



PALADIN ENERGY LTD

**ASX: PDN**

**9 NOVEMBER 2018  
AGM PRESENTATION**



# DISCLAIMER and NOTES FOR JORC AND NI 43-101 MINERAL RESOURCES AND ORE RESERVES

- This presentation includes certain statements that may be deemed “forward-looking statements”. All statements in this presentation, other than statements of historical facts, that address future production, reserve or resource potential, exploration drilling, exploitation activities and events or developments that Paladin Energy Ltd (the “Company”) expects to occur, are forward-looking statements.
- Although the Company believes the expectations expressed in such forward-looking statements are based on reasonable assumptions, such statements are not guarantees of future performance and actual results or developments may differ materially from those in the forward-looking statements. Factors that could cause actual results to differ materially from those in forward looking statements include market prices, exploitation and exploration successes, and continued availability of capital and financing and general economic, market or business conditions.
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- In the following presentation, for those deposits that are reported as conforming to the Joint Ore Reserves Committee (JORC) 2004 or 2012 code, the terms Inferred Mineral Resources, Indicated Mineral Resources, Measured Mineral Resources, Ore Reserves, Proved Ore Reserves, Probable Ore Reserves and Competent Person are equivalent to the terms Inferred Mineral Resources, Indicated Mineral Resources, Measured Mineral Resources, Mineral Reserves, Proven Mineral Reserves, Probable Mineral Reserves and Qualified Person, respectively, used in Canadian National Instrument 43-101 (NI 43-101).
- The technical information in this is extracted from the report entitled Paladin Energy Ltd 2018 Annual Report released on 28 August 2018 and is available to view on [www.paladinenergy.com.au](http://www.paladinenergy.com.au). The company confirms that it is not aware of any new information or data that materially affect the information included in the original announcement and, in the case of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person’s findings are presented have not materially modified from the original market announcement.
- Some of the information in this presentation, in relation to the mineral resources and ore reserves for all deposits except Langer Heinrich, Michelin, Jacques Lake and Manyingee was prepared and first disclosed under the JORC Code 2004. It has not been updated since to comply with JORC Code 2012 on the basis that the information that the estimates are derived from has not materially changed since it was last reported.



