



**EMPIRE ENERGY GROUP LIMITED**  
Level 7, 151 Macquarie Street  
Sydney NSW 2000  
T: 02 9251 1846  
F: 02 9251 0244  
(ASX: EEG)

## ASX Announcement - Presentation to Fracking Inquiry

**2 February 2018**

### **PRESENTATION**

The Company will be making a presentation to the Independent Scientific Inquiry into Hydraulic Fracking of Unconventional Reservoirs in Darwin on Monday 5 February. The presentation is attached for information purposes.

### **ABOUT EMPIRE ENERGY GROUP LIMITED**

Empire Energy is a conventional oil and natural gas producer with operations in Appalachia (New York and Pennsylvania) and the MidCon (Kansas and Oklahoma). In addition, Empire Energy holds approximately 405,000 acres (gross) of Marcellus and Utica shale in New York State, US.

In 2010, Imperial secured approximately 14.5 million acres in the McArthur Basin, Northern Territory. This area is highly prospective for conventional and unconventional hydrocarbon resources. Work undertaken by the Company over the past 7 years demonstrates that the Central Trough of the McArthur Basin, is a major Proterozoic depo-center that forms one segment of a series of extensive world class proven prolific hydrocarbon basins extending through Oman, Siberia and China, all of which contain resources of many billions of barrels of oil equivalent.



SAFE DEVELOPMENT OF THE NORTHERN TERRITORY'S  
ONSHORE SHALE GAS INDUSTRY

Presentation to the Independent Scientific Inquiry into Hydraulic Fracturing of Unconventional Reservoirs  
February 2018

# THE STARTING POINT

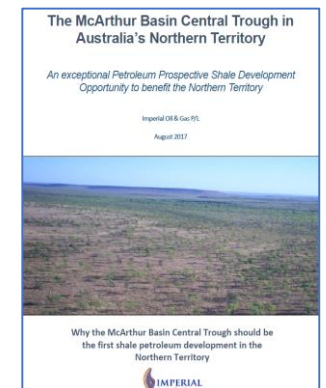
*The Northern Territory is one of a very few lucky regions globally where people have been bestowed with what is now proving to be an exceptional energy resource*

*The Northern Territory's potential onshore shale gas resources are supported by downstream natural gas processing plants (LNG) which have already been established*

*Responsibly managed and developed, this resource has the ability to address many national energy and environmental issues, it will generate jobs, build infrastructure, enhance social and educational services, provide long term security to the people of the Northern Territory, as well as assisting in transitioning the globe to a low carbon future*

# INTRODUCTION

- ✓ Imperial thanks the Inquiry Panel for the opportunity to present today
- ✓ Imperial Oil & Gas (wholly owned subsidiary of Empire Energy Group Limited) has been operating in the Northern Territory (“NT”) since 2010
- ✓ Imperial welcomes ‘**The Scientific Inquiry into Hydraulic Fracturing in the Northern Territory**’ which can demonstrate that the unconventional gas industry, managed responsibly, can bring very significant benefits to communities
- ✓ In April 2017, Imperial submitted “*Presenting the facts, debunking the myths*” to the Inquiry. The purpose of which was to enable observers of the Inquiry to gain an understanding of both sides of the public debate occurring in the US relevant to the media, environmental, and social issues around fracking
- ✓ In August 2017, Imperial submitted “*The McArthur Basin Central Trough in Australia’s NT*” to the Inquiry, to provide a review of the geological importance of the McArthur Basin Central Trough, and its potential as one of the major shale gas targets in the NT



# THE IMPORTANCE OF NATURAL GAS

## NATURAL GAS IN MODERN SOCIETY IS

- ✓ A key component of reliable, efficient clean energy generation
- ✓ A principal feedstock of modern chemistry and plays a central role in our quality of life including medicine, fertilizers, and thousands of other products

## NATURAL GAS IS ENVIRONMENTALLY RESPONSIBLE

- ✓ Switching from coal to gas fired electricity generation will lead to significant global decarbonization and environmental pollution
- ✓ In 2017, USA total carbon emissions are expected to hit a 25 year low due in large part to the increasing role of natural gas replacing coal in electricity generation (*Reuters June 6, 2017*)

## NATURAL GAS IS SOCIALLY RESPONSIBLE

- ✓ Safely extracted throughout the world, natural gas brings multitudes of benefits to the communities and regions of extraction
- ✓ Creates long term employment, new business opportunities and infrastructure (roads, schools, hospitals etc.) that would otherwise not be contemplated

