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#### **ASX** Announcement

Tuesday, 29 May 2012

#### **WOODSIDE INVESTOR SITE TOUR**

Today Woodside is conducting a site visit for the investment community to the North West Shelf Karratha onshore gas plant and the Pluto LNG facility.

The relevant presentation material is attached.

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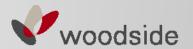
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Site Visit – Karratha Gas Plant and Pluto LNG

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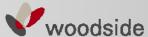


#### **NWS Karratha Gas Plant Tour**

Jeroen Buren VP Karratha Gas Plant

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### **NWS Project Karratha Gas Plant**



Bus route 1,2, and 3 - Walks

- Storage and loading overview
- 2. Trunkline Onshore
  Terminals (TOT)
  refurbishment overview
- 3. Maintenance and rejuvenation overview



#### **NWS Karratha Gas Plant**





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NWS Karratha Gas Plant overview

Slide 4

### North West Shelf Project overview



- Australia's largest oil and gas resource development
- A\$27 billion investment
- Fields located in the Carnarvon Basin, 125km north-west of Karratha, Western Australia
- Operates across the exploration to production spectrum
- International reputation for safe and reliable supply of cleaner energy
- Operated by Woodside on behalf of the NWS joint venture partners



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#### Karratha Gas Plant



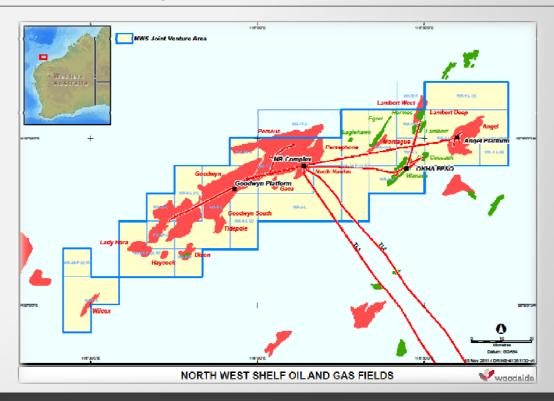
- Covering about 200 hectares
- Two trunklines ~130km to shore
- 5 x LNG trains
- 2 x domestic gas trains
- 3 x LPG fractionation units
- 6 x condensate stabilisation units
- Processing facilities for LNG, domestic gas, condensate and LPG



- Located at Withnell Bay near Karratha, 1260km north of Perth
- One of the most advanced integrated onshore gas production facilities in the world

# North West Shelf Project field locations

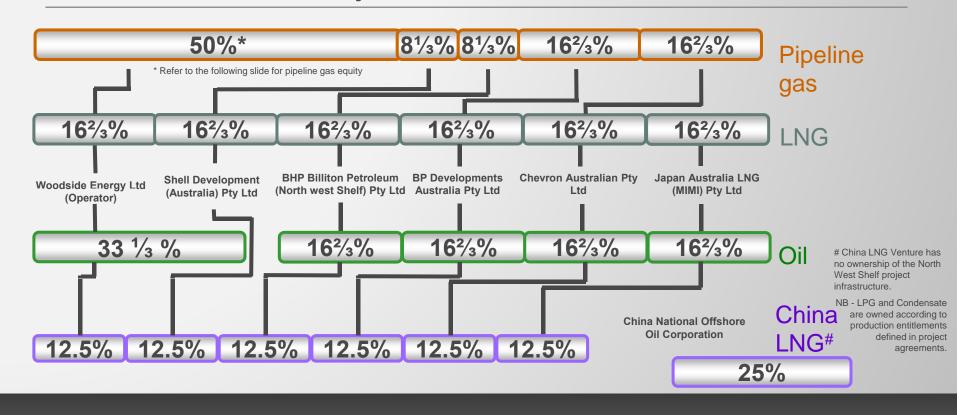




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### North West Shelf Project interests

