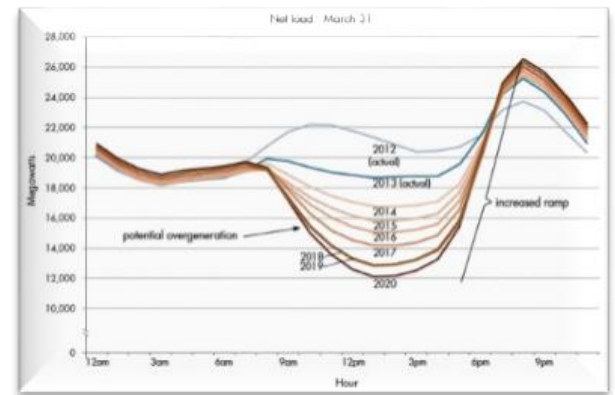
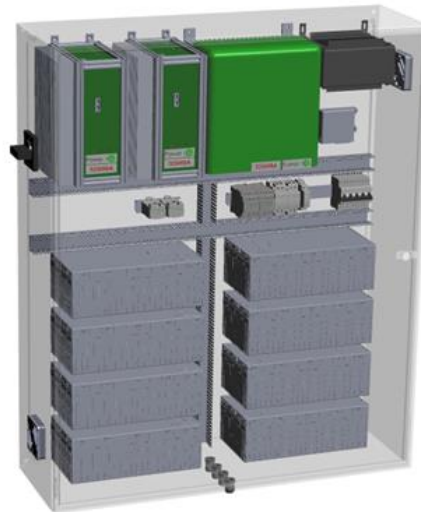


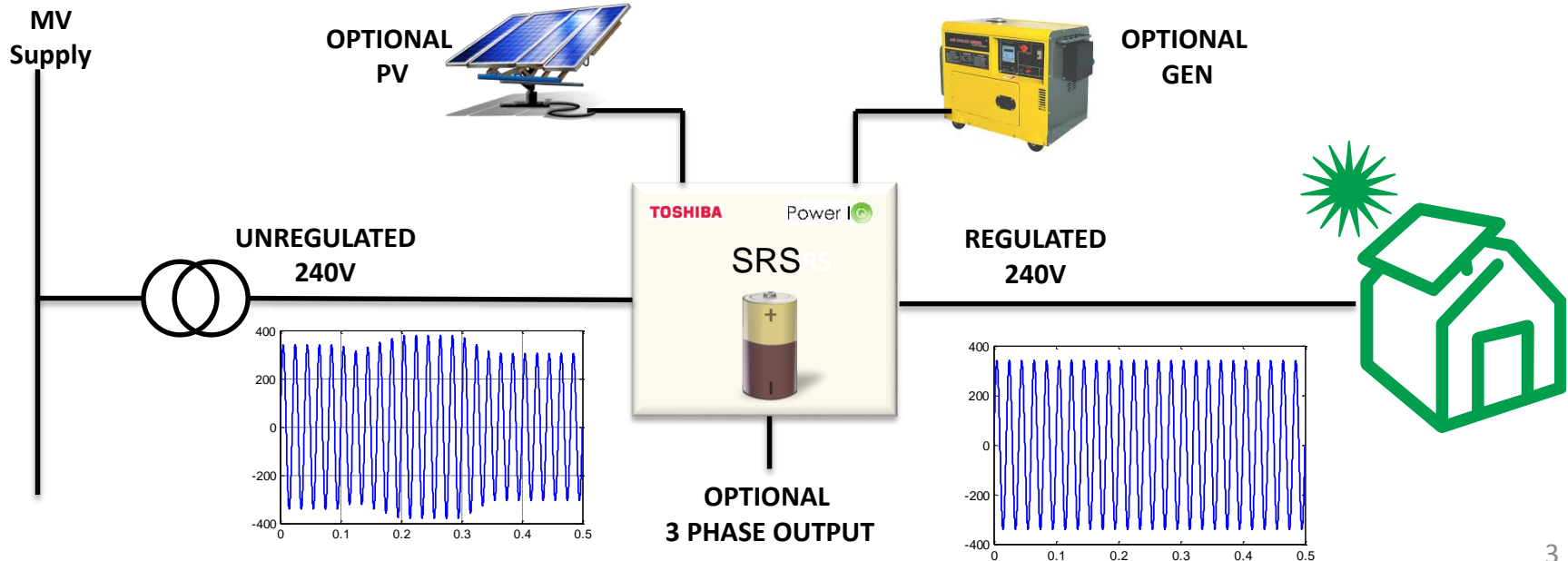
# The Smart Residential Supply (SRS)



