



Powering Human Ambition

Investor Deck – February 2021

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# Disclaimer



- ✓ This document summarizes the overview of Maana Electric SA, as a support for discussions with potential team members, partners, investors.
- ✓ The information shared in this document is proprietary and strictly confidential and should not be shared without prior consent in writing by Maana Electric SA.
- ✓ Strategies, plans and forecasts exposed hereafter may rapidly change, as market conditions and business opportunities may evolve in the future.

# Our Purpose, Powering Human Ambition in the Solar System



Step

1

2

3

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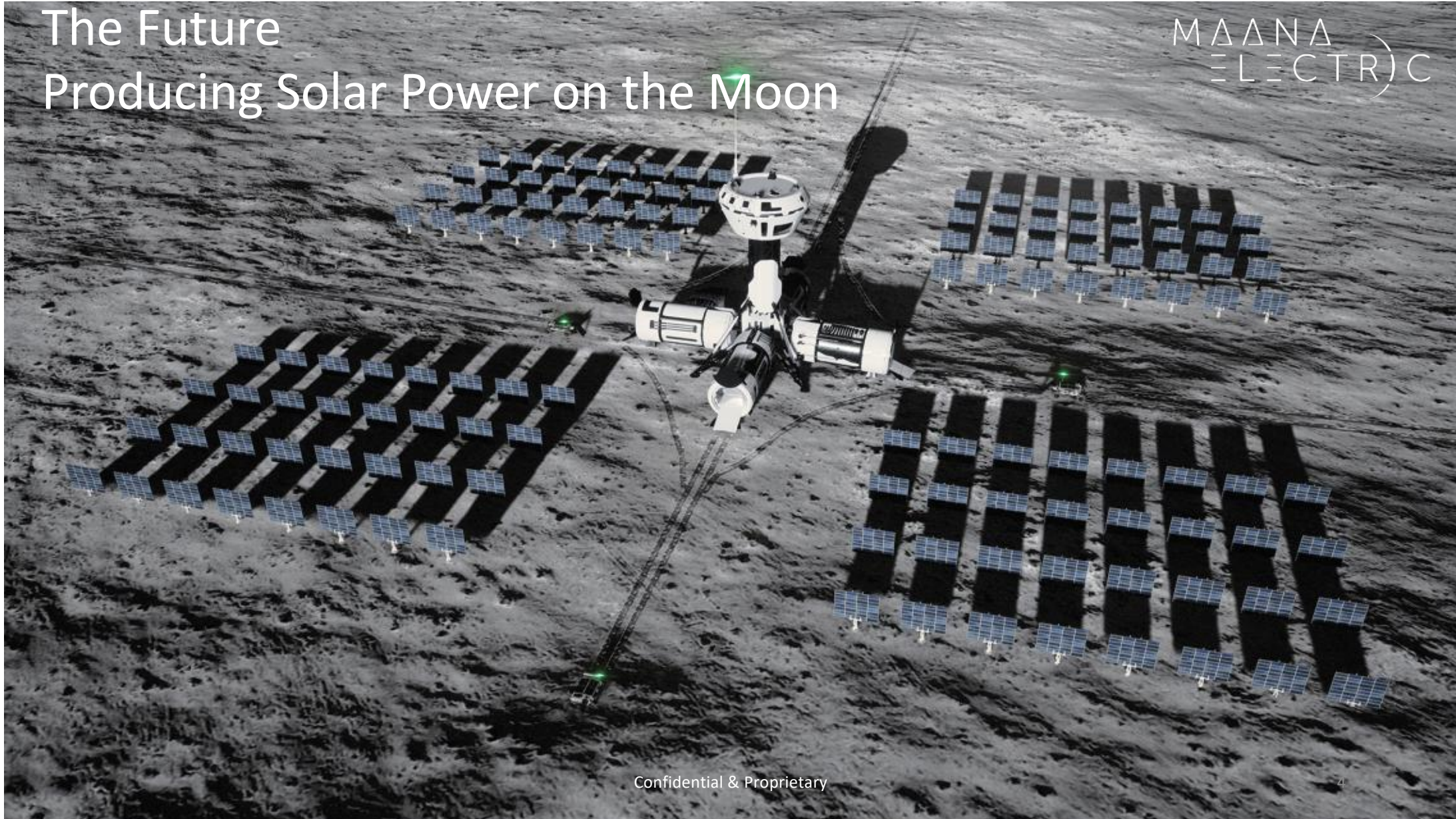
Build inexpensive solar capacity in deserts on Earth

Build solar capacity on the Moon

Build solar capacity on Mars and other celestial objects

# The Future Producing Solar Power on the Moon

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# The Present

## Turning Sand into Solar Panels on Earth

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# Solar Energy- Fighting Climate Change

