

## Energiewiende - A Self Sufficient Europe



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The information in this presentation that relates to Exploration Results, Mineral Resources or Ore Reserves is based on information compiled by Dr Francis Wedin, who is a member of the Australasian Institute of Mining and Metallurgy. Dr Wedin is a full-time employee of Dakota 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 2012 Edition of the "Australasian Code for reporting of Exploration Results, Exploration Targets, Mineral Resources and Ore Reserves" (JORC Code). Dr Wedin consents to the inclusion in this presentation of the matters based upon the information in the form and context in which it appears.

#### The Next Energy Transition is Upon Us



- > Volkswagen 30 new all electric models
- > Daimler/Mercedes 10 new all electric models
- > BMW new all electric models over all series
- > Jaguar new all electric model planned
- Renault/Nissan currently largest sellers of EV's in Europe
- > Renewables Home and commercial energy storage





## Lithium Demand – the "Perfect Storm"?



Even given the current spectacular growth rates of lithium-ion battery usage, these are expected to rise further, caused by a confluence of the following factors:

- > Government incentivisation for purchase of EVs
- Penalising fossil fuel powered vehicles motions to ban sales of new petrol and diesel cars by 2025 in Norway and Netherlands and by 2030 in Germany
- > Tipping point in 2017-18 where affordable (<US\$35,000) EVs, with a range of >300km, are becoming available
- Mass uptake of renewable energy price of solar panels reduced by 80% since 2010, making the economic case for stationary battery storage more compelling
- Climate change The Paris COP21 December 2015 agreement creates legal framework for a strong incentive to switch to EVs, and home/grid-produced renewable energy linked to stationary battery storage
- > Pollution China's target of five million EVs on the road by 2020, and mass-conversion of buses to lithium-ion battery power



- Portugal is highly prospective for petalite and spodumene-hosted lithium deposits. It is currently the leading lithium producer in Europe (mostly small-scale mining)
- Countries in Europe are leading the world in uptake of electric vehicles (EVs) using lithium-ion batteries, with EVs already totalling 22% of all new vehicle sales in Norway
- Lithium-ion batteries are already being produced in Europe to meet this increasing demand, and production capacity is growing dramatically to keep up, with Daimler-Mercedes recently expanding its factory in Germany, and multiple other factories to follow suit in Poland, Hungary and the UK
- European battery producers need a secure, ethical and low-carbon footprint source of lithium. Dakota is well placed to supply this expected surge in demand
- Portugal ranked in the global Top 10 of all countries in the Fraser Institute 2015 Survey of Mining Companies for Policy Perception Index



DKO presentation, 18/02/2016

USGS Mineral Commodity Summaries, 2016

http://media.daimler.com/deeplink?cci=2734603

http://www.telegraph.co.uk/business/2016/05/27/vw-to-invest-8bn-in-battery-factory-as-it-tries-to-reinvent-itse/

Fraser Institute Survey of Mining Companies 2015

#### **European Battery Factories & Dakota**





The largest market for EVs in the world

#### Safe Reliable Supply for Europe??



- The Lithium cartel is like OPEC on steroids. OPEC is a loose association of a dozen or so oil producing countries that controls about 40% of world oil production whereas the Lithium cartel comprises four companies that control around 90% of lithium production, with four Asian Companies controlling 80% of Liion cell production
- So what happens when China restricts supply of Lithium and or geopolitics/environmental/labour problems effect South American supply??



## Sepeda – a Major New European Lithium Discovery



#### **SEPEDA - PORTUGAL**

- Very large (753sqkm), highly prospective tenement package covering three main lithium pegmatite fields in Northern Portugal with known lithium-bearing (petalite/spodumene) pegmatites:
  - Barroso Alvão Pegmatite Field (including Sepeda project)
  - > Serra de Arga Pegmatite Field
  - > Barca de Alva Pegmatite Field
- Tenement package consists of eight exploration licences (one granted and seven under application\*)
- Historical small scale mining within tenement package
- Close to excellent power, storage, transport infrastructure, and local workforce

\*Tenement application MNPPP0395 (Barroso-Alvao) is awaiting a decision on a proposed hydroelectric dam development. This tenement and tenement MNPPP0407 also have some overlapping claims which may affect the grant process.



