Hevel Group: HJT cells for innovative applications

2019

Hevel at a glance

250

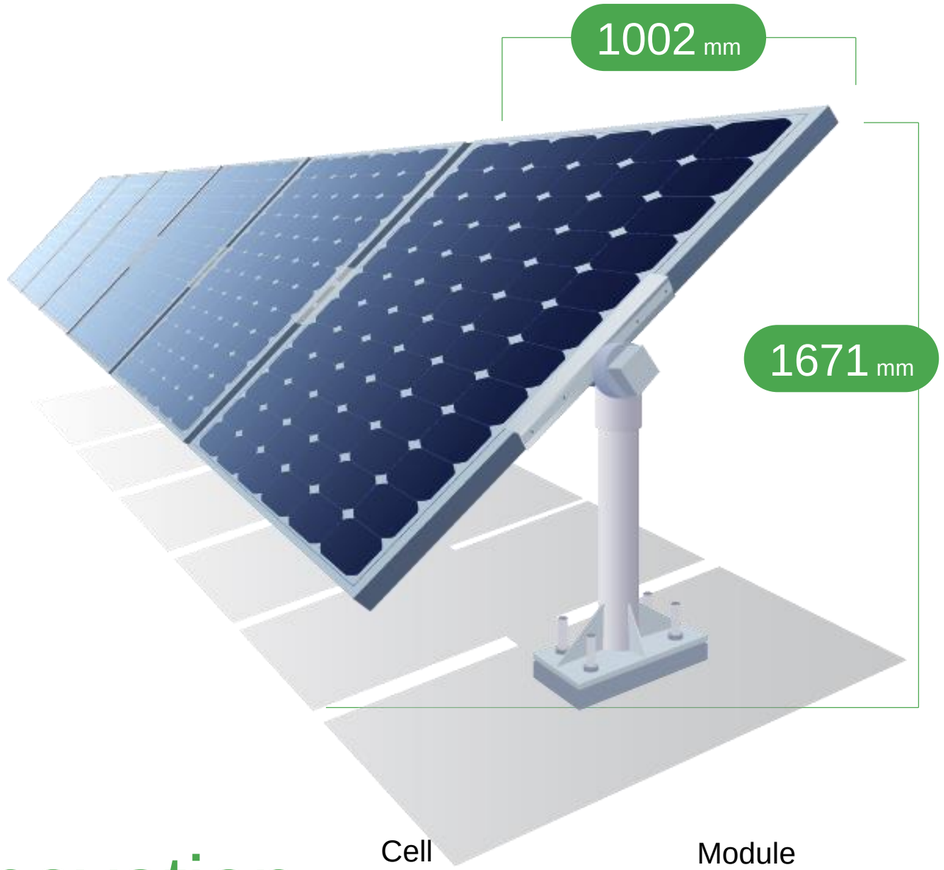
MW/year

- PV cells production
- PV module supply

SPP's pipeline

Russia **1 GW**

Overseas **70 MW**



Hybrid and micro-generation

Export

- PV cells and modules
- EPC (+F)
- Innovative solutions: microgrid + off-grid
- IPP

HJT PV module power

315 Wp

320 Wp

SPP
by the end of 2019

588 MW

Innovation technology

Cell efficiency

23,1%

Module weight

19 KG

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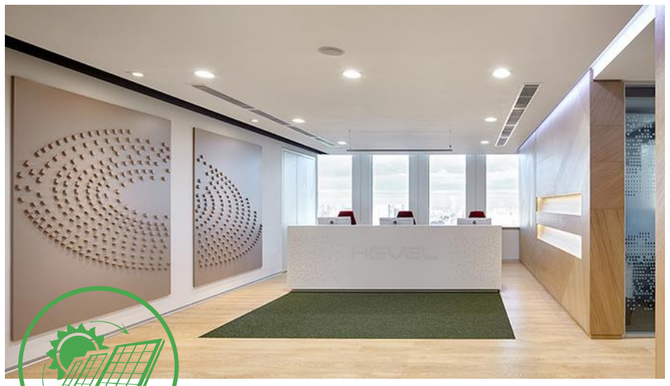
Hevel Group: Operations

PRODUCTION FACILITY

Location: Novocheboksarsk

250 MW per year

- Heterojunction solar cells.
- Heterojunction solar modules.



HEADQUARTERS AND ENGINEERING AND GENERATION UNIT

Location: Moscow

- Engineering and construction of on- and off-grid solar power plants of any capacity.
- Operation and Maintenance of solar power plants.

