



**Empower™**

## **Optimal Battery Storage and Solar PV Configuration and Benefits Assessment**



**Prepared for:**  
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Bayview  
NSW 2104

Prepared by Empower Energy on 24 June 2019

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SAMPLE

## 1.0 Executive Summary

### 1.1 Proposed Panel Layout

15 Ilya Avenue, Bayview  
New South Wales 2104  
Australia



## 1.2 System Details

Your custom design:

Solar PV	
Size (kWdc) <sup>1</sup>	7
Manufacturer	Jinko
Model	234
Type	Monocrystalline
Warranted Lifetime (years)	10 <sup>2</sup>
No. of Panels Installed	10
Estimated Annual Production <sup>3</sup> (kWh)	13,250

Inverter + Battery Storage All-in-one	
Nameplate Export Power (kW)	5
Nameplate Backup Power (kW)	4.6
Manufacturer	Empower
Model	Elektrobank 14
Type	Hybrid/ All-in-one
Communications	Wifi / LTE
Warranted Lifetime (years)	10
Nameplate Battery Capacity (kWh)	15.4
Useable Capacity (kWh)	14
Module Manufacturer	CATL
Module Lithium Type	Lithium Iron Phosphate (LiFePO4)
Warranted Energy Throughput	45MWh

Switchboard	
Priority Circuits for Backup Power	No
Performance Metering	Yes
Water Heating Switch	No

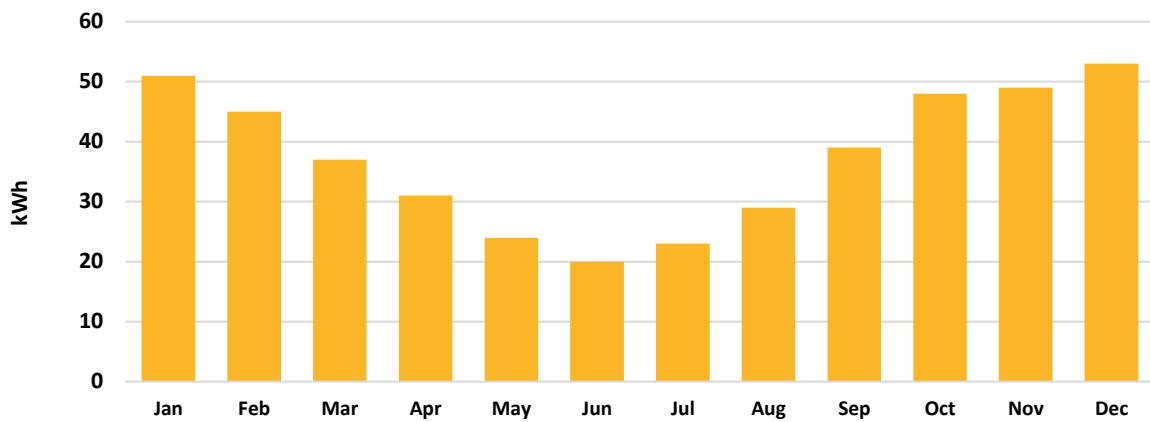
<sup>1</sup> The Standard Test Condition rating (STC) assumes a standard set of optimal operating conditions (25°C cell temperature, 1000 W/m<sup>2</sup> and an air mass of 1.5). The STC rating is most often used by manufacturers to classify the power output of PV modules. To calculate the system's energy production for any future year, the expected degradation in system performance is included (See "PV degradation", in the "Assumed Values" table).

<sup>2</sup> More information on Jinko's warranty can be found here ([https://www.jinkosolar.com/ftp/FINAL-Jinko%20Solar%20-%20Global%20Limited%20Warranty%20NON%20LINEAR%20\(20140501\).pdf](https://www.jinkosolar.com/ftp/FINAL-Jinko%20Solar%20-%20Global%20Limited%20Warranty%20NON%20LINEAR%20(20140501).pdf)) and here ([https://www.jinkosolar.com/ftp/Jinko%20Solar%20Standard\(10year\).pdf](https://www.jinkosolar.com/ftp/Jinko%20Solar%20Standard(10year).pdf)).

<sup>3</sup> Energy Output is calculated based on historical solar irradiance at the given location. A typical meteorological year is selected using statistical methods. Factors including panel tilt, orientation (azimuth), and system efficiency are taken into account.

### 1.3 Estimated Daily Production Per Month

How much electricity will my system generate per day, on average?