# CORPORATE SNAPSHOT

## CAPITAL STRUCTURE

As at 08/11/18

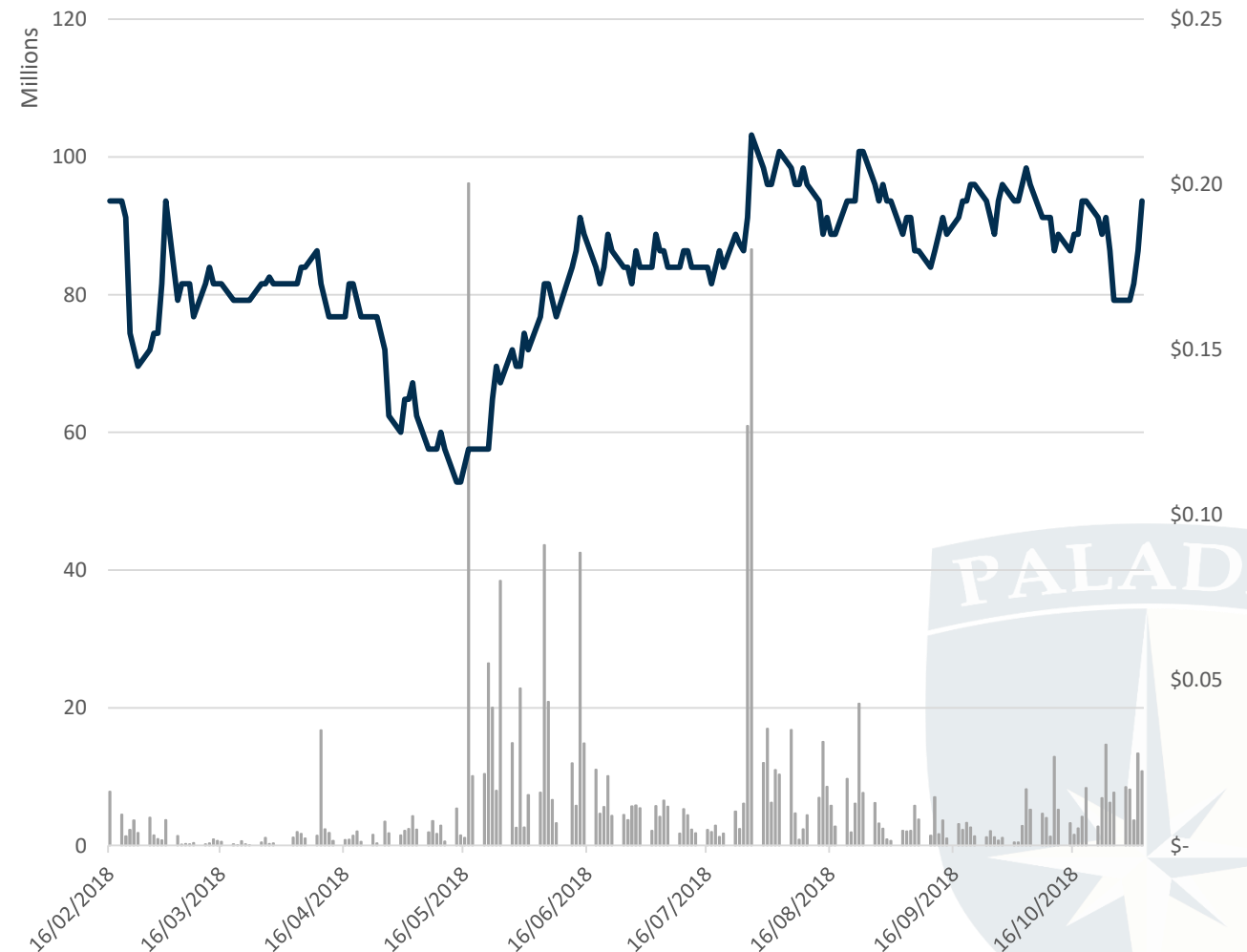
Shares on issue	1,747.3M
Share price A\$	20.0c
Market capitalisation A\$	349.5M
Market capitalisation US\$ <sup>1</sup>	254.3M
Cash US\$	30.6M
Debt US\$	122M
Enterprise value US\$	345.7M

## MAJOR SHAREHOLDERS

As at 5/11/18

Tembo	13.0%
Paradise Investment Management	9.7%
Value Partners	8.8%
HOPU	7.0%
RBC	5.7%
China Investment Corporation	5.6%

