



COALWORKS & SYNTHESIS ENERGY

BEIJING CONGRESS PRESENTATION 2010



PRODUCTION OF LIQUID FUELS FROM
OAKLANDS COAL UTILISING U-GAS AND
MTG TECHNOLOGIES



DISCLAIMER



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EXECUTIVE SUMMARY



Core business: CTL and Thermal and Coking Coal Projects

Listed in June 2008

Cash \$10M as at Jan 2010

Shares on Issue ~103.8M Current Share Price ~\$0.40 Market Cap ~\$42M

Resources: Vickery South – 42 Mte JORC Inferred Semi-soft Coking Coal, PCI and Thermal Coal.

Ferndale – 250 to 330 Mte Exploration Target of export quality Thermal Coal and Semi-soft Coking Coal.

Oaklands North – 121 Mte JORC Measured Thermal Coal.

572 Mte JORC Indicated Thermal Coal.

129 Mte JORC Inferred Thermal Coal.

TOTAL of above: over 1,100 Mte



WORLD CLASS COAL PROVINCES



COALWORKS PROJECT	NEAREST MAJOR EXISTING OR DEVELOPING COAL MINE
OAKLANDS NORTH (100%)	OAKLANDS (RIO TINTO)
VICKERY SOUTH (100% reducing to 51%) - JV farm in with ITOCHU signed	VICKERY (WHITEHAVEN – EX RIO TINTO) TARRAWONGA (WHITEHAVEN) ROCGLEN (WHITEHAVEN) CANYON(WHITEHAVEN) WATERMARK (SHENHUA) ASTON (EX RIO TINTO) CAROONA (BHP)
FERNDALE (90%)	MANGOOLA (XSTRATA) BENGALLA (RIO TINTO –WESFARMERS- TAIPOWER – MITSUI)
HODGSON VALE (100%)	NEW ACLAND – NEW HOPE COMMODORE – INTERGEN/MILMERRAN



SITE LOCATION





OAKLANDS NORTH COAL RESOURCE



Oaklands North's resource has almost **TRIPLED** since June 2008

Present Oaklands North Resource

Measured:	121Mte
Indicated:	572 Mte
Inferred:	<u>129 Mte</u>

Total Resource: **822 Mte**

- Measured resource drilling program completed in Northern portion
- Southern Measured resource pending
- Large open pit mining potential
- Existing rail alignment and easement into the project





OAKLANDS NORTH MEASURED, INDICATED & INFERRED RESOURCES



Resource status	Seam	Mass (Tonnes)	Average Thickness (m)	Raw Ash ² (%)	Fixed Carbon ² (%)	Total Sulphur ² (%)	Volatile Matter ² (%)	Gross Calorific Value ² (Kcal/kg)	Total Moisture ³ (% ar)
Measured	Lanes Shaft	121 Mt	16.7	14.2	44.9	0.27	24.4	4900	26.2
	Indicated	Lanes Shaft	570 Mt	14.5	41.7	0.28	24.1	4610	25.6
	Coreen Creek	2 Mt	0.9	20.5	40.5	0.22	22.6	4370	24.6
Total Indicated		572 Mt	15.4	17.8	41.7	0.28	24.1	4610	25.6
Inferred	Lanes Shaft	112 Mt	13.9	19.7	40.3	0.28	23.5	4460	24.7
	Coreen Creek	18 Mt	1.0	14.5	42.7	0.61	26.4	4850	26.6
Total Inferred	Total	129 Mt	15.0	19.0	40.6	0.32	23.9	4510	25.0
Total ⁴		822 Mt							

¹ Calculated in accordance with the Preston & Sanders Method

²Based on a constant (16.46%,) air dried moisture content, determined from the average for all plies. Values have been corrected for total sulphur using the formula CV (corrected) = CV (uncorrected)-0.95 x total sulphur.

³ Moisture as received in the laboratory, core having been wrapped on recovery to prevent moisture loss before analysis; included for comparison purposes only.

⁴Calculated using minimum potential working section thickness 0.40m, maximum potential working section raw ash content 40% (adb), and maximum cumulative overburden: coal ratio 10:1 BCM/tonne.