## Sepeda – Toward a Self Sufficient Europe



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#### Sepeda Tenements



#### Sepeda – a Major New Lithium Discovery





- Initial drill programmes 49 reverse circulation (RC) and two diamond drill holes completed totalling 5,181 m at the Sepeda Lithium Project, Portugal
- Results show very thick, mineralised pegmatites from surface, with intercepts<sup>1</sup> including 74 m @ 1.54% Li<sub>2</sub>O
- > New mapping extends mineralised pegmatite corridor to 3 km strike
- Maiden resource announcement imminent
- Metallurgical testwork underway at Dofner-Anzaplan to produce lithium carbonate/hydroxide results expected Mar-Apr 2017

### Sepeda - Development Timeline





#### **Company Summary**



- > Aiming to become a sustainable European petalite concentrate and lithium carbonate/hydroxide supplier
- > Current cash position of AUD\$18.0M Fully funded to completion of Sepeda DFS
- > A further AUD\$3M due as consideration for the recently concluded sale of Australian asset developed by the Company (Cash post completion: AUD\$21.0M)
- Exceptional initial results from our first Portuguese project Sepeda, with very thick lithium-bearing pegmatite intersections including 74 m @ 1.54% Li<sub>2</sub>O indicating major new European lithium discovery
- > Sepeda phase three drilling to commence mid-February Maiden Resource imminent
- > Aim to be producing petalite concentrate by end-2018 and lithium chemical products by mid-2019

#### **Capitalisation Overview**

**ASX-DKO** 



\*Milestone Vendor Shares. Definition of resource over divested Lynas Find tenements: - 15mt resource @ 1.2% Li2O

EV

\*\*Directors and Management Performance Rights. Definition of resource over DKO projects: Tranche 1 : 6,625,000 – 7.5mt resource @ 1.0% Li20 by 29/11/2018, Tranche 2: 3,312,500 – 15mt resource @ 1.0% Li20 by 29/11/2019, Tranche 3: 3,312,500 – 30mt resource @ 1.0% Li20 by 29/11/2020





#### The Dakota Opportunity

- Strategically placed to take advantage of the growing surge in European lithium demand
- Excellent initial results show major new European lithium discovery at Sepeda
- > Strong cash position allowing rapid advancement of project
- Dominant land position in well-known petalite/spodumene mineralised region of Portugal
- > Highly experienced management team with a track record of delivering successful outcomes

# to take advantage of the



(Source: Bloomberg, ASX, TSX, TSX:V, AIM and Company estimates as at 22<sup>nd</sup> October 2016)









## **Board & Management Team**



John Fitzgerald Chairman	Mr Fitzgerald is an experienced Company Director and resource financier. He has worked with the resources sector for 30 years providing corporate advisory, project finance and commodity risk management services to a large number of companies in that sector.
	Mr Fitzgerald is a Non-Executive and lead Independent Director of Northern Star Resources Ltd and a Non-Executive Director of Danakali Resources Ltd, and Carbine Resources Ltd. He has previously held positions as Chairman of Integra Mining Ltd and Atherton Resources as well as senior executive roles with a number of Investment Banks with a focus on the provision of services to the mining sector. Mr Fitzgerald is a Chartered Accountant, a Fellow of FINSIA and a graduate member of the Australian Institute of Company Directors.
David J Frances President & CFO	International mining executive of 25 years with a track record of developing assets in Africa (Democratic Republic of Congo) with Mawson West (TSX: MWE) from 2006- 2012.
	Mr Frances took MWE private in 2009 when it was a \$5M ASX listed company with exploration and development projects in the DRC. After successfully completing a transaction with Anvil Mining and subsequently recommissioning and restarting the Dikulushi copper-silver mine Mr Frances then completed the largest base metals capital raise and IPO in the world for 2010 when MWE was listed on the TSX with a market capitalisation of \$250M.
	David has also overseen other successful developments and his experience in successfully exploring, funding, and developing projects, his proven corporate strategic skills, and his knowledge of equity capital and debt markets complement the highly experienced and successful management team of Dakota.

## **Board & Management Team Cont.**



#### Dr. Francis Wedin Technical Director



Francis Wedin is a mining and metals industry executive, with a diverse expatriate working background spanning three continents and multiple commodities, producing a proven track record of mineral exploration and development success.

Whilst MD of Asgard Metals, Francis was involved in the identification and acquisition of the Lynas Find lithium project, which was later vended to Dakota. Since joining Dakota, he has overseen the discovery of a new, high grade resource at Lynas Find, and has been instrumental in growing Dakota into a globally significant lithium development company focused on Europe.

Francis has a PhD in mineral exploration parameters focused on the Tethyan Metallogenic Belt, is a Fellow of the Geological Society, London, and a member of the Australasian Institute of Mining and Metallurgy. He is bilingual in English and Turkish, with proficiencies in other languages. He is currently studying an MBA with a focus on renewable energy technologies and how this relates to the lithium market.

