Zinnwald Lithium Project

Technical Report on the Feasibility Study for the Zinnwald Lithium Project, Germany

- Summary -

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TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

1 Summary

1.1 Property Description and Ownership

Deutsche Lithium GmbH (DL, the Company) owns 100 % of the Zinnwald Lithium Project (the Project), located in the Free State of Saxony in Germany approximately 35 km south of the state capital Dresden. The Project is situated adjacent to the border with the Czech Republic and is located in a developed area with good infrastructure, services, facilities, and access roads. Power and water supply will be provided by well-established existing regional networks. Geographically, the area forms part of the Eastern Erzgebirge Mountains, a typical low mountain range with steep valleys and smooth summits with elevations of 750 to 880 m a.s.l.

DL is a 50 : 50 joint venture between Bacanora Lithium plc. (Bacanora) and SolarWorld AG i. L. (SWAG). Until the foundation of the joint venture in 2017, DL was a 100 % subsidiary of SWAG and was named Solarworld Solicium GmbH (SWS). SWS originally acquired two exploration licenses in the Zinnwald area in 2011 and 2012. In 2012, exploration drilling on the property confirmed a potential lithium resource. Subsequent drilling during 2013, 2014 and 2017 further delineated the resource. In April 2017, a mining permit was applied for, which was approved for the field ”Zinnwald“ on 12 October 2017. The mining permit covers 2,564,800 m² and is valid up to the 31 December 2047. In addition, DL holds two other exploration licenses within the area that have the potential to significantly increase the lifetime of the Project.

1.2 Geology and Mineralization

The area covered in this Feasibility Study (“FS”) is part of the Erzgebirge-Fichtelgebirge Anticlinorium, which represents one of the major allochthonous domains within the Saxo-Thuringian Zone of the Central European Variscan (Hercynian) Belt. Its geological structure is characterized by a crystalline basement and post-kinematic magmatites (plutonites and volcanites). The Zinnwald deposit belongs to the group of greisen deposits. Greisens are formed by post-magmatic metasomatic alteration of late stage, geochemically specialized granites and are developed at the upper contacts of granite intrusions with the country rock. The Zinnwald greisen is bound to an intrusive complex, which intruded rhyolitic lavas of Upper Carboniferous age along a major fault structure.

The prospective mineralization is of late Variscan age (about 280 million years old) and is geologically restricted to the cupola of the geochemically highly evolved Zinnwald granite. It was in its apical parts underground mined for veins with tin (cassiterite) and tungsten (wolframite, minor scheelite) until the end of the Second World War. Lithium is incorporated by a lithium-bearing mica, which is called “zinnwaldite”, a member of the siderophyllite-polylithionite series, which contains up to 1.9 wt.% lithium. It is enriched in 10 parallel to subparallel stretching horizons below the already mined tin mineralization. Individual lithium-bearing greisen beds show vertical thicknesses of more than 40 m. The mineral assemblage consists of quartz, Li-F-mica (zinnwaldite), topaz, fluorite and associated cassiterite, wolframite and minor scheelite and sulfides.

1.3 Exploration Status

The first underground mining for tin in the Zinnwald deposit on both sides of the current border between Germany and the Czech Republic was recorded in the second half of the 15th century. The “Tiefe-Bünau-Stollen”, which was driven from the year 1686 on, became the most important gallery of the whole Zinnwald ore field. This adit is actually part of the visitors’ mine “Vereinigt Zwitterfeld zu Zinnwald” and is located in the mining concession. Tin and minor tungsten mining on the German side ceased with the end of the Second World War, and on the Czech side in 1990. From 1890 to 1945 lithium-mica was produced as a by-product and used as raw material for lithium carbonate production. Lithium exploration on the German side started again in the 1950s.