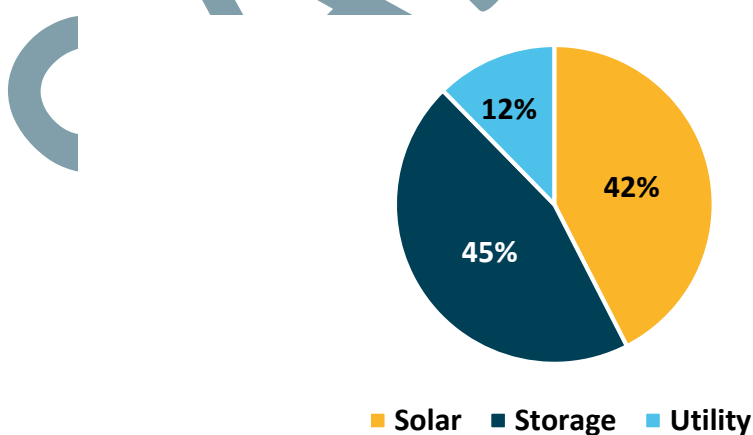
### 1.4 Estimated Utility Bills<sup>4</sup>

What will your monthly and annual bills be?

	Before Solar and Storage	With Solar and Storage
Average Monthly Bill	\$103.72	\$3.69 ↓96%
Annual Bill (first year average)	\$1,244.60	\$44.27 ↓96%

### 1.5 Energy Balance

Where will your power come from?



Solar PV is produced and consumed. Exported is Solar PV that is exported to grid. Storage is solar PV that is stored in the battery and consumed later. Utility is consumed from the grid.

<sup>4</sup> Net of feed-in credits.

## 2.0 10 Year Financial Summary

<b>Estimated Installed Cost of your System</b>	<b>\$15,000</b>
This includes everything on your quote on page 9	
<b>Net Present Value of Investment<sup>5,6,7</sup></b>	<b>\$14,534.68</b>
The Net Present Value (NPV) is the present-day value sum of all future cash in flows minus the out flows. Since money is worth more in the present day than in the future, all future cash flows needs to be discounted by cost of capital. A positive NPV indicates a good investment.	
<b>Simple Payback Period</b>	<b>3-4 years</b>
This is the time period under which you will get your money back on the up front cash. After this everything is profit!	
<b>Discounted Payback Period</b>	<b>5-6 years</b>
Similarly, the discounted payback period also accounts for all discounted future cash flows. The resulting period will typically be longer than a simple payback period calculation.	
<b>Total Return on Investment (ROI)</b>	<b>65%</b>
The Return on Investment (ROI) is another measure of the efficiency of your solar investment. Imagine investing \$100 today and receiving \$300 in return. The ROI would be 200%.	
<b>Internal Rate of Return on Cash Invested (interest)</b>	<b>8.9%</b>
The Internal Rate of Return (IRR) or rate of return on cash invested is the annual compounded rate of return that the cash flow brings based upon the net cash invested in the year of installation. Think of it as the interest rate that a savings account would need to provide to match the returns on your solar investment.	

<sup>5</sup> Australian Small-scale Technology Certificates (STCs) are an incentive provided under the Renewable Energy Target. One certificate is equal to one megawatt hour of eligible renewable electricity either generated or displaced by the installed system. [ONLINE] Read more at: <http://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Agents-andinstallers/Small-scale-technology-certificates>.

<sup>6</sup> System efficiency is estimated to account for losses caused by a variety of factors. These factors include intermittent shading, cable losses, dirt, scheduled downtime, manufacturer tolerances, inverter efficiency for DC to AC (this does not affect off-grid DC only systems), battery round trip efficiency, and other factors.

<sup>7</sup> Utility electricity price inflation is adjusted based on the given location. (Figures from NATIONAL ELECTRICITY FORECASTING REPORT June 2016 by AEMO.)