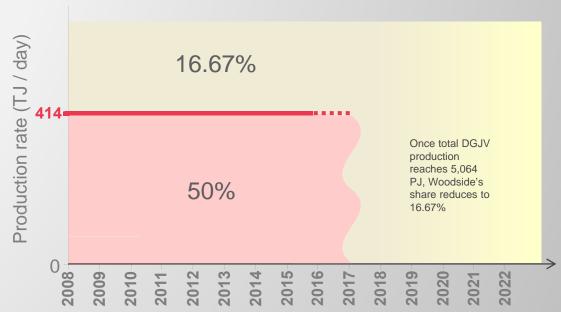




### NWS Project Pipeline Gas - Woodside share



- DGJV¹ production is capped at 414 TJ/day. Woodside has 50% equity in DGJV. Volumes in excess of 414TJ/day are sold under the IPGJV². Woodside has a 16.67% equity share in IPGJV
- Woodside's current overall entitlement is approximately 40%
- Post completion of the DGJV, expected circa 2017, Woodside's equity share of pipeline gas production will reduce to 16.67%

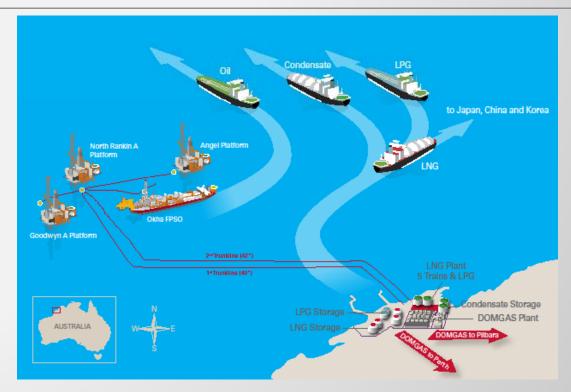


<sup>1.</sup> Domestic Gas Joint Venture

<sup>2.</sup> Incremental Pipeline Gas Joint Venture

# NWS operations overview





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#### LNG market



- North West Shelf Project delivered first LNG cargoes in 1989
- Over 3200 cargoes delivered since 1989
- North West Shelf Australia LNG markets LNG and administers contracts with customers in the Asia-Pacific region on behalf of the NWS joint venture partners
- Customers are power and utility companies including Chubu Electric, Chugoku Electric, Guangdong Dapeng LNG, Kansai Electric, Korea Gas Corporation, Kyushu Electric, Osaka Gas, Toho Gas and Tohoku



# **NWS** shipping



- North West Shelf Shipping Services Company provides the vital shipping link between the NWS Project's LNG production facilities and its customers in the Asia-Pacific region
- The largest carrier of LNG from Australia to Asia
- Core fleet of seven owned and purpose built vessels:
  - Northwest Sanderling
  - Northwest Shearwater
  - Northwest Snipe
  - Northwest Sandpiper
  - Northwest Seaeagle
  - Northwest Stormpetrel
  - Northwest Swan
- Additional ships chartered as required



### North Rankin A platform



- Commissioned 1984
- 135 km north-west of Karratha
- 125 metres of water
- 28 production wells
- 1,815 MMscf per day raw gas production capacity



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### Goodwyn A platform





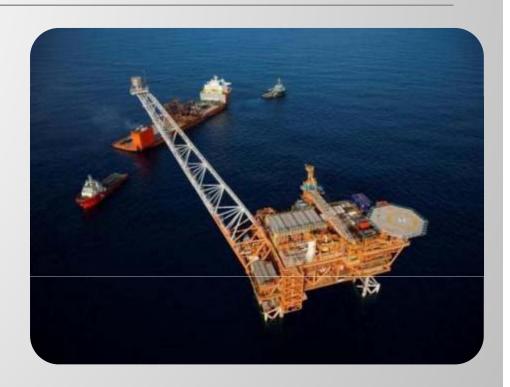
- Commissioned 1995
- 23 km south-west of North Rankin A
- 131 metres of water
- 19 wells
- 1,400 MMscf per day raw gas production capacity

29 May 2012 BUILDING VALUE Goodwyn A platform Slide 14

## Angel platform



- Commissioned in 2008
- 50 km east of North Rankin A
- Powered and remotely controlled from the North Rankin A
- 80 metres of water
- Three production wells
- Daily production capacity 800
   MMscf raw gas and 50,000
   barrels of condensate



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## North Rankin Redevelopment Project



