

Solar Power Costs and Benefits

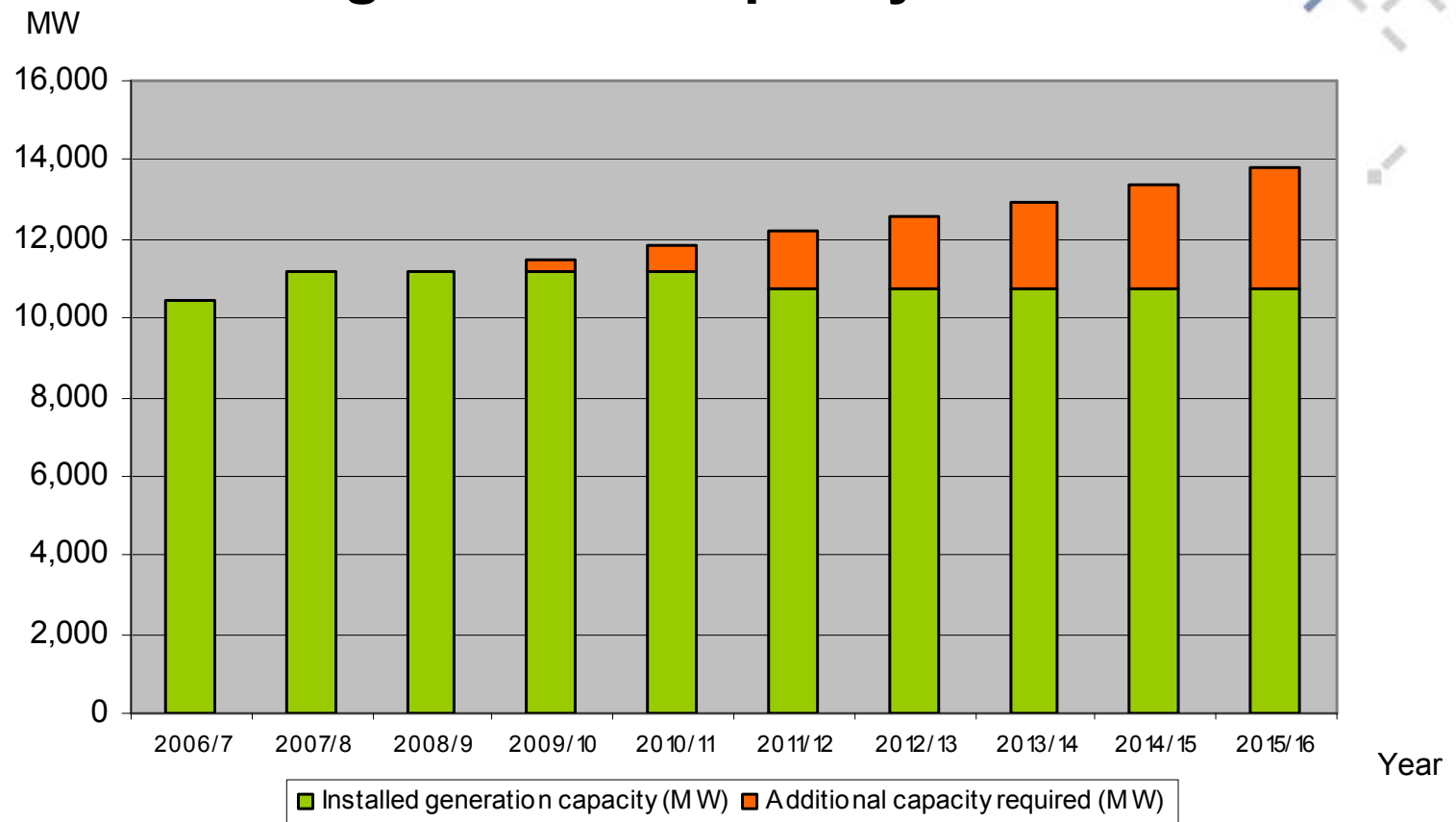
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Some terms and definitions

- Rate at which electrical power is generated or used is measured in watts (W), kilowatts (kW), megawatts (MW) or gigawatts (GW)
- 1 kW = 1000 W, 1 MW = 1000 kW, 1 GW = 1000 MW
- Some examples of electrical power used in the home:
 - Incandescent light globe = 100 W (note CFL 20 W)
 - Air conditioner = 3.3 kW
- To measure electrical energy generated or used, multiply electrical power by time period (e.g. 100 W incandescent light globe turned on for 1 hour = 100 Wh)
- Households billed in kWh (1 kWh 10 light globes turned on for one hour)
- Typical SE Queensland household uses average of 30 kWh per day
- Plant generation capacity typically in MW and output MWh