# IMPERIAL'S MCARTHUR BASIN PROJECT

## IMPERIAL CONTINUES DISCUSSIONS WITH POTENTIAL PARTNERS

- ✓ In 2014 one of the worlds most experienced shale groups identified the McArthur Basin as one of the most exciting global opportunities for potential shale oil & gas development
- ✓ In 2015 Imperial entered into a Farmout Agreement with American Energy Partners, LP (“AEP”)
- ✓ On a results driven basis, AEP committed up to US\$560 million, (US\$60 million in the 1st 3 years)
- ✓ Due to the tragic passing of the Founder of AEP, the Farmout agreement was terminated in 2017
- ✓ Discussions with new partners are ongoing

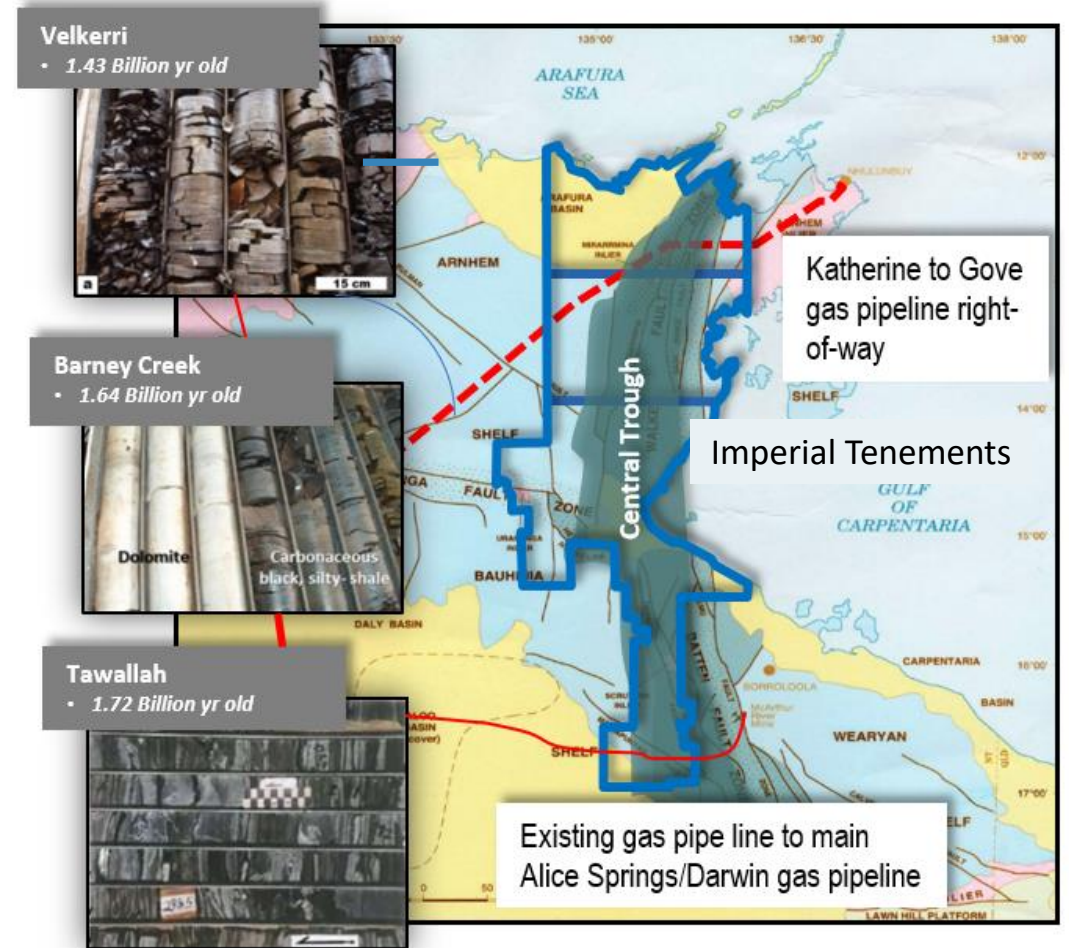
The *Scientific Inquiry into Hydraulic Fracturing in the Northern Territory* released its draft final report in December 2017 which stated:

*“provided that the recommendations made in this Report are adopted and implemented, not only should the risk of harm be minimized to an acceptable level, in some instances, it can be avoided altogether.”*