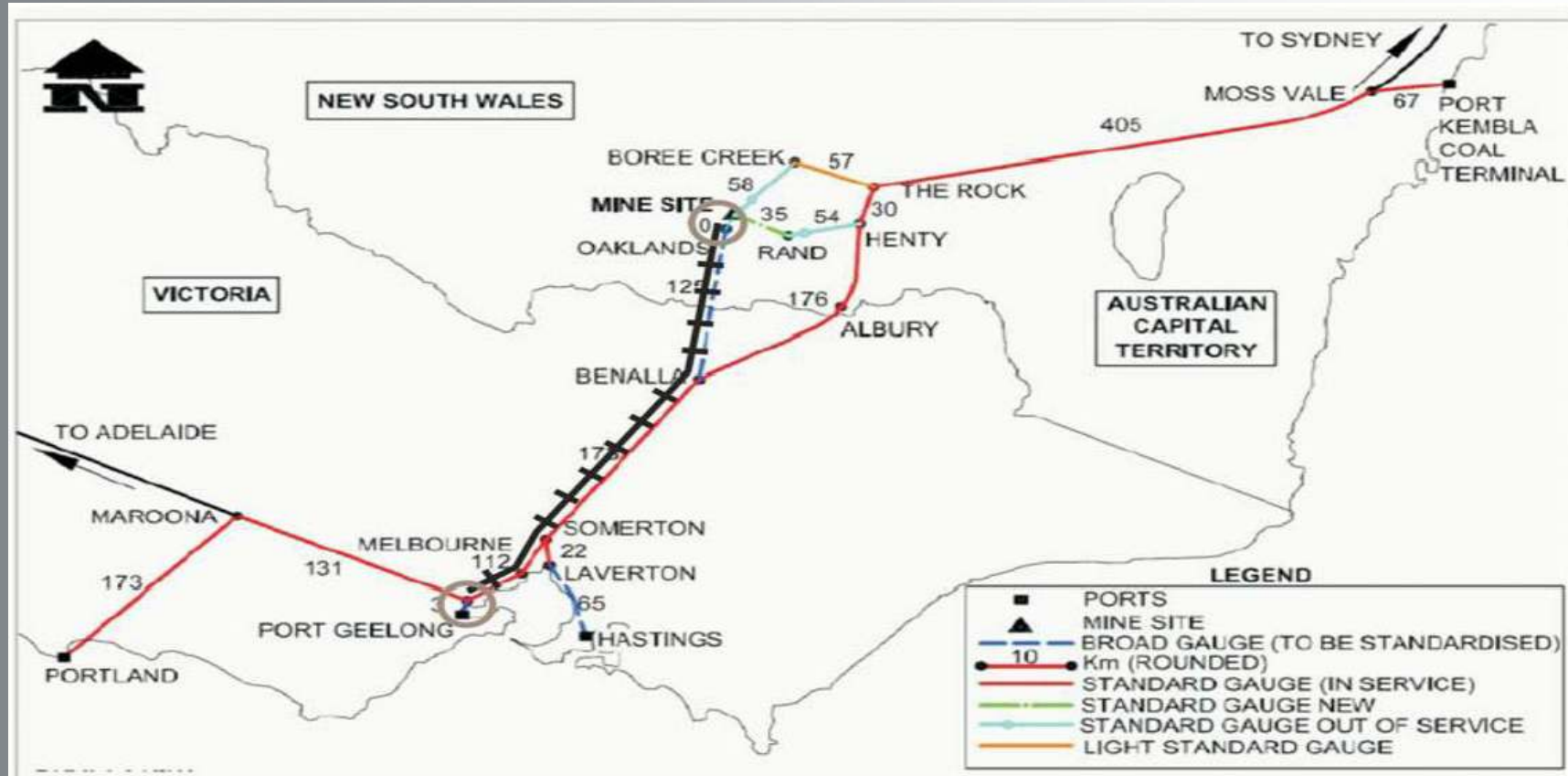
OAKLANDS NORTH CONVENTIONAL COAL MINE



- Preliminary Mine & CTL Study almost complete & Bankable Feasibility Study (BFS) process commenced
- Preliminary mine plans for the north and south developed
- Landowner Relations
 - Strategic partnerships formed with key landowners
- Community Relations
 - Regular updates distributed to local residents by Urana Shire Council
- Locally-based Operations Manager & Exploration Manager appointed
- Water & Environmental studies commenced
 - Meteorological Station installed at Oaklands and data is being uploaded via the Telstra NextG network
- Transport Options
 - Securing of Rail/Port well advanced