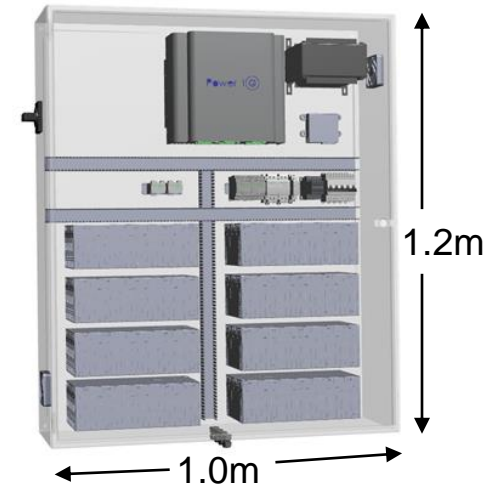
# Introduction

- Power IQ and Toshiba have partnered to develop high quality power electronics products.
- Products developed will be sold through the Toshiba organisation with all the associated warranties, backing and support
- The Smart Residential Supply (SRS) is a highly flexible battery storage product combining the premium Toshiba SCiB Lithium Titanate batteries with the reliable & intelligent Power IQ power & control hardware.

- The SRS is more than a battery storage system. It forms an interface between the grid supply and the consumer, providing:
  - A 230/240V regulated customer supply (programmable)
  - Back-up power during power outages & off grid system during high fire risk periods
  - A wide range of PV/Load energy shifting functions
  - A number of demand limiting and load control functions
  - An optional 3 phase power supply output
  - A grid friendly low harmonic power system interface
  - A range of remote communication & control options.
  - A modular solution with potential to migrate to a stand-alone system



- Premium battery quality
  - Toshiba SCiB Lithium Titanate batteries
  - 15+ year design life/>10 000 cycles
  - 100% DOD
  - Excellent temperature range / performance
  - **Excellent safety by design**
- Comprehensive Battery Management System
  - Individual cell voltage & temperature monitoring
- Next generation power electronics
  - Ultra low loss (<1.5%)
  - Very compact
  - High fidelity low harmonic output
  - Low maintenance & high reliability
- Modular (Lego concept)
  - Inverter and battery DC/DC converter are base product.
  - Add-on modules:
    - PV DC/DC MPPT converter
    - Generator interface
    - 3 phase output
    - Connection with smart meter?
    - Communication with fleet controller?
  - Expandable storage