SWS initially focused its exploration activities on the central Zinnwald area as well as underground on the accessible parts of the abandoned mine. An underground sampling campaign was conducted in the year 2012, which provided a series of 88 greisen channel samples from the sidewalls of the “Tiefer-Bünau-Stollen” (752 m a.s.l.) and the “Tiefe-Hilfe-Gottes-Stollen” galleries (722 m a.s.l.). SWS subsequently expanded the work to peripheral parts of the deposit. Exploration consisted of 10 surface drill holes (9 DDH and 1 RC DH) completed during the years 2012 to 2014 with a total length of 2,484 m. Infill and verification drilling was resumed and completed in 2017 by DL consisting of 15 surface diamond drill holes with a total length of 4,458.9 m.

1.4 Resource Estimates

The geological and geochemical results of the exploration campaigns were fully integrated in a data base, which comprises the following underlying data:

- 76 surface holes,
- 12 underground holes,
- 6,342 lithium assays of core samples covering 6,465 m of core,
- 88 lithium assays from channels,
- 1,350 lithium assays from pick samples.

SWS and DL exploration samples were analyzed by the accredited commercial ALS laboratory at Roşia Montană, Romania. Duplicates were sent to Activation Laboratories Ltd. in Ancaster, Canada, for external control. QA/QC procedures were carried out for due diligence purposes and the results confirmed the careful sampling and reasonable accuracy and precision of the assays. Twinned drill holes showed a good match. The initial geological model of several parallel to sub-parallel stretching mineral horizons ("Ore type 1 greisen beds") was verified and an authoritative resource assessed.

The general mineral inventory of lithium was estimated from the block model on the basis of a zero cut-off and without a constraint of minimum thickness of the ore bodies. It accounts for 53.8 Mt greisen tonnage ("Ore Type 1") with a rounded mean grade of 3,100 ppm.

Table 1: Mineral inventory of the Zinnwald Lithium Deposit, German part below 740 m a.s.l.

Mineral inventory "Ore Type 1"	Volume [10^6 m³]	Tonnage [10^6 tonnes]	Mean Li grade [ppm]
Total	***19.9***	***53.8***	***3,100***

Modifying factors for eventual economic extraction (vertical thickness ≥ 2 m, cut-off = 2,500 ppm Li) applied to the mineral inventory result in **a demonstrated (measured and indicated) lithium resource of 35.51 Mt of greisen ore with a mean lithium grade of 3,519 ppm** (see *Table 2*).

Table 2: Lithium resource of the Zinnwald Lithium Deposit, German part below 740 m a.s.l. – Base Case "Ore Type1" Summary

Resource classification "Ore Type 1" greisen beds	Ore volume [10^3 m³]	Ore tonnage [10^3 tonnes]	Mean Li grade [ppm]	Ore volume [10^3 m³]	Ore tonnage [10^3 tonnes]	Mean Li grade [ppm]
	Vertical thickness ≥ 2 m, cut-off Li = 2,500 ppm			**Vertical thickness ≥ 2 m, cut-off Li = 0 ppm**		
Measured	6,855	18,510	3,630	8,954	24,176	3,246
Indicated	6,296	17,000	3,399	8,046	21,725	3,114
Inferred	1,802	4,865	3,549	2,675	7,224	2,995
Demonstrated *(Measured+Indicated)*	***13,152***	***35,510***	***3,519***	***17,000***	***45,901***	***3,183***

The potential of Sn, W and K_2O have been estimated for the greisen beds as mean grades for "Ore Type 1" for the German part of the Lithium Zinnwald Deposit and below 740 m a.s.l.: At a total volume of rounded 15 million cubic meters and a tonnage of 40 million tonnes, the overall mean tin grade accounts for approximately 500 ppm, mean tungsten grade for approximately 100 ppm and mean potassium oxide grade for approximately 3.1 wt.%.

1.5 Reserve Estimates

CIM Definition Standards were followed for the calculation of the Mineral Reserves, which were generated using the September 30th, 2018, version of the Zinnwald deposit resource model. The Mineral Reserves are part of the Mineral Resources. They are reported at a 2,500 ppm Li cut-off grade and below 740 m a.s.l. inside the German state territory. They are inclusive of diluting material and are referenced as mined ore delivered to the plant.