RAIL ACCESS TO SITE





OAKLANDS COAL TO GASOLINE PROJECT



- Oaklands coal deposit
 - Approximately 800Mt of coal
 - Coal is ideal for gasification (as tested by GTI Chicago) by U-gas method- carbon conversion rate > 97%
 - Synthesis gas to methanol to gasoline
 - This major coal deposit is equivalent to 100% of Australia's current petrol consumption for 10years
- Concept Feasibility study completed for 7,000bbl/d CTL plant
- Alternatives – 14,000bbl/d, 21,000bbl/d
- Next step – PFS
- First Petrol 2015 at 75% of nameplate production



OAKLANDS COAL SUITABILITY FOR FLUIDIZED-BED GASIFICATION

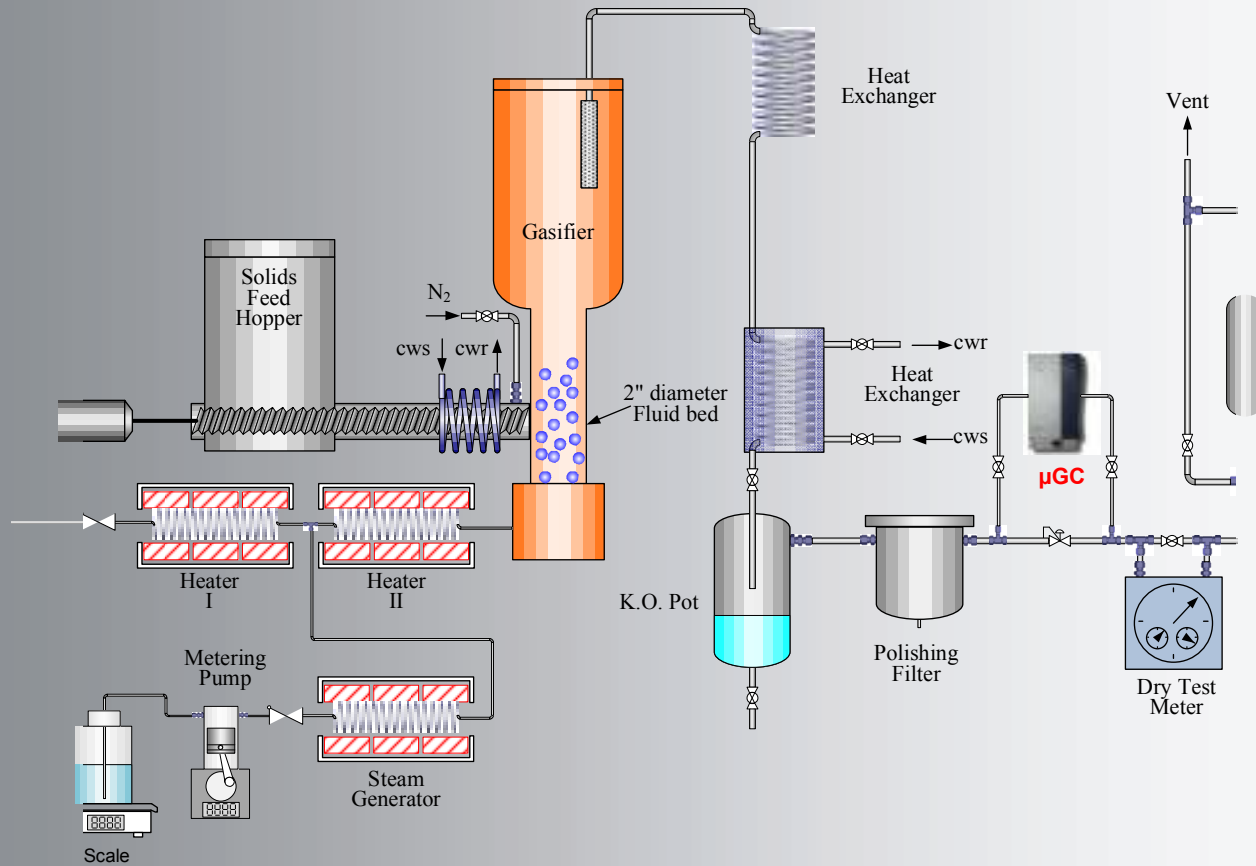


SES - GTI testing included :

- Chemical analyses of a coal sample provided by Coalworks
- TGA tests at different temperatures using a hydrogen/steam mixture determined gasification reactivity of the coal
- Oaklands coal was gasified in GTI's bench-scale unit at 1000°C and 1.14 MPa with steam and air to generate synthesis gas.
- Carbon conversions for the samples were >97 %
- The bench-scale unit operated well and the fluidized bed did not show signs of agglomeration
- Toxicity Leaching tests of the residue ash indicated that the residue material from the gasification test could be safely landfilled



