AFSIA Showcase with Jinko Solar

Meet Your Bankable High Efficiency Solar Module & Energy Storage Partner

20 April 2021
10am GMT | 11am WAT | 12pm CAT | 1pm EAT

Presented by Titus Koech
Technical Services Manager SSA

Building Your Trust in Solar

www.jinkosolar.com
The Go-To platform for everything solar in Africa

We aim at building the most complete information platform for solar professionals and the wide public for any solar activity happening throughout the continent.

We organize a multitude of events, content pieces and centralize solar news to help ease and increase the access to solar knowledge.

We assist our members with dedicated business support services and tools such as proprietary databases about the solar market and assist in their business development efforts.
AFSIA ACTIVITIES HIGHLIGHTS

- Webinar COVID implications for African solar
- Launch of African solar projects database
- Webinar Solar for airports
- Launch of AFSIA Solar Awards
- Webinar Solar in agriculture
- Webinar Technical considerations PV+storage
- eBook Annual Outlook Report
- Webinar Solar meets water
- Webinar Latest tech updates on large-scale projects in Africa
- Webinar Implications of AfCFTA

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MEMBERS

FOUNDING MEMBERS

PARTNER MEMBERS

STRATEGIC MEMBERS
MEMBERS

CORPORATE MEMBERS

[Logo images of various companies]
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Technical Services Manager SSA
Titus Koech
Technical Service Manager
Kenya

- 10 years solar experience in East Africa
- Worked with African Solar Designs, SolarGen Technologies, Kenya Power
- 2 years experience as Technical Service Manager at Jinko solar - technical support and business development across sSA
- Msc in Energy & Engineering from Kenyatta University in Kenya
Meet Your Bankable High Efficiency Solar Module & Energy Storage Partner

Titus Koech - Technical Service Manager - SSA

www.jinkosolar.com
Short Introduction of JKS

1. Shipment #1
2. Delivered 70GW
3. Market Share 12.6%
4. Cell Efficiency Record 24.79%
5. Module capacity 30GW

11 Global Factories | 30+ Service Centers
100+ Covered Countries | 8000+ Annual Orders

Data source: 2020 Q3 Financial Report
R&D By the Numbers

- Patent Applications: 1632
- Invention Patents: 722
- Authorized Patents: 968
- R&D Team: 900+
- R&D Expenditure: 200 Million USD

JinkoSolar's History of World Records

- Mono PERC Cell: 22.78% (2017.1)
- Mono PERC Cell: 23.45% (2017.12)
- P-Type Mono Cell: 23.95% (2018.5)
- P-Type Mono Cell: 373.8W (2018.5)
- P-Type Mono Module-60 Cell: 22.12% (2018.12)
- N-Type Mono Cell: 24.2% (2019.1)
- N-Type Mono Cell: 24.58% (2019.6)
- N-Type Mono Cell: 21.82% (2020.1)
- N-Type Mono Cell: 24.79% (2020.7)
- N-Type Mono Cell: 23.01% (2020.9)
- N-Type Mono Cell: 24.9% (2020.8)
- N-Type Mono Module: 22.49% (2020.1)
- N-Type Mono Bifacial Module: 46.93W (2019.5)
- P-Type Mono Module: 158 Size Mono Module-72 Cell 46.93W
# Jinko Mainstream Product List