# WHY THE MCARTHUR BASIN IS SO UNIQUE

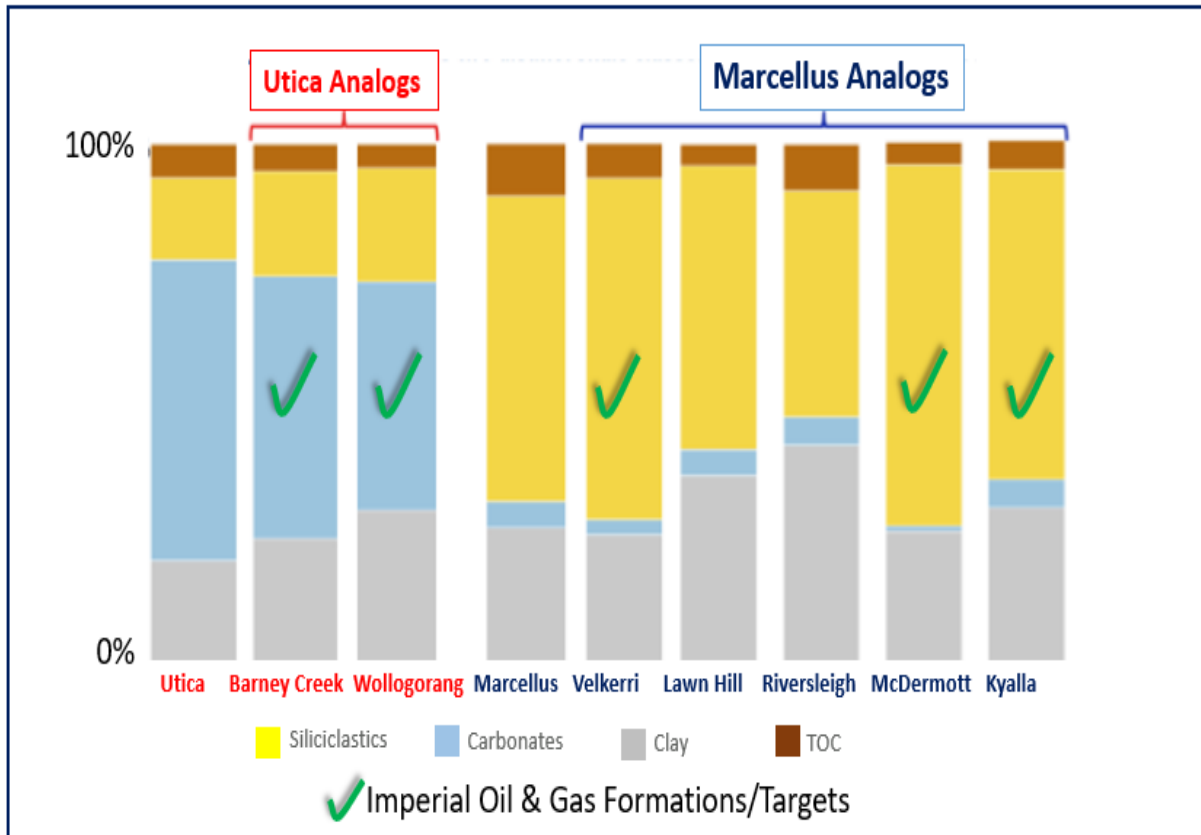
## The McArthur Basin Central Trough (“MBCT”)

- ✓ The MBCT has retained its integrity since its formation approximately 1.6 billion years ago
- ✓ Critical characteristics of the MBCT can be seen in analogue US basins, making it ideal for hydrocarbon development
- ✓ Australian shales are much thicker than US plays, meaning a greater resource potential per acre
- ✓ In many areas there are several layers of undisturbed shale formations
- ✓ Shale protective barriers have sealed in the hydrocarbons ensuring little loss of hydrocarbons
- ✓ Unique hydrogeology of the MBCT compared to other basins in the NT
- ✓ Market access for commercialisation



# WHAT DO THE ROCKS SHOW?

Mineralogical analysis of McArthur Basin rocks reveals two distinct shale clastics with clearly identified US analogs



Source: AEP

# WHY ARE THE ROCKS SO IMPORTANT?

30 day initial production rates of the top 12 Utica wells versus the top 12 Marcellus wells – Appalachia, USA