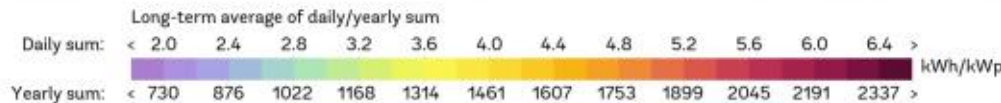
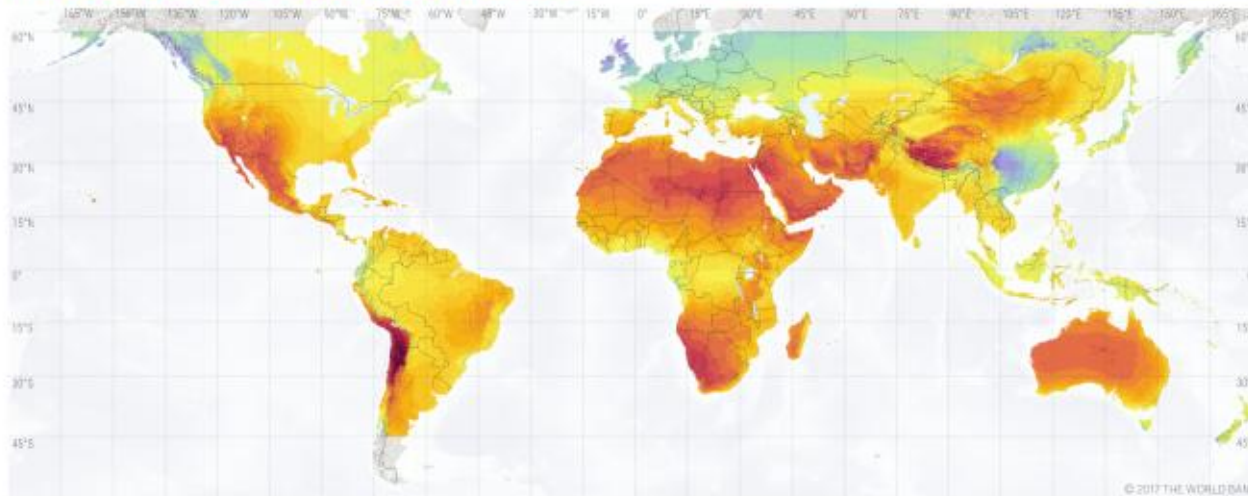


Even a **1 MW solar power plant** can cut down carbon emissions by almost **1000 tonnes per annum**, which is equivalent to planting about **5000 trees every year**.

# Yet, solar energy is underused



## SOLAR RESOURCE MAP PHOTOVOLTAIC POWER POTENTIAL



This map is published by the World Bank Group, funded by ESMAP, and prepared by Solargis. For more information and terms of use, please visit <http://globalsolaratlas.info>.

In 1h the sun gives the Earth the same amount of energy as that consumed by all of humanity in 1 year.

**Yet in some countries bathed by the sun, you see almost no solar panels.**



# Untapped abundance of desert land and sand



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# The Problem



## Price of Photovoltaics (PV)

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Strong focus on price with little product innovation means margins are tiny



## Emissions

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Greenhouse gasses are produced in todays PV supply chain

# Our Solution: The TerraBox



Automated & transportable production facilities which build solar panels - using only *in-situ* materials and electricity as inputs.



Electricity

Solar capacity produced per year: 10MW  
Expected lifetime: 10 years  
= **100MW PV capacity over lifetime**

# The Value Proposition



## Low cost

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10X less expensive than any current solar panel



## 100% Clean

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No CO2 emissions and no toxic material use from production process. (unheard of in today's industry)