<table>
<thead>
<tr>
<th>Utility Product</th>
<th>Module</th>
<th>Model</th>
<th>Module Size</th>
<th>Maximum Power (2021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiger Pro (182)</td>
<td>Monofacial</td>
<td>JKMxxxM-72HL4-(V)</td>
<td>2274*1134</td>
<td>545W</td>
</tr>
<tr>
<td></td>
<td>Bifacial DG</td>
<td>JKMxxxM-72HL4-BDVP</td>
<td>2274*1134</td>
<td>540W</td>
</tr>
<tr>
<td></td>
<td>Bifacial TB</td>
<td>JKMxxxM-72HL4-TV</td>
<td>2274*1134</td>
<td>540W</td>
</tr>
<tr>
<td>Tiger 163 (TR)</td>
<td>Monofacial</td>
<td>JKMxxxM-7RL3-(V)</td>
<td>2182*1029</td>
<td>475W</td>
</tr>
<tr>
<td>Tiger 166</td>
<td>Monofacial</td>
<td>JKMxxxM-72HLM-(V)</td>
<td>2096*1039</td>
<td>455W</td>
</tr>
<tr>
<td></td>
<td>Bifacial DG</td>
<td>JKMxxxM-72HLM-BDVP</td>
<td>2096*1039</td>
<td>450W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DG Product</th>
<th>Module</th>
<th>Model</th>
<th>Module Size</th>
<th>Maximum Power (2021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiger Pro (182)</td>
<td>Monofacial</td>
<td>JKMxxxM-54HL4-(V)</td>
<td>1718*1134</td>
<td>405W</td>
</tr>
<tr>
<td>Tiger 163</td>
<td>Monofacial</td>
<td>JKMxxxM-6RL3-(V)</td>
<td>1855*1029</td>
<td>400W</td>
</tr>
<tr>
<td>Tiger N type</td>
<td>Monofacial</td>
<td>JKMxxxN-6RL3-(V)</td>
<td>1855*1029</td>
<td>415W</td>
</tr>
<tr>
<td></td>
<td>Monofacial</td>
<td>JKMxxxN-6TL3-(V)</td>
<td>1692*1029</td>
<td>380W</td>
</tr>
</tbody>
</table>
High Efficiency DG Module
Market Trend --- Increasing DG demands

Increasing demands of DG market

- Global DG market demands will increase rapidly with CAGR (20-24) of 9.81%.
- Residential & Small and Medium commercial systems are the most important application sceneries;
- High retail energy prices and preferential policies fuel the market growth and support the premium.

Source: IHS market 2020
Customer Demands --- Comprehensive Product Solution

**Module**
- Appearance
- Power & Efficiency
- Size

**System Design**
- Compatibility
- Mechanical Load
- Weight

**Service**
- Installation instruction
- System solution

**O&M**
- Product warranty
- Reliability
Innovative Product for Roof-top Market

**Tiger Pro-54P**

Max Power: **415Wp**

Highest Efficiency: **21.3%**

- Size: 1718*1134*30
- Weight: 22 kg
- Voc: 37.31 V
- Isc: 14.01 A
- Temperature coefficients of Pmax: -0.35%/°C
Humanization design

- **Length**: The module length is around 1.7m, convenient for manual installation

- **Width**: The module width is around 1.1m, convenient for manual installation

- **Weight**: The module weight is 22kg, portable for transporting
Aesthetic Design

All Black Design
Black Backsheet + Black Frame
(Optional)

Multi Busbar
Thinner Ribbon decreases the light reflection
Advanced Warranty

25-year power warranty

15 Years
Product warranty

≤ 2%
First year degradation

-0.55%
Linear degradation

Power Output (%)

98%

84.8%
Improved Mechanical Load

Tiger Pro Frame

- Serrated surface enhances installation stability
- The larger cavity distributes the stress uniformly
- Strengthened profile

Improved Frame Design
Installation Methods Evaluation
Reliable Mechanical Load
Diverse Application

1. **Residential roof**
   The investment is small; easy to install; state subsidy funds, additional government subsidies, long-term income projects; drive more C&I projects.

2. **C & I roof**
   Energy conservation and emission reduction; High electricity consumption and price; larger installed capacity; lower LCOE.
Higher module power & efficiency

*Take certain rooftop photovoltaic system (8.5kW) for example

For the same volume, Jinko Tiger Pro module needs fewer blocks, roof area and weight. The saved area also has significant positive effect on avoiding shadows shade.
More energy generation with the same roof size

- **Tiger Pro 415W**
  - 24pcs
  - Total 9.96kW

- **XX 166-60P 375W**
  - 24pcs
  - Total 8.43kW

- **XX 210-40P 405W**
  - 24pcs
  - Total 9.72kW

- **XX 166-66P 415W**
  - 16pcs
  - Total 6.64kW
## Lowest Transportation Fee

<table>
<thead>
<tr>
<th>Pieces of module per container (pcs)</th>
<th>Total power per container (kW)</th>
<th>29%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiger Pro 415W</td>
<td>910</td>
<td>377.65</td>
</tr>
<tr>
<td>XX 166-60P 375W</td>
<td>780</td>
<td>292.50</td>
</tr>
</tbody>
</table>

Tiger Pro 415W maximize the total power per container to cut down the transportation cost.

