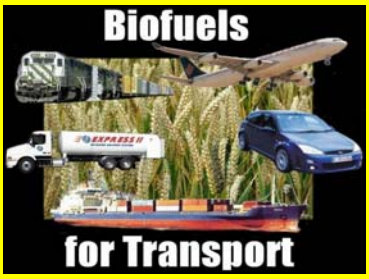
ALTERNATIVE ENERGY

SOLAR
WIND
BIO-FUELS
WATER



CONTENTS

1) *Background to the Murraylands Renewable Energy Industry*

- Renewable energy is back in focus as Australia prepares for a carbon-constrained world. Power consumption more than doubled in the last 20 years, and the industry is predicting that it will rise by another 67% by 2030.

- Tackling climate change is an integral part of the renewable energy sector
  REPORT – "Tackling Climate Change 2007 – 2010" www.climatechange.sa.gov.au
  REPORT – CSIRO – Climate Change Projections for SA
  REPORT – Climate Change – Risks and Opportunities

- Renewable sources – mainly wind, hydro and solar provide less than 10% of Australian energy supply, well below the comparable levels in the USA and Europe (Doc.' Renewable Energy Resources & Conversion Technology UNSW')

- Australia has been a world leader in Solar Technology with a practical need to supply a host of small and remote locations with electricity. However, Germany leads the world in solar farm installation.

- Solar is the most common form of renewable energy used by remote communities. Queensland town, Windorah has developed the state's first solar farm to provide power during daylight hours at a cost of $4million. (see attachment)

- The cost of photovoltaic (PV) cells continues to fall as manufacturers learn how to slice the super expensive high grade silicon even thinner, but cheaper solar is more likely to come in the medium term – 2025 – from large scale solar thermal and solar concentrators.

- Unlike hydro and coal power, Wind Farms are not affected by the drought and shortage of water. They also save on greenhouse gas emissions: a 1MW turbine, for example, provides enough electricity for 300 homes and saves more than 2000 tonnes a year of greenhouse gas. Europe is the leader in Wind Power technology and the USA has a significant number of Wind Farms providing alternative energy to consumers

- According to the Australian Wind Energy Association (Auswind), at March 2006 there were 817 MW of installed wind capacity in this country. There are now 42 operational wind farms in Australia. www.auswind.org

- In South Australia 20% of electricity will be generated by renewable sources by 2014 as local government leads an initiative from Premier Rann. When completed, 239.5MW of power will be generated from stage one and two of the Babcock and Brown Wind Partners at Lake Bonney, near Mt Gambier. www.bbwindpartners.com

- Many of the existing wind installations are small and provide power for a restricted use or locality; others – while nowhere near the capacity of large coal fired base-load stations – make serious contributions to the grid supply. http://www.tarongenergy.com.au/pdf/brochures/starfish_hill.pdf www.starfishhill.com.au/

- Australia's largest retail energy supplier, AGL Energy, has 3 major developments in SA – Hallet 95MW, the Bluff 45MW and Hallet expansion 250MW

- Bio-fuels are clean-burning, environmentally friendly fuels that are manufactured from agricultural products. Bio-diesel can be made in the Murraylands from grain, canola or any other oil or fat, via chemical reaction with an alcohol (usually methanol). Bio-diesel is suitable for most diesel engines without modification.

- The Bio-diesel industry is already a significant force in the US and Europe and is rapidly emerging as a new industry sector in Australia, with approximately 450 ML of production capacity coming on stream in 2006, up from only 10 ML in 2004. The Australian Government has set a target for the production of 350 million litres (ML) of biofuels per annum by 2010, representing 1% of total Australian transport and fuel consumption (currently around 35,000 ML).