#### Prof. Dudley Kingsnorth Non-Executive Director

Professor Kingsnorth is a Fellow of the Australian Institute of Company Directors, in addition to being a Fellow and past VP of the Australasian Institute of Mining and Metallurgy (AusIMM), and a Fellow of the Institute of Materials, Minerals, and Mining (UK).

He has more than 45 years' experience in the international mining industry, and is internationally recognised as a world authority on lithium and rare earths markets. Dudley is the current leader of the Curtin Graduate School of Business's Critical Materials Initiative.

He is also an experienced director and has acted as Chairman, Managing Director, CEO, Director, Project Manager, and Marketing Manager, for various listed and unlisted Companies in the, lithium, rare earths, tantalum, gold, iron ore and aluminium sectors.



#### **Barroso – Alvão Pegmatite Field**



- The Barroso-Alvão area is known to contain aplitepegmatite veins mineralised with petalite and spodumene. Pegmatites occur in swarms, varying in thickness, and individually mapped up to 1 km in strike length
- Lusidakota's position includes the granted, Sepeda tenement (MNPP04612), which contains historical pegmatite workings, and the Tamega/Fafia applications (MNPPP0395/0407)\*
- Drilling at Sepeda in September 2016 has already yielded exceptional results indicating a major new lithium discovery. Phase three drilling to commence mid-Feb. Maiden resource imminent.

\*Tenement application MNPPP0395 is awaiting a decision on a proposed hydroelectric dam development. This tenement and MNPPP0407 also have some overlapping claims, and are expected to go to a bid process.

#### Serra de Arga Pegmatite Field





- The Serra de Arga pegmatite field consists of swarms of aplite-pegmatite dykes and sills
- > Lithium mineral occurrences recorded include petalite, spodumene, amblygonite, elbaite and lepidolite
- Limited work has been undertaken on the large field of aplite-pegmatite bodies at Serra de Arga
- No known resources have been evaluated historical data refers to surface values of 4690 – 12400 ppm Li (1.00 – 2.67% Li<sub>2</sub>O)\*
- > First pass exploration works commenced

\*Due to the uncertainty related to the historical nature of the sampling, Dakota does not warrant that these results are accurate or situated within its tenement holding. Dakota believes that this does however point to the prospectivity of the Serra de Arga region for lithium mineralisation.

#### Barca de Alva Pegmatite Field





- Barca de Alva, the extension of the Fregeneda pegmatite field in Spain, consists of several types of aplitepegmatite dykes and sills containing petalite, spodumene, amblygonite, elbaite and lepidolite
- No known resources exist; historical data from the region refers to surface values of up to 1574 ppm Li (0.34% Li2O)\*
- Lusidakota has two key exploration licence applications, Picoes and Boavista, covering the main pegmatite swarm area\*\*
- First pass exploration works expected to commence in Q1 2017

\*Due to the uncertainty related to the historical nature of the sampling, Dakota does not warrant that these results are accurate or situated within its tenement holding. Dakota believes that this does however point to the prospectivity of the Barca de Alva region for lithium. \*\*Boavista application may be affected by National Park boundaries.

#### **Lithium Processing in Europe**

Dakota is of the view that as the Company's Portuguese deposits of petalite are closer to potential downstream processing locations than the spodumene deposits in Australia and Canada, which tend to be in remote locations, they offer the following economic advantages:

- The established storage and transportation infrastructure associated with the distribution of minerals in Europe will reduce the investment required by Dakota for these capabilities. The net result is that deliveries of concentrates will probably be made on a daily basis.
- The proximity of potential downstream processing facilities will reduce the storage facility requirements at the mine/concentrator site
- The proximity of the Dakota lithium projects to established communities familiar with the mining and processing of petalite will eliminate the need for fly-in flyout arrangements
- The combination of the above factors is likely to reduce the minimum size of an economic independent supply lithium battery supply chain in Europe; reducing the capital requirements of the supply chain and its carbon footprint

3 x expansion to Daimler-Mercedes lithium-ion battery factory in Germany, to build EV and home energy storage lithium-ion batteries





#### **About Petalite**



- > X-Ray Diffraction (XRD) work on the Sepeda deposit has shown it to mainly contain petalite, with some associated spodumene
- The material appears to have very low muscovite mica content, which is advantageous from a processing perspective
- Petalite, a lithium aluminium tectosilicate, is an important ore mineral for lithium. It has a density of 2.4 g/cc, and a hardness of 6. Its colour is white, grey-white and more rarely light pink, and is a wellknown occurrence at the Bikita mine, in Zimbabwe



- > The petalite crystals do not accommodate much iron, so petalite deposits generally have a low iron content
- Whilst historically it has been mined for the glass-ceramic industry, petalite can also be processed to produce chemical grade lithium carbonate/hydroxide products for the rapidly-growing battery market, via conventional processing techniques used with spodumene.