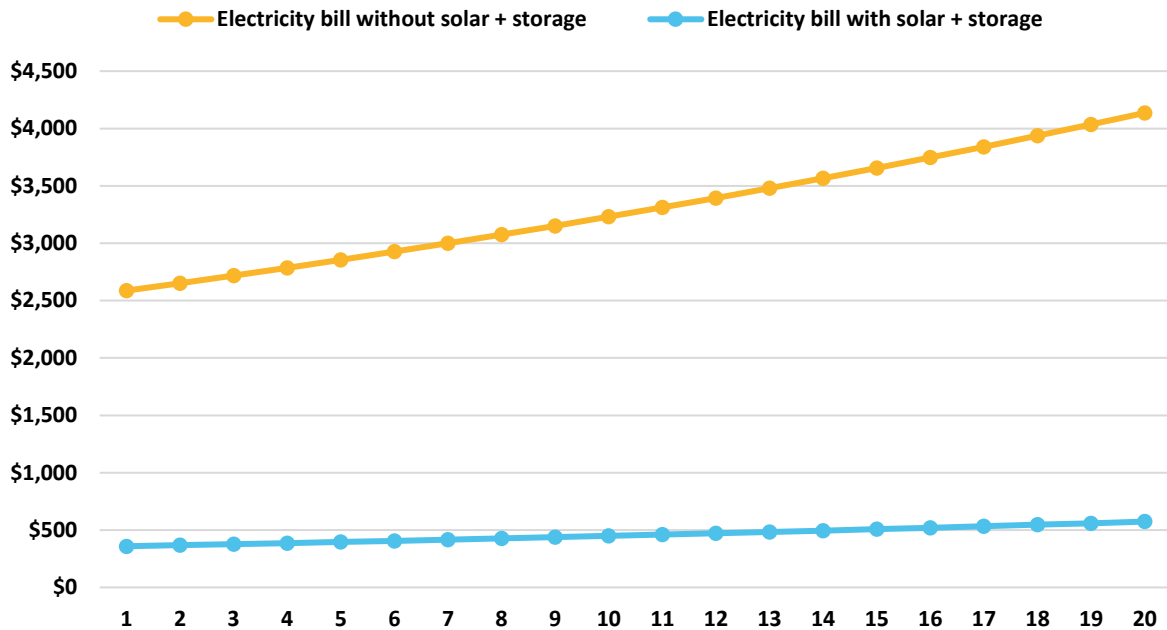
### 3.0 Financial Analysis

Your historical electricity bills were used to help size your solar system. Based upon the system size suggested, the expected electricity bill savings over a 10-year period are provided below.

In addition, the first-year electricity bill savings you can expect are provided together with a chart of the monthly solar system output you can expect.

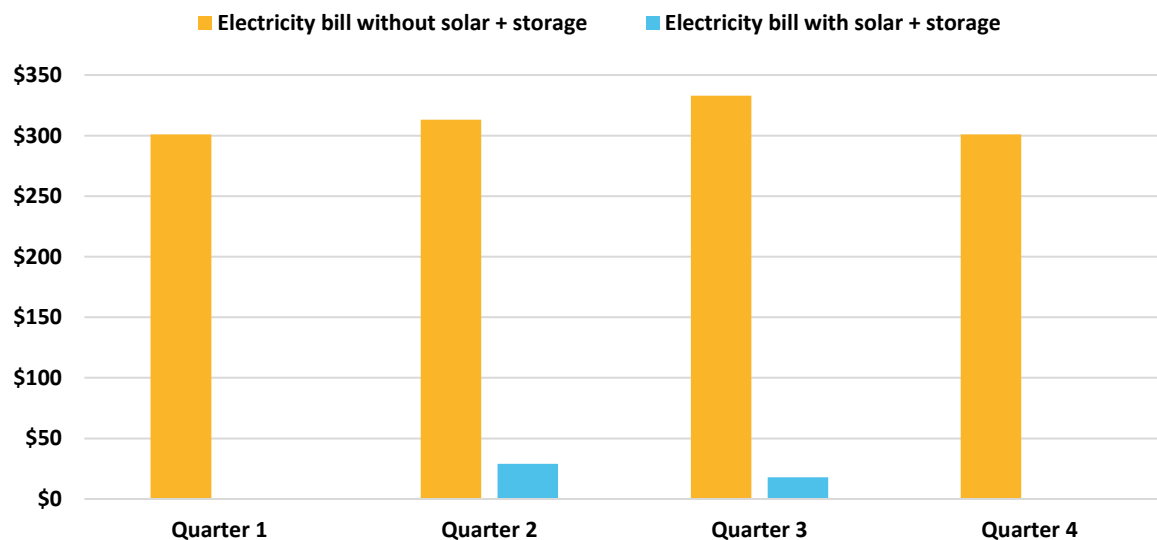
#### 3.1 Annual Electricity Bill Over Time

How much will your annual bill be over time with and without your solar + storage system?



