

# FACT SHEET



RENEWABLE

ENERGY

## SOLAR ELECTRIC UPGRADE

ENERGY PRICES AND CARBON EMISSIONS ARE HOT TOPICS AS JOSH'S HOUSE CONTINUES TO BE A TEST BED FOR RESIDENTIAL SOLAR TECHNOLOGIES AND ENERGY PRODUCTIVITY.

Built in 2013 as a national exemplar of energy efficient housing design for the volume market, the learnings from Josh's House have been shared widely through [Dr Josh Byrne's](#) research activities with [Curtin University](#) and the [CRC for Low Carbon Living](#). A recent upgrade (mid 2018) to the solar energy system, and the inclusion of an electric vehicle (EV) sees this applied research continue in collaboration with local industry partners.

The electrical upgrades also include the replacement of the original gas boosted solar hot water system with an electric heat pump, and the gas stove with an induction cooktop, making the house completely solar-electric. The new appliances are metered, along with the EV charging point, with the data providing valuable insights into the impact of car charging on a solar-electric home.



### EQUIPMENT INSTALLED AND COST

| ITEM                              | MAKE & MODEL              | APPROXIMATE RETAIL COST    |
|-----------------------------------|---------------------------|----------------------------|
| 64kW High Performance Solar Array | SunPower X-Series         | \$9,000                    |
| 5kW Hybrid Inverter               | Fronius Symo 5.0          | \$4,000                    |
| 10kWhr LiPO Battery               | LG Chem Resu 10           | \$10,000                   |
| Heat Pump Hot Water System        | Bosch Compress 3000       | \$2,500 (+\$2,000 install) |
| Induction Cooktop                 | Fisher & Paykel CI905DTB3 | \$2,100 (+\$1,500 install) |
| Electric Vehicle (EV)             | Mitsubishi iMiev          | \$16,000 (second hand)     |

### PERFORMANCE MONITORING

Data collection is underway to monitor the performance of the new equipment and its configuration. Key points of interest include the degree of grid defection (self supply) with an all-electric house that includes vehicle charging, as well as payback on investment. Optimising the time

of charge of the EV to best utilise available solar and battery energy is also a focus. The data is available for viewing via the Josh's House [Data Dashboard](#) and the findings of the research will be published mid 2019. A summary of the early data analysis is provided over page.

## EARLY RESULTS

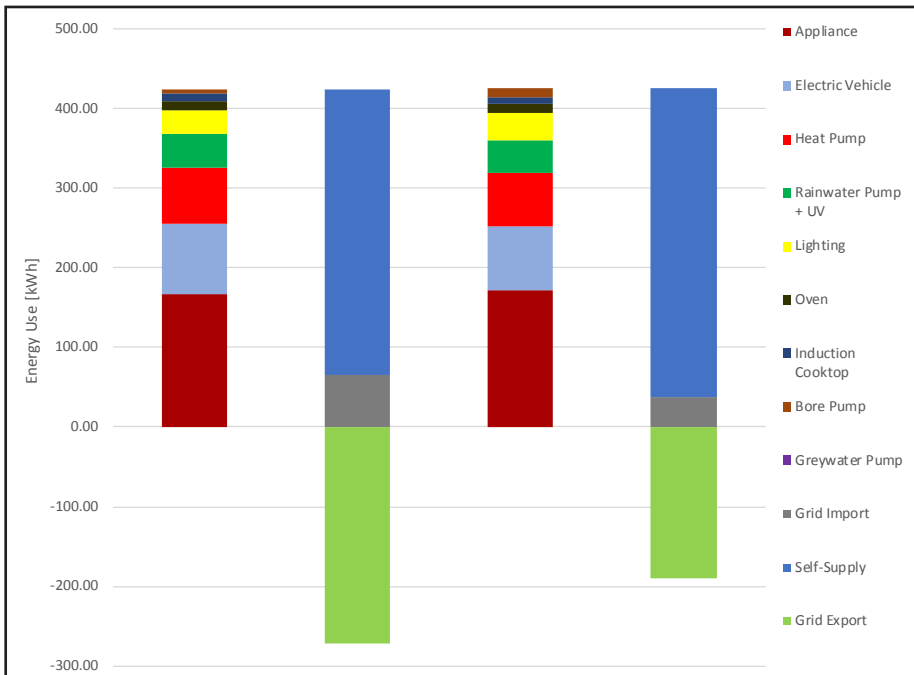


Figure 1: Energy demand vs production, including proportion of self-supply, grid import and export at Josh's House for August and September 2018.

### DATA ANALYSIS, QUALIFICATIONS AND ASSUMPTIONS

- Energy data: August and September data divided by 2, then multiplied by 12 to get annual figure.
- Synergy Home Plan (A1) tariff: 28.3273 cents per unit » 1 unit = 1 kWh (Synergy - Standard Electricity Prices and Charges, July 2018).
- Synergy Buyback scheme: 7.1350 cents/kWh (Synergy – Renewable Energy Buyback Scheme, July 2018).
- EV savings from previous vehicle: Nissan Navara ST-X D40 Manual 4x4 Dual Cab » 9L/100km.
- Average Diesel Price: August – September = 149.9 cents (FuelWatch).
- The government rebates for the PV and hot water systems were claimed on the original systems.
- Doesn't include cost of electric vehicle as this is substituted with previous vehicle. Retail cost of all other equipment items and installation expenses are included.

### MORE INFORMATION

Find out more about the new solar energy system and appliance upgrades at Josh's House by watching the [video](#). Information on the original solar equipment configurations can be found in our [Video Library](#).



|                                 |                  |
|---------------------------------|------------------|
| Energy Produced                 | 10,782 kWh/Yr    |
| Energy Exported                 | 4,739 kWh/Yr     |
| Self-Supply                     | 5,403.85 kWh/Yr  |
| Energy from Grid                | 638.75 kWh/Yr    |
| Annual Savings from Self Supply | \$1,530 AUD      |
| Annual Income from Grid Export  | \$338 AUD        |
| Annual Savings from EV          | \$1,665 AUD      |
| Total Savings                   | \$3,534 AUD      |
| Total Investment                | \$31,100.00 AUD  |
| <b>PAYBACK PERIOD</b>           | <b>8.8 YEARS</b> |

Table 1: Annualised results from preliminary data showing expected energy balance and estimated payback on investment.

FOR MORE INFORMATION, VISIT [WWW.JOSHSHOUSE.COM.AU](http://WWW.JOSHSHOUSE.COM.AU)