

#### WA Mining Club

24 October 2013

TORO ENERGY: an emerging Australian Uranium Producer

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### Outline



- > Uranium and Nuclear Energy
- > The Global Uranium Market
- Uranium in Australia





# Uranium & Nuclear Energy



### **Uranium and Radiation**

- Heaviest naturally occurring metal
- Only mildly radioactive in natural form
- ➢ 3 isotopic forms − <sup>238</sup>U <sup>235</sup>U <sup>234</sup>U
- Uranium ore =
  - > <sup>238</sup>U = 99.3%
  - > <sup>235</sup>U = 0.7% (fissile)
- To convert U ore to nuclear fuel requires multiple processing steps
- > 1 kg  $U_3O_8 = 20,000$  t black coal
- Sufficient energy to power an average household for 25 years







## **Nuclear Fuel Cycle**





#### **Nuclear Fuel and Waste**

Source: WNA

30g enriched uranium LWR enrichment power plant 6q tation 30Kg - 70Kg 230g uranium oxide spent fuel high level waste glass concentrate (U308) uranium ore 200g of depleted 'tails' **Coal-Fired Electricity** 8000 KWh electricity 8 tonnes S. S. CO<sub>2</sub> plus SO2 etc. 3 tonnes black coal 300Kg fly ash power station gaseous emission plus particles (9t brown coal)

**Coal produces more than 1 million times the waste** (by weight of final product).

High level spent fuel product from the electricity consumption of one person's lifetime would be encapsulated in a vitrified glass disc of this size.







### **Average Radiation Exposures**



What most people DON'T know about Radiation.....

#### Annual Average Dose (mSv)





### **Global Uranium Market**



# **The Global Uranium Industry**

#### Supply/Demand Forecast ('000 T's U<sub>3</sub>O<sub>8</sub>)

- The worlds needs new primary supply
- Less than 1/3<sup>rd</sup> of 2030 reactor demand can be met by current mines
- Existing mines are being depleted
- Secondary supplies running down
- By 2017, current mines and secondary supply will not keep pace with reactor demand
- New mine developments have been slow getting to market
  - Uranium pricing and capital markets
  - Permitting slow

Source: Independent industry and broker report

- Fukushima sentiment
- New supply now sought from stable jurisdictions: Australia is a tier 1 supplier
- Australian market share has decreased as CIS countries expand production



#### Wiluna is one of only two Australian projects permitted and capable of being brought into production during the forecast supply gap

# **Supply and Demand Drivers**

#### Global nuclear power

- 435 operating facilities
- 65 under construction
- 167 firmly planned
- >300 proposed
- Japanese reactor restarts
  - 12 re-start applications
- Up to 60+ GWe in China by 2020 (30 reactors under construction)
- India doubling nuclear power capacity by 2020
- End to HEU agreement 2013

Source: Independent industry and broker report

Delayed large projects, no expansion and no new mines







### **Uranium Demand**

#### **Reference Case Capacity**

Net GWe (2013 to 2030)

WNA Fuel Market Report - Demand

James Nevling, Manager, Fuel Supply Projects, Exelon



operating

serious

emerging

		2013	2030
×	US & Canada	117	121
x	Europe	126	120
✓	Russia	24	45
✓	China	20	128
✓	India	5	27
✓	Asia	30	86
✓	Middle East	4	18



# **Uranium Supply**



All five pivotal projects are at risk



- 80% world's primary supply from 10 current mines
- Future global supply dependent on 5 major new projects
  - Olympic Dam expansion
  - Imouranen
  - Cigar Lake Canada
  - Husab, Namibia
  - Khazakstan

Deposit	Financial risk	Technical risk	Social, political, environmental risk
Olympic Dam	×		×
Imouranen	×		×
Cigar Lake	×	×	
Husab	×		×
Khazakstan		×	×



## **Australia's Production Profile**



- Australia = almost 40% world's resources BUT...
- Only 12% of world supply
- 2011/12 Australian production = 7489t valued at \$679M
- Majority in U mining friendly states
- Australian production beginning to "flat line"
- No new production coming on line
- Australian contribution to global production in decline but has great potential to grow





# **Toro Energy:**

# an emerging Australian uranium producer



## **Toro Energy**

Capital Structure Post Acquisition								
ASX Code	TOE							
Ordinary Shares on Issue <sup>1</sup>	m	1,481.9						
Share Price (23 Oct)	A\$/share	0.09						
Undiluted Market Capitalisation	A\$m	133.4						
Pro-forma Cash <sup>2</sup>	A\$m	14.7						
Macquarie Bank facility	A\$m	12.0						
Undiluted Enterprise Value <sup>3</sup>	A\$m	130.7						

