



Sustainable Energy Solutions

- Energy Efficiency
- Renewable Energy

Presentation Slides including Full Transcript

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greenBusiness09
TRANSITION TO A LOW CARBON ECONOMY

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Overview of Presentation

- The Green Energy sector
- How Enhar started
- Wind Energy
 - Onshore wind farms
 - micro wind innovations
- Offshore Wind Energy
- Wave Energy
- Tidal Energy
- Energy Conservation

Good afternoon,

Today, I will be talking about the **green energy sector in Australia**. Energy, both stationary energy generation and stationary energy consumption, is probably the largest contributor to man made emissions and to the global warming problem. Peter Redlich from Victorian department of Innovation, Industry and Regional Development Energy has told us this morning that stationary energy is responsible for 52% of all greenhouse emissions in Victoria. Conversely, it is also where major solutions are happening, and it the innovation and application of these sustainable energy solutions that I want to speak to you about today.

Enhar is a consulting company which assists clients to deliver renewable energy power generation projects, to commercialise renewable energy technologies and to implement energy efficiency improvements.

We provide knowledge-based solutions for companies

- Wishing to prove new renewable energy technologies
- Wanting to find sites to develop renewable energy projects including wind, wave, tidal and other energy systems,
- Aiming to develop, acquire or sell renewable energy projects
- As commercial energy consumers, to reduce energy demand through audits and efficiency measures,

To explain how Enhar started, I will first give you a bit of background about myself.

After completing a Bachelors in Environmental Engineering at Lancaster University and a Master of Science in Renewable Energy Technology at Loughborough University, I took up a consulting career in the UK. I worked as employee and consultant across the sustainable energy sector including Garrad Hassan, Powergen's Power Technology Centre, NPower Renewables, OPD (now Pelamis Wave Power), The Carbon Trust's Marine Energy Challenge, the Sustainable Development Commission's d-Carb UK project, in the Energy Services Division of Entec, Energy Savings Trust's Scottish Community and Householder Renewables Initiative and more.

I took a career break and landed in Australia. It is not only business which attracts UK citizens to Australia. I was initially attracted by the opportunity to travel. I later became attracted to an Australian woman who is now my wife.



I describe myself and my work as “the possibility of **energy and harmony**”. I set up the business in 2007 and named it ‘Enhar’, combination of the two words Energy and Harmony.

In Australia, I underwent a transition from backpacker to business owner:

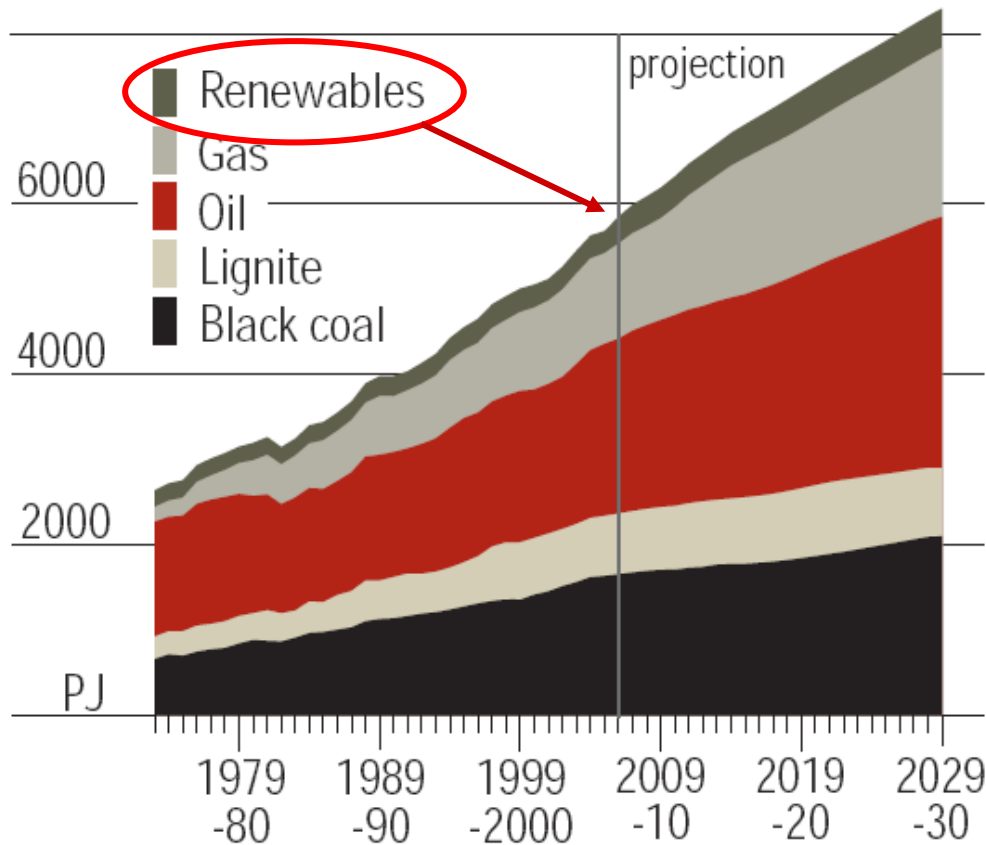


The challenges of setting up a new business have been met with support from Federal and State business start-up schemes. We now have team of five employees and contractors in Melbourne.