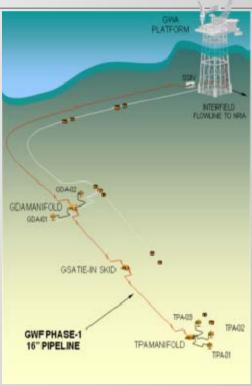
- A\$5 billion development in 125 metre water depth
- Final Investment Decision announced March 2008.
   Production planned 2013
- Maximises North Rankin and Perseus field recovery
- 5 Tcf low pressure gas reserves
- North Rankin B fixed jacket installed September 2011
- Connected to North Rankin A by two 100 metre bridges February 2012
- 24,000 tonne topsides
  - Prefabricated by Hyundai Heavy Industries in Korea
  - Installed on jacket April 2012
  - Second largest industry float over
- 2,700 MMscf per day raw gas production capacity
- Now in hook-up and commissioning phase



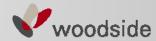
### Greater Western Flank Project phase 1



- A\$2.5 billion development
- Final investment decision announced December 2011
- The project will develop the Goodwyn GH reservoir and Tidepole field via subsea wells tied back to the Goodwyn platform
- The project is the next major development for the NWS
- Schedule for start-up in early 2016



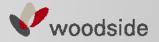
#### Okha FPSO





- Okha FPSO began production in September 2011
- 34 km east of North Rankin A
- 80 metres of water
- Four fields Wanaea, Cossack, Lambert and Hermes
- 10 production wells
- Produces around 30,000 barrels of oil per day
- Associated gas exported to North Rankin A

### Notes



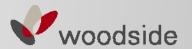
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### Notes



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#### Pluto LNG Tour

Niall Myles VP Production Pluto

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### Pluto LNG – site tour



Bus route ——— Walk — — —

- 1. Site panorama
- 2. Start LNG train walk
- 3. End LNG train walk



29 May 2012 BUILDING VALUE Pluto LNG Tour Overview Slide 22

#### Pluto LNG overview



- Joint Venturers:
  - Woodside 90% (Operator)
  - Tokyo Gas 5%
  - Kansai Electric 5%
- Standalone deep water LNG development
- Investment approved July 2007, started up 2012
- 4.8 Tcf gas reserves (Pluto, Xena)
- World-class delivery outcome involving considerable innovation
- Producing and shipping cargoes to customers



# Pluto LNG overview

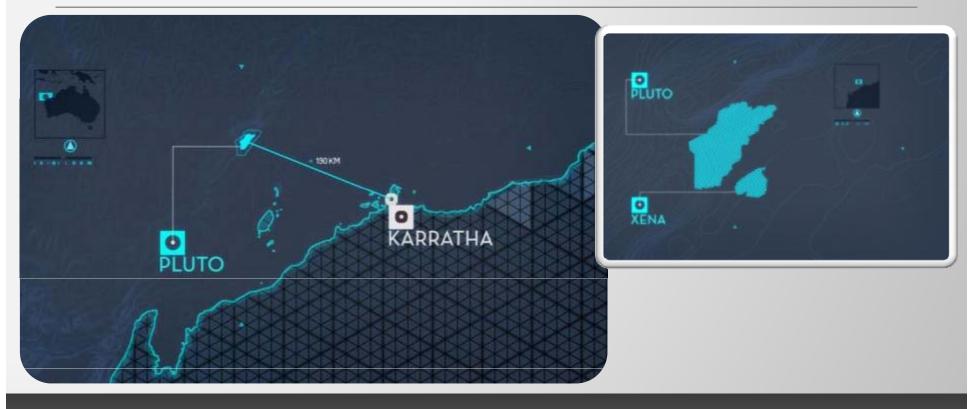




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### Pluto LNG field locations





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#### Pluto LNG offshore infrastructure



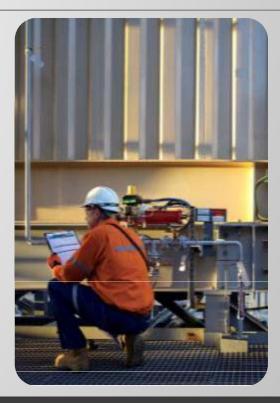


- 5 subsea wells
- Platform substructure built in China
- Platform topsides built in Malaysia
- Platform height 211 metres
- Platform weight -15,000 tonnes
- Flowline dual 20-inch 27 km pipeline from wells to platform
- Trunkline 36-inch 180 km pipeline from platform to shore