RESEARCH AND DEVELOPMENT CENTRE

Location: Saint Petersburg

- Development of technological advantages and its implementation into production.
- Solar cell efficiency increase.
- Production cost reduction.
- Product line extension (e.g. flexible cells) and PV applications for different industries.

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Hevel Group is the leading company in the renewable sector of Russia

Regions of presence

Regions with implemented infrastructural projects

HEVEL GROUP is the biggest vertically integrated company in the field of solar energy in Russia.
The main target is to make Russian energy market more “green”, environmentally friendly and attractive for investors and green bonds

IN RUSSIA

1 GW
Pipeline till 2022

588 MW
by the end of 2019

40 MW
Pipeline off-grid hybrid solar systems till 2022

IN THE WORLD

70 MW
Committed project pipeline in Kazakhstan

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Hevel - Environmentally Friendly Company

✓ **FULL-CYCLE VERTICAL INTEGRATED COMPANY**

Significant experience in EPC and IPP in Russia

Own R&D: continuous improvement of unique high-efficient PV technology incl. cost reduction plan

Own cell and module production facility: cost reduction plan in progress

Competitive LCOE

✓ **INNOVATIVE AND ENVIRONMENTLY FRIENDLY SOLUTIONS**

- ✓ Low CO_2 footprint.
- ✓ Saving water consumption
- ✓ Saving electricity
- ✓ Saving fuel
- ✓ Saving money for end-users

INTERNATIONAL CERTIFICATION

✓ **TÜV certified**

Hevel HJT PV modules certified by IEC 61215: 2005, IEC 61730-1:2004+A1+A2, IEC 61730-2:2004 standards

✓ **Certification for local foreign markets**

Ready to certify HJT modules and cells for local foreign markets

RUSSIAN CERTIFICATION

- ✓ **Technical regulation of Customs Union** (TRCU 004/2011)
- ✓ **Green and nano- standards:** NANOSERTIFICA and GREEN NANOINDUSTRY
- ✓ **Quality management system** ISO 9001:2015
- ✓ **Environmental management system** ISO 14001:2016
- ✓ **Health and Safety management system** OHSAS 18001:2007

TÜVRheinland®

ISO International Organization for Standardization

EAC

Российская Нанотехнологическая Продукция

Листок жизни Экомаркировка

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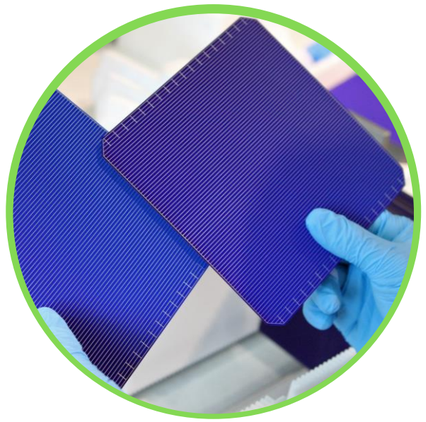
Hevel Group is prepared to offer a wide range of products and solutions

SALES

Hevel Group is ready to supply **highly efficient PV products** based on the heterojunction technology (**HJT**).



HJT CELLS

Power **– 5,62 Wp**
Efficiency **– 23,1 %**

HJT MODULES

Power **– 315-320 Wp**
Efficiency **– 19,1 %**

Hevel Group *has successfully completed shipments of its PV products to such countries as*:

Thailand *Poland* *Switzerland*

Austria *Germany* *Italy*

PROJECT IMPLEMENTATION

Hevel Group is prepared to offer a **wide range of PV solutions** based on an **EPC / IPP model**.

ON-GRID UTILITY SCALE SPP

A complex “turnkey” solution: from engineering to commissioning.

Recent reference:
Funtovo SPP, 60 MW

ROOFTOP PV SYSTEM

Rooftop solution is a perfect response to high energy bills and black-outs.

Recent reference:
Rooftop system for oil & gas company, 250 kW

HYBRID GENERATION UNIT

Hybrid solutions allow to save up to 30% of fuel consumed annually at isolated sites.

