



MINING CONSULTANCY & ENGINEERING SERVICES.

Creating Opportunities. Enhancing Performance.

1. ABOUT US.

RWE Technology International (RWETI) is a leading independent consulting and engineering company, providing services to various energy markets including mining, thermal generation, renewables and grids. With clients in more than 100 countries around the world, our expertise spans the full range of generation technologies, fuel sources including hard coal, lignite, nuclear, oil and gas, renewables and mining methods. We offer a diverse range of technical, professional and construction services to industrial, commercial and governmental customers across the globe. Our service portfolio includes project, process, scientific and systems consulting, construction, operations and maintenance.

Mining Heritage

We provide services to the global mining industry with special emphasis on open cast mining equipment. Our mining expertise covers minerals and solid fuels and spans exploration, development, operations and rehabilitation.

We draw on the extensive operation and engineering knowledge as well as the practical experience of RWE's five operating coal mines totalling an annual production of 120 Mt of lignite and 900 Mt of waste. RWE operates a total of 260 km of conveyor belt systems in its own mines in Germany (namely: Hambach, Garzweiler, Inden).

RWE's coal mine "Hambach" (Figure 1) has a surface opening of 6 km by 6 km and is nearly 400m deep including an annual production of 40 Mt of lignite and a displacement of 260 MBcm of waste. It is 100% operated by RWE on continuous mining equipment.

Our reputation for independence, excellence and innovation have established us as the market leaders in providing professional mining services that improve efficiency, reduce risk and deliver a competitive advantage for you. RWETI has executed many hard and softrock mining consulting projects around the world including:

- > Due Diligence, Technical and Bankable
- > Conceptual, Pre-Feasibility and Feasibility Studies
- > Environmental Impact Assessment
- > Least Cost Investment Planning
- > Tendering, Procurement and Contract Administration
- > Operations Management
- > Operational Engineering Support
- > Innovative Risk Management Solutions
- > Technical Training
- > Construction Management and Owners Engineering
- > Project Development and Implementation
- > Quality Management
- > FEED, Basic and Detailed Engineering Services
- > Management Assistance



2. OUR EXPERTS.

RWETI's success is driven by its multi-disciplinary team of world class experts consisting of: Project Managers, Quality Managers, Engineers, Designers, Planners, Geologists, Environmental Scientists, Economists and many other related disciplines. Their combined expertise is strongly rooted in the vast operational experience of RWE's own assets and thus provides best practice methods as well as innovative solutions and techniques across the whole range of engineering disciplines required for mining projects in a variety of commercial and political environments.

Next to its core team, RWETI has access to more than 3,000 Engineers and Technicians within the RWE Group to further strengthen their capability in open cast mining.

By working with strong local project partners or drawing on locally available resources for additional regional knowledge, RWETI's experts combine global reach with local understanding.



3. OUR SERVICES.

RWETI has successfully carried out projects financed or underwritten by major international lenders and international agencies including the World Bank, Asian Development Bank, European Bank for Reconstruction, European Agency for Reconstruction, and the United Nations.

RWETI's Management Systems are certified according to DIN ISO 9001 (Quality) and DIN ISO 14001 (Environmental). RWETI has been commended with several esteemed awards for work safety management, such as the safety award presented by the UK Royal Society for the Prevention of Accidents.

Based on our own extensive mining experience, RWETI provides assistance that cover all aspects of the mining cycle from early development to mine operation. Our services include exploration, resource and reserve estimation, project assessment and detailed engineering design, provision of assistance during construction, commissioning and at all stages of mine operation, including optimisation, rehabilitation and finally mine closure. We also provide independent technical support and advice to lenders and investors, and to governments, law firms and insurance companies.

RWETI can plan and develop any open-cast mine, ensuring minimal impact on the surrounding environment throughout the whole life of the mine. RWETI assists in operation of clients open-cast mines and provides the necessary transfer of skills to future operators. Existing mines benefit from increased efficiency through RWE's state-of-the-art

mining technology and techniques, for example In-Pit Crushing and Conveying (IPCC).