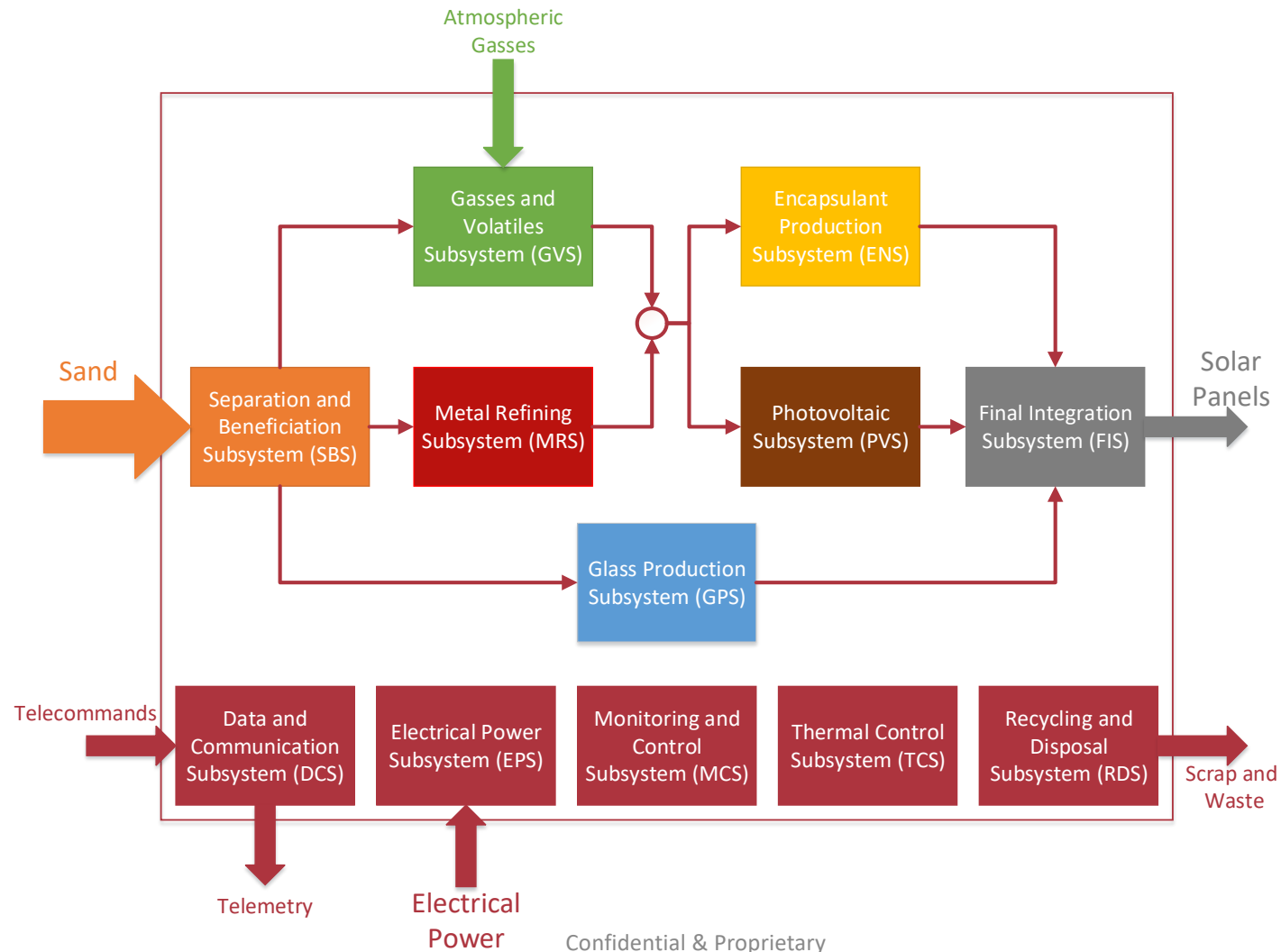


## Locally produced

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Maana produces panels locally at the installation site.

# Original System Architecture



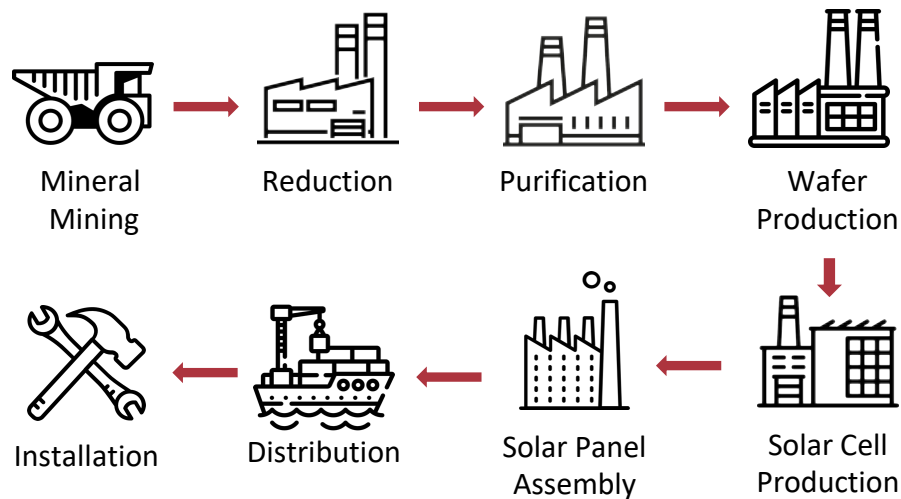


# Our Fast Track Supply Chain



Maana's cost savings over the traditional industry comes from using low value sands, our own electricity production and supply chains shortcuts.

## The Traditional Supply Chain\*

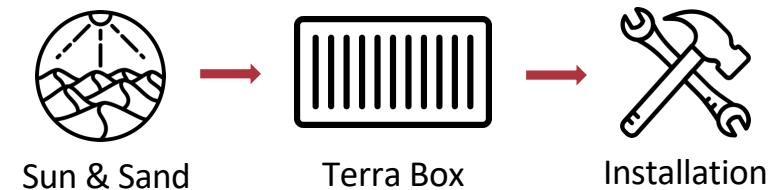


**Months to years**

**Process time**

**~1-2 days**

## Maana's New Supply Chain



Local production means Maana can circumvent tariffs which typically affect competition.

I.e. >70% tariff in USA, >50% in EU.

\* This is a simplified representation

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# Broader Impact

Economic impact	<ul style="list-style-type: none"> <li>Reduction of the PV solar energy cost, thanks to the much lower cost of the solar panel produced with TerraBox.</li> <li>Widening of potential installation sites for solar parks, due to the removal of logistic constraints existing nowadays (especially in remote desertic areas).</li> </ul>
Societal impact	<ul style="list-style-type: none"> <li>Foster renewables by reducing their prices.</li> <li>Wealth creation in depressed areas, also promoting the local employment.</li> <li>Reduction of the reliance on fossil fuels (and political conflicts related to oil reserves).</li> </ul>
Environmental impact	<ul style="list-style-type: none"> <li>Reduction of CO<sub>2</sub> emissions through the use of a green and never-failing source of energy.</li> <li>Reduction of the emissions related to the transport of conventional solar panels from the factory (usually in China) to the installation sites.</li> <li>Zero emissions during the whole process in TerraBox (except during the commissioning and first production period).</li> <li>Reduction and subsequent elimination of the reliance on carbon-based fuels.</li> </ul>



**Ensure access to affordable, reliable, sustainable and modern energy**



**Build resilient infrastructure, promote sustainable industrialisation and foster innovation**



**Ensure sustainable consumption and production patterns**



**Take urgent action to combat climate change and its impacts**

# Reduction of Greenhouse Gases (GHG) in gigatons per year

**By 2032 Maana will produce enough panels with its 1200 TerraBoxes to offset 860 Megatons of CO2 equivalent per year when compared to the US current energy mix.**

The reduction of GHG cannot be compared only to conventional solar panels, because this does not take into account the potential for additional reduction in GHG due to switching from non renewable to Maana Electric technology.