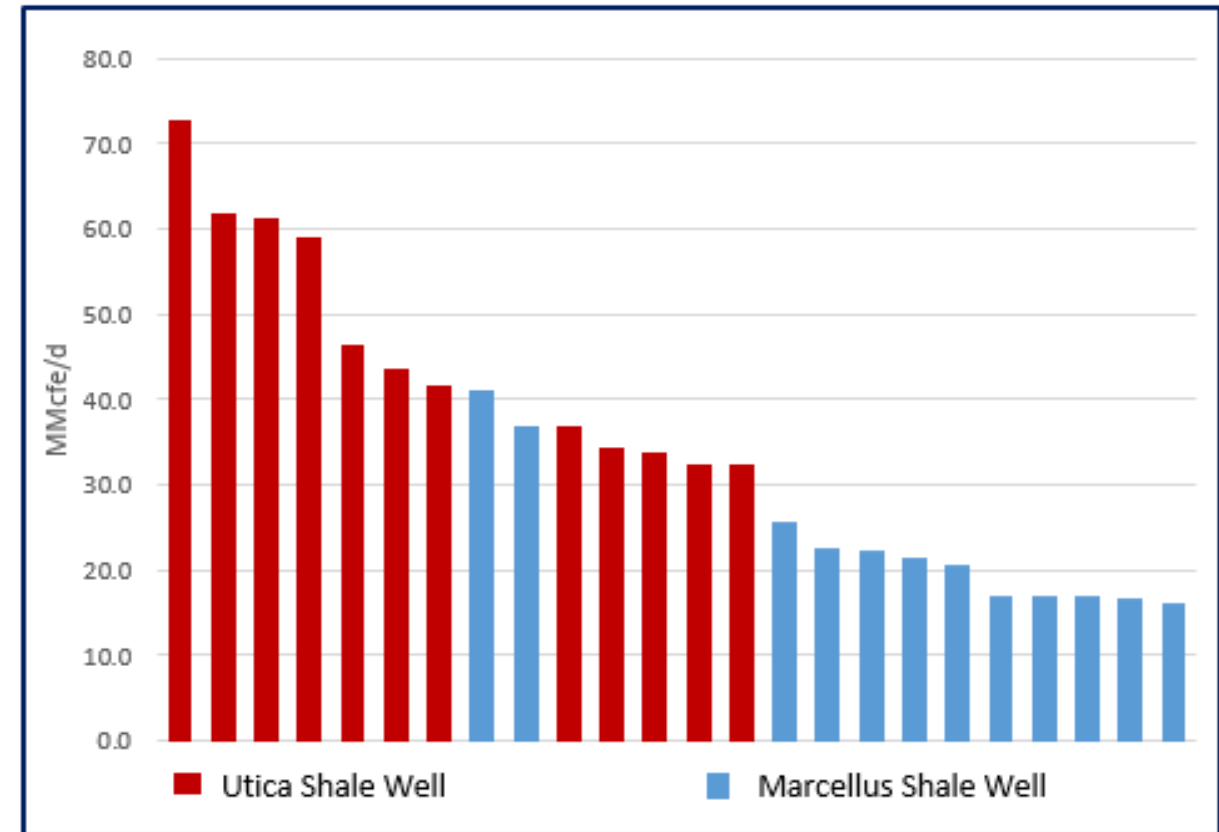


Table compiled by Activity Editor, Hart Energy.

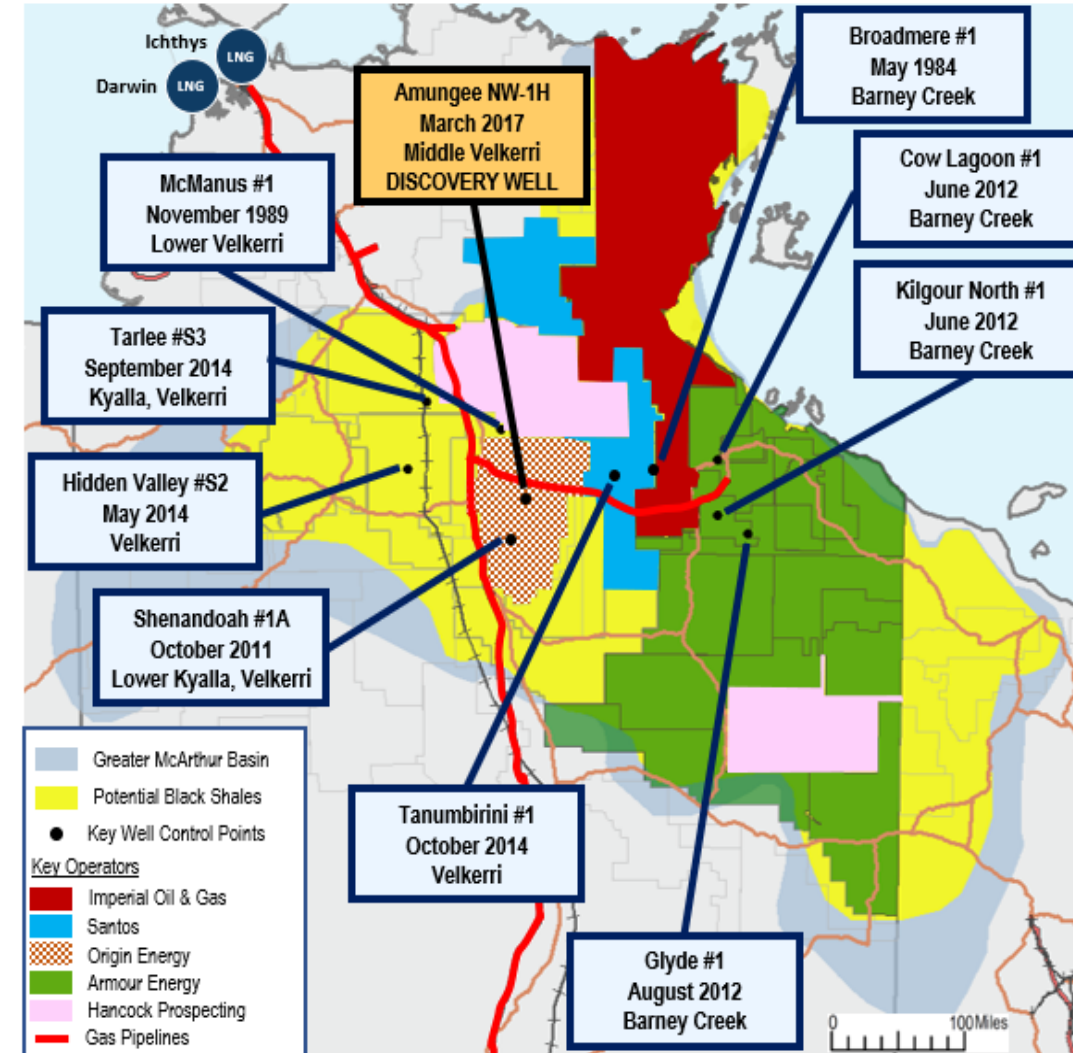
Data Source: IHS Inc.