GTI MINI-BENCH SCALE UNIT





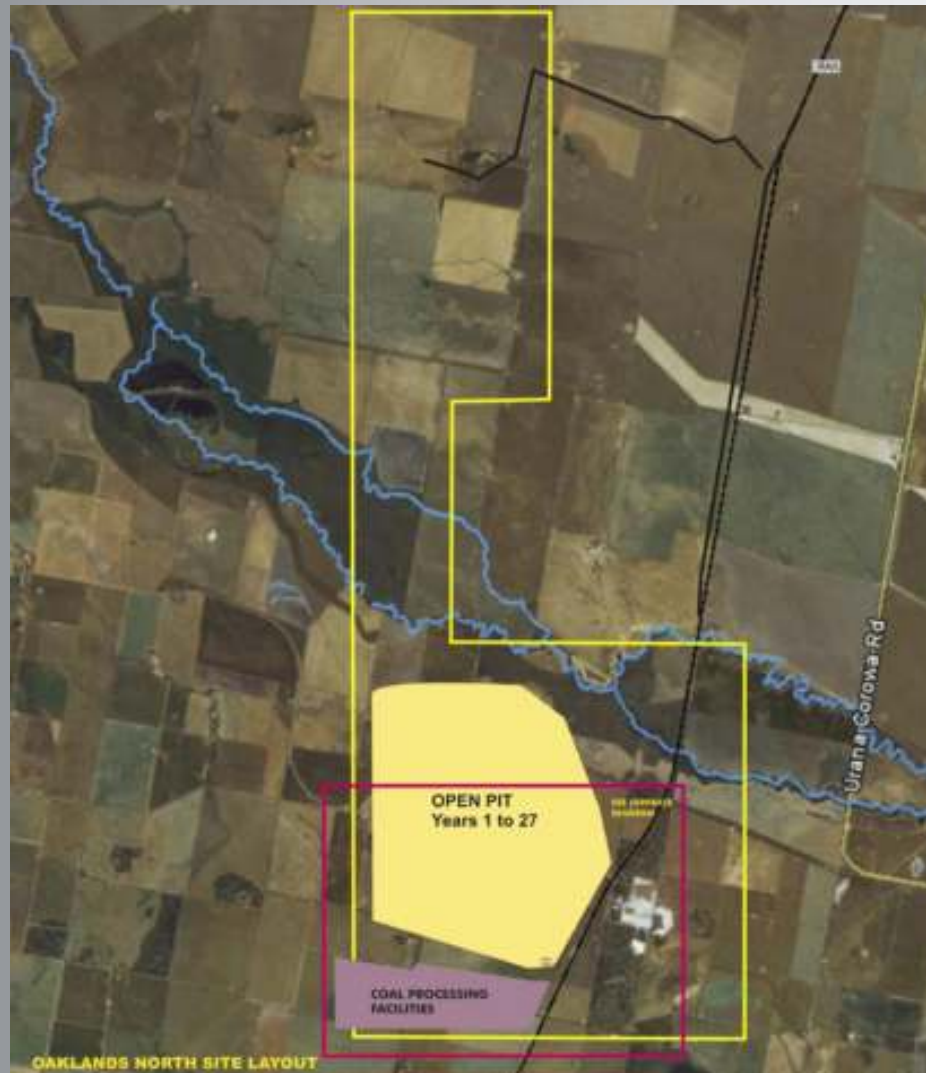
7000BBL/D CTL PLANT



- A 7000bbl/day plant Base Case is under consideration
- Consists of U-Gas gasifier, gas to methanol process, methanol to gasoline (by Exxon Mobil process).
- Coal raw material at 1.44Mtpa
- Plant production;
 - 360MI/y of ULP petrol (7000bbl/d at 91% availability)
 - 2% of Australia's current total consumption of petrol
 - ULP, RON-92
 - Zero sulphur, phosphorous, lead
 - Low in benzene (0.3%)
 - 43MI/y of autogas
 - 19MI/y of raffinate (i-butane and n-butane)



MINE LAYOUT





CTL PLANT LOCALITY





PETROL SPECIFICATION – MTG PRODUCT



MTG Gasoline properties

Reid Vapor Pressure (RVP) - bara	0.58	
Research Octane Number (RON)	92	
Motor Octane Number (MON)	83	
Specific Gravity	0.7306	
Distillation (wt%, TBP):		
IBP	-12.2	°C
10%	28.3	°C
30%	62.2	°C
50%	101.1	°C
70%	140.0	°C
90%	170.6	°C
95%	188.3	°C
FBP	206.7	°C

Component	Vol%	Wt%
Sulfur	Nil	Nil
Paraffins	53.2	47.8
Olefins	11.9	11.3
Naphthenes	8.1	8.6
Aromatics (total)	26.8	32.2
Benzene	0.3	0.4
Durene*	1.7	2

Australian standard

Specification	Unit	Value
Sulfur	mg/kg	150 (max)
Benzene	vol%	1.0 (max)
Lead	g/L	0.005 (max)
Oxygen	mass%	2.7 (max)
Phosphorus	g/L	0.0013 (max)
Di-isopropyl ether (DIPE)	vol%	1.0 (max)