The comparison is best made to different real energy mixes of countries in which Maana Electric may operate.

**Maana's impact would be most significant in countries like South Africa and Australia where coal is dominant.**

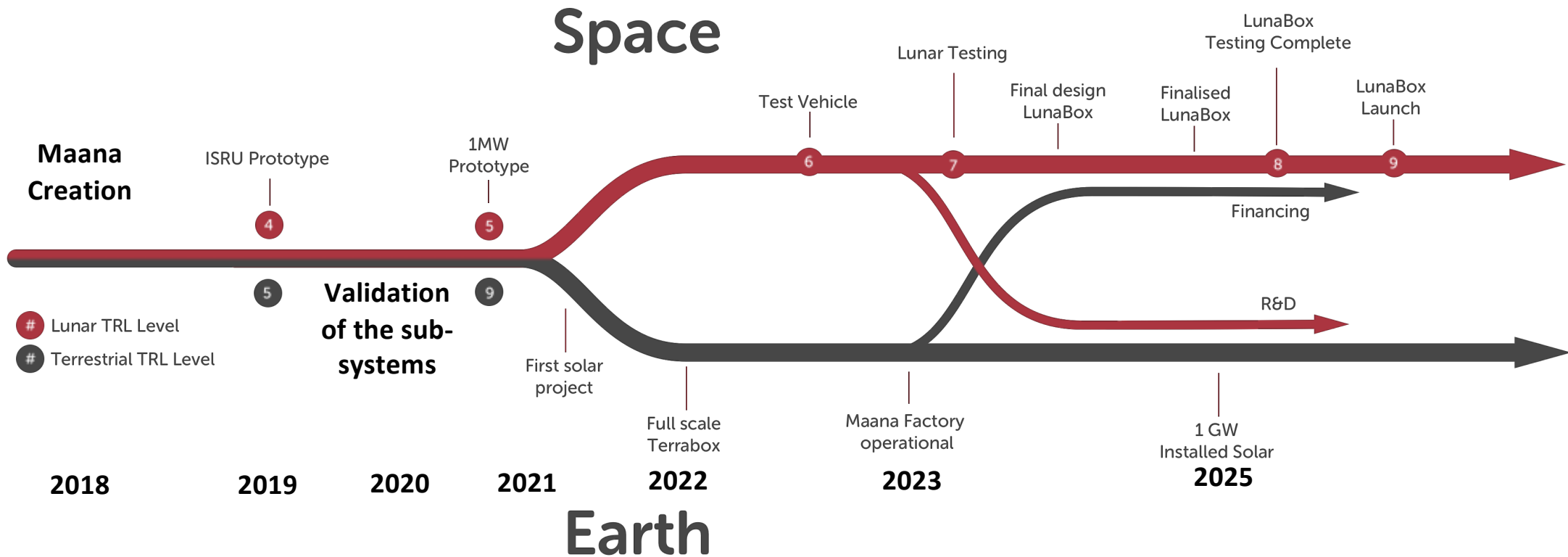
Values are  
above half a  
gigaton per  
year



**Reduction of Gigatons of CO2  
Equivalent (Maana compared  
to other energy mixes)**

Maana Electric	0,00
Solar	0,07
Spain	0,43
Luxembourg	0,54
EU	0,59
Egypt	0,79
Chile	0,84
US	0,86
Mexico	0,89
Israel	1,22
China	1,25
India	1,39
Australia	1,47
South Africa	1,62
Coal	1,75

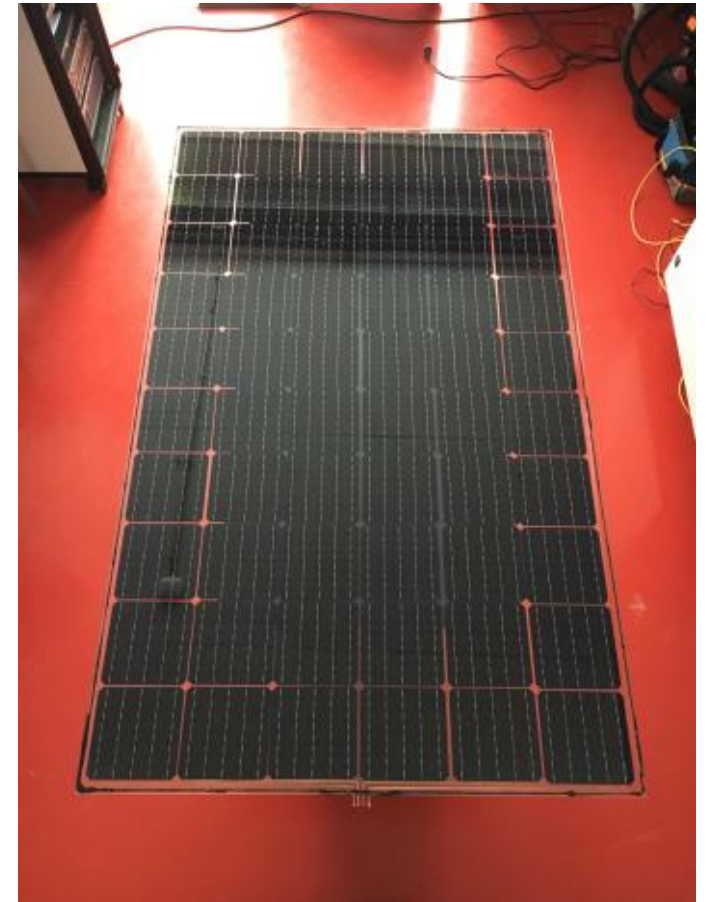
# Timeline





# State of Progress

- Glass production: working
- Silicon production: working
- Solar cells production: in progress (should be available shortly)
- Automatic assembling of the panels: working (see picture)



