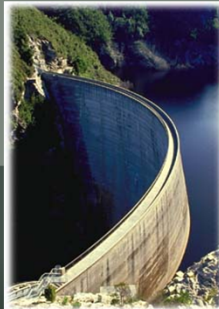


## Business overview

Christoff le Grange



## The facts



- Government Business Enterprise, which means we are owned by the State of Tasmania but operate as a commercial business
- Australia's largest renewable energy generator:
  - \$5.1 billion worth of assets
  - 2 500 MW of hydro-electric capacity in Tasmania
  - 10 000 GWh of output in 2009/10
- 350 strong consulting business *Entura*
- Electricity retail business *Momentum* – accredited GreenPower electricity retailer in Victoria
- 50% owner of Roaring 40s, 206 MW in Australia
- Value of power system realised through trading electricity and energy products in the National Electricity Market
- Other assets - King Island Huxley Hill Wind Farm, and two diesel power stations on King and Flinders Islands in Bass Strait

## The island State of Tasmania is separate to mainland Australia

- Overview
  - Size: 62,409 sq km
  - Population: 500,000 people
  - Rainfall: 626mm or 24 inches
  - World Heritage Area: 1.38 million hectares
  - Covers 1% of Australia's landmass
  - Receives 12% of Australia's annual rainfall
  - Economic growth & development over the past century has been driven by hydro-industrialisation
    - Forestry
    - Tourism
    - Agriculture

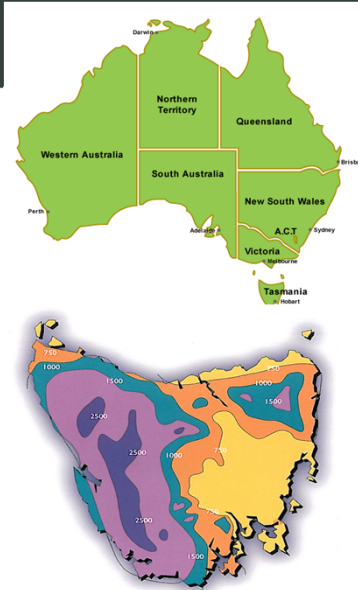
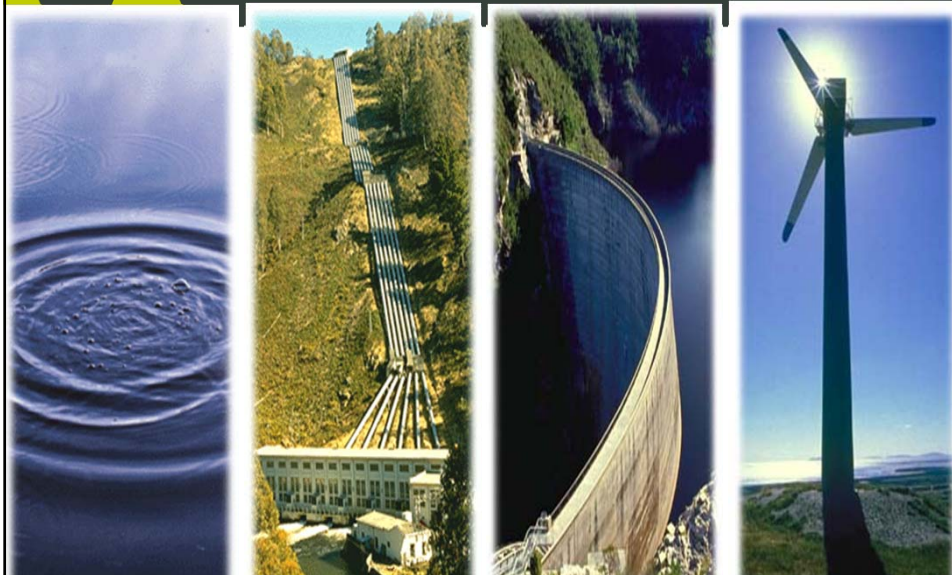
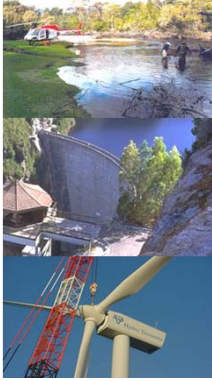


Figure 1. Tasmanian Average Annual Rainfall Distribution

## THE POWER OF NATURE: Tasmania's renewable energy from water and wind.



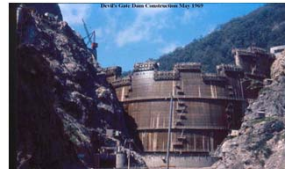
## What makes us different?



