur in yacht design and responsible for financial administration.

Examples

Year 2004: 5 kWp residential system



Year 2011: off grid water pumping system, Amsterdam



Year 2010: 1 MWp greenhouse near Milano, Italy



Our dream

Our dream is...

*making solar energy available for everyone,
everywhere, even in remote areas without a
grid-connection. No more polluting diesel
generators!*

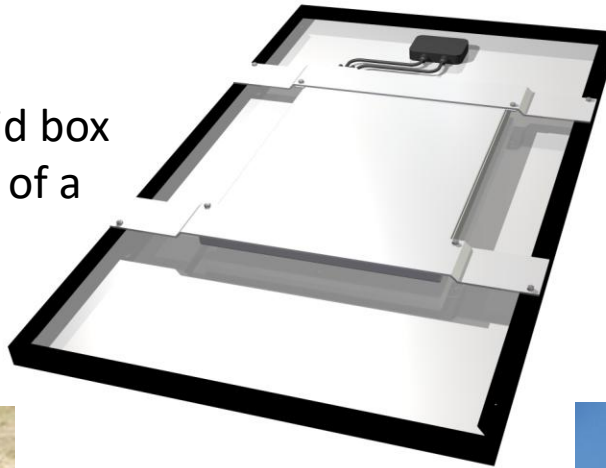
The opportunity

- Lithium battery technology is getting mature and cost is quickly going down. We expect a price reduction of more than 15% a year for the next five to seven years.
- Photovoltaic solar technology is now cost competitive against diesel generators
- Lower cost of storage and higher storage efficiency will enable a larger use of renewable energy lifting some of the constraints.
- Autonomous off grid system will be the fastest and more economical way to electrify under developed or not yet grid connected areas of the world.
- There will no more be the need to build a costly electrical infrastructure (we see the same in Africa with telephone landlines and mobile phone)

NoGrid Solar Generator: the idea

A modular Energy Storage and Energy Management System compatible with 90% of commercial PV modules .

Rendering of the NoGrid box mounted on the back of a solar panel



The product: NoGrid



- Plug & Play
- Modular system
- Maintenance free (no moving parts)
- 1 kWh of available storage capacity and 500 Watt of continuous power
- Long Product Life (10 years)
- Fits on the back of every solar panel
- In case of failure, the modular design will ensure a failure of 1 module instead of the whole system

On grid and Off grid photovoltaic systems

On grid PV system:

The photovoltaic generator is directly connected to the national grid

- Excess electricity generated by the PV system is send back to the net, and used somewhere else
- If the system provides insufficient electricity then the national grid can supplies the difference between demand and supply from the PV system

Off grid PV system:

There is no national grid on site

- Excess electricity generated by the PV system is send to the batteries
- If the system provides insufficient electricity then the battery supplies the difference between demand and supply

Stage of Development

Received three subsidy grants (ESA BiC, IDeeGO & MIT).

Developed & sold 14 prototypes to:

- Aruba - for beach lockers

- UAE - for water pumping and house airconditioning

- Guinea - for street lighting

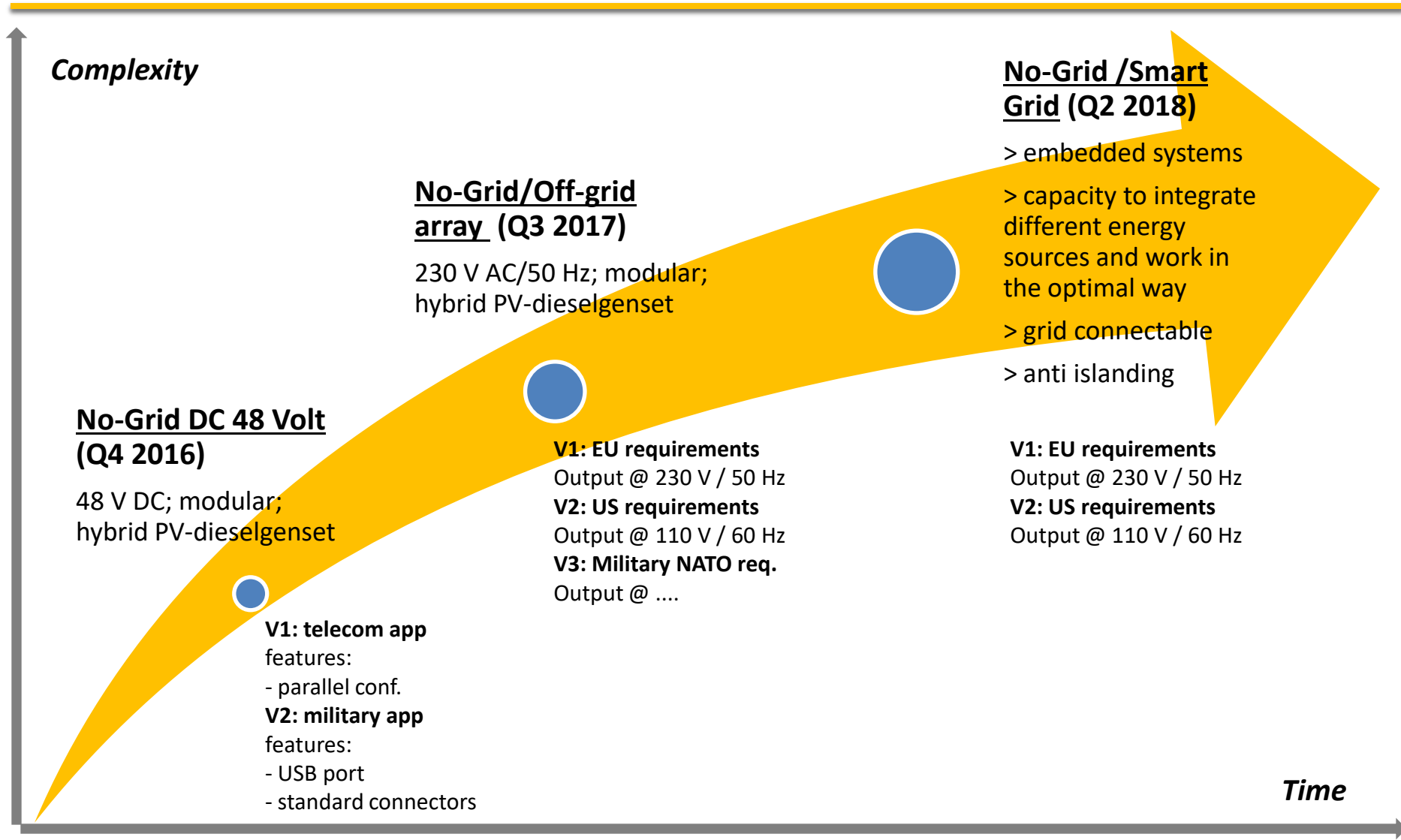
- Curacao - for residential house

Received letter of interest from:

- UN – for powering refugee camps with NoGrid in Kenya (60.000 refugees)

- Dutch Ministry of Defense – for initial test for powering remote military camps

Product time to market



Market Size

Initial markets:

Off grid systems

- Caribbean & Suriname
- Middle East
- Africa

Grid connected systems

- Europe
 - Netherlands
 - Italy
 - Germany
 - Etc.



Potential market size in the millions of customers and billions of €.