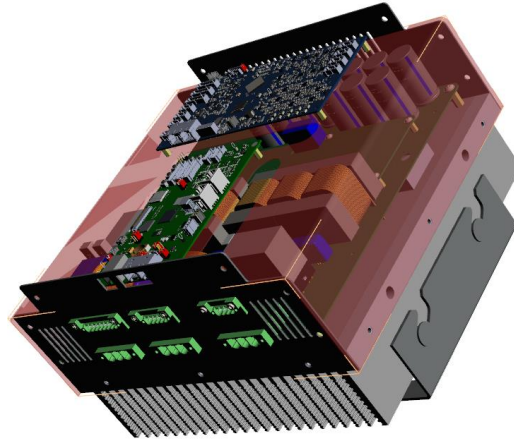
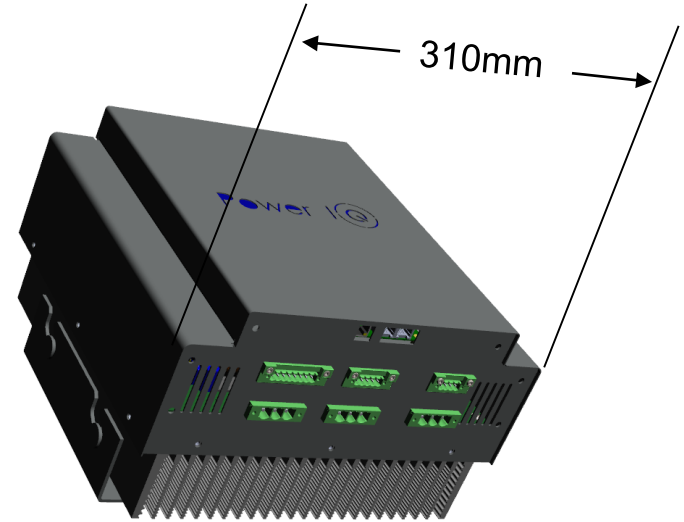
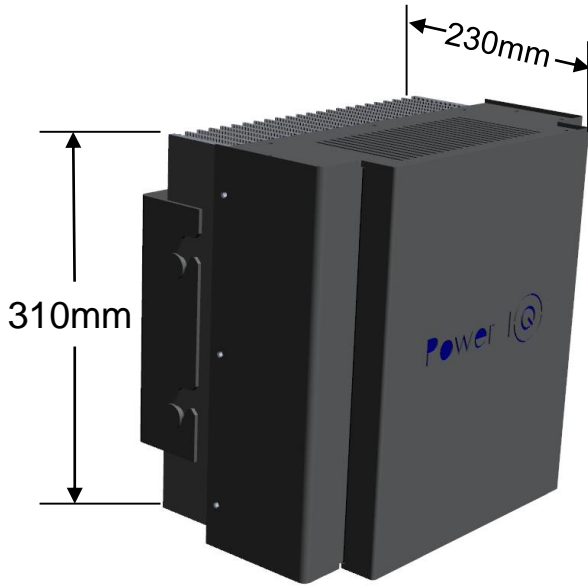


Specification	Rating
Battery Converter Power rating	10kVA
Storage (usable)	8.8kWh expandable to 26.4kWh
Max. Operating Temperature	45°C
DC connected PV	Up to 5kW
AC connected PV	unlimited
3 phase output	5kVA

# Power Converter System (PCS) design

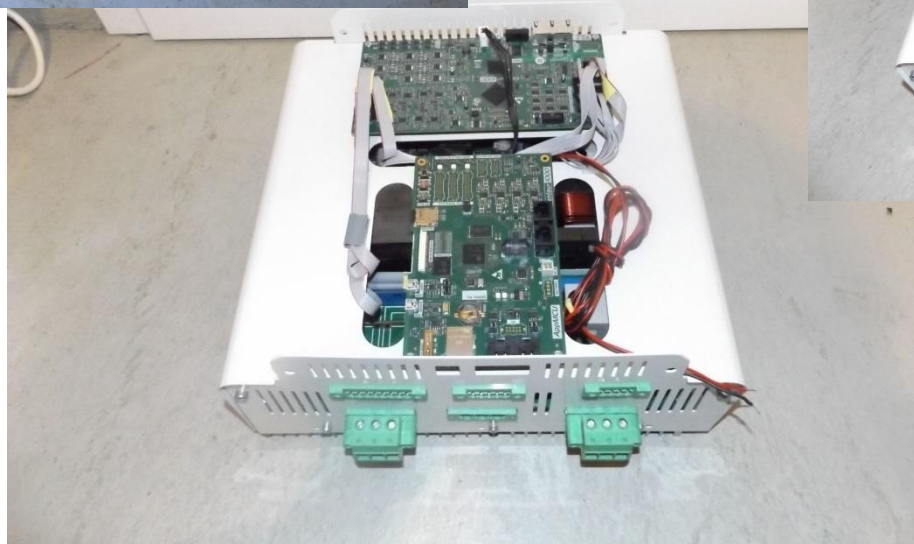
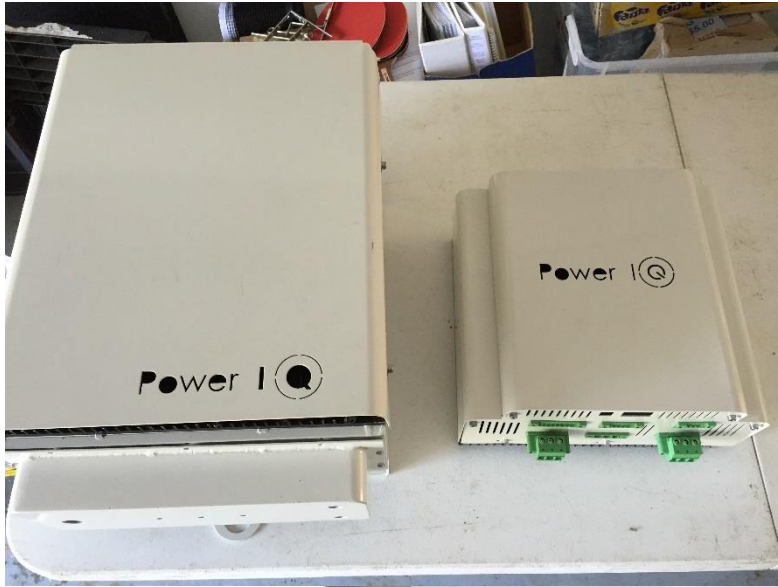
Power IQ  
Simply Smart Power Solutions

