



ambreCTL

Rural Watch, Pittsworth
22 March 2010

Outline

- Introduction to Ambre Energy
- Global & Australian Energy Issues
- ambreCTL
- Project Specifications & Comparisons
- Environmental Advantages

Ambre Energy

- **Australian company** founded in 2005
- **Based in Brisbane** - office in Salt Lake City USA, with further site offices due to be opened in Felton area and in Toowoomba in 2010.
- **24 Employees**, 220+ shareholders
- **Good Management Track Record**
 - ❖ **Millennium Coal** project in Bowen Basin, Queensland
 - ❖ developed and sold by Ambre Energy team members & shareholders in 2004/05
 - ❖ current owner is Peabody Energy
- **Poised to commence coal mining operations in USA** by mid-2010
- **ambreCTL** will be company's 1st project in Australia
- **\$60+ million invested** in company development



Ambre Energy development

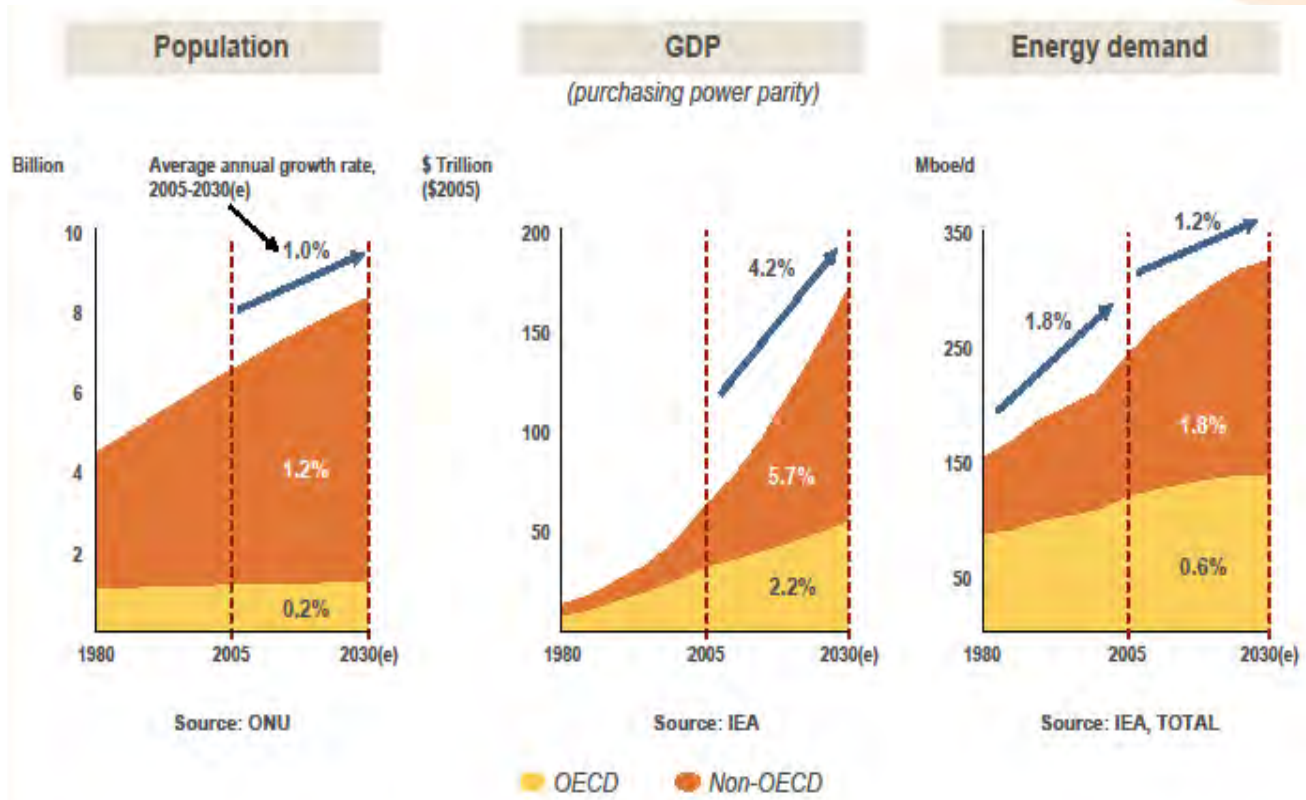


- **Ambre Exploration and Mining Team has identified and acquired world-class coal assets**
 - Australia – 500 million tonnes within 2800ha footprint at Felton, near Toowoomba
 - 1000km² of coal exploration permits in SE Queensland
 - USA – poised to acquire and assume operation of coal mines in Wyoming and Montana
- **Ambre Chemical Engineering Team has overseen acquisition and development of technologies to upgrade coal**
 - Low temperature pyrolysis for direct liquefaction of coal & production of char
 - Assessment & development of coal gasification systems
 - Improved syngas-to-DME (**dimethyl ether**) production technology for diesel engine applications