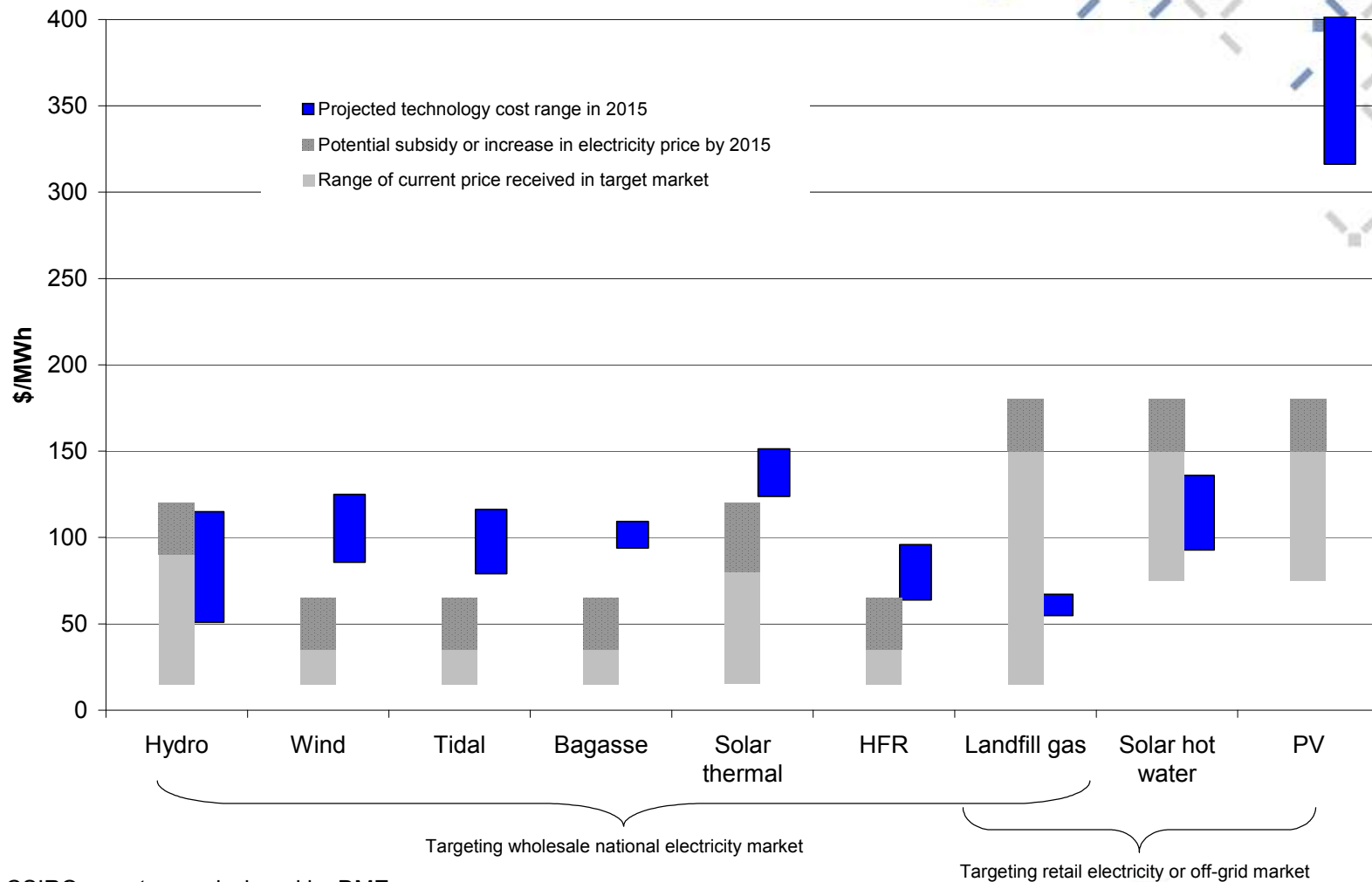
Queensland's current and projected electricity generation capacity



Renewables in the generation mix

- Renewable energy generation capacity currently 5.2% of capacity (or 3.2% of energy generated)
- Majority of renewable electricity generated from bagasse (sugar cane waste) with current plant capacity of around 400 MW
- Solar power generation very small – solar PV estimated to be around 5 MW
- Solar hot water not included in above figures (displaced electricity demand)
- Around 7% of households have solar hot water systems

Comparative economics of renewables in 2015



Source: CSIRO report commissioned by DME

Queensland the Smart State

Some indicative solar PV economics*

- Current up-front cost per MWh = \$410 (based on 1 kW system)
- Current retail price of grid connected electricity 14c per KWh or \$140 per MWh
- Effect of present rebates on up-front cost of 1 kW system
 - Installed cost \$14,000
 - Less maximum Commonwealth PVRP rebate \$8000
 - Less Renewable Energy Certificates (RECs) \$1000
 - Net cost to customer \$5,000
- Net cost per MWh = \$150 (subsidy = \$260 per MWh)
- Discounting output over life of system indicates significant deficit to owner
- 1 kW PV system able to supply approximately 12% of typical SE Queensland household electrical energy consumption

Review of solar power viability

- Large non-polluting resource
- Solar PV technology very expensive but declining in cost
- Large levels of subsidisation required in grid connected applications to match retail prices
- Carbon price not sufficient to close the gap with fossil fuel generated electricity
- Solar thermal technology better positioned than solar PV
- Solar hot water has a positive pay-off to household over system life without need for additional subsidisation

Queensland Government policies to promote solar energy

- New homes must install greenhouse efficient hot water systems (solar, heat pump, 5 star gas)
- \$5m support of Townsville solar city trial
- Developing feed-in tariff for solar PV systems:
 - Require all retailers to publish tariffs for purchase of electricity
 - Develop standard contractual conditions
- Renewable energy target commencing in 2010 – to reach 6% by 2015 and 10% by 2020 – solar PV and solar hot water eligible
- Phase out of conventional electric hot water systems in existing homes commencing in 2010, beginning with gas reticulated areas
- \$50m Renewable Energy Generation Fund to offer support to establishment of larger scale renewable plant such as solar thermal

Alternative and complementary actions to help reduce emissions

- Purchase GreenPower renewable electricity from electricity retailer
- Improve home energy efficiency. For example:
 - Install low-flow shower heads
 - Buy high energy efficiency (high star rating) appliances
 - Don't run multiple fridges
 - Use a microwave oven
 - Set air conditioners to 24 degrees in summer or use ceiling fans instead
 - Install roof insulation and window shading
 - Replace incandescent light globes with CFLs
 - Turn-off appliances at the wall

Further information



<http://www.energy.qld.gov.au>

<http://www.climatesmart.qld.gov.au>

<http://www.greenhouse.gov.au/rebates/index.html>