Proposal

High Voltage matrix solar modules
Objective

Solar market looking for new technology

- Increase performance of solar cells
- Increase life cycle of solar modules
- Cost reduction of solar plants
- Ability to compete with Chinese companies
High Voltage matrix solar modules

Our technology
- The module has a double-sided operating surface and produced in a matrix of series connected miniature solar cells
- Illuminating surfaces solar modules divided into area of charge carriers generation and area with p-n junction responsible for the separation and collection of charge carriers

Results achieved
- Voltage up to 840 V
- Performance = 14,58 % (solar radiation = 1 kW/m²)
- Performance = 24 % (solar radiation = 102 kW/m² with concentrating)
- Life cycle is 40 years
## Comparison with planar solar module

<table>
<thead>
<tr>
<th>Parameter</th>
<th>High voltage matrix solar module</th>
<th>Planar solar module</th>
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</thead>
<tbody>
<tr>
<td>Voltage, V</td>
<td>800</td>
<td>12 – 24</td>
</tr>
<tr>
<td>Life cycle, years</td>
<td>40 – 50</td>
<td>20 – 25</td>
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<tr>
<td>Average performance, %</td>
<td></td>
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<tr>
<td>- solar radiation = 1 kW/m²</td>
<td>12 – 15</td>
<td>15 – 18</td>
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<tr>
<td>- spectrum AM 1,5</td>
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<td>- temperature = 25 °C</td>
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<tr>
<td>Performance with concentrating</td>
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<tr>
<td>- solar radiation = 100 kW/m²</td>
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Advantages

Technology advantages
- High performance (19 – 24 %) at concentrated solar radiation
- Operating voltage (800 V)
- Life cycle is 40 years
- 10 times reduction of area under solar plant, saving of Si
- No transformers and converters on solar power plant (30% cost reduction)
- Low cost for installed capacity
Usage scenarios

Solar power plant with concentration

Advantages:
- High efficiency
- Low costs
- Green planet
Commercialization steps

Research and development step
1) We are looking for co-investors to finish our R&D project
   - Cost: 64,7 million RUB
   - Duration: 36 month

Production step
1) Small series production will be opened
2) Production expansion
The State Scientific Institution “All-Russian Scientific-Research Institute for Electrification of Agriculture” at the Russian Academy of Agricultural Sciences (GNU VIESH) is a research center for energy supply, electrification and automatization of agriculture, electromechanization of animal breeding and use of renewable and nonconventional energy sources.

The Institute was set up in March, 1930.

The Institute has 279 highly qualified specialists, including 24 doctors and 79 candidates of sciences, have production capacity for high-quality and timely execution.