## SHARE PRICE SINCE LISTING



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<sup>1</sup> AUD/USD 0.73

3

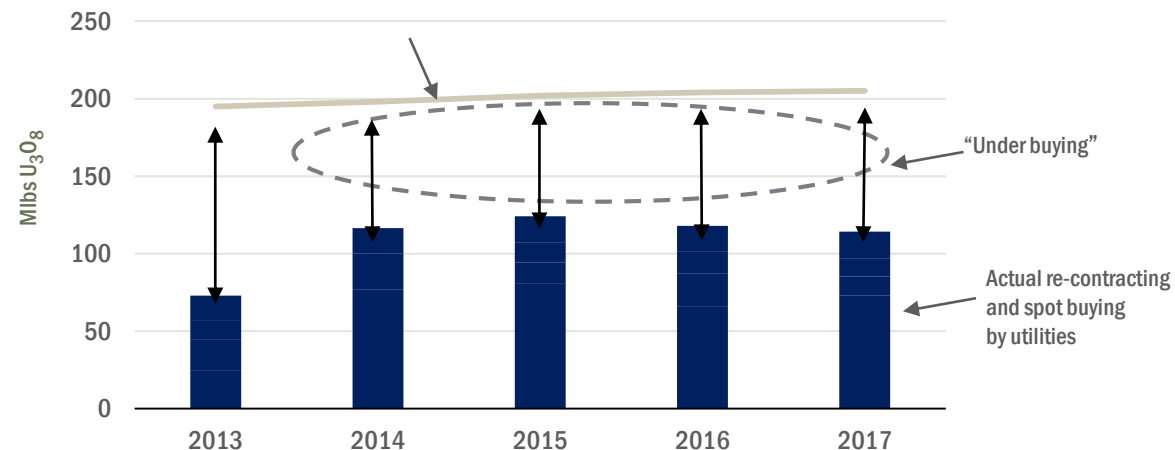
# THE URANIUM STORY IS COMPELLING

- Spot uranium prices recovering from a 13-year low
- Growth in China, India and elsewhere means the nuclear power industry is consuming more uranium than pre-Fukushima
- Utilities have been “under buying” at an average rate of more than 100Mlbs less per year than consumption – running down stockpiles and contract positions put in place pre-Fukushima when European and U.S. utilities worried about market tightness due to rapid China growth
- Mined supply is being rapidly cut back