Methyl tertiary butyl ether (MTBE)	vol%	1.0 (max)
Tertiary Butyl Alcohol (TBA)	vol%	0.5 (max)
Olefins	vol%	18 (max)
Aromatics	vol%	45 (max) 42 (max pool avg)
Final Boiling Point	°C	210 (max)
Research Octane Number (RON)		91.0 (min)
Motor Octane Number (MON)		81.0 (min)

Gasoline properties to be verified in subsequent
Feasibility study and bench testing



AUTOGAS SPECIFICATION



- LPG from process is modified by removal of butanes to achieve Australian Autogas specification
- MTG Auto gas properties

Composition	Mol%
Propane	46.1
Propylene	2.9
i-Butane	44.6
n-Butane	3.1
i-Butene	3.3

- Autogas properties to be verified in subsequent feasibility study and bench testing

Property	Specification
Dienes	0.30 mole% (max)
Residue on evaporation	100 mg/kg (max)
Sulfur (after stanching)	100 mg/kg (max)
Volatile residues(C5s and higher)	2.0 mol% (max)
Hydrogen sulfide	Negative (EN ISO 8819)
Copper strip corrosion	Class 1
Water	No free water at 00C
Motor octane number	90.5 minimum
Odour	Detectable in air at 20% lower flammability limit
Vapor pressure (gauge) at 400C	800 kPa minimum 1,530 kPa maximum



RAFFINATE SPECIFICATION



Component	Mol%
Propane	0.08
Propylene	0.01
i-Butane	66.3
n-Butane	22.06
i-Butylene	8.42
i-Pentane	3.13