The Mineral Reserve of the Zinnwald lithium deposit considers the underground preparation and development of the whole deposit as well as the technological development of an exemplarily selected mine sublevel. Volumes of material belonging to outer and inner dilution exhibit lithium grades > zero. Predominately greisenized granite accompanies the orebodies. It shows mean lithium grades of roughly 1,700 ppm. Inner dilution mostly consists of greisen and greisenized granite which shows mean lithium grades of roughly 1,900 ppm.

The portion of the geological lithium resource, which is blocked by safety pillars surrounding already existing mine workings, or which cannot be mined economically due to the isolation of ore bodies or to an insignificant ore thickness, amounts to 7 % and was a priori excluded. Based on the reduced resource, Mineral Reserves have been estimated for mining schemes applying sublevel stoping with longitudinal stopes. The normal case suggested for the future mining procedure of the Zinnwald lithium deposit can be specifically adjusted to locally changing geological conditions. It is referred to as "Standard Mining Technology and Optimized Backfill". It includes maximum dimensions of the rooms of 7 m x 7 m with 2 m wide safety pillars and 1 m thick horizontal roof pillars. Backfill material is characterized by a compressive strength value of at least 4 to 5 MPa.

The resulting portion of the Proven Mineral Reserve accounts for **16.5 Mt of ore** including dilution and contains **51 kt lithium metal**. This corresponds to 54 % of the total lithium metal reserve.

The Probable Mineral Reserve is **14.7 Mt** of ore including dilution with a content of **43 kt lithium metal**. It comprises 46 % of the total lithium metal reserve. For further details see *Table 3* below.

Table 3: Mineral Reserve for lithium (normal case)

Category	Ore and Dilution Tonnage [kt]	Li Grade [ppm]	Li Metal Content [kt]
Mineral Reserve considering mining loss and dilution			
(1) Parameter conform ore	22,270 (71 %)	3,500	78
(2) Internal dilution	2,632 (8 %)	1,929	5
(3) External dilution	6,300 (20 %)	1,700	11
(4) Total Mineral Reserve (1+2+3)	**31,203 (100 %)**	**3,004**	**94 (100 %)**
(5) Proven Mineral Reserve	**16,504 (53 %)**	**3,075**	**51 (54 %)**
(6) Probable Mineral Reserve	**14,699 (47 %)**	**2,933**	**43 (46 %)**

1.6 Mining

The mining operation for the Project is planned as an underground mine development using a main ramp for access to the mine and for ore transportation from the mine to the surface. The mine technology will be a common load-haul-dump (LHD) room and pillar technology with subsequent backfill using self-hardening material. Based on the key figures of the overall project, the mine has been designed for an annual output of 1,800 t of Li metal. With reference to the reserve estimation this corresponds to an annually mined ore production between 500.000 to 600.000 t.

Preparation and development of the deposit by main ramp and ventilation shaft includes the following actions:

- Ramp collar at the Europark in Altenberg
- Shaft collar in the north of the deposit
- Routing towards north
- Main hauling by truck
- Ventilation with intake shaft and return air ramp
- Optional involvement of additional mine openings for ventilation purposes
- Utilization of “Tiefe-Hilfe-Gottes” gallery (THG) for water drainage

The deposit itself will be developed via short ramps and sublevels with a spacing of 8 m, initially focussing on the deeper portions of the deposit. With respect to the best possible adjustment to the deposit structure and the prevention of mining losses, a mining technology consisting of sublevel stoping with longitudinal stopes and optimized self-hardening backfill was developed. Mining consists of two extraction steps:

- 1st Extraction Step: Construction of pillar roads with a standard cross section of 5.0 by 4.0 m with permanently stable dimensioning and a horizontal roof pillar thickness of 4.0 m.

- 2nd Extraction Step: Systematic reduction of pillars and horizontal roof pillars depending on the local conditions (ore body shape, geotechnical conditions, etc.) to a dimension of up to 7.0 by 7.0 m.