- To do this will require enhanced varieties in crop-based feed-stocks and the development of additional novel feed-stocks (e.g. micro-algae) for bio-diesel production. - SARDI BIOFUELS RESEARCH PROGRAM - http://www.sardi.sa.gov.au/pages/biofuels/biofuels_research_program.htm:sectID=877&tempID=1

2) *Regional Development / Expansion Potential*

SOLAR

- A trial solar thermal project using parabolic mirrors to magnify the sun's energy is under development by a company, Solar Systems, near Mildura in Victoria and has received significant Federal and State government support.
  WEBSITE - www.solarsystems.com.au

- A second solar system, a kilometre high 'sun siphon' will also be built near Mildura by a public listed company EnviroMissions Ltd, with the potential to power 200,000 homes and provide 900 jobs when under construction
  EXPLANATION - www.enviromission.com.au/pdfs/ecos_sept_oct_2003.pdf
  DESCRIPTION – www.aie.org.au/pubs/enviromission.htm
  WEBSITE - www.enviromission.com.au

- Adelaide is the site of Australia's first Solar City. The northern areas of Salisbury, Tea Tree Gully and Playford, specifically the suburbs of Mawson Lakes, Lochiel Park, Northgate and Playford North, are the key focus of this innovative 'real world' trial.

  AGL have a solar system in the Flinders Ranges
  www.agl.com.au/AGLNew/About+AGL/Generation+assets/Solar/default.htm

- An innovative solar farm industry developed in the Murraylands, creating long term employment in associated solar power industries and long term solar farm maintenance. Vital requirements for a solar farm include ample sunshine and transmission grid lines for energy transfer

- The Murraylands could also be suited to solar farming by individual solar farmers as is the case in Carnarvon WA. (see News Report attachment)

- Green and Gold Energy Pty Ltd have expressed interest in the Murraylands Region for the development of their 'Sun Cube' a high efficiency solar energy concentrator and innovative solar farm concept.
  www.greenandgoldenergy.com.au

WIND

- By the end of the decade, AGL hopes to be operating 134 turbines in SA with a combined capacity of 255MW. And it has under consideration investment in a further 400MW of wind generation.

- South Australia is committed to the development of the renewable energy industry for both environmental reasons and its strategy of supporting smart manufacturing in emerging industries. The State has a strong manufacturing capability across each of the core wind energy manufacturing areas: tower fabrication, composites and components, cast metals and machining, and electrical power and control systems engineering.

- The Murraylands Region has several potential areas for wind powered energy farms and initial research and testing is being carried out on at least one site in the lakes area near Narrung.

- Other potential sites are located around the coastal, Coorong and lakes area of the Region. Landowners have an opportunity to earn additional income for each turbine they have on their land. By diversifying into wind-clusters, landowners receive a regular income, with no additional labour or expense, over the long term.

- Wind Prospect is a leading independent wind energy developer, constructor and operator, working in Australia, UK, Ireland, China (Mainland and Hong Kong), New Zealand, Canada and France. In Australia, Wind Prospect Pty Ltd has over 800MW of consented wind energy developments, and 300MW of these developments are either under construction or already operational. Wind Prospect is active in South Australia www.windprospect.com.au

BIO-FUELS

- Investigations are underway into a commercially driven land care opportunity for South Australia. It involves the development of a mallee agro-forestry system for the purposes of bio-energy production, land-care, mallee-wood products, carbon sequestration and possibly future bio-fuels production.

- For the past six years Dr Harrison of Verve Energy (W.A.) has been a key player in a world-first bio-energy project from mallee that has produced oil, activated carbon, charcoal and electricity from the eucalypt. http://www.verveenergy.com.au/subContent/homePageInfo/iwpExpressionInterest.html

- The vision is to develop a commercial tree crop for farmers, which could see 1,000's of hectares of mallee integrated with existing farming practices, grown by farmers on their land, to be harvested and sold to a regional Integrated Wood Processing plant. The concept is based on an existing model being established in Western Australia by the Oil Mallee Company www.oilmallee.com.au

- SARDI Bio-fuels Research Program: The Sustainable Systems Strategic Research Area, led by the Chief Scientist Rob Thomas, has developed a new program focussing on Bio-fuels (with an initial focus on Bio-diesel). This program is led by Principal Scientist Dr Kevin Williams. The primary role of the program is to use existing and new SARDI expertise and infrastructure to research and develop feed-stocks for bio-fuel production. Reliable, affordable sources of feedstock are needed to underpin the rapidly developing Bio-fuels industry.