Ambre Energy Demonstration Pyrolysis Plant in Vernal, Utah



Global energy demand



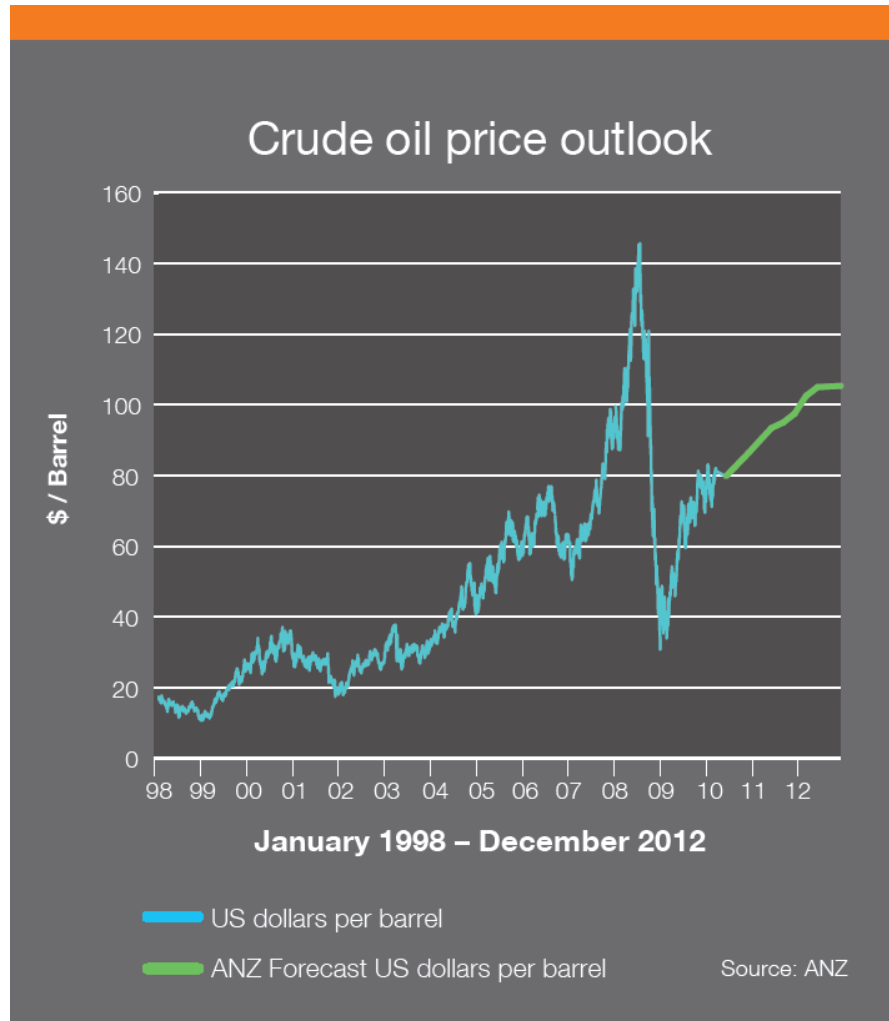
*Population, welfare and energy supply:
demand needs to adapt*