1.7 Processing and Metallurgical Test Work

The FS test work program builds on the Preliminary Economic Assessment Report (PERC PEA) program completed by SolarWorld Solicium GmbH in 2014. The purpose of the FS test work program was:

- to confirm the results of the laboratory test work in a technical scale
- to define the process flowsheet to produce high quality battery-grade lithium fluoride
- to provide engineering data for basic engineering and for major equipment selection and sizing

The FS test work included flowsheet development test work using a split of a 100 t lithium-mica greisen ore sample. This ore was mined by drilling and blasting in the Zinnwald visitor underground mine from ore body B02, one of the biggest ore bodies in the deposit. During the development of the FS, the flowsheet of the mineral processing from PFS has been confirmed. Some changes have been made in pyrometallurgy and hydrometallurgy:

- Pyrometallurgy: Recipe has been changed with sodium sulphate being replaced by calcium carbonate (limestone)
- Hydrometallurgy: The target lithium compound was changed from lithium carbonate / lithium hydroxide to lithium fluoride

The test work was done to verify the robustness of the processes for both mineral processing and metallurgy. The mineral processing test work was carried out by UVR-FIA (Freiberg / Germany). Pyrometallurgical test work was conducted by IBU-TEC (Weimar / Germany) and the hydrometallurgical test work was done by K-UTEC (Sondershausen / Germany).

Key outcomes of the test work are summarized below.

- The mineral processing, consisting of
  - jaw crusher
  - cone crusher
  - ball mill
  - dry magnetic separation, and
  - fine grinding

  is very robust. The lithium recovery was above 90 % for both the 20 t test work of the PFS (94 %) and the 50 t test work of the FS (92 %). The lithium recovery assumed in the FS is 92 %.
- The pyrometallurgy test work has confirmed a robust roasting recipe consistently achieving > 85 % lithium extraction in the leach.
- The hydrometallurgical test work confirmed, that impurity removal successfully reduced calcium and magnesium contaminants in the pregnant leach solution (PLS). The precipitation by adding potassium fluoride has resulted in a battery-grade lithium fluoride with 99.5 % purity with a recovery rate of 95 %.
- The overall recovery rate from ROM to end product (LiF) is 76 %.

The design criteria which have been used to develop mass balances and process design are based on these test work results.

In addition, a test work program was undertaken in the PERC-PFS to demonstrate the direct synthesis of lithium carbonate products out of the zinnwaldite concentrate. This can also be adapted to the LiF flowsheet with minimum optimization.

1.8 Recovery Methods

The process engineering and design for the process plants and infrastructure was completed by:

- Mineral processing: UVR-FIA GmbH (Freiberg / Germany), KÖPPERN (Freiberg / Germany)
- Chemical processing: IBU-TEC (Weimar / Germany), K-UTEC (Sondershausen / Germany), CEMTEC (Enns / Austria), ERCOSPLAN (Erfurt / Germany), AMPROMA (Herrschingen / Germany)

The extraction of lithium from the greisen ore is structured in two main operation units:

- Mineral processing unit in Freiberg
- Metallurgical / chemical processing plant in Freiberg

The FS is based on an average annual mine production over 30 years of the mine plan of approx. 573,362 t greisen ore containing an average grade of 0.31 wt.% Li. In the mineral processing unit, the ore is beneficiated to approx. 124,420 t/a zinnwaldite concentrate with up to 1.33 wt.% Li, which is extractable in a dry magnetic separation process. The subsequent metallurgical / chemical processing starts with a roasting process in a rotary kiln on the chemical site by adding limestone and anhydrite / gypsum. The roasted zinnwaldite-limestone-anhydrite mixture is than leached with hot water. In this process lithium and potassium are converted into water soluble lithium and potassium sulfates, which can be separated by several crystallization cycles. This is followed by various purification steps. Finally, 5,112 t/a of high purity lithium fluoride can be produced from the solution, which corresponds to 7,285 t/a lithium carbonate equivalent (LCE). As a by-product of this production process, approximately 32,000 t/a of potassium sulfate is expected to be produced. This co-product will be sold to chemical companies in Germany as a fertilizer product.