# THE POTENTIAL OF THE MCARTHUR BASIN

## Potential to:

- ✓ ...replicate the US shale boom
- ✓ ...provide additional natural gas supplies to NT consumers, businesses and regional centres, to put downward pressure on energy prices
- ✓ ...generate many long term jobs in new downstream hydrocarbon industries in the NT
- ✓ ...supply the East Coast gas market which is critically undersupplied
- ✓ ...provide Queensland LNG plants with additional gas resources
- ✓ ...ensure the NT becomes a major powerhouse for Australian energy



# BENEFITS OF RESPONSIBLE SHALE GAS DEVELOPMENT



## TRADITIONAL OWNER BENEFITS

- ✓ Royalties from on-ground expenditure per well
- ✓ Royalties from oil & gas sales over well life
- ✓ Royalties on transportation infrastructure
- ✓ Skills, jobs, contracting opportunities
- ✓ New services infrastructure (schools, roads, etc)

## TERRITORY WIDE POPULATION BENEFITS

- ✓ Brings new jobs and industries to existing towns
- ✓ Replace industries that are in decline or recently closed (e.g. closure of Gove smelter)

## REGIONAL POPULATION BENEFITS

- ✓ New / improved roads and access
- ✓ Opportunity to connect to local natural gas supply to replace diesel generators
- ✓ Jobs & contracting opportunities across permits
- ✓ Improved local education and medical facilities
- ✓ Employment opportunities to keep family members in the region
- ✓ Water quality monitoring bores handed over for water supply bores

Development of shale and tight gas could provide a cumulative \$22.4 billion boost to the NT economy over 20 years in NPV terms, and add an additional 6,300 jobs by 2040. Deloitte Report 2015

# COMMERCIALISATION

## PIPELINE INFRASTRUCTURE

- ✓ Existing McArthur pipeline to Alice Springs/Darwin
- ✓ Northern Gas Pipeline (NGP) under construction
- ✓ NGP will allow access to East Coast markets
- ✓ Existing gas pipeline easement - Alice Springs/Darwin to Nhulunbuy