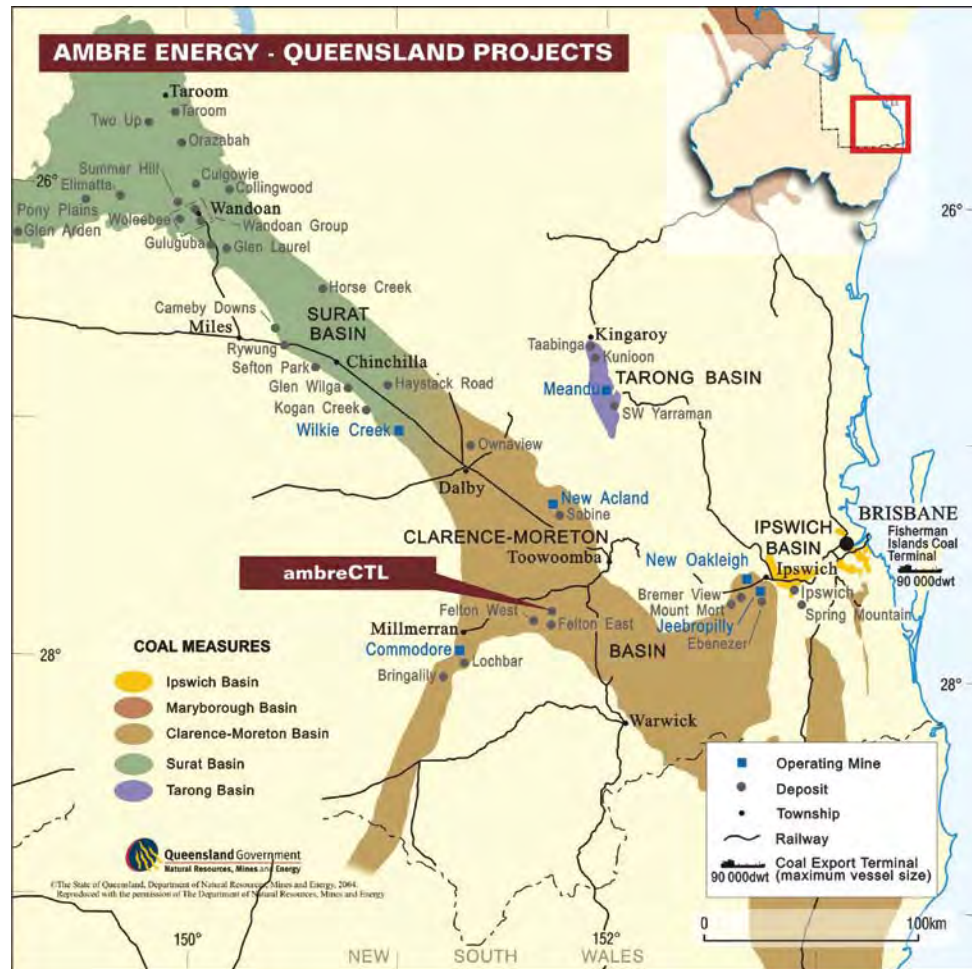
Global energy supply

- **Oil**
 - “Civilisation’s Lifeblood”
 - Oil fields are depleting – can global production keep pace with demand?
 - New oil field discoveries are much smaller and more expensive to exploit than previously
 - Concentration of reserves in hands of state-owned corporations and unstable governments
- **Gas**
 - Used to replace oil and coal as a cleaner fuel, particularly for power generation
 - Surplus supplies in Australia and around the world are being secured for international LNG market
- **Coal**
 - Widespread global deposits, but best coal has been mined
 - New coal mines - lower quality coal and more expensive to produce
- **Renewables, Nuclear, etc.**
 - Limited capacity to increase share of global energy supply

Crude oil price outlook



ambreCTL location



Project development to date



- Total coal resource = 500Mt
- High ash content ~35%
- EIS studies commenced
- \$7 million+ spent on drilling, laboratory testing, mine design, EIS studies, R&D and land acquisitions
- \$1 million+ spent in surrounding towns such as Pittsworth & Toowoomba