The forecast operating schedule for the mine in Zinnwald and the mineral processing unit in Freiberg is 24 hours from Monday to Friday and 6,000 hours per annum. The weekends will be used for maintenance. The chemical plant will run 24/7 and 8,000 h/a. The designed plant availabilities are typical 83 % for mine, mineral processing unit and pyrometallurgical plant. *Figure 1* presents a summary of the overall process flowsheet.

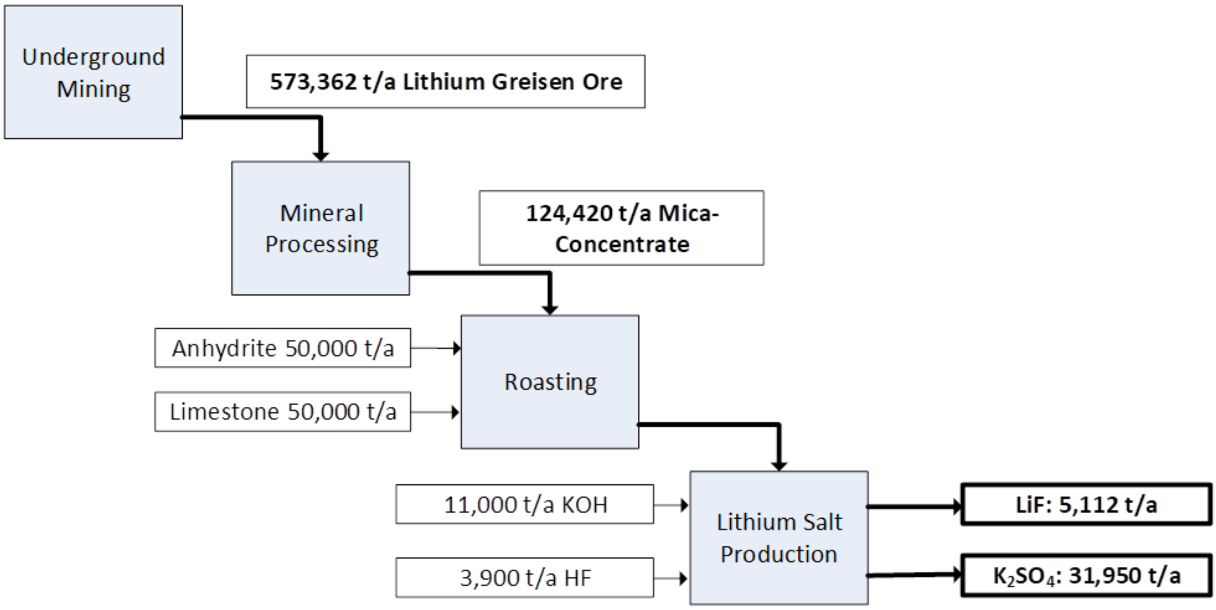

Figure 1: Summary flowsheet (5,112 t LiF are equivalent to 7,285 t LCE)

1.9 Project Infrastructure

The Project is located in a region with developed infrastructure, services, facilities, and access roads. Power and water are provided by existing regional supply networks. The mining site is in Altenberg situated on the former mining site of “Zinnerz Altenberg”.

The processing plant will be located in Freiberg, 49 km far from Altenberg, in the industrial area “Saxonia”. Saxonia is an industrial zone with an existing pyrometallurgical industry for zinc oxide production from zinc-containing residues (mainly steel plant dusts) and a well-developed general infrastructure. This plant will cover the entire process from beneficiation of the mined ore to pyrometallurgical and then hydrometallurgical processing. All media (power, gas, water) and railway connections are available. Steam will be supplied by the local power supply company.

1.10 Market Review and Lithium Pricing

The Zinnwald deposit provides an opportunity to focus on the production of high value downstream lithium products, rather than spodumene concentrates or lower-value lithium carbonate products. With an abundant supply of fluorspar / hydrofluoric acid available in the Dresden / Zinnwald region of Germany, DL has chosen to focus on lithium fluoride production. Lithium fluoride (LiF) is an important component in the manufacturing process of $LiPF_6$, which is the most important conducting salt in lithium-ion batteries. Due to the growing utilization of electro-vehicles (EV), the lithium fluoride market is expected to grow markedly over the next 30 years.