OAKLANDS CTL – PRODUCT OPTIONS



- Oakland CTL can be configured to deliver various products options driven by market or offtake partner
- Need to anticipate the market at 2015
- Possible products would be
 - RON 92
 - RON95 – E10 (assuming ethanol mandate and consumer sentiment will drive this)
 - RON 98 – E10
- CTL plant would be configured to produce a base single product at an octane level that would blend to the target products



CLEAN FUEL BENEFIT



- Zero sulphur, lead and phosphorous
 - Refiner can blend sulphur and other down in refinery product using Oaklands petrol
 - Retailer can charge premium at pump for environmentally friendly petrol
- Low Benzene – less than 0.3 percent
- Carbon capture ready
- Prospective sequestration sites under consideration at Oaklands
 - Oaklands has saline aquifers which are prospective sites



OAKLANDS NORTH LOGISTICS



- Rail freight from Oaklands to Geelong – 1c/l
 - Only 8km of new rail line to connect Oaklands to std guage wheat line
 - Opportunity to deliver to Shell refinery door at siding at Geelong
- Road tanker freight Geelong/Oaklands – 4c/l
- Bring ethanol to Oaklands (from (say) Manildra) - 0.2c/l
- Possible rail connection to Sydney – rail freight 1.8c/l



ALTERNATE PROJECT CONFIGURATIONS



- 14,000 bbl/d CTL
- 21,000 bbl/d CTL
- Coal to Methanol



OAKLANDS DEVELOPMENT TIMETABLE



ACTIVITY	2007	2008	2009	2010	2011	2012	2013	2014	2015
Oaklands EI Granted	●								
Initial drilling & JORC Inferred Resource	→								
Indicated Resource			→						
Measured Resource			→	→					
Scoping / prefeasibility study			→	→					
Sample testing		→	→						
EA base data			→	→					
Mine Plan			→	→	→				
Environmental assessment			→	→	→				
Final feasibility (Bankable)			→	→	→				
Mine Approval			→	→	→				
Engineering & Construction					→	→	→	→	→
Start Production							→	→	→
First Shipment									●
CTL Study Pre FEED FEED				→	→	→			
CTL Plant Produces Petrol LPG							→	→	→



U-GAS PLANT IN COMMERCIAL OPERATION PROPOSED FOR OAKLANDS NORTH



2x400 ton per day U-GAS[®] in Zao Zhuang
City, China using coal



SES GASIFICATION TECHNOLOGY

— A CLEAN ALTERNATIVE FOR ENERGY AND CHEMICAL PRODUCTS

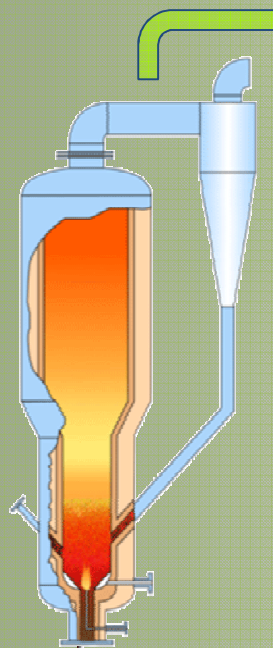


Low Value Feedstocks



Fluidized-bed Gasifier

CO₂, H₂S Capture



Syngas
(CO, H₂, CH₄)

Downstream Processes

End Products



- Coal Chemicals:
 - Glycol
 - MeOH
 - Olefins
 - CO + H₂
 - Acetic acid



- DRI



- Fuel Gas



- MeOH for gasoline blending
- Synthetic gasoline
- DME for diesel and LPG blending



- Ammonia and fertilizer



- Synthetic natural gas (SNG)



- Power



OUR TECHNOLOGY



SES and U-GAS®

**U-GAS® originally developed by GTI
SES is commercializing and
advancing U-GAS® Technology**

- Design expertise – engineering & PDP capabilities
- In-house procurement professionals
- Operations & Maintenance expertise
- Technology improvement – continue filing new patents

>> GTI at a glance



- GTI is the leading research, development and training organization serving the U.S. natural gas industry and energy markets
 - 65 years of history, 1000+ patents, 500 products
 - U-GAS® fully developed piloted and demoed over 35 years with support from the US DOE, AGA, and private industries
 - GTI's® Education Division has trained more than 55,000 energy professionals