In addition to the above, RWE and the world's largest contract miner Thiess Pty Ltd. have established a global first joint venture to serve the mining industry with O&M services for continuous mining equipment. This joint venture was established in 2013 to meet the growing need for low-cost, sustainable mining solutions.

Mineral Potential Surveys & Exploration Management

Any search for mineral resources begins with an assessment of the mineral potential. Our experts review the geology, assisted by the interpretation of satellite images and geophysical data, where available. We review historical mining activity, including documentation of artisanal mining activities. As a result you have an inventory of potential mineral deposits to take the prospecting process further.

Exploring a prospect is expensive. The risk of a prospect not being economical is high, so you will need all relevant information to be able to make the correct investment decision. We will manage this process for you, from reconnaissance surveys right through to detailed drilling campaigns. We lay out your sampling and drilling campaigns and select the drillers and assay laboratories. We make sure that the samples are correctly taken and analysed and interpret the data to guide further exploration work. Our experts will manage your exploration program efficiently, economically and transparently, with repeated reviews and decision points along the way.



Hydrology / Groundwater Modelling

Management of groundwater and consequently dewatering of mine sites to ensure optimum operational conditions is a key aspect of our services. We carry out ground-water investigation studies, including laboratory analyses and the supervision and evaluation of drilling and pump testing programmes, ground water modelling studies with the world's most advanced 3-dimensional groundwater modelling software, and develop mine dewatering and groundwater management plans.

In addition, we can develop and implement large-scale groundwater infiltration programmes and carry out acid mine drainage mitigation studies, thereby assisting you in running your mine and groundwater programme in an environmentally responsible way.

Resource Estimation

The estimation of resources is the basis for determining the viability of a mineral deposit. Based on the results of geophysical and geological exploration campaigns, our geologists and mine planning experts set up computerised 3-dimensional geological mineral deposit models by the utilization of latest state-of-the-art software (Deswik, Datamine and Surpac). Our geologists are certified to sign resource estimations following internationally agreed standards in compliance with the CRIRSCO family and the JORC code.

Mine Design and Planning

Our development of mine design and mine plans are guided by our experience as a mine operator and as a reputable international consultant, as are our

choices of mining method and equipment. Our mine plans optimise the economical extraction of the deposit, while taking into account the equipment limitations and production targets. The resulting plans detail the run-of-mine tonnage and grades. Our experts provide detailed information including: How many staff, which equipment, and which materials are required, where economical mining limits are and how waste dumps and tailings dams will develop throughout the life of the mine. The best mining and or equipment options will be elaborated and compared for the final decision.

Equipment Concept Studies

For any mining or bulk transportation problem there is more than one solution: Continuous mining methods (e.g. with bucket wheel excavators) or discontinuous shovel and truck operations, transportation by conveyor, truck or rail, or any combination thereof (e.g. In-Pit Crushing and Conveying - IPCC). We can determine the most appropriate concept for each situation. We look at the quantity and type of material to be mined and transported, the distance and changes of elevations to be covered, and we also consider the environment in which the system must operate – climate, available infrastructure, available suppliers and service, capabilities of the work force.

Whether it's the high Andes, tropical India, or arctic Canada, we have been there. And since the bottom line counts, we balance investments, debt service and operating costs in a least-cost optimisation to come up with the best and most cost-effective solution.



Feasibility Studies

Our mining experts will determine whether your deposit has the potential to become a profitable mine, providing you with the level of detail required to transfer resources into reserves. Our studies range from simple concept studies, through pre-feasibility studies, to fully bankable feasibility studies and mine master plans. The studies include both technical and economic aspects for the life of the proposed mine. Our experts are sensitive to the impact the mine will have on the environment, the vegetation, surface and ground water, and of course the local population. Our efforts go beyond simply assessing the environmental effect of the mine; we revise the mine plan to minimise and mitigate environmental impact, ensuring that environmental protection is an integral part of the project.

Environmental Management

Our complete range of expert services will enable you to manage environmental performance more effectively. We can assess the environmental impacts of your business, whether in power generation or mining, and provide operations advice to maximise the value of your asset, within the local regulatory framework.