## IP & technology



Maana Electric does not pursue a patent strategy due to the geographic location of the majority of competition being in China. For this reason it does not share information about its technology without an NDA.

However, Maana has identified at least 10 technologies within its production process which could be patented. Mainly in the field of:

- Separation & Beneficiation
- Metals Refining
- Materials
- Photovoltaics manufacturing.
- Solar Panel integration

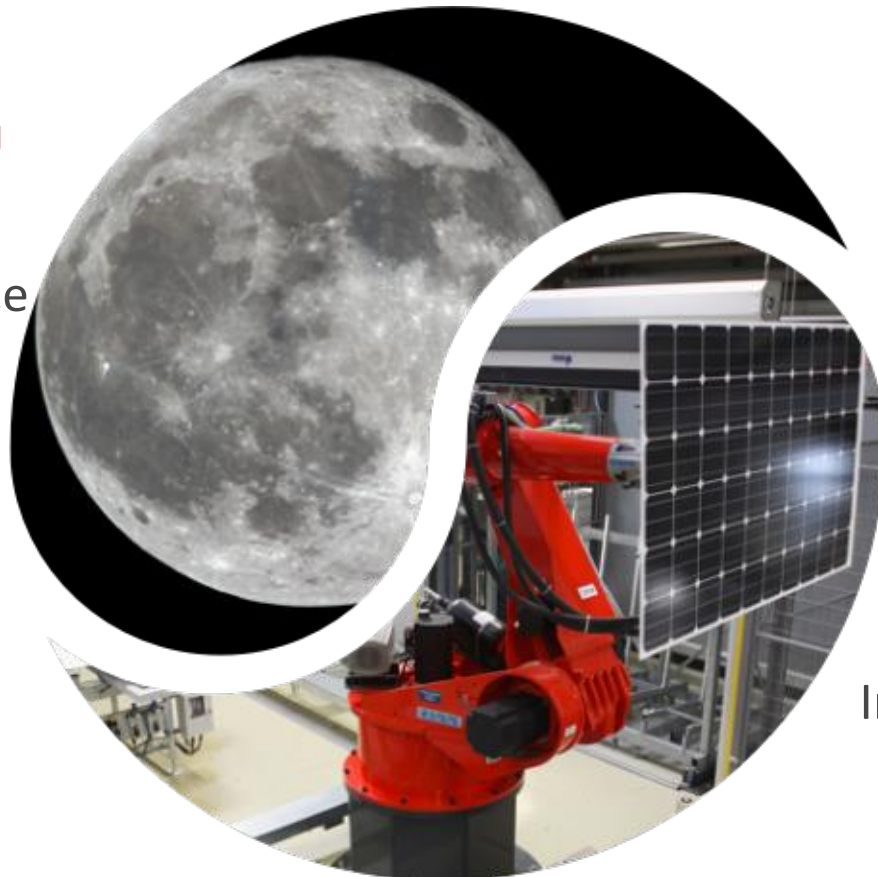
The ESA considers Maana's technology as highly promising for ISRU metal & oxygen production on the Moon, which has resulted in continued financial support.

# Competitive Advantage

Smart combination of proven space & Earth technologies to disrupt the solar panel production industry by significantly reducing costs and emitting no greenhouse gasses.