## GAS SUPPLY OPTIONS

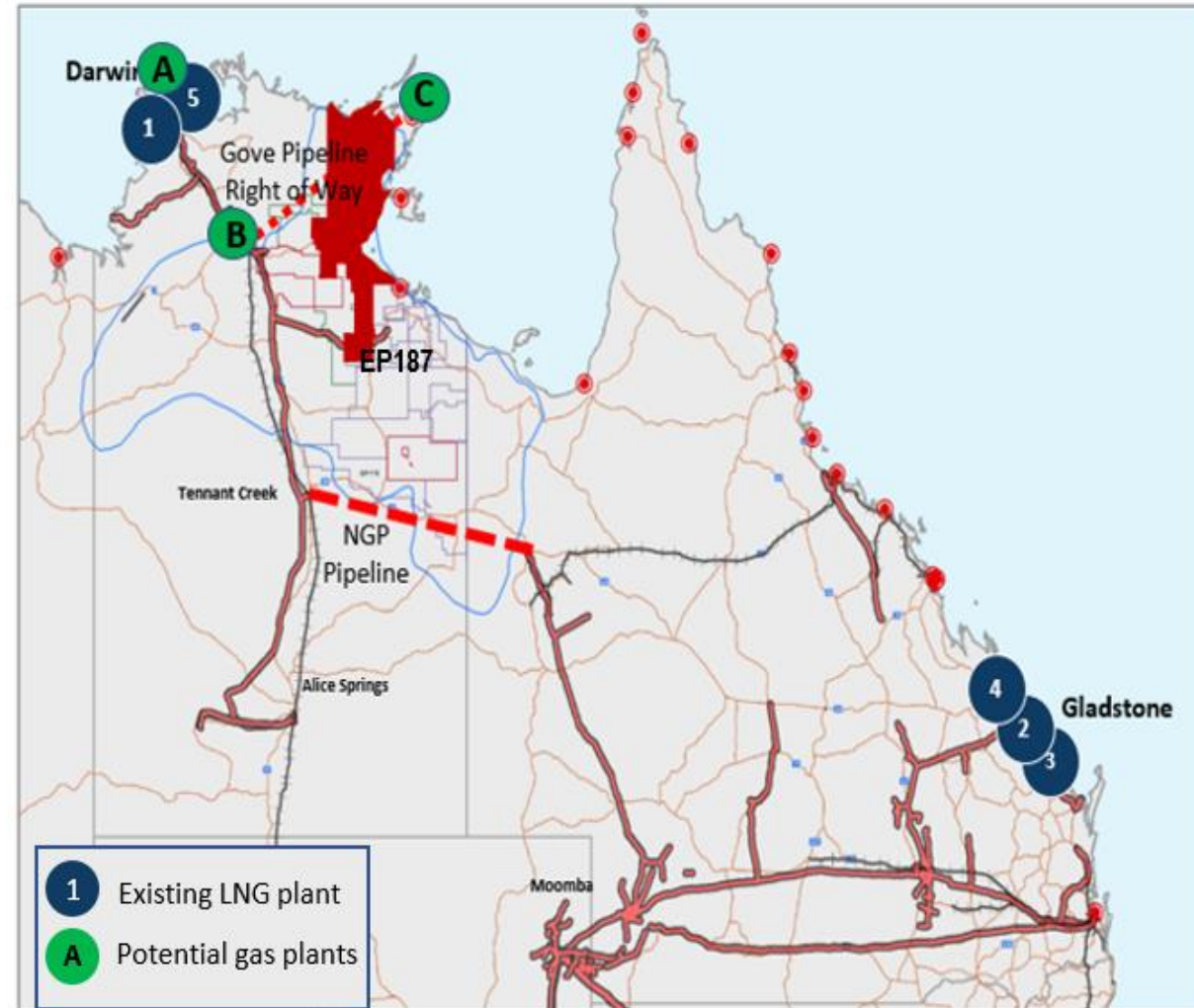
- ✓ NT domestic gas market
- ✓ East Coast domestic market
- ✓ Darwin & Queensland LNG plants

## VALUE ADDED POTENTIAL FOR NATURAL GAS

- ✓ Methanol production – export A,C
- ✓ Ammonia Urea production – rail to Darwin for export and south to Australian markets - A,B, export only C