#### Share Price History (A\$/share)



#### Notes:

- 1. Pro-forma for Acquisition and completion of share subscriptions from Pinetree and OZ Minerals
- 2. TOE cash on hand 30 June 2013 plus cash from Acquisition and A\$2.0m share subscriptions associated with the Acquisition
- 3. Unlisted options on issue: 135.2M at various strike prices

Refer: Theseus Competent Persons' Statements in Appendix 1



#### Project Location



established and follow up targets)

### Wiluna Project

Refer: 8 October 2013 ASX Release

Location	$\triangleright$	520 km north of Kalgoorlie and 30 km south of Wiluna					
Highlights	≻	74 Mlb JORC Resource					
	$\succ$	6 shallow calcrete-hosted carnotite deposits					
		Centipede, Lake Way, Millipede, Nowthanna, Dawson Hinkler and now Lake Maitland					
		First class mining jurisdiction; 100+ years of mining history					
		Infrastructure and services available – power, gas, transport, people					
		Major environmental approvals to commence mining in place					
		2013-2014: complete final feasibility studies and arrange project finance					
Status		State & Federal Environmental approvals granted for Centipede and Lake Way					
	$\succ$	Pilot Plant completed 2011					
	$\triangleright$	PFS and Phase 1 DFS Engineering complete					
	$\triangleright$	Trial mining completed					
	≻	Low technical risk – simple open cut mining and proven process flow sheet					



## **Strategically Growing Wiluna Resources**

Refer: 8 October 2013 ASX Release and Competent Persons' Statements in Appendix 1



Exploration and strategic acquisitions have grown the Wiluna Regional Resource base to a development scale



# **Technical De-Risking – Trial Mining**



- Ability to map and select higher grade confirmed
- Continuous miner confirmed efficient method
- In pit tailings deposition and full rehabilitation
- Groundwater control through water barriers



#### **Trial mining confirmed selective mining process**

## **Technical De-Risking – Pilot Plant**



- Proven economic processing and recovery (~85%)
- Saline groundwater used for processing
- Sample uranium quality suitable for uranium converters
- Engineering savings from coarser grind & lower leach temperature



#### **Pilot plant confirms Toro's proposed process**

### **Regulatory Approvals Process**





### **Approvals Granted**





EPA recommends approval for Toro's Wiluna Uranium Project in WA to proceed.

Paul Vogel, EPA Chair; 21 May 2012



"The Liberal-National Government is committed to ensuring that uranium mining in WA will be subject to strict security provisions and world's best practice safety and environmental standards."

WA Government Minister Marmion; 10 October 2012



"My decision comes after a rigorous environmental assessment."

Australian Government Minister Burke; 2 April 2013

### **Traditional Owner's View**



toroenergy.com.au



"... for the first time, a mining company has come to talk to the mob about their concerns. This is good and the old men are happy that Toro will keep away from their sites.

There is a long way to go, but at least the men who are responsible for that area have been able to sit down and talk about that country on behalf of all the Wiluna mob and be listened to and be involved in decisions about that country. This hasn't happened before."

> Spokesman for Senior Lawmen Darren Farmer

### **Anti-Nuclear – How real is it?**

- Wide community engagement
  - ➢ 4 times over 3 years
  - No legal challenge June 2013
- Rejection by local TO of NGO position
- Small groups, highly vocal opponents
- Little influence or traction
- Base of opposition not proven
  - No environmental grounds
- Good corporate practices on CSR aspects







### 2013-2014 Toro's Development Plans

- Implementing the approved Wiluna Project
- Integrating Lake Maitland and optimisation of economics
- Financing activities targeted to allow construction start late 2014

	20	13	2014			2015				2016				2017	
	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar
Millipede & Lake Maitland Approvals Process															$\rightarrow$
Wiluna Project Resource Upgrade															
Wiluna & Lake Maitland Mining Studies															
Expanded Wiluna Project DFS															
Project Finance															
Target FID															
Mine Construction															
First Sales															$\rightarrow$
															toroenerg

### Wiluna – the next Australia Uranium Mine



Toro's Wiluna project is one of the most progressed undeveloped, independent, uranium-only projects globally. Wiluna has secured all major environmental approvals for mining and now in the process of finalising its DFS ready for development. Pathway to Production