- Australia's largest renewable energy generator
- Australia's largest water manager
- One of Australia's largest renewable energy developers
- Leader in development and application of sustainability principles for the international renewable energy industry
- Offices throughout Australia and in India
- Servicing a broad client base in Australia, Africa, Asia and the Pacific

## Hydropower

- Hydropower is the basis of our renewable energy business and expertise (Special water Licence that provides access to water)
- Almost a century of expertise in power engineering and dam construction and renewable development
- 30 hydro-electric power stations (60 machines from 1MW to 165MW) in an integrated system, more than 50 large dams







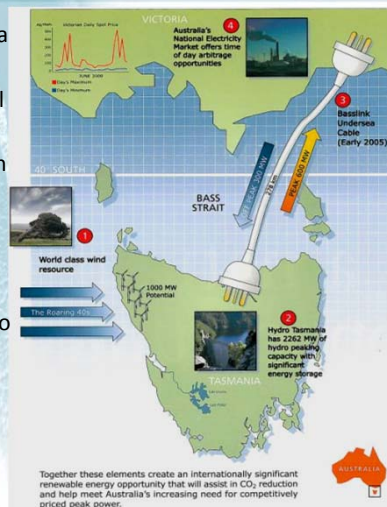
## Lake Margaret in operation from 1914

- Redevelopment of the Power Station and wooden pipeline (\$14.7 million) was completed July 2009
- Station has installed capacity of 8.6MW
- Provides 50 GWh of additional energy powering around 4 000 Tasmanian homes
- Lower Lake Margaret mini-hydro has also undergone redevelopment
- Installed capacity of 3.2 MW or around 22 GWh of extra output




## Tasmania in the National Electricity Market




- Basslink – under sea cable 450V DC
- Commissioned April 2006
- Provides connection to NEM
- 300MW import, 600MW export
- Delivery clean renewable energy to mainland Australia
- Providing drought protection for Tasmania's electricity network



## Our people



- Hydro Tasmania is a values-based organisation
- Based in Hobart, our workforce stands at 923 people across the Hydro Tasmanian group.
- Through our consulting arm Entura, we now have offices in Melbourne, Brisbane, Sydney, Adelaide, and India
- We are focused on developing our capability by retaining and recruiting the best people in the renewable energy sector


## The Hydro Tasmania group








- An anagram for 'nature', Entura provides expertise in the areas of: renewable energy; power engineering; and environmental and catchment management.
- Growing international business with offices in Hobart, Melbourne, Adelaide, Sydney, Brisbane, India and Malaysia. (Africa as project office)
- Employs approximately 350 people
- A growing consultancy business in Asia Pacific and currently active in:
  - India, Nepal, Malaysia
  - PNG, Fiji
  - New Zealand
  - Pitcairn, Solomon & Cook Islands



## Entura (Hydro Tasmania Consulting) is an international consulting practice with a centre of excellence in renewable energy

Entura  
(Hydro  
Tasmania  
Consulting)

**About Us**


- We are an international consulting practice with a centre of excellence in renewable energy.
- We believe in the benefits of renewable energy and the importance of resource sustainability.
- With a heritage that is based on technical, scientific and consulting expertise, we are proud of our achievements and long-term commitment to helping organisations to improve their energy and resource use.
- Our growth program includes an Asia Pacific expansion strategy, ideally centred around Malaysia and Africa (focus on SADC)

**International Capability**

- With over 350 technical, scientific and consulting specialists, we support corporate, government and semi-government clients across a range of geographic regions. Our strength comes from an ability to deploy the best combination of expertise to meet the needs of clients and projects in any location.
- We have successfully supported our clients in Australia, Antarctica, Cambodia, Canada, China, Fiji, India, Indonesia, Ireland, Kazakhstan, Laos, Malaysia, Namibia, Nepal, North Korea, New Caledonia, New Zealand, Papua New Guinea, Philippines, Samoa, South Africa, South Korea, Sri Lanka, Tajikistan, United Kingdom, Vietnam.

**Centres of Excellence**

- Renewable Energy is one of our key sectors
- In addition, we have market leading expertise in Power Transmission, Hydro Power, Environmental Management, Water Management and Water Infrastructure
- We have four centres of excellence located in Hobart, Melbourne, Brisbane and Delhi



## Hydropower centres of excellence

Centre of Excellence	Benefit to client
Hydrology and Systems Studies	Our teams work on leading scientific studies to understand and forecast the impact of climate change on water availability.
Survey and GIS	We are leaders in the collection and management of hydro graphic and environmental data with over 80 years continuous experience. We have a specialised team of skilled chirographers, electronics technicians and data managers, utilising the latest technology for communications, data logging and flow measurements.
Civil Engineering	Our expertise in Dam engineering incorporates the investigation, construction and management of 40 ICOLD large dams and over 90 smaller dams. We offer a full service from feasibility, construction, dam safety and decommissioning.
Mechanical Engineering	As part of utility we undertake a majority of the design, testing and maintenance advise for Hydro Tasmania's assets. We provide design, asset management, condition assessment and maintenance.