Source: <http://www.gastechnology.org>

**SES has exclusive global rights to U-GAS®
SES expanding U-GAS® patent portfolio**



SES U-GAS[®] FLUIDIZED BED

- A SIMPLE SOLUTION



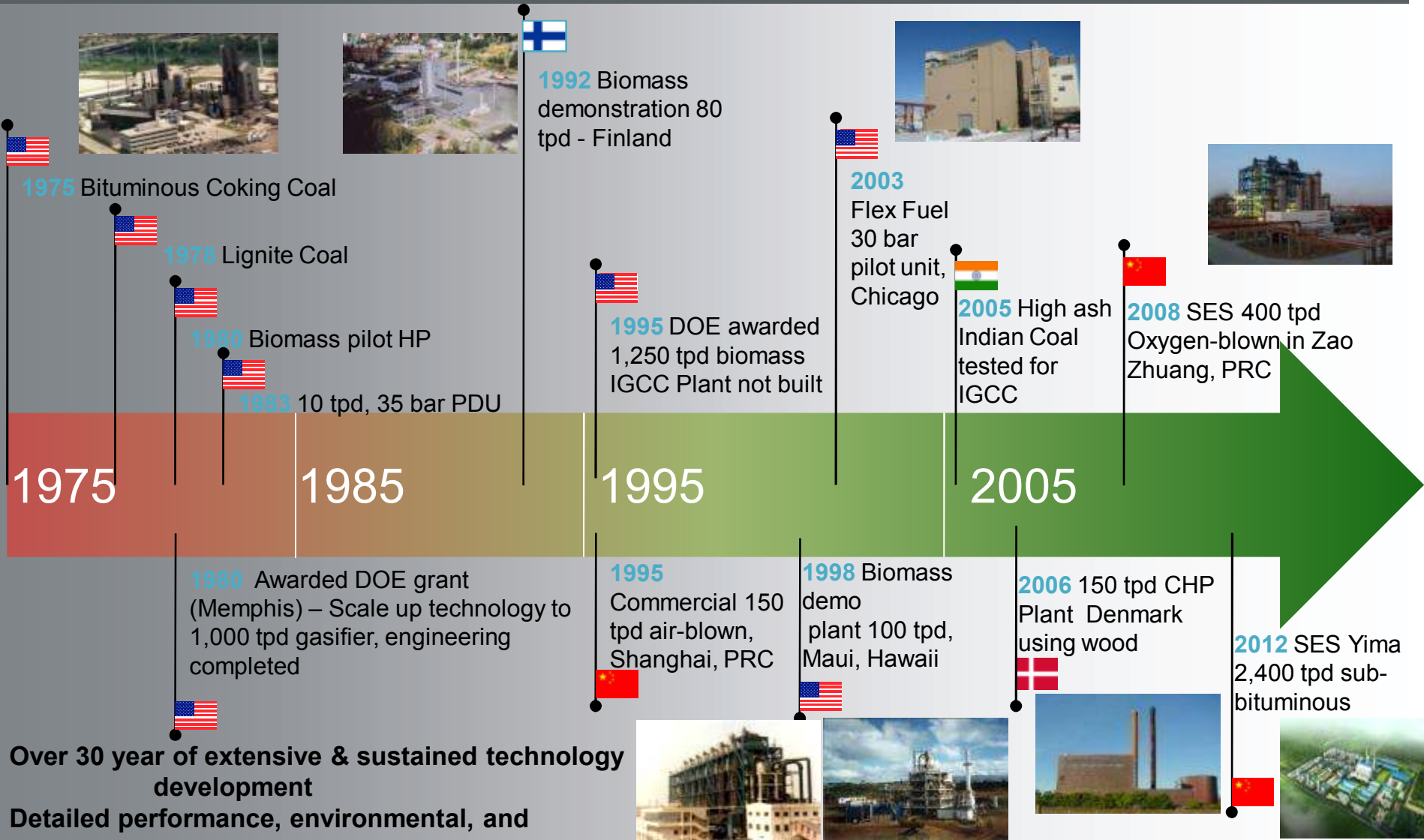
SES's U-GAS[®] Fluidized Bed Gasification Characteristics:

- Well mixed bed for even temperature control
- Moderate gasification temperatures, 900 to 1050 C
- High carbon conversions, up to 98%
- Simple gasifier design with safe & reliable operations
- Good turn down capability, > 50% turn down
- Fuel Flexible – suitable also for low quality feed-stocks with high ash and moisture and fines
- Moderate gasification conditions result in lower materials cost with high reliability

Fuel Flexibility	Range of Feed stocks Tested
Moisture Content, wt %	1 – 43
Volatile Matter, wt %	3 – 69
Fixed Carbon, wt %	6 – 83
Sulfur, wt %	0.2 – 4.6
Free Swelling Index	0 – 8
Ash Content, wt %	<1 – 50%
Ash Softening – T ₁ , C	1,000 – 2,600
Heating Value, Kcal/kg	1,388– 6,375



TECHNOLOGY DEVELOPMENT



Over 30 year of extensive & sustained technology development
 Detailed performance, environmental, and scale-up assessments
 Continued support by US DOE and Industries



THE ZAO ZHUANG PLANT IS SUCCESSFULLY DEMONSTRATING THE U-GAS[®] PLATFORM



- Design basis coal – coal washing wastes (middlings) with 35-43% ash coal.
- Demonstrated U-GAS[®] fuel flexibility, operated on:
 - ROM bituminous coal
 - Coal washing waste (middlings) - up to 50% ash
 - High-ash sub-bituminous coal
 - High moisture & ash lignite
- Demonstrated ability to seamlessly transition from one feed material to another
- Demonstrated stable operations (1 operational + 1 spare) demonstrating 98% availability since May 2009.
- Demonstrated high carbon conversions
- Demonstrated large turn-down capability of U-GAS[®] >50%
- Phase II expansion approved in Feb 2009



Location	Zao Zhuang City, Shandong Province
Partner	Shandong Hai Hua Coal & Chemical Co. Ltd.
Design Capacity	28,000 ncm/hour (2 X400 tonnes/day gasifiers)
Product	Syngas is sold over-the-fence to Hai Hua for methanol production
Structure	95% SES / 5% Hai Hua
COD	December 2008



YIMA – A MULTI-PHASED PROJECT



- The Yima Coal Industry Group is one of China's largest integrated coal companies with total assets of RMB 15.7 billion (USD 2.3 billion)
- Yima owns and operates a large Lurgi gasification plant for town gas and methanol production
- Chose U-GAS® for its expansion projects because of U-GAS® efficiencies after validating Yima's high-ash sub-bituminous coal at SES' Zao Zhuang gasification facility for approximately 2 weeks in November 2008
- Plant construction started this summer



Location	Henan Province, China - Mazhuang Coal Chemical Industrial Park
Partner	Yima Coal Industry Group Co.
Capacity	3 X1,200/day (2 operating & 1 backup)
Product	Integrated coal gasification to methanol
Fuel	Sub-bituminous; 30 – 38% ash
Capital Cost	Approx. \$250 million – financial close Aug 2009
Structure	75% Yima / 25% SES
Mechanical Completion	First half 2012 - COD – approx 6 months later



SES U-GAS[®] TESTING FACILITIES



Flex Fuel

- Coal 20 T/D with O₂
- Biomass 40 T/D with O₂
- Over 400 psig pressure

Commercial Scale Tests

- 400 tpd coal
- 450 tpd biomass



Feedstock Properties Tests



Bench-scale Gasification Tests



Pilot-Scale Tests



Commercial Plant Test



Process Design Package for Commercial Plant



Modeling / Simulation



Note: arrows represent inputs to modeling and simulations and then outputs for design



CONCLUSION



SES

- A global gasification company
- U-GAS[®] is a proven, well-developed, and low cost gasification platform

U-GAS[®]

- Flexibility to gasify a wide range of coal types biomass, or coal/biomass blends.
- Simple system enhances reliability
- Low life cycle costs





ENQUIRY AND CONTACTS



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