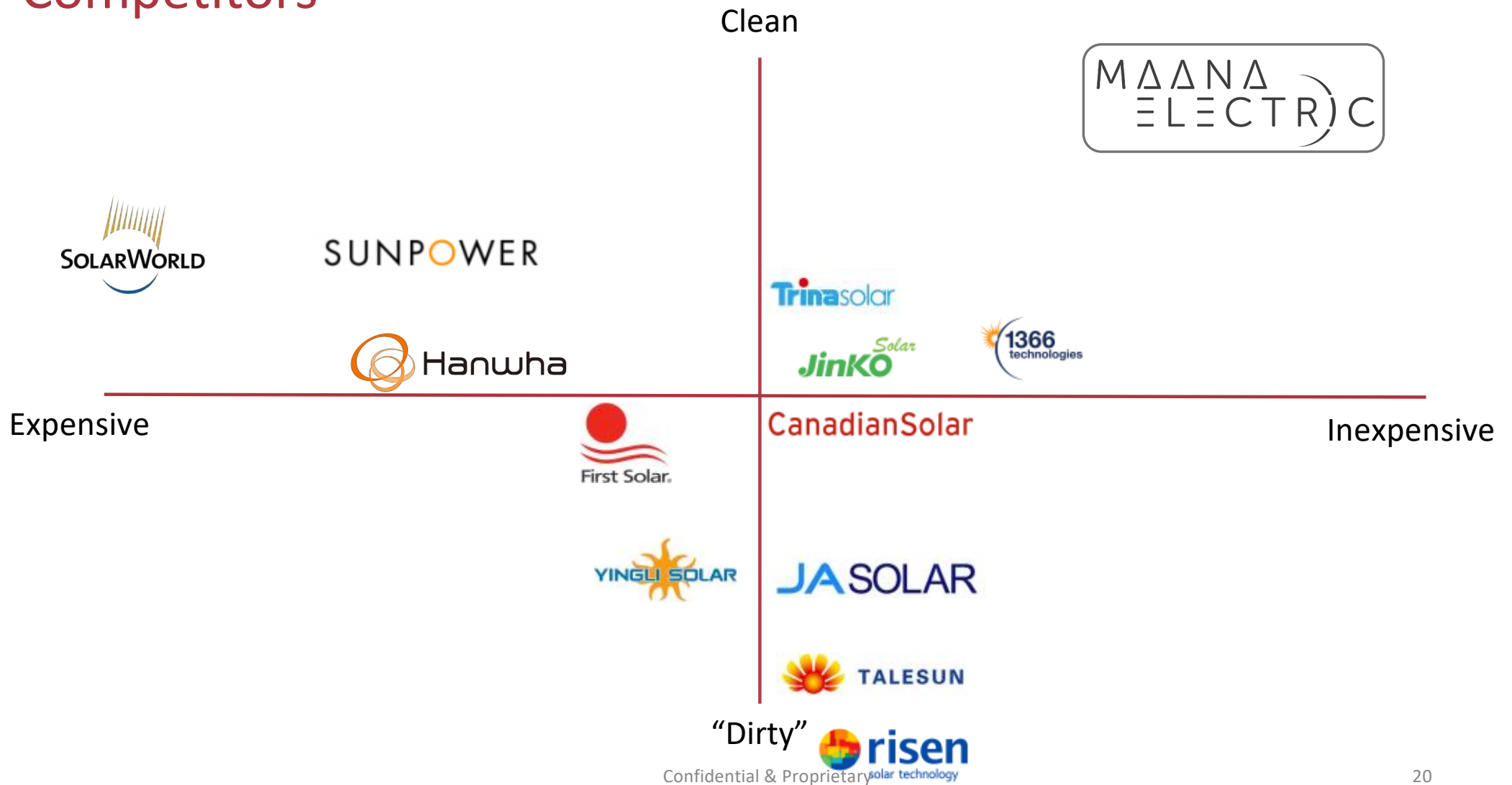
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Space ISRU  
Technologies  
Material Science



Earth Automated  
Industry 4.0 Processes

# Competitors



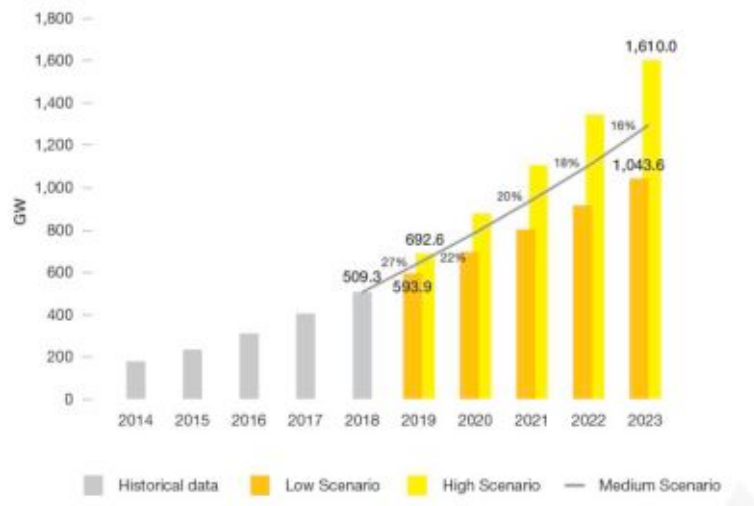


# Solar Market

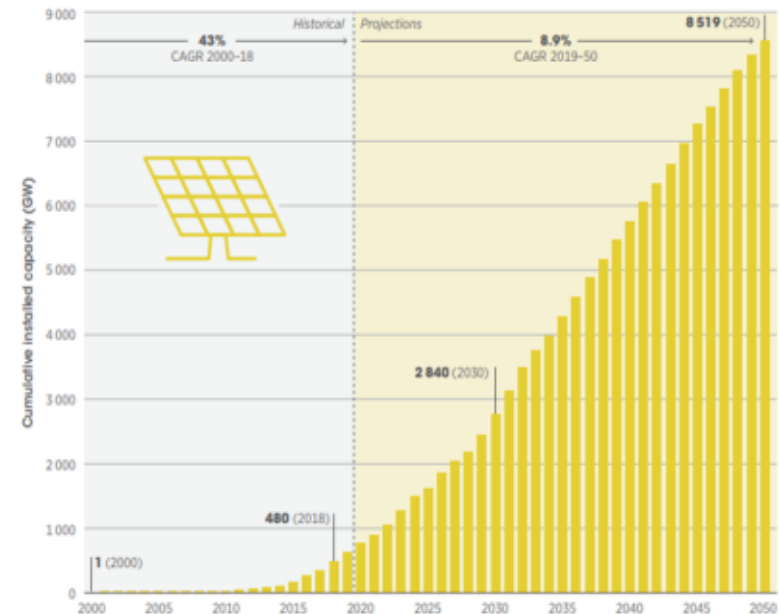


Under reasonable scenarios it is expected **600GW** of solar capacity added **every year**.