The FS has been developed on a planned average annual production capacity of 5,112 t/a lithium fluoride (7,285 t LCE). Whilst the FS is based solely on the production of lithium fluoride, DL has established the possibility to produce battery-grade lithium carbonate directly from the lithium mica concentrate with only minimal modifications to the chemical plant circuits.

SignumBox Chile (www.signumbox.com) has provided the Company with its detailed 20 years analysis of the wider global lithium market. The Fraunhofer Institute in Germany (www.fraunhofer.de) has provided a detailed analysis of the electrolyte / LiF market. These reports can be summarized as follows:

- By 2037, SignumBox anticipates a global annual demand for lithium chemicals to reach about 1,700,000 t of LCE in its base scenario, compared to the current 360,000 t in 2019, equating to an average annual growth rate of about 11.5 % over the next 20 years.
- Contract prices for battery grade lithium carbonate products have increased significantly since Q3 2015 from a global average price of lithium carbonate of approx. 6,000 USD/t to over 12,000 USD/t (Q2 2019).
- SignumBox' estimates of the total demand for electrolyte materials reached 142,000 t in 2018 with a value of 4 billion USD, which represents a 11.4 % growth compared with 2017. SignumBox expects the annual demand to grow to over 230,000 t by 2030.
- Fraunhofer estimates, that mid-case consumption of LiF in electrolyte production will be in the range of 20,000 t/a to 40,000 t/a by 2030, depending on LiF density remaining in the electrolyte in the range of 5 % to 10 %.

For the FS cashflow analysis, the Company reached a consensus forecast for LiF pricing and uses a price of EUR 22,000 t for battery grade lithium fluoride over 25 years of production. It is based on an average pricing from a number of sources:

Zion Market Research: 26,000 – 26,500 USD/t
SignumBox Calculation: 22,725 – 27,269 USD/t (Average global production cost)
Spot market price (Q1 2019 China): 30,000 – 32,000 USD/t

For the potassium sulphate co-product, the FS assumes a sale price of 500 EUR/t based on existing spot market prices in the local German economy.

The cashflow analysis was prepared by the Company's financial consultants eXnet audit GmbH.

1.11 Environmental Studies

An environmental impact analysis (EIA) pre-study for the mining activities was prepared and applied for, which is based on the German Mining Act standards as follows:

- Land use of the Project below 10 ha
- Forest use of the Project below 1 ha
- Water handling in the mine below 100,000 m^3/a

The Mining Authority of Saxony decided in March 2018 that a full EIA was not required. The permit process follows a simplified model called Facultative Frame Operation Plan ("fakultativer Rahmenbetriebsplan"). In November 2018, DL started this permit process and the process is still ongoing. The permit process for the chemical site in Freiberg will follow the standard BImSchG – Permission Process according to the German BImSchG rules.

1.12 Capital Cost Estimates

The capital cost estimates cover the design and construction of the mine and the process plants, together with on-site and off-site infrastructure to support the operation including water and power distribution and support services. The capital costs associated with the gas supply pipeline and power / steam stations are also included.

Table 4 is a summary of the capital cost estimates included in the FS with an expected accuracy of ±10 % and a base date of Q1 2019. All amounts expressed are in Euro unless otherwise indicated. An exchange rate of 1.12 from USD to EUR was considered during the FS.

Table 4: Estimated Capital Cost for the execution of the Project

Area	M EUR
Mining equipment, infrastructure and site	27.4
Beneficiation / mineral processing plant	23.3
Chemical plant	82.0
Property and general on-site infrastructure	10.6
EPCM / Project management	14.9
Contingency	15.8
Subsidies / grants*	(15.0)
Total:	158.9

(* The subsidies are based on EU and German law and precedent and are granted for investments in the industrial sector of the former German Democratic Republic.)