#### Notes:

1. Uranium Peers selected based on uranium only deposits (or with other commodities as by-products), resources greater than 20Mlbs U<sub>3</sub>O<sub>8</sub> (and less than 200Mlbs U<sub>3</sub>O<sub>8</sub>)

2. Presented on an equity basis

Source: Company announcements

Refer: 8 October 2013 ASX Release and Competent Persons' Statements in Appendix 1

# Summary



- Uranium mining is safe and highly regulated
- Global market demand/supply imbalance after 2016
- Australia = significant resources, but underrepresented as a supplier
- Toro Energy = an emerging uranium producer
- Wiluna Project = one of the few projects capable of bringing new production to market





#### **Appendix 1: Competent Persons' Statements**



#### CP1: Wiluna Project Mineral Resources – 2012 JORC code compliant resource estimates – Centipede, Millipede, Lake Way and Nowthanna deposits

The information presented here that relates to Mineral Resources of the Centipede, Lake Way, Millipede and Nowthanna deposits is based on information compiled by Dr Greg Shirtliff of Toro Energy Limited and Mr Robin Simpson and Mr Daniel Guibal of SRK Consulting (Australasia) Pty Ltd. Mr Guibal takes overall responsibility for the Resource Estimate, and Dr Shirtliff takes responsibility for the integrity of the data supplied for the estimation. Dr Shirtliff is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM), Mr Guibal is a Fellow of the AusIMM and Mr Simpson is a Member of the Australasian Institute of Geoscientists (AIG) and they have sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity they are undertaking to qualify as Competent Persons as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012)'. The Competent Persons consent to the inclusion in this release of the matters based on the information in the form and context in which it appears.

#### CP2: Wiluna Project Mineral Resources – Historical 2004 JORC code compliant resource estimate – Dawson Hinkler deposit

The information presented here that relates to Mineral Resources of the Dawson-Hinkler deposit is based on information compiled by Dr Katrin Karner of Reptile Uranium Namibia Pty. Ltd. (formerly of Toro Energy Limited at the time of the estimation) and Mr Robin Simpson and Mr Daniel Guibal of SRK Consulting (Australasia) Pty Ltd. Mr Guibal takes overall responsibility for the Resource Estimate, and Dr Karner takes responsibility for the integrity of the data supplied for the estimation. Mr Guibal is a Fellow of the Australasian Institute of Mining and Metallurgy (AusIMM), Dr Karner is a Member and CP (Geo) of the AusIMM and Mr Simpson is a Member of the Australian Institute of Geoscientists (AIG) and they have sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity they are undertaking to qualify as Competent Persons as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2004)'. The Competent Persons consent to the inclusion in this release of the matters based on the information in the form and context in which it appears.

#### CP3: Wiluna Project Mineral Resources – Historical 2004 JORC code compliant resource estimate – Lake Maitland deposit

The information presented here that relates to Mineral Resources of the Lake Maitland Deposit is based on information compiled by Mr Stewart Taylor and Mr Matthew Wheeler of Mega Uranium Limited, and Mr Peter Gleeson and Mr Daniel Guibal of SRK Consulting (Australasia) Pty Ltd. Mr Guibal takes overall responsibility for the Resource Estimate, and Mr Taylor and Mr Wheeler take responsibility for the integrity of the data supplied for the estimation. Mr Taylor is a Fellow of the Australian Institute of Mining and Metallurgy (AusIMM), Mr Guibal is a Member of the AusIMM and Mr Wheeler and Mr Gleeson are Members of the Australian Institute of Geoscientists (AIG), all have sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity they are undertaking to qualify as qualified persons as defined by the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2004). The Qualified Persons consent to the inclusion in this release of the matters based

#### CP4: Theseus Project - 2004 JORC code compliant resource estimate

Information in this report relating to the Theseus Resource Estimate is based on work supervised by Michael Andrew, who is a Member of the Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists. Mr Andrew is a full-time employee of Optiro, and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Andrew consents to the inclusion in this release of the matters based on his information in the form and context in which it appears.

#### CP5: Theseus Project – Target range and exploration results in accordance with the 2004 JORC code

Information in this report relating to the Theseus Exploration Target Range and Exploration Results is based on information compiled by Dr David Rawlings, who is a Member of the Australasian Institute of Mining and Metallurgy. Dr Rawlings is a full-time employee of Toro, and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr Rawlings consents to the inclusion in this release of the matters based on his information in the form and context in which it appears.

#### Contact



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