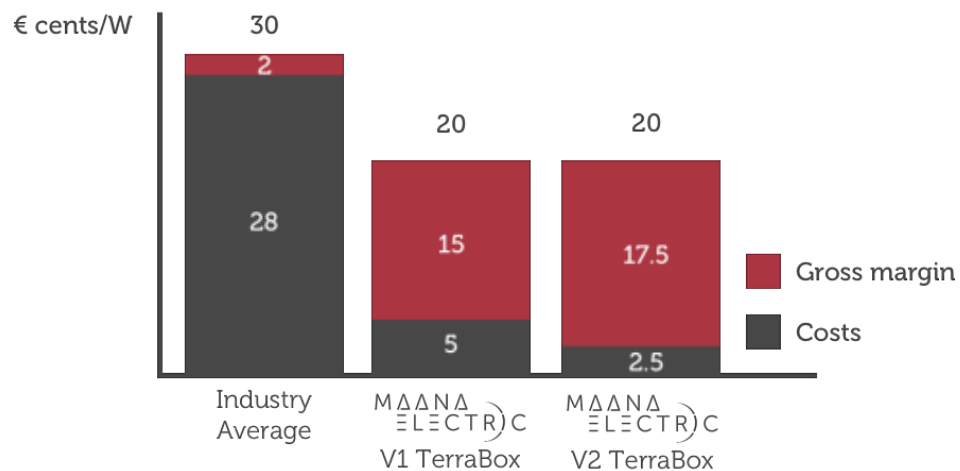
FIGURE 12 WORLD TOTAL SOLAR PV MARKET SCENARIOS 2019-2023



Cumulative capacity to reach globally  
**2,840 GW by 2030**  
**8,519 GW by 2050**



# Go-to-Market Strategy – Short Term



**Maana does not sell TerraBoxes. Maana sells solar panels.**

- Fixed price **20 cents per watt**
- **ARR €2M per TerraBox**
- €15M Profit per TerraBox over 10 years
- Prevents competition from copying tech
- Secures competitive advantage in the long run