Recent reference:
Hybrid system for a mining company, 1 MW

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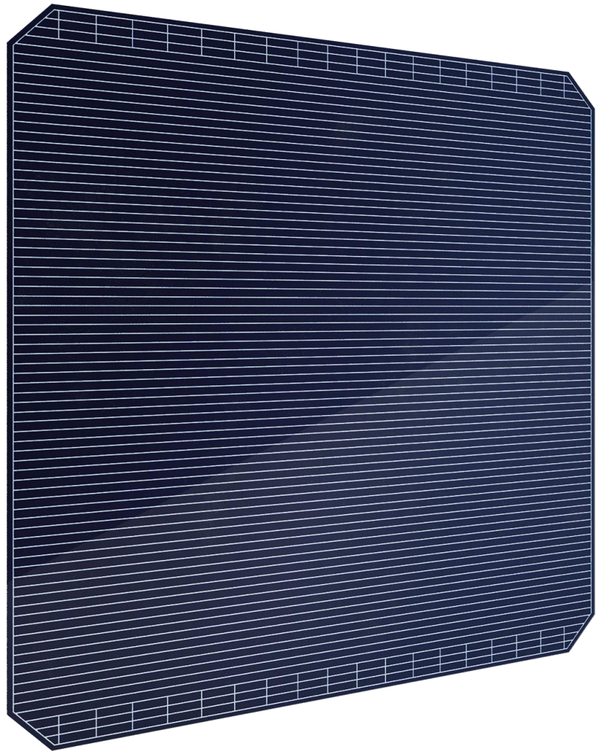
Hevel Heterojunction Cells

Bifacial N-type HJT solar cell



Produced in Russia

ISO 9001:2015ISO 14001:2015 certified

OUTSTANDING CELL EFFICIENCY RATE

23.1 %

vs. ~ 17-21 % for mass market solar cells

LOW TEMPERATURE COEFFICIENT

-0.31 %/ºC

vs. from -0,37 to - 0,45 % / ºC for mass market solar cells

BIFACIALITY FACTOR

93 %

vs .~ 75 % for mass market solar cells

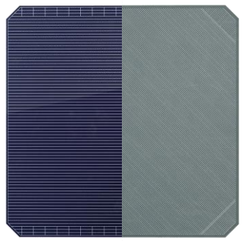
MINIMIZED DEGRADATION

NO LID

n-type cells lacks light induced degradation (LID), which affects p-type cells

Front side ▶ ◀ Back side

23.1 % 5.62 Wp



21.5 % 5.23 Wp

Measured with GRID^{TOUCH} contacting system. Measurement uncertainty ±3%.

- Standard dimensions: 156,75 x 156,75 mm
- Busbarless design: current collecting grid optimized for 18 wires
- High open-circuit voltages due to superior a-Si passivation

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Hevel cells for innovative applications

High-efficiency HJT cells are perfect for reliable, efficient and technologically advanced PV solutions as well as customized products

Flexible modules for marine, aircrafts, RVs, roofs…




Building and vehicle integrated solutions



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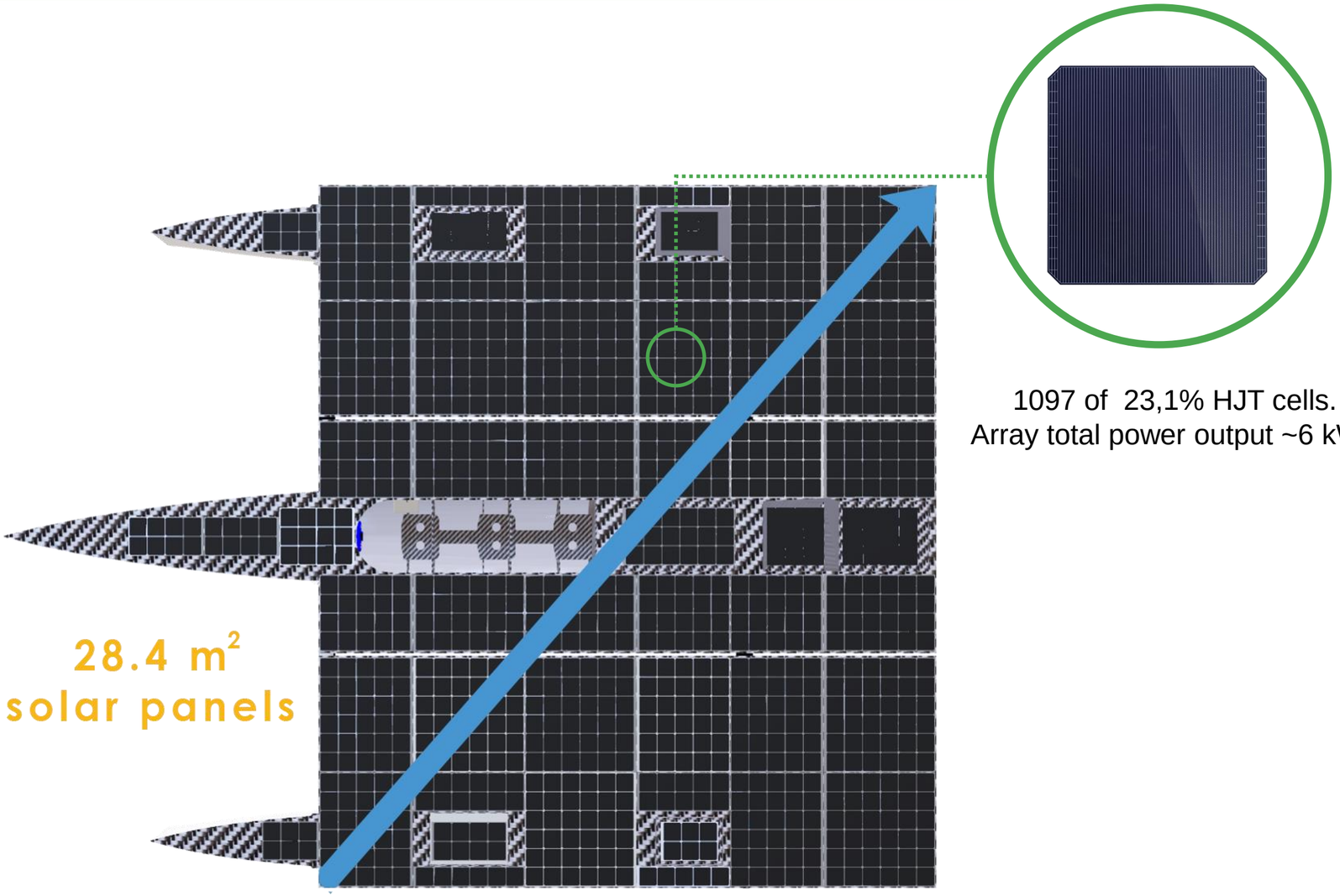
Cooperation of Hevel and TU Delft on innovative solar boat project