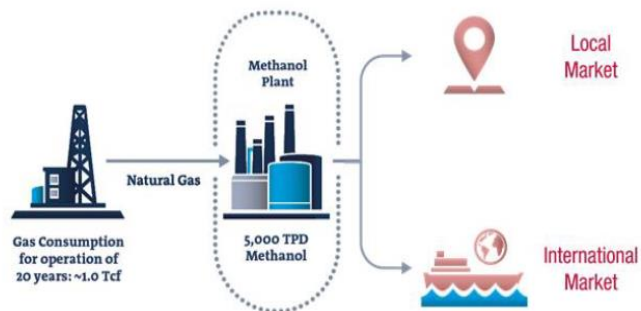
## PROJECT FINANCING

- ✓ Readily available with booked natural gas reserves



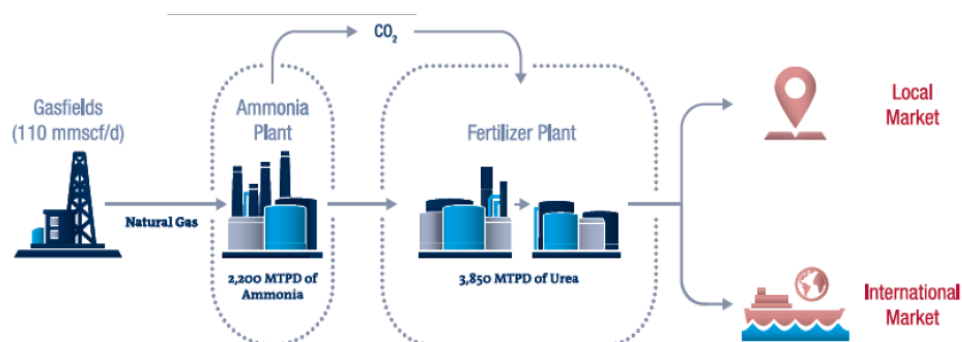
# DOWNSTREAM VALUE ADDED POTENTIAL

## Shale gas conversion to Methanol, Ammonia, Urea



© Copyright Ferrostaal 2015

	Production Capacity	Required Gas Reserve (estimated for 20 yrs of operation)	Required Gas Flow
Methanol	5,000 tpd	1.0 Tcf	150 mmscfd
Methanol	3,000 tpd	0.7 Tcf	110 mmscfd



© Copyright Ferrostaal 2015

	Production Capacity	Required Gas Reserve (estimated for 20 yrs of operation)	Required Gas Flow
Ammonia/Urea	3,850 tpd (of Urea)	0.7 Tcf	110 mmscfd
Ammonia	2,200 tpd	0.5 Tcf	70 mmscfd

- ✓ Opportunity to add significant value to NT natural gas
- ✓ Petrochemicals need economically produced natural gas. Onshore gas would achieve this benchmark
- ✓ Project realisation:
  - Gas allocation to FID: 18-24 months
  - EPC to operation: 3 to 4 years
- ✓ Capital Costs:
  - ~\$1.0 billion for 3,000 tpd Methanol plant
  - ~\$1.4 billion for 3,850 tpd Urea plant
- ✓ Project funding availability – high
- ✓ Process Plant plot area ~760m x 450m (est. max)
- ✓ Employment created:
  - Methanol: > 60 direct jobs + ~3x as many indirect jobs
  - Urea: > 120 direct jobs + ~3x as many indirect jobs