#### "Straightforward to process"

### Lithium Demand – the "Perfect Storm"?



Even given the current spectacular growth rates of lithium-ion battery usage, these are expected to rise further, caused by a confluence of the following factors:

- A trend in many countries towards government incentivising purchase of EVs, and penalising fossil fuel powered vehicles. Lawmakers in the Netherlands and Norway recently proposed separate motions that would ban all sales of new petrol and diesel cars by 2025, and in Germany by 2030
- With Tesla leading the way, we are reaching a tipping point in 2016-17 where affordable (<US\$35,000) EVs, with a range of >300km, are becoming available to the mass market. The technology is publicly available, so we are likely to see (and are already seeing) adoption by all major car companies
- Mass uptake of renewable energy is increasing at a rapid rate, with the price of solar panels reduced by 80% since 2010, making the economic case for EVs and stationary battery storage more compelling
- Climate change effects mean that a switch away from fossil fuels is becoming increasingly urgent. The Paris COP21 December 2015 agreement has created the legal framework to facilitate the transition. This has created a strong incentive to switch to EVs, and home/grid-produced renewable energy linked to stationary battery storage
- Pollution from coal plants and fossil fuel-powered vehicles is destroying the health of millions of people in cities globally every year. It is already evident that certain governments will take dramatic action to tackle pollution e.g. China's target of five million EVs on the road by 2020, and mass-conversion of buses to lithium-ion battery power. This will have a profound impact on lithium demand.

#### Where Does Lithium Come From?





## The Ideal Battery - Why Lithium?





#### The Lithium Market in 2016

- Demand 2015 : 184ktpa\* Lithium Carbonate Equivalent (LCE)
- > Lithium Market 'Value': currently >US\$2 billion
- Market expected to grow to 535ktpa by 2025\*
- > Time to construct and high capex of future brine production are creating opportunities for hard-rock projects
- > With Europe as the fastest growing market, Dakota, is well-placed to play a significant future role in downstream/value-add production



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## Lithium Market Growth Areas



#### **Key Points**

- Strong existing glass/ceramics market
- Battery grade lithium is tipped to be the main growth area in the lithium sector for many years to come

#### Forecast (Conservative) Global Growth Rates 2015 - 2025

	Application	Lithium Products	Demand kpta LCE	Growth between 2015 - 2025
4	Batteries	Specialty compounds - primarily derived from lithium hydroxide	60 - 70 ktpa	10 - 15% p.a. = 200 - 250 kpta
-	Glass / Ceramics	Spodumene concentrates Lithium carbonate	40 - 50 ktpa	2 - 4% p.a. = 55 - 65 kpta
Ō	Greases / Lubricants	Lithium hydroxide	15 - 20 ktpa	4 - 8% p.a. = 30 - 40 kpta
	Metal Alloys	Lithium metal & alloys	10 - 15 ktpa	3 - 5% p.a. = 15 - 25 kpta
*	Air Conditioning	• Various	5 - 10 ktpa	3 - 5% p.a. = 10 - 15 kpta
$\mathcal{N}^{\prime}$	Polymers	• Various	4 - 8 ktpa	2 - 4% p.a. = 10 - 15 kpta
0	Medicine	Specialty organo-compounds	4 - 8 ktpa	2 - 4% p.a. = 10 - 15 kpta
Li	Others	• Various	10 - 15 ktpa	3 - 6% p.a. = 15 - 25 kpta
	Compound Average Growth Rate	N/A	150 - 170 ktpa	6 - 10% p.a. = 350 - 400 kpta

## **Lithium Supply - Summary**

- > Lithium sources currently very constrained by company and country
- Major brine resources carry significant geopolitical risk
- Imperative to define new sources that present alternatives with lower development risk
- Current planned production expansions, and new resources going into production, are likely to be inadequate to support the forecasted large-scale electrification of vehicles
- > Greater volume and diversification of supply is needed to enable the global "energiewiende", or energy transition