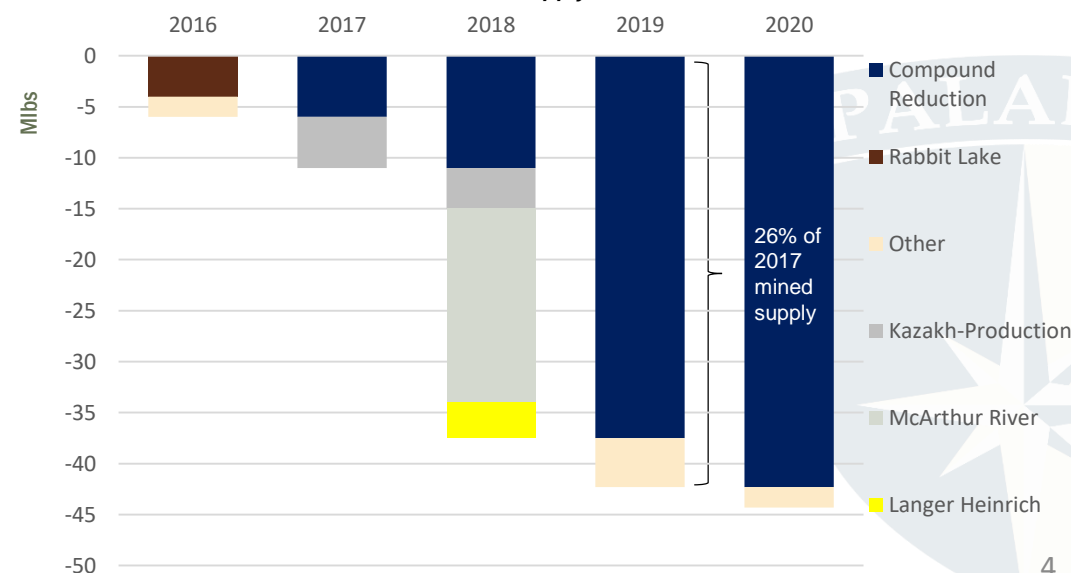
*Spot Price 2013-2018*



*Underlying estimated uranium use based on nuclear power generation*



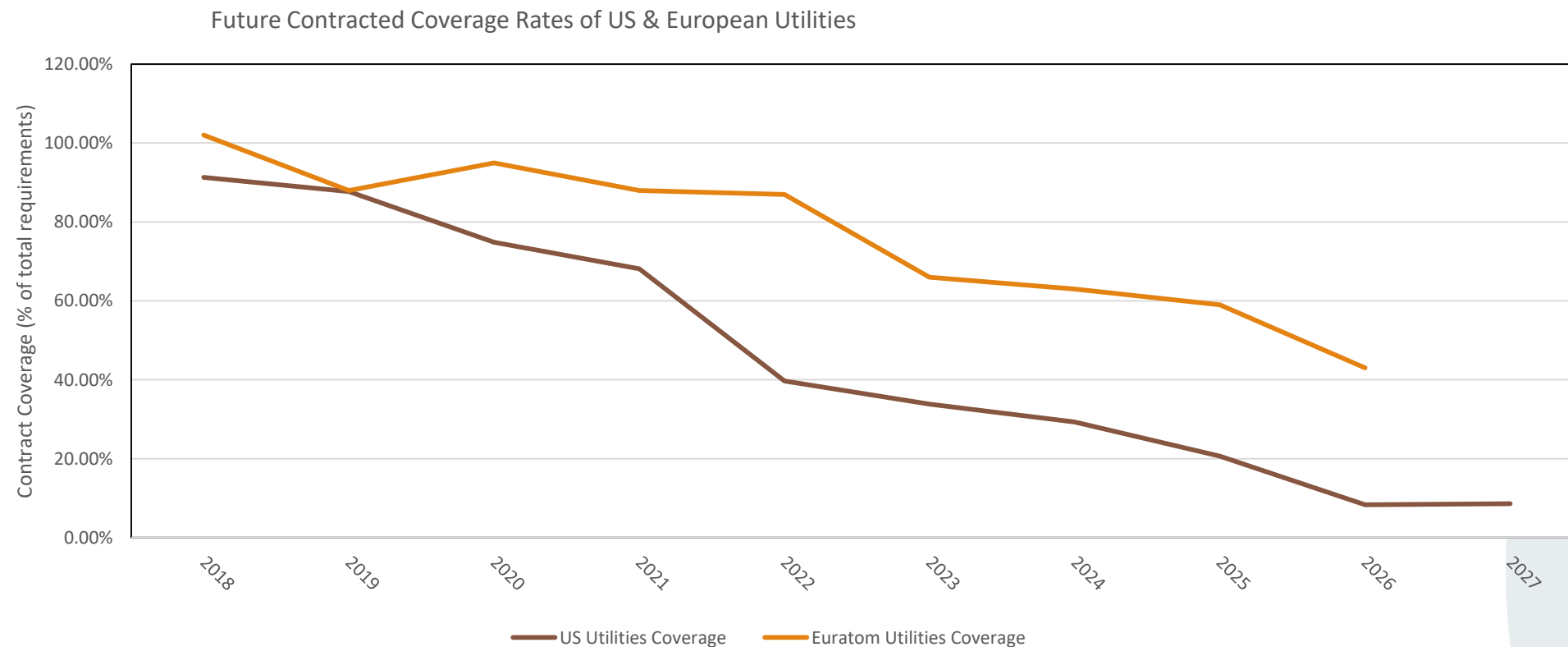
*Cumulative supply cuts*



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Source:  
- UxC, TradeTech and Paladin Research