Now we're going to have a look at some parts of the **renewable energy industry in Australia**.

With the exception of some major established hydro power, Australia has yet to develop really significant levels of renewable power generation. We have good reason to believe however that this will happen in our lifetimes. The pace of uptake of renewable power generation in Australia has been slower relative to other developed nations. This is demonstrated in the slide showing Australian primary energy production. This means that renewable energy technology that is now available to deploy in Australia is cheaper and more highly developed than was available to other countries who were at this stage say ten years ago. Manufacturers in Europe, America and Asia are now supplying renewable energy technology which Australia benefits from.

Renewable Energy in Australia



Source:
ABARE Energy in
Australia 2008

A small but growing segment of overall energy usage

Wind power is the most established new renewable energy source.

In Australia, around 482MW were installed in 2008, bringing the total installed capacity to 1,306 MW by the end of 2008. No offshore wind projects are yet announced in Australia. This is some way behind the UK where 836 MW were installed in 2008, bringing the total UK wind capacity to 3,214 MW and a large segment of this being installed at sea.

In Australia, over 5,000 MW of new wind farm proposals have already been announced. Australia enjoys huge land area hence the spatial planning issues experienced in the UK and Europe are less of a hindrance to development. The faster rate at which Australia can increase its percentage of wind power is testimony to this less inhibiting development approval climate.

As well as large land area, wind resources are good in many parts of the country including South Australia, western and coastal Victoria, Tasmania and Western Australia.

The transmission grid is stretched due to the large distances involved and in its current form poses a constraint to development. However, large volumes of additional wind energy are to be expected within the existing system in Australia.

Following the Federal election the pledges of the new government in favour of renewable energy, a second 'wind rush' is taking place. Some land owners are cautious to proceed with striking deals with an industry which they have seen disintegrate once before.

Enhar assists clients in the wind energy sector in the following ways:

- Site finding, feasibility and acquisition
- Wind speed monitoring, wind resource analysis
- Predictions of energy yield from wind projects
- Assistance with planning and development applications
- Noise, visual and shadow flicker assessments
- Construction advice and management
- Compliance with standards including Certified Windfarms Australia



An example of **innovation in wind farm prospecting** work is the use of online aerial photography and relief tools to replace physically driving around large areas of the country to identify good sites. Because high resolution aerial photographs are now draped across detailed terrain elevation data for the whole country, we now fly above terrain with an eagles eye view enabling us to scope out large areas from a computer without leaving the office.

Opportunity for partnership between Australia and the UK in this sector includes the transfer of human resources from the UK, where a larger workforce is engaged in the wind industry, into Australia as the wind industry picks up.

It is not all plain sailing however. In the UK, a groundswell of local opposition has made onshore wind more difficult to permit much sooner than many companies expected. The mega wind farm proposal for the Isle of Lewis is a case in point, where 6 years of investment in proving the case was lost as the final court hearings fell in favour of the objectors and none of the proposed 181 turbines are being built.

This fact that the sea is nobody's "back yard" has swung the pendulum towards offshore wind faster than some expected in the UK. We predict that this shift towards offshore wind will also occur in Australia at some point.

Offshore wind potential in Australia is significant, again due to large stretches of coast with suitable sea depths, significant wind resource and coastal power infrastructure for connections.

Enhar assists clients to realise offshore wind opportunities by providing:

- Site finding and development
- Wind resource analysis and feasibility studies for offshore wind farms
- Designing site layouts and determining total generating capacity
- As an independent due diligence assessor for sales or acquisitions

Opportunities exist for UK firms with experience of offshore wind farm development and construction to partner up with Australian developers.



Local wind power



Windpods,
Western Australia



Swift turbine, UK

In the rooftop wind energy sector, innovative products are developed by both Australian and UK firms. Here we see the Australian WindPods product and the Scottish Swift turbine, both suitable for rooftops with good wind resources.

Enhar provides services for commercial installations of small and rooftop wind energy systems including:

- Feasibility, equipment price tendering
- Wind resource monitoring on rooftops



Marine Energy



Marine energy is another very interesting area of opportunity.

Innovation and development of marine energy technology has progressed both in the UK and Australia. The UK hosts the European Marine Energy Centre in Orkney where many leading wave and tidal energy devices have been rigorously tested against new Standards for marine energy technology.