## Hydropower centres of excellence

Centre of Excellence	Benefit to client
Mini Hydro	We provide a 'one-stop-shop' to cover the complete spectrum of mini hydro services from Prefeasibility to commissioning. Being an owner and operator of all sizes of hydro generators, we understand the need to optimise life cycle costs by minimising O&M costs, maximising output efficiency and ensuring longevity of the asset. We are renowned for our innovative and economic engineering, providing the right balance between efficiency, cost effectiveness and constructability.
Remote Area Power Supply	We are owner and operator of remote island wind-diesel system, we understand the unique issues relating to working in isolated communities. From this experience we understand the need for solutions that focus on proven, reliable, cost effective and having local involvement in the construction operation and maintenance.

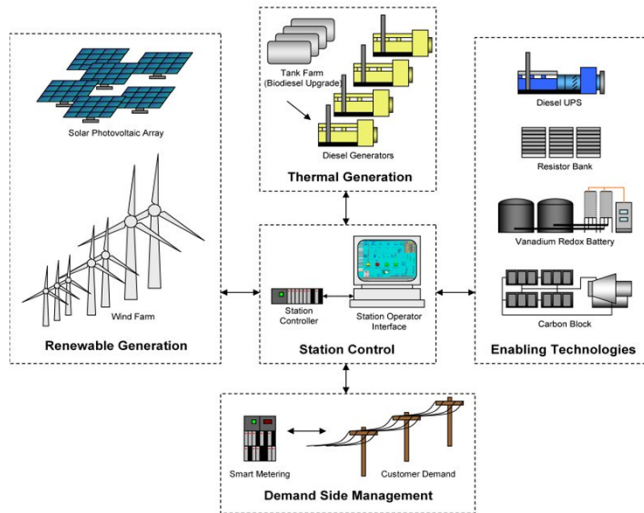
## Bass Strait islands

### Bass Strait Islands Renewable Energy Integration Project (\$61million):

- Portfolio of innovative new and existing renewable energy technologies
- Globally unique opportunity to demonstrate the integration of a portfolio of renewable generation, with enabling and smart grid technologies
- Potential to be replicated throughout NEM as renewable penetration increases
- Projects include:
  - **Diesel Uninterruptible Power Supplies (D-UPS)**, allowing achievement of 100% instantaneous renewable energy penetration
  - Installation of **energy storage** technology, incorporating thermal storage (Australian technology) and additional chemical battery storage, which has the potential of meeting both heat and electrical loads
  - **Smart Grid** - Demand Side Management (DSM) through the use of smart metering and remote load control supported by an internet communication system
  - **Expand wind and solar** energy generation
  - **Biodiesel** - conversion the diesel engines and fuel systems from conventional diesel to bio-diesel



## King Island system



## King Island system



### Wind

- 2 Vestas V52 wind turbines
  - 850 kW output
  - 60 metres tall
  - Rated wind speed of about 50 km/hour
  - 52 metre rotor diameter
- 3 Nordex N29 wind turbines
  - 250 kW output
  - 29 metres tall
  - Rated wind speed of about 50 km/hour
  - 29.7 metre rotor diameter

### Vanadium Redox Battery (VRB)

- 68 000 litres of electrolyte contained in four plastic tanks
- Six Sumitomo cell stacks
- Energy storage of 200 kW for four hours
- Peak short-term output of 400 kW

### Solar

- Six SOLON Movers manufactured by SOLON AG, total rated power of approximately 100 kW
- Each Mover is capable of producing up to 16 kW in full sun conditions
- Precise 2-axis tracking of the sun to maximise power production
- Capable of withstanding strong winds by stowing away into 'locked' position

## The Hydro Tasmania group













- Accredited GreenPower electricity retailer in Victoria
- Retail presence in Vic, SA, ACT & NSW
- Targets small to medium enterprises (SMEs)
- Also caters to commercial and industrial clients (C&I)
- Products include standard energy contracts and energy efficiency advice
- Record success in revenue, sales and volume of contracted load in the 2009/10 financial year



## The Hydro Tasmania group









- Hydro Tasmania and China Light and Power 50/50 Joint Venture
- Created in 2005 as a result of poor national policy settings and significant investment opportunities in Asia
- In 2009 the Government expanded the RET and greatly improved prospects for renewables back in Australia – this led to the sale of Roaring 40's Asian assets

**2009 Sale of Asian Business**

- Enabled Roaring 40s to refocus on emerging renewable growth opportunities in Australia
- Still operated as a 50/50 joint venture
- Immediate focus on developing Musselroe 168 MW in Tasmania and Waterloo 111 MW in South Australia
- Existing Wind energy projects in Australia: Woolnorth 140 MW, Cathedral Rocks 66 MW



## Operating wind farms

- Bluff Point Site (Woolnorth)
  - (2002 – 2004) 2002,
  - 37 Vestas V80 1.75 MW (64.75 MW)
- Studland Bay Site (Woolnorth)
  - (2007), 25 Vestas V90 3 MW (75 MW)
- Cathedral Rocks Site (SA)
  - (2007), 33 Vestas V80 2 MW (66 MW)
- Waterloo (SA)
  - 37 Vestas V90 3 MW (111 MW)



Thankyou.