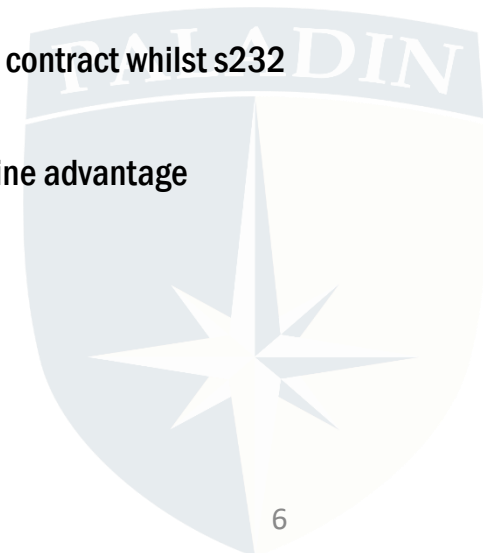
# REDUCED CONTRACTING LEVELS CANNOT CONTINUE





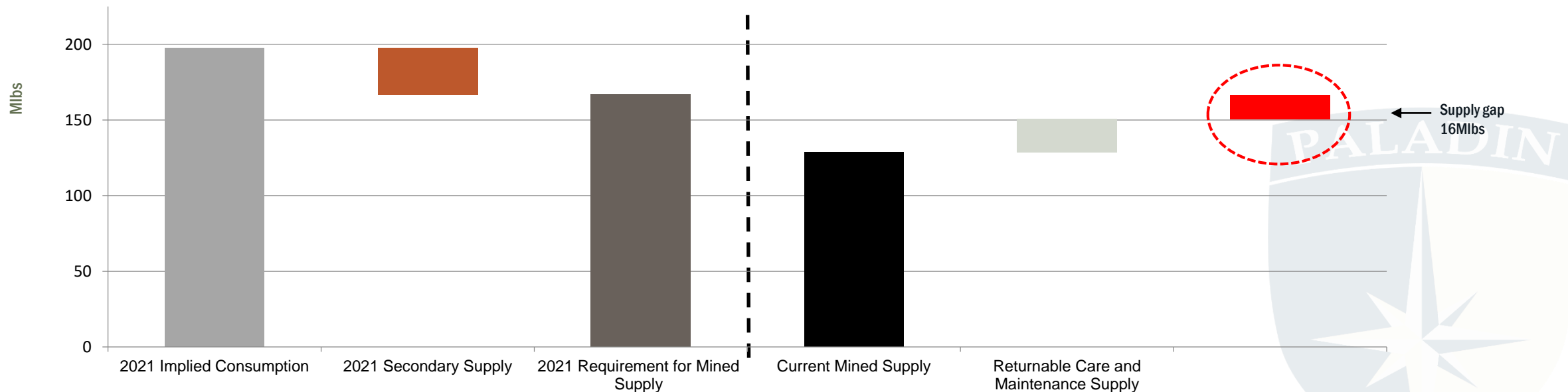
# IT'S ALL ABOUT SUPPLY

- +35Mlbs taken out of the market in recent years
- Significant decrease in exploration spend since Fukushima
- New Project Development timelines stretched:
  - Majority are still very much in the early stages of development
  - Require significantly higher incentive prices
  - Production from new mines will be many years after incentive prices reached
  - Permitting uncertainty remains in many jurisdictions
- Global mine supply now structurally impaired and unable to respond in time to price increases. Potential for price spikes.
- When long-term contracting returns to historical levels, enrichment tails will increase, reducing the contribution of secondaries to the market
- Supply shock impact exacerbated by US utilities reluctance to contract whilst s232 petition unresolved – final decision expected mid 2019.
- Mines currently on care and maintenance have a restart timeline advantage



# POSSIBLE OUTLOOK – MID LEVEL GROWTH

- Care and maintenance supply expected to come back online if prices lift to US\$40-50/lb range
- The industry also needs additional new growth from mining before 2021 – this requires incentive prices of US\$60-80/lb (i.e. 2-3 x current price levels)
- In reality, the downtrend has been so long and deep, it will be difficult for the industry to meet medium term demand and conditions are in place for an “overshoot”





An aerial photograph of the Langer Heinrich uranium mine. The mine is situated in a vast, arid desert landscape. In the center, there is a large industrial complex with several tall, cylindrical storage tanks and various processing buildings. To the right of the main complex, there are several large, rectangular water reservoirs. The foreground and middle ground show extensive mining operations, including deep pits, terraced slopes, and winding roads. In the background, a range of rugged, brown mountains stretches across the horizon under a clear sky. The overall scene conveys a sense of large-scale industrial activity in a remote, natural environment.