Reducing packaging damage risk by optimized packaging design and strengthened support.

- Keep reasonable operation space, effectively avoid packaging damage during loading and unloading.
- Internal N shape* support to reduce deformation risk.

*N shape support is optional.
Lower system cost and higher return for customer

<table>
<thead>
<tr>
<th></th>
<th>XX 166-60P 375W</th>
<th>XX 210-40P 400W</th>
<th>Tiger Pro 415w</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverter</td>
<td>Cost (Baseline)</td>
<td>93.75%</td>
<td>90.36%</td>
</tr>
<tr>
<td>Fixed tilt Mounting</td>
<td>Cost (Baseline)</td>
<td>98.93%</td>
<td>96.64%</td>
</tr>
<tr>
<td>Cable</td>
<td>Cost (Baseline)</td>
<td>98.99%</td>
<td>98.72%</td>
</tr>
<tr>
<td>Installation</td>
<td>Cost (Baseline)</td>
<td>93.75%</td>
<td>90.36%</td>
</tr>
<tr>
<td>Others</td>
<td>Cost (Baseline)</td>
<td>98.47%</td>
<td>97.50%</td>
</tr>
</tbody>
</table>

**Payback period (years)**

| Cost (Baseline) | -0.28 (-3 months) | -0.69 (-9 months) |

* Project location: Madrid, Span 100KW(Ac) Project,
Assumption: 1. Fixed the AC side, and different type of modules are in same rooftop
2. Self-consumption system, the bill of tariff to grid is 0.04USD/kwh

With Tiger Pro, the payback period can be reduced by up to 9 months compared other DG modules
Fully Compatible with Distribution Inverters

MPPT input current

15A+

Isc 14.01A  Voc 37.31V

- The upgrade of inverters for high current module could totally meet the compatibility demand in the coming H2 2021

* From 2021H2
JinKo Solar
Energy Storage System Solutions
(The Europe, Middle East and Africa)
## Hybrid LV RESS Solution Specification (On-grid/Off-grid)

<table>
<thead>
<tr>
<th>Item</th>
<th>3.6kW-7.2kWh</th>
<th>5kW-9.6kWh</th>
<th>8kW-19.2kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. PV Input power</td>
<td>4.68kW</td>
<td>6.5kW</td>
<td>10.4kW</td>
</tr>
<tr>
<td>MPPT range</td>
<td>125-425V, Max. 500V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC rated power</td>
<td>3.6kW</td>
<td>5kW</td>
<td>8kW</td>
</tr>
<tr>
<td>Output voltage</td>
<td>230Vac (Single phase), 50/60 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery capacity</td>
<td>7.2kWh</td>
<td>9.6kWh</td>
<td>19.2kWh</td>
</tr>
<tr>
<td>Battery voltage</td>
<td>48V, (Inverter:40-60V; BMS:42-51.5V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP level</td>
<td>IP65 (inverter), IP55(Battery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle life</td>
<td>≥6000 cycles, 80%DOD, @25°C, 0.5C, 70%EoL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating mode</td>
<td>On grid/off grid, switch time &lt;20ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimension (W<em>H</em>D, mm)</td>
<td>680<em>233</em>420mm (Inverter); 570<em>1150</em>285mm (Battery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>24 (5kW inverter)32kg (8kW inverter), 140kg (9.6kWh/Battery cabinet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>APP/Web</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMS Communication</td>
<td>Rs485 /CAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>Inverter: VDE0126, IEC62109-1/2, IEC61683 Battery module: IEC62619, UN38.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### KEY FEATURES