#### Lithium Supply 2015





## Growth in Lithium Use - 1

- Lithium is used in a variety of applications, from medicine to metal alloys, greases and lubricants
- Currently, global lithium demand is 184,000mt LCE per annum
- Glass and ceramics industry 30-35% of market share. Most lithium uses experiencing 2-4% Compound Annual Growth Rate (CAGR)
- Largest growth market: lithium-ion batteries currently around 35% of world lithium use, from next to nothing in the 1990s, and has experienced CAGR of around 10% to date
- > Uptake of laptops, tablets and smartphones have all contributed to this rise, however electric vehicles (EVs) are already having a significant effect on lithium demand
- A cell phone will require on average 5-7g of LCE for its battery. The Tesla Model S, with its 70kWh lithium-ion battery, uses 63kg of LCE, or 10,000 times that of a cell phone

#### **Global Battery Production**





### **Growth in Lithium Use - 2**



- Currently, EVs account for 27,000t LCE (15%) of the overall lithium market. However, forecasts predict an 11x growth of this market to 2025, adding 300,000mt LCE of lithium demand
- > This on its own would, in effect, triple the current lithium market
- > 74 million vehicles are expected to be sold worldwide in 2016. In 2015, the total number of plug-in EVs sold to date surpassed one million, of which over 500,000 were sold that year
- More rapid growth expected in 2016-17 with greater availability of cheap, long range models. Just a 1% penetration of the global new car market, would add an additional 50-70,000t LCE demand
- Norway is leading the way, with government incentives the large driver behind a plug-in EV uptake of approximately 25% of all new vehicles. Total penetration of the global car market would require 5-7mt LCE of supply.



**Global Electric Vehicle Sales** 

#### Lusidakota - Portuguese Tenements



Tenement ID	Prospect	Project	Licence Type	Status	Area (Km²)
MNPP04612	Barroso Alvão	Sepeda	Prospecting & Research	Granted	37.1
MNPPP0395	Barroso Alvão	Tamega	Prospecting & Research	Under Application	283.3
MNPPP0407	Barroso Alvão	Fafia	Prospecting & Research	Under Application	27.3
MNPPP0274	Serra de Arga	Arga West	Prospecting & Research	Under Application	249.8
MNPPP0275	Serra de Arga	Arga East	Prospecting & Research	Under Application	93.2
MNPPP0396	Serra de Arga	Arga Central	Prospecting & Research	Under Application	42.7
MNPPP0393	Barca de Alva	Boavista	Prospecting & Research	Under Application	14.3
MNPPP0394	Barca de Alva	Picões	Prospecting & Research	Under Application	5.5

#### **Peer-group Analysis\***



Company Name	Symbol	EV (AUD \$M)	Market Cap (AUD \$M)	Primary Commodity
European Lithium	ASX: EUR	6	9	Li
Dakota Minerals	ASX: DKO	3	21	Li
Avalon Advanced Materials	TSX: AVL	36	37	Li, Sn, In, HREE
Prospect Resources	ASX: PSC	32	45	Li, Au
European Metals	ASX: EMH	105	108	Li, Sn
Neometals	ASX: NMT	141	202	Li
Bacanora Minerals	AIM: BCN	122	146	Li, B
Nemaska Lithium	TSXV: NMX	388	453	Li
Galaxy Resources	ASX: GXY	1041	1,050	Li

\*Updated for 8/2/2017. All figures converted to AUD equivalent

#### **Lithium Conversion Factors**



## Lithium – Li, $Li_2O$ or $Li_2CO_3$ ?

The lithium content of minerals and compounds is referred to in one of three units depending on the source quoted and the end-use referred to:

- > lithium (Li) content
- > lithium oxide (lithia, Li<sub>2</sub>O) content
- > lithium carbonate (Li<sub>2</sub>CO<sub>3</sub>) content or lithium carbonate equivalent (LCE)

Lithium oxide content is widely-used in the glass and ceramics industry, while LCE is commonly used for lithium compounds. The conversion factors are shown below.

Conversion Factors				
To Convert from:	to Li x	to Li <sub>2</sub> O x	to Li <sub>2</sub> CO <sub>3</sub> x	
Lithium Li (100% Li)	1.00	2.53	5.32	
Lithium Oxide Li <sub>2</sub> O (Lithia)	0.46	1.00	2.47	
Lithium Carbonate $Li_2CO_3$ (40.3% $Li_2O$ )	0.19	0.41	1.00	
Lithium Hydroxide LiOH	0.29	0.63	1.55	
Spodumene LiAlSi <sub>2</sub> O <sub>6</sub> (8.03%Li <sub>2</sub> 0)	0.037	0.08	0.20	
Petalite LiAlSi <sub>4</sub> O <sub>10</sub> (4.88%Li <sub>2</sub> O)	0.023	0.05	0.12	