# **A STRATEGIC TIER-ONE ASSET AT LANGER HEINRICH**

**A low cost, long life uranium mine**





# KEY ACTIVITIES UNDERWAY

- **Operational Review of Langer Heinrich Mine**
  - Study team has been assembled
  - Concept Study is currently underway
  - Studies will examine improving the existing base operation, lowering operating costs, increasing recoveries and throughput and the potential for vanadium recovery
  - Refine the restart plan
  - Concept study targeted for completion Q3 FY2019



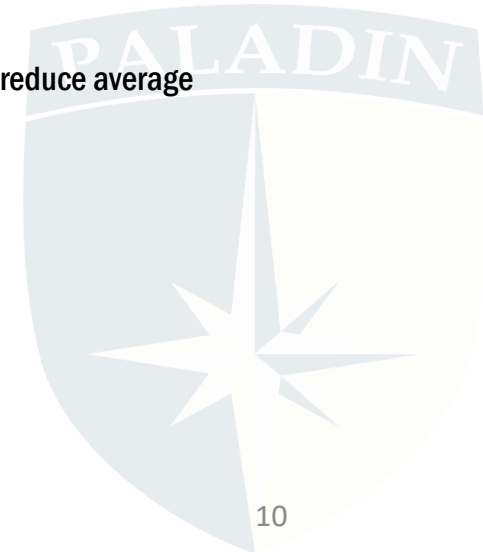
# FUTURE OPTIMISATION POTENTIAL

## BACK END UPGRADE PROJECT (BUP)

- The BUP will utilise the existing Langer Heinrich Mine process across the Beneficiation, Leach, CCD and TSF areas with relatively minor changes
- The PLS to be treated via a substantially new process that has been divided into the following process areas:
  - PLS concentration
  - Vanadium precipitation
  - Uranium precipitation
  - Causticisation & carbonation
  - Crystallisation
  - Vanadium refinery
  - Uranium refinery
- BUP has completed the R&D phase with material benefits identified across the operations including:
  - Potential to reduce process cost by US\$4-5/lb
  - Vanadium produced as a co-product for sale
  - Process more stable and operability improved

## BENEFICAITION

- Paladin is reviewing available third-party beneficiation technologies to assess benefits to the Langer process
- Paladin is also evaluating the significant body of beneficiation performance and test work data developed by the Paladin team during operations in the Company's dedicated metallurgical laboratory at Langer Heinrich
- The aim of both these lines of investigation is to increase production, potentially lower operating costs and improve the ability to economically process the remaining available mineral resources at Langer Heinrich including low-grade stockpiles
- Potential to increase production by 1.5-1.8Mlb pa and reduce average costs by US\$1-2/lb