Tender Assistance

Bulk transport systems or tendering of contractor services and major mine equipment are significant investments. To assure to get the best value for money, we assist our clients throughout the tender process. We draw up and publish tender documents, evaluate the bids, recommend the most suitable bidder and assist you during the contract negotia-

tions. We keep the tendering process transparent, showing the trade-off of quality for price. We help to make equipment functioning for the best price, without come-backs, failures or delays.

Training

It is well recognised that experienced, well-trained staff and management are vital to the successful running of a mine. RWETI's experts provide training in all aspects of mining, from mine design and operations to mine economics and management. Training can be provided at your site, at our offices, or at RWE mines and workshops.

Mine Development and Operations

The development of a new mine poses particular challenges on management and staff, since new staff has to be trained in operational, planning and maintenance procedures, and mining operations have to be fine-tuned in light of the specific conditions at the new mine, while staff are still getting familiar with the equipment.

RWETI can manage the developing mine on behalf of the owner, whilst training local management and staff until such time that they have phased into full operational control and responsibility. Thereafter, as and when required, our experts can provide expert assistance to mine management to overcome specific problems. Alternatively, we can continue to manage the mine operation for the remainder of the mine's life.

4. OUR EXPERTISE.

Our clients include a wide and prestigious range of mining and other companies e.g. exploration & development companies, governments, multi utilities, mine operators, banks and other lender organizations, private equity investors. View our key projects of the last 10 years:

Client / Project	Country	Project Details	Scope	Date
Major Mining Company Technical Assistance	Chile	Optimisation of several belt conveyor lines	TO	ongoing
Fertilizer Producer Technical Assistance, Selection of Mine Equipment	Peru	Review, design and equipment specification; Peru phase III	TO, TS	ongoing
Major Mining Company Technical Assistance – Production Optimization	Chile	TA Production increase in a copper mine	TO, TS	ongoing
Major Mining Company Technical Assistance	Chile	Review of the new crusher circuit for the continuation of the heap leaching operation past the year 2020	TO, TS	ongoing
Major Mining Company Technical Assistance – Production Optimization	Peru	Technical Assistance to the production optimization program of the material handling system at a copper mine	TS	ongoing
Major Iron Ore Producer Comparative Study	Brazil	Comparative study between S&T (shovel & trucks) vs. IPCC (In-pit Crushing and Conveying), mine planning (multi-mine, belt conveyor, surface miner, other techniques)	TS	ongoing
Industrial Minerals Producer Technical Assistance – CME Evaluation	Australia	Provision of engineering services and advice for evaluation and selection and client options	TS	ongoing
Major Mining Company IPCC Study	Australia	Technical assistance for the replacement project	CS, TS	ongoing
Multi Utility Company Coal Quality Management	Pakistan	Coal Quality prediction and monitoring	TO, TS	2015
Mining Company IPCC Study	Norway	IPCC Scoping Study	TO, TS	2015

Scope Legend

BE	Bankable Estimate	C	Construction	CS	Concept Study	Com	Commissioning	CM	Construction management
DE	Definition Estimate	E	Engineering	FS	Feasibility Study	PM	Program management	PFS	Prefeasibility Study
P	Procurement	TS	Technical Support	TO	Technical Optimization				

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Matra Erömü RT Hydrological modelling	Hungary	Update of groundwater model for the Visonta open pit coal mine	TO, TS	2015
Mining Contractor Equipment Inspection	Thailand	Mine equipment inspection	TO, FS	2015
Junior Mining Company Scoping Study	Australia	Scoping Study – pit design and equipment selection	TO, FS	2015
Major Power Utility Equipment inspection	China	Inspection of two ship unloader (coal)	TS, E	2015
Fertilizer Producer Equipment specification, long-term mine planning	Peru	Review of proposed mining system for a phosphate project, long-term mine planning, design and equipment specification, evaluation of CAPEX and OPEX	TO, FS	2015
Multi Utility Company Reserve estimation and production planning	Turkey	Revision of production planning for a coal mine	TO, TA	2015
Mining Company Geological modelling, mineral resource update	Mongolia	Mineral resource update for the Iron project, geological modelling, hydro-logical and geotechnical studies, supervision contractor drilling programme	PM, PFS	2015
Mining Company Technical Specifications	Chile	Preparation of technical specifications for the project, and new bypass conveyor at the copper mine	TS, DE	2015
Power Utility Company Equipment Inspection, Technical Audit	Laos	Technical audit of equipment	TO, FS	2014
Mining Company Equipment Inspection	Chile	Identifying the causes of lack of material transport capacity	TO, FS	2014
Equipment Manufacturer Technical Support	Chile	Technical support, commissioning of conveyor belt system at the copper mine	TS	2014