1.13 Operating Cost Estimates

The mining and processing operating costs were calculated for an operation achieving an average annual production of approx. 5,112 t/a of battery grade (99.5 %) lithium fluoride and are based on the operating cost estimations of the engineering companies G.E.O.S. (mining), KÖPPERN (processing), CEMTEC (roasting) and K-UTEC / AMPROMA (LiF production).

The operating cost estimate covers the mine, the beneficiation plant and the process plants and general and administration facilities. Operating costs have been estimated with an accuracy of ±10 % and are summarized in *Table 5*.

The financial model includes a ramp-up for the mine and processing plants. This results in lower recoveries and thus in slightly lower LiF production for the first two years of operation.

Table 5: Average Annual Operating costs per tonne of LiF

Category	EUR/t LiF
Mining	2,525
Mechanical Processing	2,699
Chemical Processing	7,448
Environmental and Central	386
Total - Direct Operating Costs	13,058
G&A	607
Total - All costs per LiF	13,665

1.14 Economic Analysis

As shown in *Table 6*, the FS demonstrates the financial viability of the Zinnwald Lithium Project at an initial minimum design production of 5,112 t/a LiF (battery grade 99.5 %).

The Project is currently estimated to have a payback period of 6.1 years. Cash flows are based on 100 % equity funding. The average gross annual revenue is 129 M EUR over 30 years of operation. The economic analysis indicates a pre-tax NPV, discounted at 8 %, of approximately 428 M EUR and an Internal Rate of Return (IRR) of approximately 27.4 %. Post-tax NPV is approx. 270 M EUR and IRR 21.5 %.

A sensitivity analysis has shown that the Project is more sensitive to the lithium price than it is to either CAPEX or OPEX. An increase of 30 % in the average lithium fluoride price from 22,000 EUR/t to 28,600 EUR/t increases the Post-Tax NPV from 270 M EUR to 511 M EUR and the Post-Tax IRR to 31 %. A decrease of 30 % in the average lithium fluoride price from 22,000 EUR/t to 15,400 EUR/t decreases the Post-Tax NPV from 270 M EUR to 30 M EUR and the Post-Tax IRR to 10 %.

Table 6: Overview Financial Analysis

Feasibility Study Key Indicators	**Value**
Pre-tax NPV (at 8 % discount) (M EUR)	428
Pre-tax IRR (%)	27.4 %
Simple Payback (years)	6.1
Initial Construction Capital Cost (M EUR)	159
Average LOM Unit Operating Costs (EUR/t LiF)	13,058
Average LOM Revenue (M EUR/a)	112
Post-tax NPV (at 8 % discount) (M EUR)	270
Post-tax IRR (%)	21.5 %
Average Annual EBITDA with co-products (M EUR)	58.5
Annual Average LiF Production	5,112
Annual K_2SO_4 Production Capacity	32,000

1.15 Conclusions and Recommendations

Diamond core confirmation and infill drilling and underground sampling was conducted by DL between the years 2011 and 2017. Drilling, sampling, sample preparation and sample assaying by ALS and Actlabs fulfilled high industrial standards. Internal and external QA/QC procedures were performed with reasonable care. A comprehensive geostatistical evaluation of the geological and geochemical data was conducted and proved its reliability. The geological model was verified and an authoritative resource assessed.

The majority of the Measured and Indicated Mineral Resources was converted to Mineral Reserves. There is appreciable potential to upgrade the current Inferred Mineral Resources to Measured and Indicated Mineral Resources by infill drilling and underground exploration. The lithium deposit is open to the west and at least one additional drill hole west of the hole ZGLi 11/2017 is recommended. Additionally, it is recommended to explore the claims “Falkenhain” and “Altenberg DL” in order to assess future resources.

The mine technology will be a common load-haul-dump (LHD) room and pillar technology with subsequent backfill using self-hardening material. Technical risks due to historic mine workings and water drainage pathways should be avoided by detailed technical planning. At the present time no significant risks have been identified that would inhibit the development of the property. Public acceptance of the planned mine seems to be sufficient and major environmental restrictions do not appear to exist.