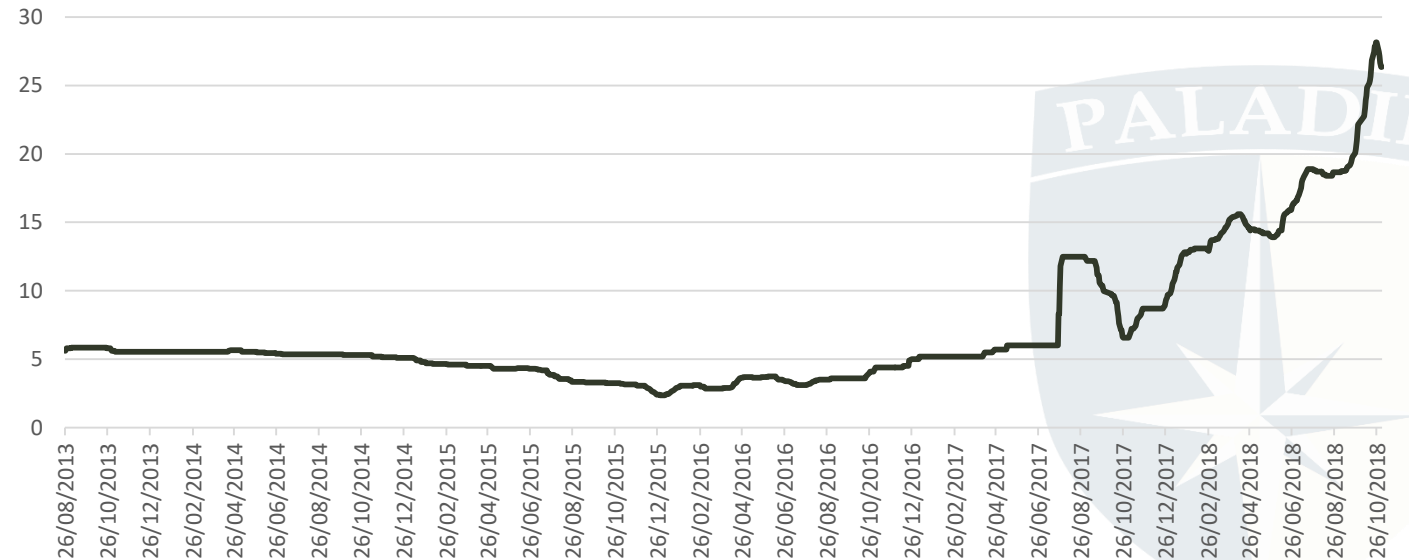




# VANADIUM - A NEW HORIZON?

- Opportunity to produce Vanadium at LHM
- Estimated resource grade 150ppm
- Potential economic, marketing and environmental benefits
- Significant price increase due to usage within vanadium redox flow batteries
- Future demand is expected to rise due to supply constraints

*Vanadium Price  $V_2O_5$  Flake 98%*





An aerial photograph of a large industrial facility, likely a refinery or chemical plant. The image shows a complex network of pipes, walkways, and structural steel. Numerous large, circular storage tanks are visible, some containing green liquids and others with brown liquids. There are several large rectangular buildings with flat roofs. The facility is situated in a desert-like environment with sandy ground and some sparse vegetation in the background. The overall tone of the image is muted, with a blueish-grey overlay.

# SO WHAT'S AHEAD FOR PALADIN?

New management, ready to re-start production,  
diverse portfolio, attracting value



# WE'VE GREATLY REDUCED COSTS

## EXPLORATION

- Exploration costs will reflect the work required to meet minimum tenement commitments
- Includes 100% spend for the Michelin Project

~ US\$1.5Mpa

## CORPORATE COSTS

- All non-essential expenditure continues to be reduced
- No change to recently reduced corporate staffing levels
- Does not include spend for optimisation/restart studies

~ US\$4.0Mpa

## LHM CARE & MAINTENANCE COSTS

- Predominant costs associated with staffing
- Costs will continue to be scrutinised without compromising the asset

~ US\$3.5Mpa

## KM CARE & MAINTENANCE COSTS

- Predominant costs associated with power and water treatment (c.US\$3.1M)
- Higher than expected rainfall can result in increased power costs for water treatment

~ US\$5.0Mpa

**Total Ongoing Annual Costs \***

~ US\$14Mpa



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\* Not including study costs.

# STRATEGY

- Focus on optimizing and restarting LHM
- Progress feasibility studies centred on lowering costs, improving recoveries, increasing throughputs and potential vanadium production
- Leverage increases in the uranium price to create value propositions for Paladin's leading global resource base
- Maintain KM, exploration, corporate on a minimal expenditure, care and maintenance basis



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# Green Shoots Everywhere

- IPCC REPORT – Global warming increase by 1.5 °C by 2030
  - China - Plans to have 56 reactors operating by 2020 and 180 reactors, or 400% increase, by 2030 to reduce its reliance on coal
  - India following suit with 300% increase
  - 17 new reactors in Saudi Arabia announced
- Demonstrated willingness of supply to self correct
- Lack of exploration and near term options
- Kazakhstan 38% of world production
  - Reduce growth plans 20%
  - Align with global marketing practices
  - IPO of up to 25% - increased transparency for the industry
- The level of reactor fuel requirements covered under contract is decreasing– not sustainable