Pelamis Wave Power are unfortunately unable to join us today. Their technology, developed in my home town of Edinburgh, is a world leader. The achievements of Pelamis Wave Power include the generation of the first offshore grid connected wave power in the world and deployment of three of their full size floating attenuator systems in a commercial scale wave farm in Portugal.

In Australia, several **wave power** products are under development with leaders including Carnegie's CETO system, developed in Western Australia, with plans to install a wave farm in South Australia.

The potential for wave power generation in Australia is very large due to the enormous lengths of coastline with high wave resources in many States including Western Australia, South Australia, Western Victoria and Tasmania. With population concentrated along the coasts, power infrastructure is reasonably located to accommodate marine power generation.

The relative status of **tidal power** technology innovation in Australia and UK is similar to wave power. Tidal power innovation in the UK includes leaders such as Marine Current Turbines whose Seaflow turbine has generated record levels from tidal currents in UK waters. The tidal energy resource in Australia is less than the UK due to lower tidal current velocities. However several tidal power inventions are progressing in Australia. In the slide you can see a prototype turbine from the CETUS marine energy system. Enhar provided an independent report on the proven and potential power generation capacity of the CETUS marine energy technology.

Enhar provides consulting assistance for Australian wave and tidal technology developers including:

- Power performance evaluation of wave and tidal technology against recognised Standards
- Evaluation of tidal and wave technology design and performance to satisfy investor criteria

We also provide services for tidal and wave farm developers in Australia including:

- Wave and Tidal farm site-selection , design and development
- Wave and Tidal farm site permitting, feasibility, resource monitoring and energy yield assessment



Other Renewable Energy Sectors

This presentation would be incomplete without mention of other major sources of renewable power which are being developed in Australia:

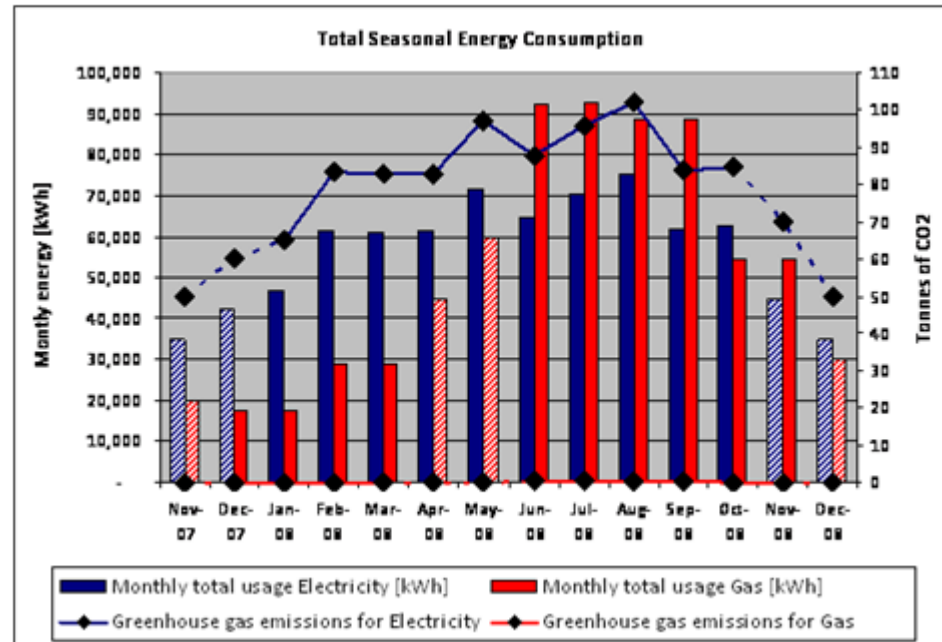
- Biomass heat and power
- Solar Thermal
- Solar Photovoltaic
- Geothermal

Energy Conservation

Energy Conservation is the last topic I will mention today. Reduction in stationary energy usage is probably the largest available source of greenhouse emission reductions.

We as a society must use energy wisely as well as generate it renewably.

Enhar conducts energy audits and efficiency recommendation reporting for schools, office buildings and industrial facilities. Shown below are some examples of power monitoring and seasonal analysis.



Our philosophy is that energy saving systems should be engineered “built-in” hard-wired systems rather than “remember to switch off” reminders. Rather like the route to a new Health and Safety culture, well engineered systems which eliminate the possibility of energy wastage are more effective than softer systems of behaviour change requests.

Which brings me to my final point. I believe that we the business community have the ability to meet the environmental challenges facing the globe by engineering and implementing the solutions. While lobby groups focus on persuading the public to change habits, our well engineered, green solutions will make the biggest difference by making everyday life for all of us become **green business** as usual.

Enhar will be working with clients to make this vision into a reality.

Thank you.

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