- 24-hour clean energy supplying
- Flexible design, easy to scale up
- Automatically on/off-grid switch
- Real-time monitoring at anywhere via APP
- Fast, easy installation
## HV RESS 10kW/12.5kWh 3 Phase power distribution Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>10kW/12.5kWh</th>
<th>10kW/25kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. PV Input power</td>
<td>13kW</td>
<td></td>
</tr>
<tr>
<td>MPPT range</td>
<td>200-850V, Max. 1000V</td>
<td></td>
</tr>
<tr>
<td>AC rated power</td>
<td>10kW</td>
<td></td>
</tr>
<tr>
<td>Output voltage</td>
<td>400Vac(3 phase), 50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>Battery capacity</td>
<td>12.5kWh</td>
<td>25kWh</td>
</tr>
<tr>
<td>Battery voltage</td>
<td>512V, (Inverter: 180-600V; BMS: 448V~584V)</td>
<td></td>
</tr>
<tr>
<td>IP level</td>
<td>IP65(inverter), IP55(Battery)</td>
<td></td>
</tr>
<tr>
<td>Cycle life</td>
<td>≥6000 cycles, 80%DOD, @25°C, 0.5C, 70%EoL</td>
<td></td>
</tr>
<tr>
<td>Operating mode</td>
<td>On grid/off grid, switch time &lt;20ms</td>
<td></td>
</tr>
<tr>
<td>Dimension (W<em>H</em>D, mm)</td>
<td>415<em>516</em>180mm(Inverter); 660<em>1650</em>260mm(Single Battery Cabinet)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>24kg(inverter), 197±2kg(Single Battery Cabinet)</td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>APP/Web</td>
<td></td>
</tr>
<tr>
<td>BMS Communication protocol</td>
<td>CAN2.0</td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>Inverter: VDE-AR-N 4105, VDE 0126-1-1, EN 50549-1, G98, G99, G100, CEI 0-21 Battery module: IEC62619, UN38.3</td>
<td></td>
</tr>
</tbody>
</table>

### 10kW/12.5kWh Hybrid RESS Solution

- allows up to 10% overloading to maximize power output and features.
- Uninterruptible Power Supply function (UPS) to inductive loads such as air conditioners or refrigerators with an automatic switchover time of less than 10 milliseconds.
C&I scale BESS

C&I ESS (50kWh-1MWh) + Pcs / Hybrid Inverter + Battery + EMS + Inverter (Optional)
• LFP Battery with 10 years+ Calendar life.

• The Pre-installed ESS battery management system (BMS) consists of Battery Management Unit (BMU), Battery Cluster Management Unit (BCMU), Battery Stack Management Unit (BSMU) and High Voltage Management Unit (HVMU).
1. **Maximum product flexibility:**
   JESS’ s commercial product platform carries the full range of storage product from 50 kWh up to 1MWh to cater to each individual need.
2. **Industry leading cycle performance:**
   We lead the industry with cell cycle of more than 6000 times. More than enough for majority of renewable energy scenario.
3. **Easy installation**
   System is designed with quick installation each step of the way
With advantages of highly integration and standardization, multiple functions, convenient transportation, short construction planning and system debugging phase, LFP battery storage system in transferable container is an independent energy storage unit, including lithium-ion battery system, power conversion system, SCADA and ancillary system.

- Multilevel protection strategy
- Rapid installation and deployment
- Integrated battery platform with safety and reliability
- Modular design, flexible configuration, suitable for multiple scenarios
Containerized design: easy to transport and install on site

- Battery Rack
- FM-200 fire suppression system
- Cabinet PCS
- LED lighting system
- Industry HVAC & air duct
- Cabinet monitoring system
BMS main protection functions include:

- Over-charge protection
- Over-discharge protection
- Over-temperature protection
- Over-current protection
- Ground-fault detection
- Internal battery fault detection
- Cell balancing
Connecting to the WIFI signal of the inverter, and the device data can be viewed in real time through the mobile phone APP.
Thank YOU!
Email: Titus.Koech@jinkosolar.com
Africa Solar Industry Association

info@afsiasolar.com