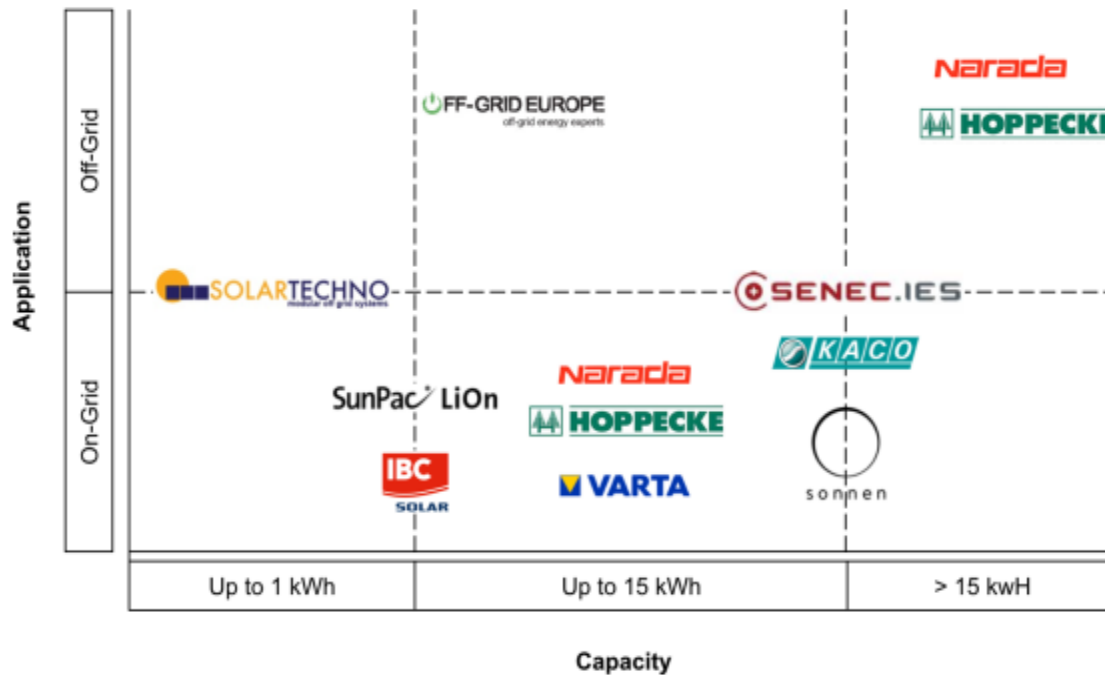
Business to Business (industrial application like powering telecom antennas, commercial and industrial roofs) and B2C (residential) clients as the market is still growing.

Competitive landscape and differentiation

Current competitors in the market:

Solartechno is unique in the modular design of the NoGrid

No competitors in the market segment below 1 kWh (for both off- & on-grid)



Customers in the European solar energy market can be segmented into four groups

A Short-term market entry strategy

B2B

Industrial



B2B

Ground Mounted



Commercial

B2B



Residential

B2C



The opportunity for the Real Estate in Europe

A trend present in Europe that the feed-in tariffs are being lowered by governments.

There will be in many countries a difference in pricing between purchased and self produced electricity.

This difference will become larger and larger because there is in some hours of the day an energy surplus due to too much supplied energy.

This will occur typically deep in the night and at midday.

The price difference will make it convenient to :

- install solar panels in combination with an electricity storage system
- retrofit already installed solar panels with a storage system

Some countries (for example Germany) are already incentivating the local storage of the locally produced electricity

Location	Main application (2013)	Irradiation kWh/m ² (annual avrg.)	Cumulative capacity of PV installations (2014)	Government support	Electricity price per kWh (2015)	Total Score (weighted)
		Subjective Factor (12.5%)	Subjective Factor (60%)	Subjective Factor (10%) (Pass = 1, Fail = 0)	Subjective Factor (15%)	= (application % *cum cap. + irradiation + gov. support + electricity price)
Spain	Commercial (7%); Residential (3%) Total 10%	1810	5,000 MWp	0	23.7 cts	0,277738969
Belgium	Commercial (18%); Residential (61%) Total 79%	1490	3,105 MWp	0	23.5 cts	0,301893162
France	Commercial (40%); Residential (22%) Total 62%	1450	6,000 MWp	0	16.8 cts	0,290163511
Italy	Commercial (22%); Residential (17%) Total 39%	1650	18,460 MWp	0	24.3 cts	0,432987029
Germany	Commercial (50%); Residential (15%) Total 65%	1160	38,000 MWp	1*	29.5 cts	0,955110497
UK	Commercial (30%); Residential (23%) Total 53%	1100	8,000 MWp	0	21.8 cts	0,308284836
The Netherlands	Commercial (26%); Residential (70%) Total 96%	1120	1,048 MWp	0	18.3 cts	0,210346579