**THE GOOD, THE  
BAD AND THE UGLY:  
LIMITING TEMPERATURE  
RISE TO 1.5°C**



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Source:  
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# APPENDIX: RESOURCE & RESERVE TABLES

Ore Reserves	30-Jun-18				Paladin Ownership %
	M tonnes	grade % U <sub>3</sub> O <sub>8</sub>	Mlb U <sub>3</sub> O <sub>8</sub>		
Malawi					
Proven	Kayelekera	0.39	0.117	1.0	85
Probable	Kayelekera	5.34	0.088	10.4	85
Stockpiles	Kayelekera	1.59	0.076	2.6	85
Kayelekera Total	7.32	0.087	14.0		
Namibia					
Proven	Langer Heinrich	41.97	0.052	48.5	75
Probable	Langer Heinrich	13.14	0.048	14.0	75
Stockpiles	Langer Heinrich	30.78	0.035	24.0	75
Langer Heinrich Total	85.89	0.046	86.6		

Mineral Resources		M tonnes	30-Jun-18 grade % U <sub>3</sub> O <sub>8</sub>	Mlb U <sub>3</sub> O <sub>8</sub>	Paladin Ownership %
<b>Canada</b>					
Measured	Michelin	17.62	0.097	37.6	50
	Rainbow	0.21	0.092	0.4	50
Indicated	Gear	0.35	0.077	0.6	50
	Inda	1.2	0.069	1.8	50
	Jacques Lake	12.96	0.063	18.0	50
	Michelin	20.65	0.098	44.6	50
	Nash	0.68	0.083	1.2	50
	Rainbow	0.76	0.086	1.4	50
Inferred	Gear	0.3	0.093	0.6	50
	Inda	3.26	0.067	4.8	50
	Jacques Lake	3.61	0.055	4.4	50
	Michelin	4.54	0.099	9.9	50
	Nash	0.51	0.072	0.8	50
	Rainbow	0.91	0.082	1.6	50
Total Canada		67.56	0.086	127.7	
<b>Malawi</b>					
Measured	Kayelekera	0.74	0.101	1.7	85
Indicated	Kayelekera	12.71	0.070	19.6	85
Inferred	Kayelekera	5.35	0.062	7.4	85
Stockpiles	Kayelekera	1.59	0.076	2.6	85
Total Malawi		20.39	0.070	31.3	
<b>Namibia</b>					
Measured	Langer Heinrich	60.71	0.051	68.7	75
Indicated	Langer Heinrich	21.48	0.046	21.7	75
Inferred	Langer Heinrich	8.70	0.047	9.0	75
Stockpiles	Langer Heinrich	30.78	0.035	24.0	75
Total Namibia		121.67	0.046	123.5	
<b>Australia</b>					
Measured	Valhalla	16.02	0.082	28.9	91
Indicated	Andersons	1.4	0.145	4.6	82
	Bikini	5.77	0.050	6.3	82
	Duke Batman	0.53	0.137	1.6	100
	Odin	8.2	0.055	10.0	91
	Skal	14.3	0.064	20.2	91
	Valhalla	18.64	0.084	34.5	91
	Carley Bore	5.4	0.042	5.0	100
	Manyingee	8.37	0.085	15.7	100
Inferred	Andersons	0.1	0.164	0.4	82
	Bikini	6.7	0.049	7.3	82
	Duke Batman	0.29	0.110	0.7	100
	Honey Pot	2.56	0.070	4.0	100
	Mirrioola	2	0.056	2.5	82
	Odin	5.8	0.059	7.6	91
	Skal	1.4	0.052	1.6	91
	Valhalla	9.1	0.064	12.8	91
	Watta	5.6	0.040	5.0	82
	Warwai	0.4	0.036	0.3	82
	Carley Bore	17.4	0.028	10.6	100
	Manyingee	5.41	0.085	10.2	100
Total Australia		135.39	0.064	189.9	
Global Total		345.01	0.062	472.3	