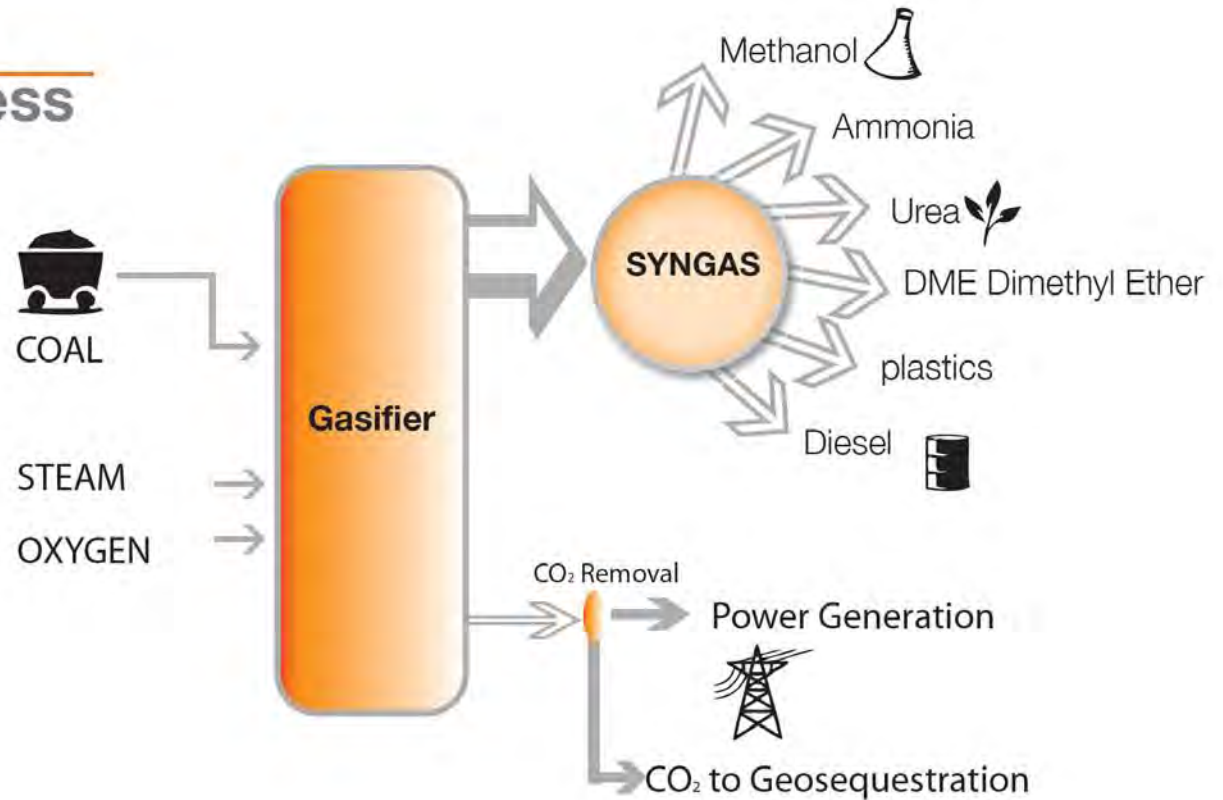
Project revision 2010

- **Original Concept: Felton Clean Coal Demonstration Project**
 - Coal gasification plant (above ground) and demonstration-scale reactor
 - Feed coal - 800,000 tonnes/yr from adjoining Ambre coal mine
 - Gasify coal, and convert resulting syngas to dimethyl ether (**DME**), a cleaner diesel replacement
 - 2nd stage expansion - 3.8 million tonnes/yr of coal to DME
- **Revised Project: ambreCTL**
 - Commercial-scale coal gasification and fuel production facility
 - Feed coal - 4.0 million tonnes/yr from adjoining Ambre coal mine
 - Gasify coal, and convert resulting syngas ($H_2 + CO$) to methanol (CH_3OH)
 - Convert methanol to zero-sulphur unleaded petrol and LPG, using ExxonMobil MTG technology
 - Estimated capital expenditure in order of \$3.5 billion
 - 540 jobs ongoing (up to 1170 jobs during 2 yr construction period)

Coal Gasification – cleaner use of coal



The Gasification Process



Contrast with other coal/gas projects



- **Conventional Coal Combustion**

- Eg. Millmerran Power Station
- Coal is burned to produce steam which drives steam turbine to produce power

- **Coal Seam Gas (CSG)**

- Deep underground coal seams are de-watered to release methane (CH_4)
- Methane is burned for power generation or piped to towns for domestic use
- Proposals to pipe to LNG plants for compression/liquefaction to enable export via specially designed ships