Feed-in tariffs Germany (as of 2016)

PV installation size in kWp:

- <10 kWp: 12.31 cts
- >10 – 40: 11.97 cts
- >40 – 100: 10.71 cts
- Ground-mounted: up to 100 kWp: 8.53 cts

But: expected to fall in future due to degressive system

Electricity Price vs. FIT

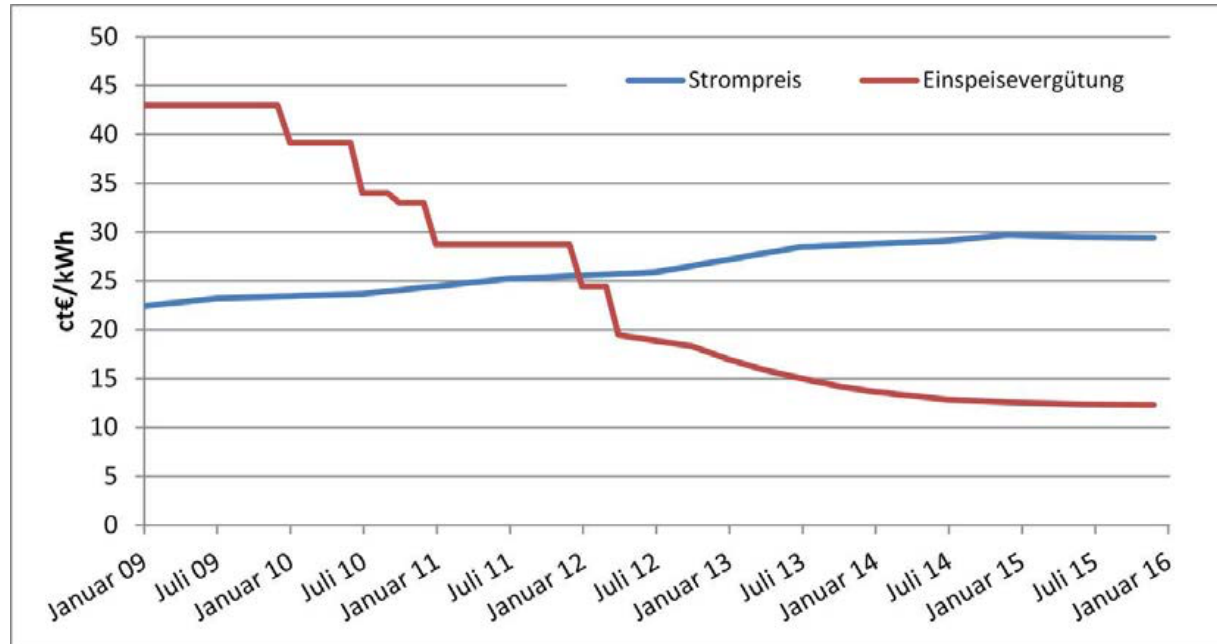


Abbildung 1-6: Entwicklung von EEG-Einspeisevergütung (Pv-Anlagen < 10 kWp) und durchschnittlichem Strompreis seit Januar 2009 ([22], [23], Abbildung ISEA)

Customers have two main rationales for using solar storage

A Short-term market entry strategy

Rational Motivation

- cost savings
 - $\text{Feed-in-tariff} < \text{domestic household electricity price}$
- phasing out of FIT (starting in 2021)
- potential auction spot market in future