#### Pluto LNG onshore infrastructure



- LNG train with a forecast capacity of 4.3 mtpa
- LNG train modules 264 fabricated in Thailand
- Heaviest module ~ 2000 tonnes
- LNG storage capacity two tanks totalling 240,000 m<sup>3</sup>
- Condensate storage capacity three tanks totalling 130,000 m<sup>3</sup>
- Cabling length ~ 2500 km
- Total concrete ~ 200,000 m<sup>3</sup>



### Pluto LNG onshore

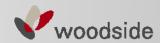


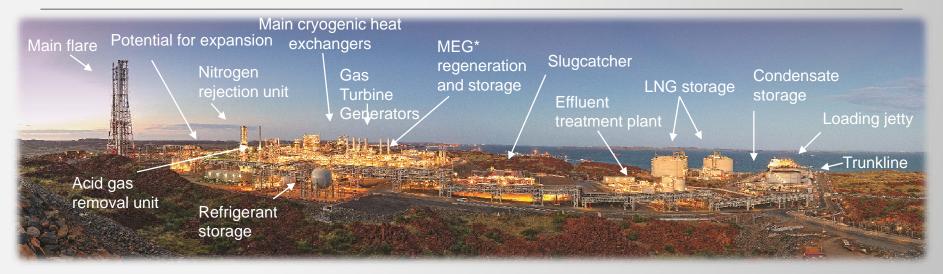


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Pluto LNG onshore overview

#### Pluto LNG onshore



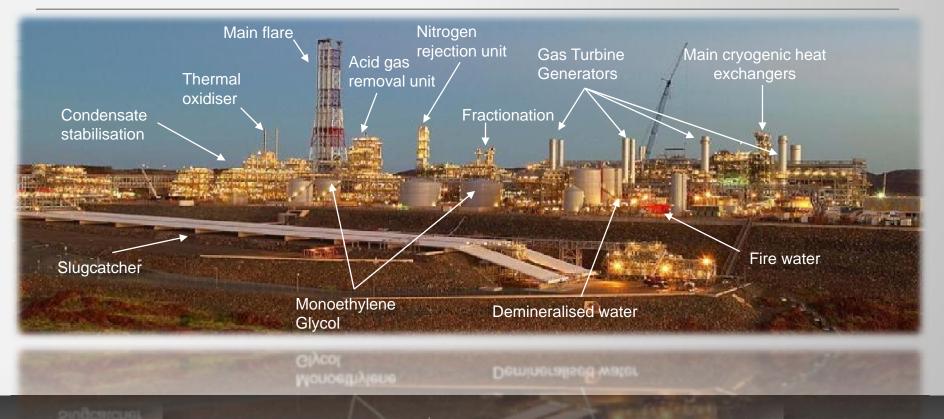


- Pluto LNG Park demonstrates Woodside's LNG capability
- LNG train is established technology, a carbon copy 'plus' an increased refrigerant capacity
- Installed capacity and site preparation to facilitate expansion e.g. LNG storage is equivalent to NWS

<sup>\*</sup>Monoethylene glycol

### Pluto LNG site B and utilities





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Pluto LNG site B overview

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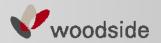
### Pluto LNG utilities and power generation

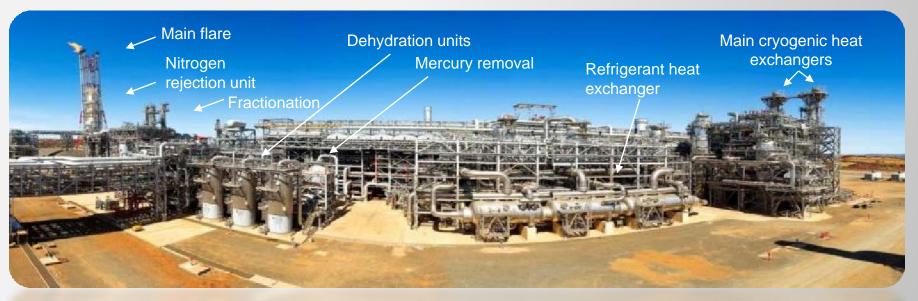




- Electrical power generation of 120MW with sparing for reliable operations (four x GE Frame 6 Gas Turbines (GT))
- Sufficient Monoethylene Glycol (MEG) buffer storage for two week operation at normal plant capacity
- Waste heat in GT exhaust stacks recovered to provide hot water for processing units