## (Inverter + battery DC/DC converter)



Natural Convection  
(Fan-less design)

# SRS Mechanical Prototype



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# 10kVA SRS compared to leading 5kVA PV inverter



Power IQ SRS is  $\frac{1}{2}$  the size of a leading 5kVA PV inverter.  
 $\Rightarrow \frac{1}{4}$  of the size on an equal power basis.

And it is naturally cooled  $\Rightarrow$  no fans or moving parts.

# SRS Key features – Software/Functionality

- Customer voltage regulation
  - $V_{nom} \pm 10\%$
- Off-grid operation & back-up power:
  - Automatic connection/reconnection (AS4777 compliant)
  - Automatic generator start-up & shutdown
  - Output relays for control of non-essential circuits (eg. A/C, H/W)
  - Integrated DRED load control
- Customer Energy Control Functions:
  - **Programmable Capacity limit:** Limit maximum demand
  - Programmable Export limit: Limit feed-in to grid
  - TOU: Minimise consumption during peak periods
  - Time scheduled operation
  - Customer load control & DRED integration
- Communications:
  - Ethernet interface, can connect 3G modem or wi-fi interface
  - DNP3 supported for SCADA communication
- Utility/remote control functions:
  - Scheduled charge/discharge
  - Remote controlled charge/discharge
  - Aggregation (with 3<sup>rd</sup> party system)
- PV/load smoothing
- Network peak load reduction & voltage support



- Power IQ has designed a highly flexible power electronic converter /battery storage system
- An on-board Linux computer means that customized apps can be easily added.
- Premium ultra long life Toshiba SCiB batteries have been used with the capability to expand the amount of storage.
- System (hardware) can be customised for different markets/applications.
- Software highly modular and flexible.

# The SRS - A new world standard?

- The SRS will be the world leader in inverter design.
- ¼ of the size of today's leading products.
- High reliability (no fans, electrolytic capacitors designed for 15 year life)
- Potentially very cost competitive.
- Highly flexible functionality and software potential.
- This core product has worldwide market potential in a wide variety of applications.

## Enquiries

**Toshiba International Corporation Pty Ltd**  
**ABN 29 001 555 068**  
**2 Morton Street**  
**Parramatta NSW 2150**  
**Australia**

**Faruk Deveci**  
**[deveci@tic.toshiba.com.au](mailto:deveci@tic.toshiba.com.au)**  
**+61 (0) 400 207 992**  
**Noel Madden**  
**[madden@tic.toshiba.com.au](mailto:madden@tic.toshiba.com.au)**  
**+61 (0) 419 299 647**

**Power IQ Pty Ltd**  
**ABN 24 602 267 734**  
**15 Silverash Crt**  
**Capalaba QLD 4157**  
**Australia**

**Mike Wishart**  
**[mike.wishart@power-iq.com.au](mailto:mike.wishart@power-iq.com.au)**  
**+61 (0) 425 613 429**