Emotional Motivation

- green movement
- grid independence

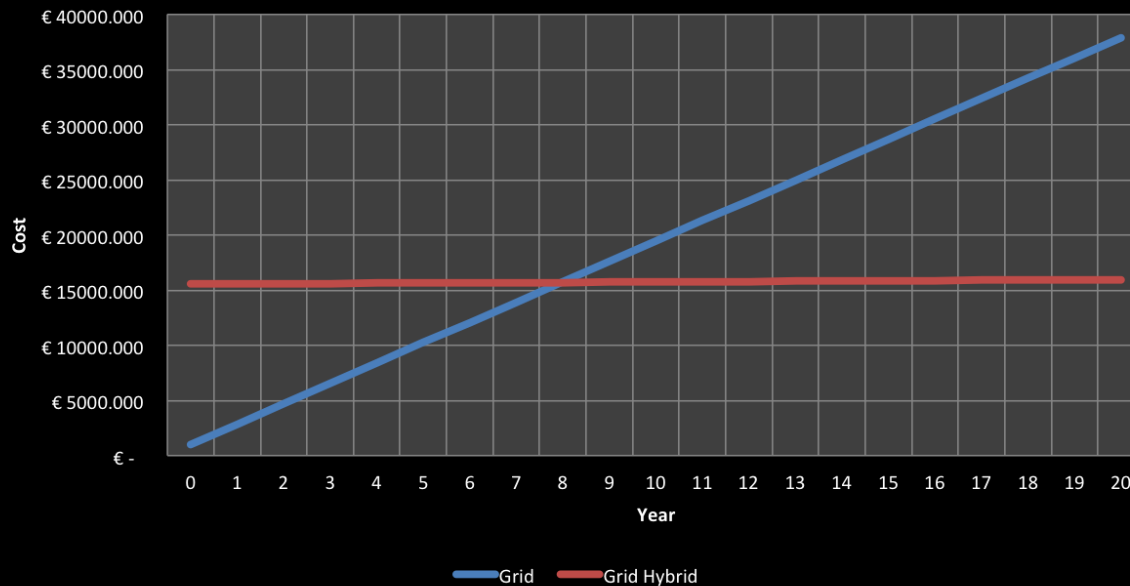
Example: Investment into NoGrid PV batteries breaks even after 8 years assuming no feed-in-tariffs

A Short-term market entry strategy

HIGH LEVEL CALCULATION

Business Case: Grid vs. Grid Hybrid Solution

RELIABLE GRID HYBRID



Assumptions

- **Private household** (residential segment, B2C)
- Installation of **10 batteries** to existing PV panels
- Purchasing price: **€ 510 / unit** (including € 90 subsidy)
- Other costs: **€ 600 / unit**
- **No feed-in-tariff**
- Inflation: **2%**

What Solartechno can offer to the Real Estate industry

Consulting activities

- Second opinion about the production of solar systems on your roofs (worldwide)
- Evaluation of offers from local suppliers
- Feasability studies (technical and economical evaluations with turnkey cost , ROI etc)
- Market info (prices of components, and of turnkey systems)
- Energy systems assesments and optimization

Turnkey systems

- Rooftop Turnkey systems with or without traditional energy storage systems
- From Q2/2017, turnkey system with NoGrid storage and remote monitoring

Sales

Sales: Participation in World Future Energy Summit
Abu Dhabi Jan 2016

Sales: Building sales network with agents in

Curaçao	(1 agent)
Aruba	(1 agent)
Suriname	(1 agent)
Africa (French speaking)	(1 agent)
Africa (English speaking)	(0 agent)
Italy	(4 agents)
The Netherlands	(4 agents + direct sales)

Sales pilot: in advanced agreements with Heijmans for a show case / demo system in
Amsterdam to be installed in March 2016

Sales: Follow-up meeting with Dutch ministry of defense.
Dec 10th, 14:00h at SBIC Noordwijk



Ministerie van Defensie