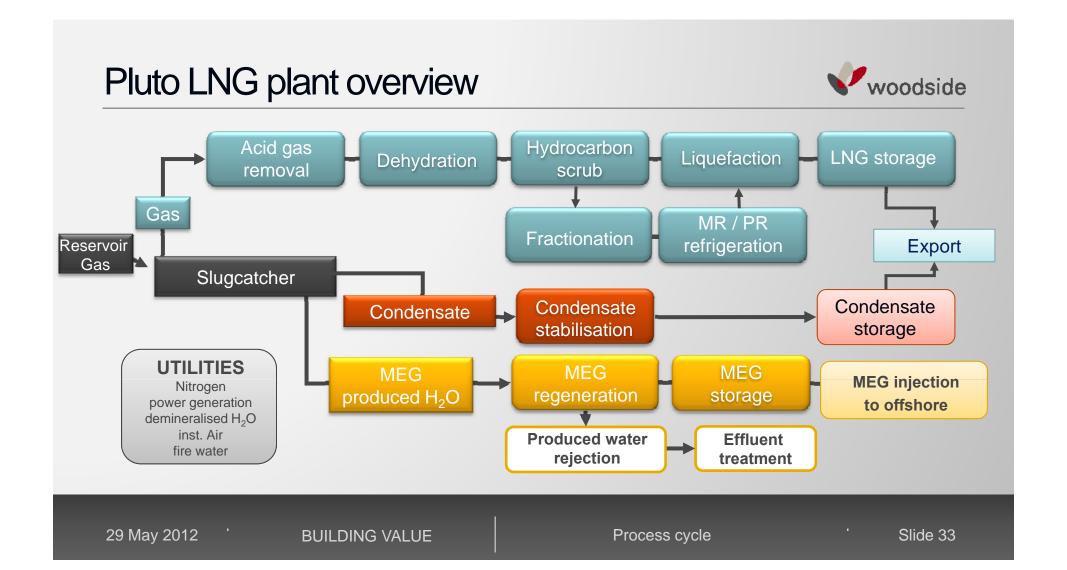
### Pluto LNG train 1





- LNG capacity of 4.3 Mtpa loaded; two GE Frame 7 Turbines and helper motors total power of approximately 200MW
- World-class delivery outcome involving considerable innovation

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# Pluto LNG shipping



- Woodside currently manages an integrated fleet of three ships on behalf of Pluto LNG:
  - Woodside Donaldson; a 165,000 m<sup>3</sup> membrane vessel (pictured)
  - LNG Ebisu; a 147,545 m³ Moss type vessel
  - Energy Horizon; a 177,440 m³ Moss type vessel
- To meet the expected future shipping needs of Pluto LNG, and to take advantage of other potential opportunities, Woodside has chartered an additional LNG ship to be delivered in 2013



#### Pluto LNG offshore contractors



- EOS (a joint venture of WorleyParsons and Kellogg Brown Root) front-end engineering and design (FEED) of the platform topsides, substructure and production system engineering
- JP Kenny and Atteris flowline and trunkline engineering
- Bredero Shaw pipe coating
- FMC subsea hardware
- Acergy subsea installation
- Allseas trunkline and flowline installation
- Mitsui and Co line pipe supply
- McDermott Industries platform and installation
- Shenzhen Chiwan Sembawang Engineering jacket fabrication
- Ramunia International Services topsides fabrication

#### Pluto LNG onshore contractors



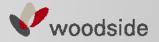
- Foster Wheeler Worley Parsons FEED and engineering, procurement and construction management (EPCM)
- BGC site preparation work on the storage and export site and civils (O&U)
- Leighton Contractors site preparation and civil works on the LNG train site
- CB&I construction of the LNG and condensate storage tanks
- STP&I module fabrication in Thailand
- Decmil and John Holland temporary buildings and facilities
- United Group, Monadelphous and AGC mechanical
- Harbourworks Clough jetty construction
- Thiess Kentz LNG processing site electrical installation
- AGC installation, construction, testing and pre-commissioning of the effluent treatment plant, in addition to storage and loading site painting and insulation
- Southern Cross storage and loading site electrical and installation work

### Notes



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### Notes



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# Oil facilities – Woodside operated FPSOs





Northern Endeavour FPSO



Nganhurra FPSO

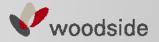


Ngujima-Yin FPSO



Okha FPSO

### Notes



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