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Contractor Training of Staff	Indonesia / Germany	Long term training of clients staff, safe and reliable conveyor belt operation at RWE	TS, TO	2014
Contractor IPCC Implementation Study	Indonesia	IPCC Implementation Study	E, CM	2014
Multi Utility Company Feasibility Study	Turkey	Preparation of a feasibility study, mine development and associated procurement process	FS, TS, P	2014
Mining Company IPCC Study	Brazil	IPCC application trade-off study as part of client's pre-feasibility study for the iron ore project	CS	2014
Mining Company Static Calculation	Chile	Static calculation of conveyor frames and friction factor measurements	CM	2014
Power Utility Company IPCC Scoping Study	Australia	IPCC Scoping Study	CS	2014
Major Mining Company		Technical support to the client's truck-less mining piloting execution plan	TS	2013
Major Mining Company IPCC Study	Australia	IPCC study for a dam expansion project as sub-contractor	CS	2013
Multi Utility Company Study Review	Turkey	Review of a coal mine	TS	2013
Major Mining Company Conveyor Engineering Study	Chile	Engineering study to support financial evaluations of mass mining methods	CS	2013
Mining Company Audit – Evaluation	Chile	Technical audit – evaluation of the coarse ore conveyor system	TS	2013
Multi Utility Company Alternative Mining Concept	Australia	Development of alternative mining concept for the coal project	PFS	2012
Major Mining Company Technical Review	Australia	Technical gap analysis and estimation of availability / utilization of portable conveyor systems for the dam project	TS	2012
Major Mining Company IPCC Study	Chile	Technical support to IPCC study investigations for a Chilean copper mine	TS	2012

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Major Mining Company IPCC Case Study	Australia	Technical support to IPCC case study investigations for a coal mine	TS	2012
Mining Company Material Handling Study	Chile	Material handling study for an additional ore conveyor system	FS, E, CM	2012
Equipment Manufacturer Design Review	Chile	Design review of coarse ore overland conveyors and reclaim (belt) feeders	E	2012
Major Mining Company IPCC Workshop	Brazil	3-day IPCC workshop for mine planning engineers	TS	2012
Mining Company Audit – Evaluation	Chile	Audit – evaluation of the coarse ore conveyors system	TO	2012
Mining Company IPCC Study	Zambia	IPCC study for the copper mine project	PFS	2012
Mining Company Technical Audit of Material Handling System	Chile	Technical audit of material handling system at client's mine	TO	2012
Public Mining Company Coarse Ore and In-Plant Conveyor Systems	Chile	Revision of coarse ore and in-plant conveyor systems	TO, E	2012
Engineering Company Technical Assistance	Indonesia	Consultancy for ship loader c28, twin boom stacker and skyline conveyor c34 at a coal terminal	TO, E, CM	2012
Mining Company Revision of Concept	Chile	Revision of conveyor system at a copper mine	E, CM	2012
Engineering Company IPCC Implementation Study	Indonesia	IPCC implementation study	CS, TS	2012
Mining Company Technical Assistance	Peru	Technical assistance for new conveyors	E, CM	2012
Multi Utility Company IPCC-Study	India	Feasibility study for a 40 Mtpa	FS, BE, E	2012
Major Mining Company Technical Assistance	Chile	Technical assistance for load commissioning of overland conveyors cv-003 and cv-004	TS, E	2012