#### 3.2 Quarterly Electricity Bill Comparison

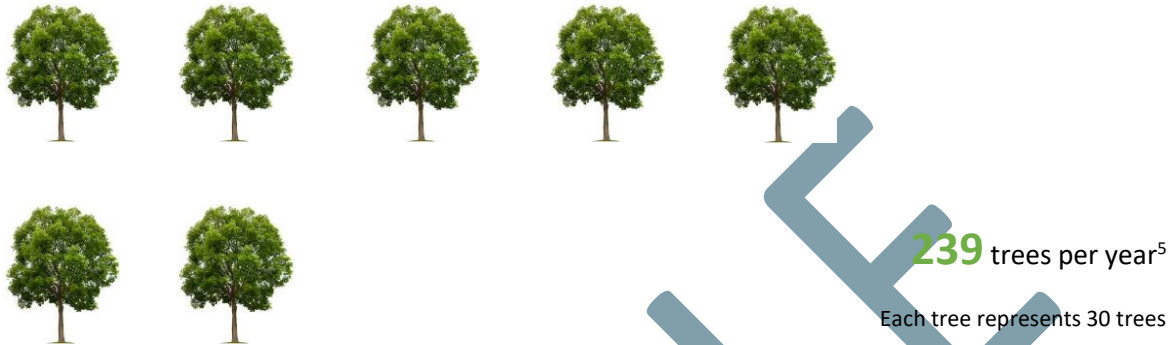
How much will your quarterly bill be with and without solar + storage?



## 4.0 Environmental Analysis

Your solar system will generate significant environmental benefits. These come primarily from avoided power plant emissions. Below is a summary of environmental benefits your solar system will provide.<sup>8</sup>

### 4.1 Trees Planted Equivalent



### 4.2 Avoided Equivalent Fuel



### 4.3 Avoided Coal Burnt



<sup>8</sup> United States Environmental Protection Agency. 2018. Greenhouse Gases Equivalencies Calculator - Calculations and References. [ONLINE] Available at: <http://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Agents-and-installers/Small-scale-technology-certificates>.



## 5.0 Quote

Description	Quantity	Price	Total
7 kW Solar Panels	1	\$3,000	\$3,000.00
ElektroBank Battery	1	\$12,500.00	\$12,500.00
Balance of System			
Network Pre-Approval			
Installation and Labour		\$2500	\$2,500
STC Credits		(-\$3,000)	(-\$3,000)
Other Rebates?			
	Subtotal		\$15,000.00
	GST		\$0.00
	Discounts		\$0.00
	Total		\$15,000.00
	Minimum Deposit Amount		\$3,600.00

### Acceptance

Please sign and return to Empower Energy. Be sure to keep a copy for your own records. A 20% deposit of the total price is required to initiate the process. The balance must be paid in full within two weeks of the planned Collection Date, unless otherwise agreed upon in writing, or it will be cancelled and the Deposit forfeited.

\_\_\_\_\_  
Client Name (please print)

\_\_\_\_\_  
Client Signature

\_\_\_\_\_  
Date

## 6.0 Assumptions and Disclaimers

Please note that this proposal is an estimate and does not guarantee actual system production or savings. The system design may change based on a detailed engineering site audit. Actual system production and savings will vary based on final system design, size, configuration, utility rates, applicable rebates and your energy usage. Utility rates, charges and fee structures imposed by your utility are not affected by this proposal and are subject to change in the future at the discretion of your utility.

### 6.1 Assumed Values

- Assumed Tilt: x
- Assumed Retailer: Origin
- Assumed Azimuth: x
- Assumed Contract: x

Array	DC Array Power	Tilt	Azimuth
1	2.16 kW	0°	49°
2	2.16 kW	0°	48°
3	4.68 kW	0°	31°

Assumed Values	
Quarterly Electric Bill	\$350 (winter)
Utility Rate Increase	3.79% per annum
System Efficiency	87%
Self-Consumption Rate	47.87%
AC System Size	7.83 kW
Term	20 years
Inflation Rate	1.5% per annum
Effective Interest Rate	3.29%
PV Degradation	Hanwha Q Cells Q. PEAK Q. PEAK L-G4.2 360 98% for the first 1 year(s) -0.6% per year to year 25
Nominal Storage Capacity	14 kWh
Maximum Depth of Discharge	100%
Power	5 kW continuous
Round Trip Efficiency	90%



## About Empower Energy

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Empower Energy is an established, 9-year old high-tech company based in Brookvale, NSW, started by an ex-Ausgrid employee with a vision for a more distributed energy system.

At Empower, we've developed our own, industry leading power control system of software and hardware using top-tier batteries, solar panels and water heating systems.

Our optimized, end-to-end solution and unique, power-as-a-service business model allow us reduce consumer's electricity bills by 80-100%.

We also offer conventional contracts for consumers wishing to own or host their own solar, battery and water heating assets.

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