is official HJT cells supplier for

TU Delft SOLAR BOAT TEAM



1097 of 23,1% HJT cells.
Array total power output ~6 kWp

Future events:

- Monaco Solar Energy Boat Challenge (July 2019).
- World record attempt to cross the English Channel as the fastest solar boat (August 2019).

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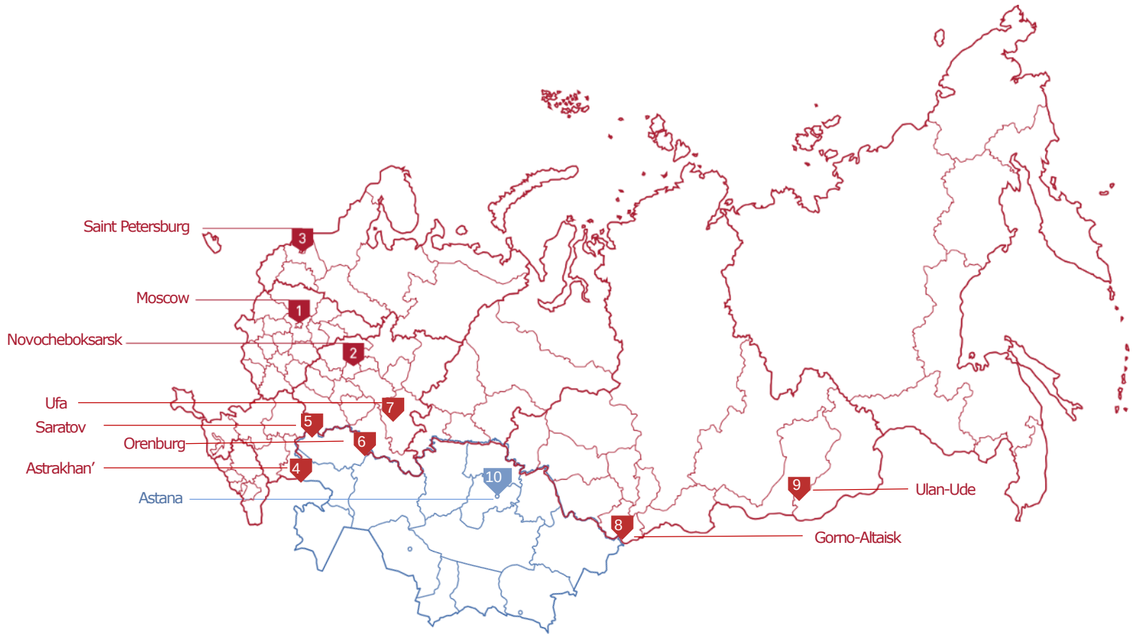
Thank you for your attention!



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