# Go-to-Market Strategy – Medium & Long Terms



## Produce and commercialize other PV components

- Grid connections
- Structural components
- Electrical components

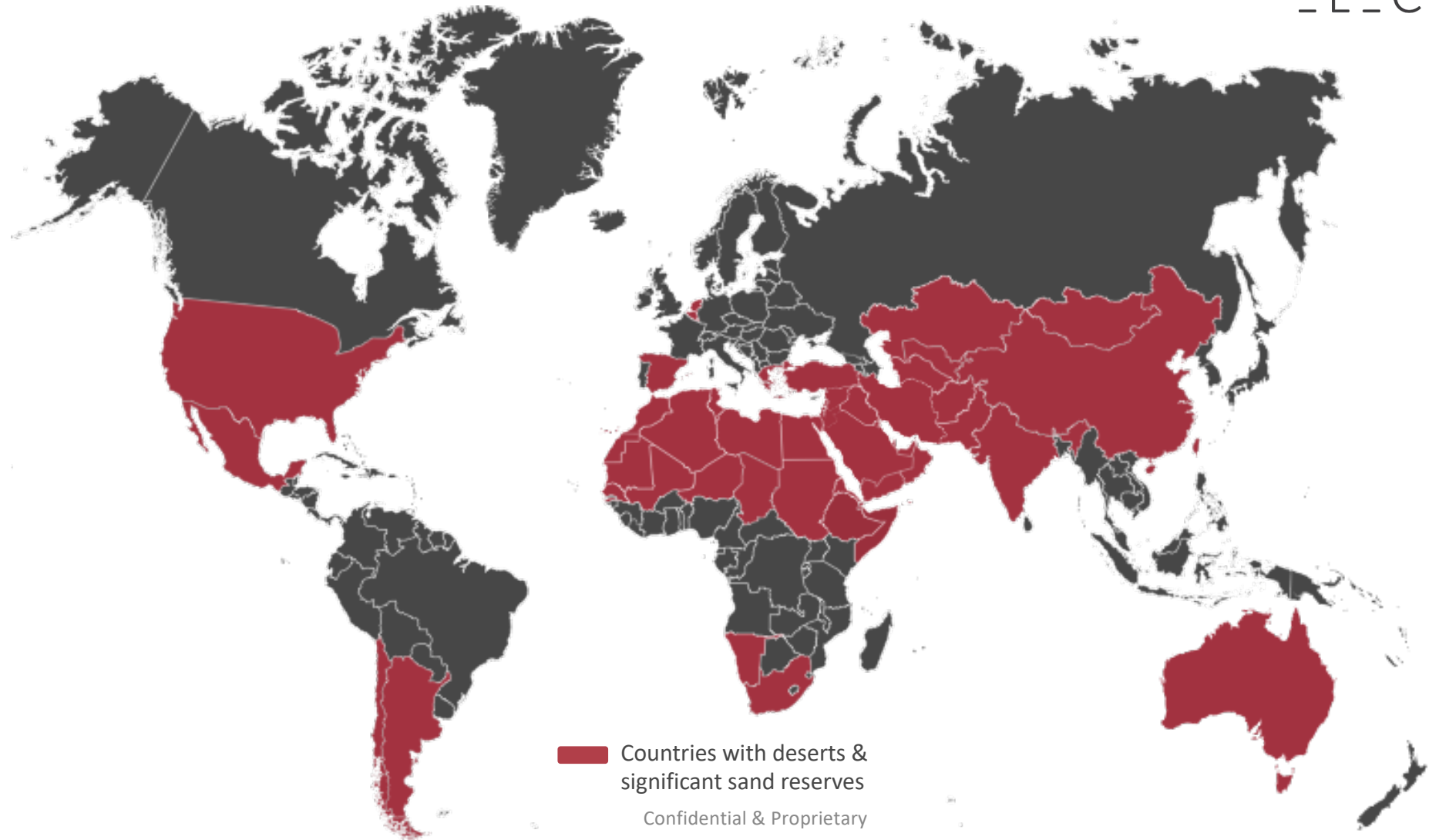
## Develop own large-scale PV Projects

- Recurring revenues by selling electricity
- Ensure fleet of TerraBoxes is always operating
- Reduce risks associated with sales cycle fluctuation



## Automate panel installation

# Potential Markets





# 1<sup>st</sup> Target Markets



## Middle East & North Africa

Focus on: UAE, Algeria, Egypt and Saudi Arabia.

Relatively small market with huge potential. Major growth expected in next 10 years.

- 4.2GW installed in 2019
- \$1 Trillion investment in Solar between 2019-2023
- >100GW expected installed PV by 2023

## Other Target Markets



### USA & Australia

- Focus on: Desert States
- Stable markets with high energy prices.
- Both solar markets expected to double by 2030
- Australia = 11GW under construction in 2019
- USA = 15GW installed in 2019
- US growth in PV installs steadily growing at >14% YoY

## Other Target Markets



### India

- Focus on: Rajasthan
- 10% of India is Desert
- India has strong focus on domestic manufacturing
- 190GW of installed Solar expected by 2030

# Achievements so far



## R&D Contracts & funding

### Space Industry contracts:



### Other grants & contracts:



**Total R&D Contracts:**  
**~€ 11 Million**

## Customer Development

### PV industry:



### Space industry:



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## Awards & Recognition



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# Organisation

- 100% founder owned.
- Headquartered in Luxembourg, LU.
- Subsidiary in Delft, NL.
- Close to **30** Employees.
- **€3M** revenues in 2020
- Profitable in 2020

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# New Facilities

- 2,000 sqm
- SISA Foetz

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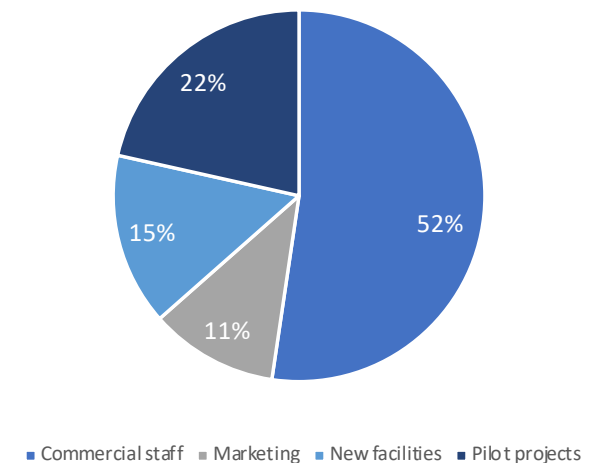
# Ask and Use of Funds



Thanks to our R&D contracts we have a cash runway till mid 2022. We are looking for **€1,000,000**, to develop the business

- Move to bigger facilities by May 2021 and prepare the industrialization
- Develop activities in Algeria to run our first pilot project
- Open a subsidiary in Dubai to run our second pilot project
- Develop awareness of Maana Electric in the US market and establish relationships with US Gov agencies and local operators
- Prepare a **€ 7.5 Million round in 2022**, to reinforce the capitalization of the company and to accelerate the company development, with EIB matching the equity investment via their venture debt instrument (leading to € 15 Million funding total in 2022)

Use of Funds



# Co-founding Team



**Joost van Oorschot**

**CEO**

MSc. Space Studies, BSc. Economics & Business Economics.

Founder of several software and space industry startups. Space industry VC experience.



**Fabrice Testa**

**CFO**

Master Business Management, MSc. Aerospace Engineering.

Serial entrepreneur. One of the companies scaled up to 200 people and €100 million revenues.



**Pablo Calla**

**CTO**

MSc. Space Studies, MEng. Electronics & Control systems.

Experience in sustainable power generation & satellite power control systems.



**Jean Jacques Favier**

**CSO**

PhD Engineering, PhD Metallurgy & Physics, >100 publications, Principal investigator on >15 space experiments.

Former Astronaut, held several director positions at CNES & CEA.



**Luca Celiento**

**COO**

MSc Space Studies, MSc Space Transportation Systems, MSc. Space Engineering.

Experience in business management, CFD, system engineering & microgravity experimentation.

80 years of cumulated  
experience among the  
founders

# An amazing team



7,000 days-man of R&D  
7 PhD's  
15 nationalities

2030

Power >10 million households  
&  
the first utility company on the Moon



# Will You Fly With Us?



Maana's co-founder, Jean-Jacques Favier, switching out experiments on Space Shuttle Mission STS-78.



Feel free to reach out to:

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P.S. In case you were wondering, our name comes from the word "mana", which means "power" in Hawaiian and "Maan" which means "Moon" in Dutch. Maana reflects the founders dream of powering the world and eventually the Moon using its technologies.

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