# AUSTRALIAN ELECTRICITY MARKET

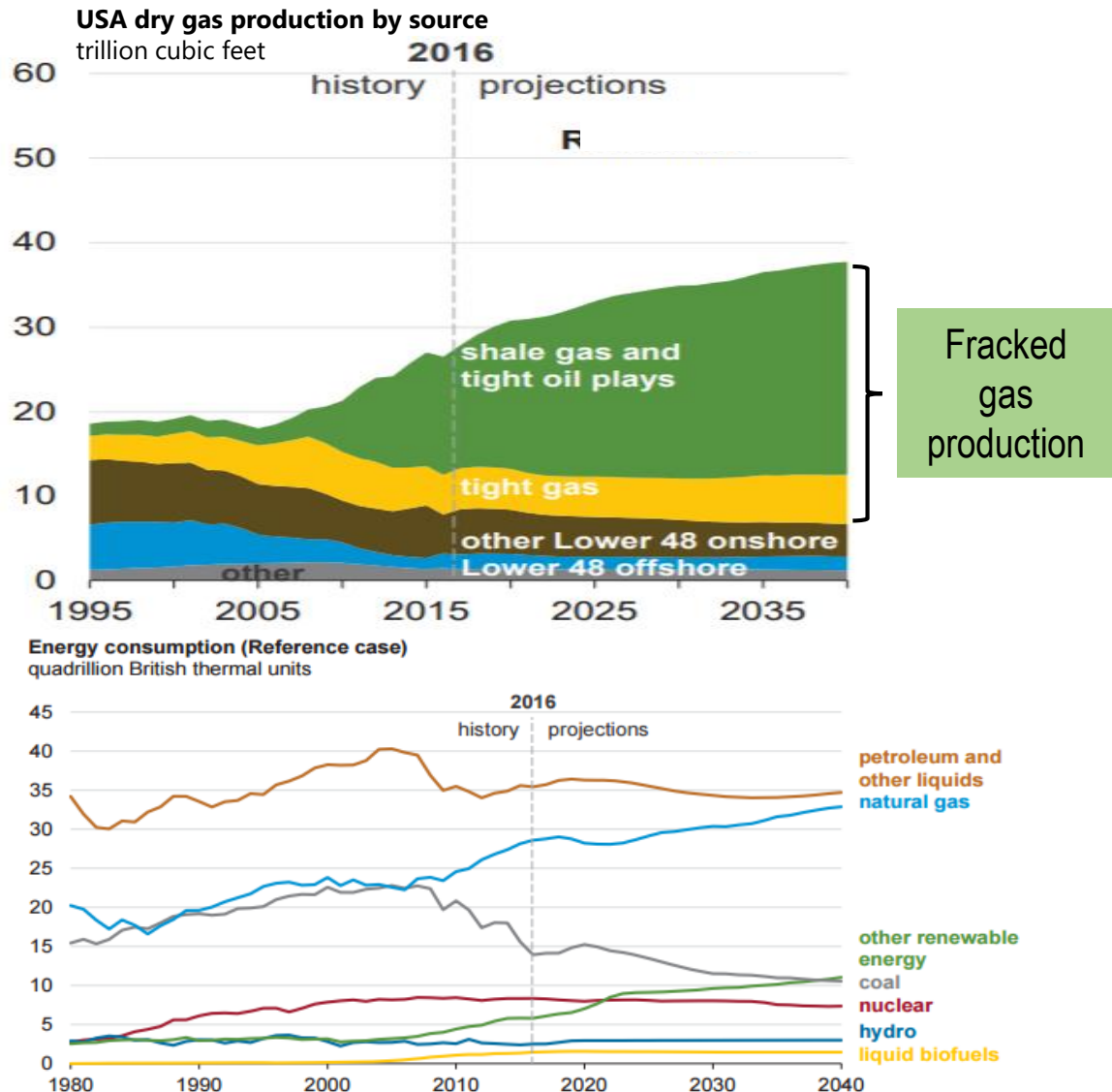
## AUSTRALIA HAS SOME OF THE WORLD'S HIGHEST ELECTRICITY PRICES

- ✓ Despite being a resource-rich country, parts of Australia have some of the world's highest electricity prices
- ✓ Electricity supply reliability is falling and current East Coast prices are significantly higher than shown in graph
- ✓ Investment in power generation is falling below Australia's domestic needs
- ✓ A large scale source of gas supply for gas-fired power generation can benefit Australian consumers through greater reliability and lower prices
- ✓ The NT has a tremendous opportunity to provide affordable energy to Australia's electricity market



# SHALE GAS IS TRANSFORMATIONAL

What does the US see in developing shale and tight gas that Australia doesn't?



There is a major disconnect between the US and Australia...

- ✓ Since 2008 US gas prices have dropped from around +US\$8/mcf to <US\$3.00/mcf. In Australia natural gas prices are rapidly escalating
- ✓ Shale now provides ~67% of US natural gas (from <10% in 2000). None in Australia
- ✓ Shale gas in the US is rapidly replacing coal for electricity generation. Currently not a 'real' alternative in Australia
- ✓ Massive growth in US manufacturing of natural gas derived products. Declining in Australia due to gas feedstock prices and escalating energy prices
- ✓ US is meeting its CO<sub>2</sub> reduction targets well ahead of time. Australia is failing to meet emission targets while dealing with energy uncertainty and rapidly escalating energy costs

## IMPERIAL'S VISION IS TO DEVELOP RESOURCES WHILE PRESERVING THE REGION'S RICH CULTURAL HERITAGE AND ENVIRONMENT

Imperial looks forward to working with all stakeholder groups to responsibly develop these resources

# ABOUT IMPERIAL OIL AND GAS



An Australian owned and operated company active in the Northern Territory and USA

Imperial is a subsidiary of Empire Energy (ASX:EEG) which listed on the Australian Stock Exchange in 1984. EEG entered the USA oil and gas industry in 2006 and is now a conventional oil and natural gas producer with operations in New York, Pennsylvania, Kansas and Oklahoma. In addition Empire Energy holds approximately 405,000 acres (gross) of Marcellus and Utica shale in New York State, US.

In 2010, Imperial secured approximately 14.5 million acres in the McArthur Basin, Northern Territory. This area is considered to be highly prospective for conventional and unconventional hydrocarbon resources. Work undertaken by the Company over the past 7 years demonstrates that the Central Trough of the McArthur Basin, is a major Proterozoic depo-center that forms one segment of a series of extensive world class proven prolific hydrocarbon basins extending through Oman, Siberia and China, all of which contain resources of many billions of barrels of oil equivalent.

For further information:

Imperial Oil & Gas Pty Ltd,  
Level 7, 151 Macquarie Street,  
Sydney NSW Australia 2000

[info@empiregp.net](mailto:info@empiregp.net)