- SARDI has a strategic relationship with Australian Renewable Fuels (ARF). This company was recently listed on the Australian Stock Exchange. Its strategy is to become the leader in bio-diesel production in Australia. ARF's first 45,000 million litre per annum production plant has been built in Adelaide and will initially use tallow as feedstock. ARF intends to expand its production capacity to 220,000 million litres per annum and to do that it will need new sources of feedstock. ARF has engaged SARDI to research and develop new (and improved) feed-stocks from crops, micro-algae and other sources.

- Under a new structure, the Bio-fuels Group will include two subprograms – breeding and micro-algae. SARDI will use current breeding and farming systems capabilities to evaluate and develop canola and mustard varieties specifically tailored to bio-diesel production. Some of these varieties will be targeted to cultivation in low-rainfall areas of the state, providing farmers with more crop choice in rotations.

- The SARDI aquatic science research capability will also be used to select and develop micro-algae as a source of oil for bio-diesel. Studies show that algae can produce up to 60% of their biomass in the form of oil.

- SAFF has developed a unique system by which they guarantee their pure bio-diesel is 100% carbon neutral. They achieve this through the planting of native mallee trees, which soak up carbon dioxide gases as they grow, acting as a "carbon sink". The cost of this tree-planting is included as a levy in the price of Bio-diesel. www.farmersfuel.com.au

- Minister commends Big Green Umbrella
  The Big Green Umbrella has secured the support of service station chain SAFF which will offset all the carbon dioxide created by the bio-fuels in its new Green Fuel range by facilitating the planting of thousands of trees on former farm land near Murray Bridge. Greening Australia has designed and will implement the tree planting program to recreate bio-diverse mallee forests. www.greeningaustralia.org.au/

- Australian Carbon Bio-sequestration Initiative Ltd (ACBI) is a not-for-profit company that operates The Canopy Project and the Big Green Umbrella Project. They plant trees to create carbon sinks that offset CO2 emissions. They legally register the "carbon credits" on land titles to keep them safe. www.acbi.org.au

- ACBI have planted native trees (with Greening Australia) on the Shores of Lake Alexandria, continue to plant at the Mitsubishi testing site at Tailem Bend and on former farm land in Murray Bridge www.biggreenumbrella.org.au

3) *Future Technologies*

CETO Wave Energy Technology

- Carnegie Corporation, an Australian plc is focussed on developing and commercialising clean energy technologies. Carnegie is currently developing two clean energy technologies: CETO Wave Energy and Cleaner Coal Power.

  The CETO Wave Energy technology harnesses the ocean's waves to create zero-emission fr3eshwater and power from a variety of wave heights. The best wave energy sites in the world, such as much of the Australian coastline, receive sufficient wave energy greater than 90% of the time, making CETO a base load renewable energy technology.

- CETO operates as a pump. The submerged buoys harness the ocean's energy to drive CETO units which pump seawater ashore at high pressure. The pressurised water can be used to drive turbines onshore to create base load electricity. Simultaneously the seawater can be desalinated via reverse osmosis to create zero emission fresh-water

- SUNDERMANN Low-head Water Turbine

  The only water turbine that can produce electricity from low-head, low-velocity water and designed for use in tidal flows, rivers (River Murray) and streams

- Can be produced in varying sizes (from 1 kW upwards) and used as single units or in batteries. Out-performs wind and solar powered generators and provides power at all hours. www.sundermann.com.au

3) *Challenges*

- Improve understanding of opportunities to reduce energy use and greenhouse gas emissions
- Expand, develop and attract providers of greenhouse friendly products and services and industries that have sustainable business practices
- Encourage trialling and innovation of products and services within existing businesses
- Stimulate Research and Development activities, making the Murraylands a Center for Renewable Energy
- Facilitate commercialisation plans for priority technologies
- Collaboration – improve linkages between the research sector and industry
- Develop appropriate sustainability skills and practical experience for a greenhouse ready economy
- Encourage local government policies to reduce Murraylands industry greenhouse emissions