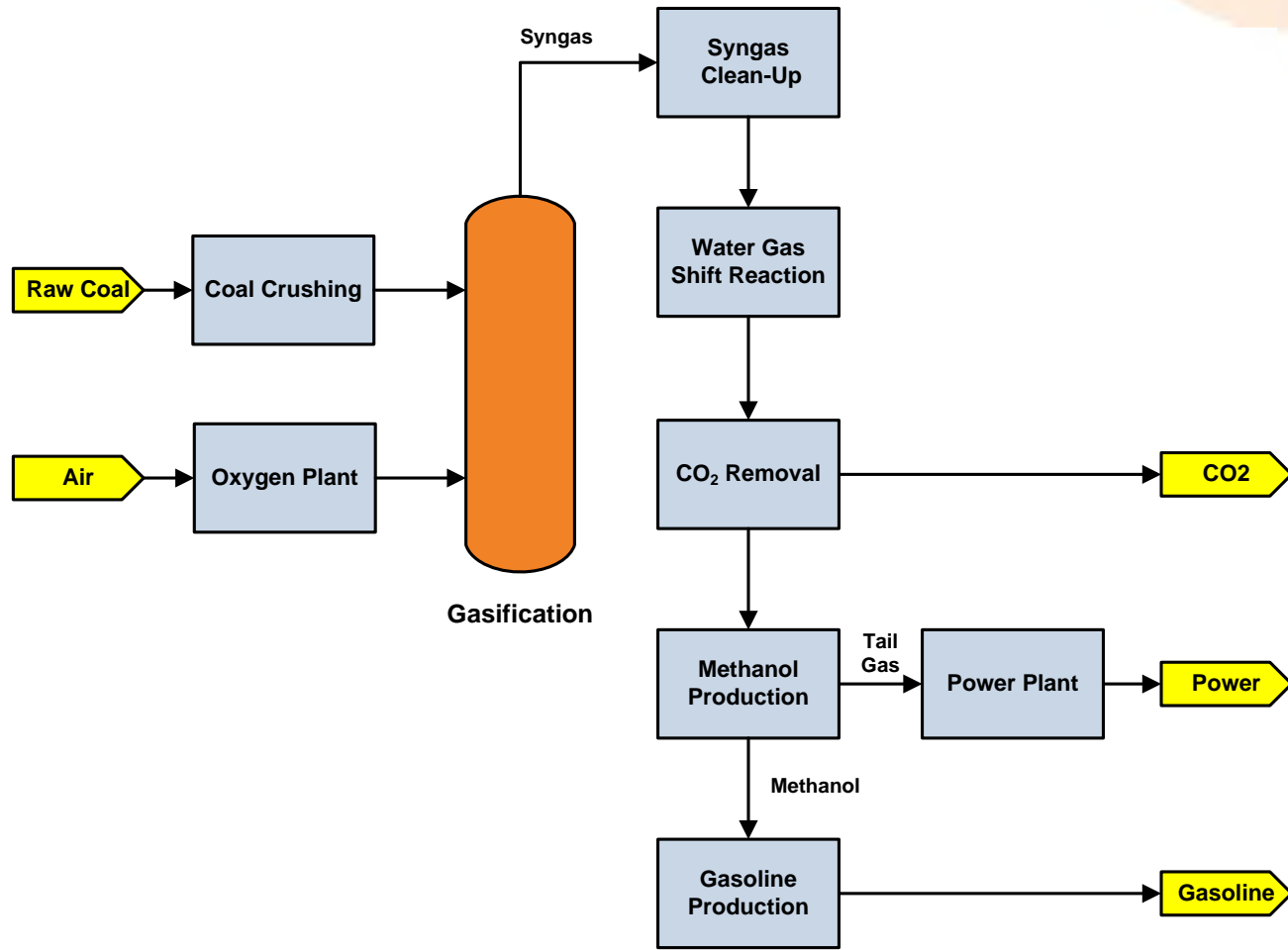
- **IGCC power plants**

- Integrated Gasification Combined Cycle
- Eg. Zerogen proposal
- Similar to ambreCTL (ie. above-ground gasification) but syngas is burned for power generation, rather than processed further to produce fuel

- **Underground Coal Gasification (UCG)**

- Eg. Linc Energy, Carbon Energy
- Syngas is produced “insitu” by burning deep underground coal seams and piping syngas to surface

Process overview



ambreCTL – Specifications and comparisons



Capacity	ambreCTL Annual Quantities	Total Annual Australian Consumption 07/08	% supplied by ambreCTL
Feed Coal	4.0 Mt		
Unleaded Petrol	940 ML* (18,000 bbl/day)	19,234 ML	4.9%
LPG	150 ML	4,024 ML	3.7%
Sulphur by-product	19,710 tonnes		

ambreCTL environmental advantages



- ExxonMobil MTG technology produces zero-sulphur petrol and LPG
- No need for further refining (unlike Fischer-Tropsch technology used by Sasol)
- Only 2 sources of gas emissions from the plant:
 - Flue emissions from combustion of the fuel gas for power generation;
 - CO₂ stripped from the syngas prior to methanol production
- Flue emissions will be much cleaner than from normal coal-fired power station – low sulphur, low particulates
- CO₂ will be captured in high purity form for geosequestration or industrial uses but can initially be vented safely onsite
- Coal gasification allows commercially and technically viable large-scale capture of pure CO₂ from coal-fuelled energy production
- Shallow coal deposit allows for progressive rehabilitation of land as mining operation advances



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