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Construction Company Owners Consultancy	Turkey	Consultancy for a lignite mining contractor operation, design, owners consulting, tendering	TA	2012
Major Mining Company CME Workshop	Australia / Germany	Workshop with the client regarding continuous mass mining technologies	TS	2011
Power Utility Company Equipment Inspection	Australia	TS3 travelling stacker repair procedure – TS3 structural inspection	TO	2011
Power Utility Company Equipment Design	Pakistan	Conveyor Design Study	FS	2011
Mining Contractor Technical Improvement	Indonesia	Coal terminal improvement	FS	2011
Mining Company Review Mechanical Feasibility	Peru	Review of mechanical feasibility for a sub-horizontal curved conveyor line at 12600 t/h	FS, E	2011
State-owned Mining Company Production Increase	India	Preparation of feasibility report and other studies	FS, BE, TO	2011
Mining Company	Chile	Detailed engineering for a copper mine	E, DE	2011
Mining Company Waste Handling Project	Peru	Technical assistance during pre-feasibility study for the waste handling project	PFS	2011
State-owned Mining Company IPCC Application Study	India	Conversion of 3 small-scale S&T to 1 large-scale IPCC operation	PFS	2011
Equipment Manufacturer IPCC Pre-Feasibility Study	Columbia	Pre-feasibility study for coal mine conversion during in-pit crushing and conveying (IPCC)	PFS, E	2011
Mining Company Iron Ore Project	Congo	Support for the conveyor design – next phase of PFS – for an iron ore project	PFS, E	2011
Mining Company Technical Review	Chile	Revision planned underground belt conveyor system for the client	FS, E	2010
Power Utility Company Mine Master Plan	Laos	Mine master plan for the client's open cast lignite mine	FS, BE, E, DE, PM	2010

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Mining Company IPCC Project	Peru	Engineering counterpart for the development of the pre-feasibility study for the IPCC Project	PFS, E	2010
RWE Power / RWE Turcas Hydrological Study	Turkey	Water provision study for Denizli gas power plant	TA	2009
Major Mining Company Spence Phase III Project	Chile	Review of pulley design and structural calculation of bridge conveyor	E, TO	2009
Conveyor Belt Manufacturer Belt Manufacturing Inspection	Australia	Inspection of an Australian belt manufacturing line at Perth	TS	2009
Mining Company Review of Specification	Chile	Review conveyor specification	E	2009
Power Utility Company Overland Conveyor Project	Indonesia	Feasibility study for overland conveyor project	FS	2009
Mining Company Basic Engineering	Chile	Basic engineering for a 175 ktpd expansion project	E	2009
Multi Utility Company Geomechanics, Training	Turkey	Slope stability calculation and training of geologic / geotechnical staff	TO	2009
State-owned Mining Company Material Handling System	Chile	Review of PTMP material handling system	TO	2008
Mining Company Engineering Services	Chile	Engineering services	E	2008
Mining Company Technical Support	Chile	Basic engineering for the conveyor system	E	2008
RWE Power Technical Support	Turkey	Afşin Elbistan C Field development	TS	2008
State-owned Power Utility Engineering Services	Turkey	long and short-term mine planning, mine equipment rehabilitation, planning of relocation of a conveyor distribution point at Kislaköy coal mine, Elbistan	TA	2007-2010
State-owned Mining Company Project Report	India	Project report for expansion of openpit coal mine Ramagundam II	FS, BE	2007

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Power Utility Company Mine Equipment Inspection	Thailand / Indonesia	Mine equipment inspection at client's mines	TS	2007
State-owned Mining Company Geotechnical Study	India	Geotechnical study for deepening and expansion of Ramagundam open cast coal mine	TO	2006
State-owned Power Utility Technical Assistance	Thailand	Technical assistance for deepening of the client's mines	CS	2006

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5. QUALITY, HEALTH, SAFETY AND ENVIRONMENT.

RWETI is committed to effective quality management for in order to understand and deliver services in line with our clients' requirements, with maximum effectiveness and focus on health, safety, environment and quality.

These commitments are reflected in the behaviour of the whole company and the way that our employees work at all times.

RWETI management systems are certified to

- > ISO 9001 Quality Management Systems
- > ISO 14001 Environmental Management Systems
- > OHSAS 18001 Occupational Health & Safety Management Systems

and are applied to all of our projects.



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