Further process and test work investigations are recommended to reduce technical risks of the Project and to optimize operating parameters. Additional development is required at the start of the next phase (detailed engineering and design) regarding an optimization of the site layout of the chemical plant. The key technical aspects involve engagement with vendors of the rotary kiln and crystallizer and evaporator packages. Further test work should be done to improve the quality of the LiF from 99.5 % to 99.9 % and the particle size from 20 µm to approximately 100 µm. Additionally, it is necessary to found a more profitable way for the further application of the leached roasted product tailings.

Financial modelling carried out for the FS demonstrates that the Zinnwald Lithium Project is financially viable. The proposed execution schedule, whilst achievable, is considered ‘fast track’ and is reliant upon rapid decision making, unencumbered design process, collaborative engagement, and no adverse outcomes from the recommended work.

1.16 Forward Work Program

1.16.1 Geology

The Project is ready for execution based on the mineral reserves. Some potential exists to improve it by:

- infill drilling on the western side of the claim "Zinnwald"
- a new evaluation of the tin and tungsten resources in case of increasing prices

1.16.2 Mining

The following activities have to be addressed in order to start the Project:

- Purchase of real estate in Altenberg for surface mine infrastructure
- Signing of supply contracts with customers for site materials during the construction of the ramp
- Finalization of the permission process with mining authorities and county authorities regarding operation and construction permits
- Bidding process for construction of ramp and ventilation shaft by service companies
- Subsoil investigations at the planned location of the mine portal
- Establishing the project management team at Deutsche Lithium
- Border security post to be defined during the permission process

The following tasks should be addressed in order to conduct an efficient and optimized mining operation:

- Modelling the mine ventilation to optimize energy demand
- Developing standard operating procedures for intermediate storage of leached roasted tailings
- Hiring underground mining engineer
- Application for construction permits for ramp, ventilation shaft and buildings
- Hiring mine operators for training after 6 months past the start of the ramp construction
- Start of bidding process for leasing of mine equipment after 12 months past the start of the ramp construction

1.16.3 Processing

The following process-related activities are recommended before starting the execution of the Project:

- Purchase of real estate in Freiberg for processing site
- Establishing of project management team at DL
- Signing supply contracts with suppliers for HF, anhydrite / gypsum, limestone, KOH
- Signing of supply contracts with customers / off-takers for SOP and LiF
- Finalization of the permission process with county authorities regarding operation permit (BImSchG) and construction permits
- EPC/EPCM - Bidding process for mechanical and chemical processing plant
- Application of lithium fluoride at Reach-Organisation

The following process related activities are recommended to improve or to optimize the processing technology and operation:

- Additional test work to enhance the application of tailings by sieving to increase the potential of selling these materials in several applications
- Test work to increase the purity of lithium fluoride from 99.5 % to 99.9 %
- Test work to increase the lithium yield of the roasting-leaching step from > 85 % to > 90 %
- Test work to check tunnel kiln application with respect to a better process stability
- Evaluation of grinding of limestone by DL
- Test work to increase the yield of potassium in roasting and leaching

1.16.4 Infrastructure

Infrastructure work is recommended in the following areas:

- Signing of service contract with power & gas supplier for the sites Altenberg and Freiberg and steam supplier in Freiberg
- Signing service contract with railway company “Deutsche Bahn”
- Increase activities to purchase landfill IAA Bielatal in Altenberg
- Signing supply contracts with companies for takeover of tailing sands
- Signing of supply contracts for lignite filter ash for backfilling of the mine

1.16.5 Environment

Environmental work is recommended in the following areas:

- A social engagement plan has to be developed to ensure risks are mitigated as the Project continues through construction and operation
- A site-wide project has to count animals within the mine site in Altenberg as part of the construction permit of the ramp
- Application for a temporary water discharge permit during the construction of the ramp
- Preparation and negotiation of environmental countervailing measures ("Ausgleichsmaßnahmen") according to the landscape conversation measures concept