50 YEARS OF INTERNATIONAL SUCCESS.

From Rheinbraun-Bergbauberatung to RWE Technology International.
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
<td>3</td>
</tr>
<tr>
<td>50 years – a success story</td>
<td>8</td>
</tr>
<tr>
<td>The first years</td>
<td>11</td>
</tr>
<tr>
<td>The Seventies:</td>
<td></td>
</tr>
<tr>
<td>Demand for German opencast</td>
<td>15</td>
</tr>
<tr>
<td>mining equipment is booming</td>
<td></td>
</tr>
<tr>
<td>The Eighties:</td>
<td></td>
</tr>
<tr>
<td>RC becomes a byword among</td>
<td>21</td>
</tr>
<tr>
<td>experts</td>
<td></td>
</tr>
<tr>
<td>The Nineties:</td>
<td></td>
</tr>
<tr>
<td>A lot of work, also in</td>
<td>31</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td></td>
</tr>
<tr>
<td>The 2000s:</td>
<td></td>
</tr>
<tr>
<td>Expanding the horizon</td>
<td>47</td>
</tr>
<tr>
<td>The present day:</td>
<td></td>
</tr>
<tr>
<td>A time of change</td>
<td>57</td>
</tr>
<tr>
<td>Outlook</td>
<td>73</td>
</tr>
<tr>
<td>Contributions</td>
<td>75</td>
</tr>
<tr>
<td>Masthead</td>
<td>75</td>
</tr>
</tbody>
</table>
DEAR READERS,

1 July 2015 will be the beginning of RWE Technology International GmbH – and yet it can already look back on 50 years of history. It’s an unusual but not unpleasant situation. The main reason for this is that RE GmbH, the precursor to the new company, was founded in 1965.

In fact, RWE Technology International owes this anniversary to the great commitment and successes of all men and women who have worked for RE over the last half century to establish its excellent industry reputation. We remain very grateful to the current team and their predecessors for this commitment. Our new company is built on the reputation they worked so hard to create. The changeover from RWE Technology International GmbH’s two predecessors RE und RWE Technology is going well, which will enable us to keep our business on course for success, offering focused expertise and one hundred percent customer orientation.

This chronicle includes a selection of projects from the last five decades. Many thanks to the authors and all the others who made this chronicle possible. We think you’ll find it very interesting!

Ingo Birnkraut,
Managing Director
Sales/CEO

Wim Tjerkstra,
Managing Director
Operations
50 years ago, former Rheinbraun began to provide its technical experience overseas within the scope of engineering and consulting projects – experience it had built up in open-cast mining.

In 1965 it was one of the first German mining companies to market its operational experience internationally on a commercial basis.

The company trading under the name Rheinbraun Engineering had, since 1981, been a member of the German Federation of International Mining and Mineral Resources (FAB), which was first established in 1978 under the slogan ‘Our way to raw material and energy security’. Alongside other professionals from the German mining sector, RE was engaged in practical and partnership-based collaboration to ensure German’s raw material and energy security.

Our particular thanks go to RE for its support in association work. Work within the FAB has been primarily focused on shaping a German international raw materials policy, the preparation of overseas investments, resource exploration and consultancy operations with a key focus on engineering services in the mining sector. RE has not only proven to be a supporting pillar of the FAB, but also re-established German overseas mining after the war and evolved to operational maturity, as illustrated by investments in Hungary.

The secret of RE’s success was and still is in being able to always fall back on the wealth of experience in German lignite mining and its engineering achievements.

Martin Wedig is the managing director of the German Federation of International Mining and Mineral Resources (FAB) in the German Association of Raw Materials and Mining (VRB), based in Berlin.

LADIES AND GENTLEMEN,

The international consulting activities of the RWE Group, which arise from the 50-year history of the former Rheinbraun company and its experience in the mining consultancy business, stand for success and consistent growth, while embracing continuous change.

Its evolution is a reflection of the profound change witnessed in the power generation industry – a change which is, in RWE’s case, closely linked to the mining sector. This is not least manifested in the fact that RE GmbH, celebrating its anniversary, is now aiming to achieve new business success under a new name and with a new strategy.

As the European trade association of power and heat generation companies, VGB PowerTech also had to respond to this change: with increasing Europeanisation and a continuous expansion of activities. Just as RE and now RWE Technology International emerged over the years from Rheinbraun-Bergbauberatung, VGB PowerTech has emerged from the former Association of Industrial Boiler Owners. Besides mining, the jubilarian is nowadays active in all facets of power and heat generation, and VGB has intensively opened up to renewable energy sources.

One fundamental aspect has remained the same for both organisations: the targeted pooling and reprocessing of operator expertise and operational experience from all relevant fields and the structured utilisation of this knowledge both within and outside the respective company. VGB PowerTech congratulates the old RE on its 50-year anniversary and wishes the new RWE Technology International a continuation of this success story – together. Good luck!

Oliver Then manages the Power Plant Technologies Competence Center of the VGB PowerTech e.V. trade association in Essen.
The name-change to ‘RWE Technology International’ seems like a new beginning for our company. And that’s a good thing because this feeling gives all those involved the drive that is needed for business success.

The roots of this new company go back 50 years, to Rheinbraun-Bergbau-beratung of 1965. Clients from the mining and power plant industries across the world have since profited from RWE’s wealth of experience as planners and operators. Why should they reinvent the wheel if the expertise is readily available? At the start of my career, I served in a team of German engineers and technicians for two years for PT Bukit Asam at an opencast hard coal mine on Sumatra. Not only did our team make a crucial contribution to the project development, we also gained valuable experience that we could incorporate into work back home.

RWE Technology International sustains this long-standing tradition of customer-oriented knowledge transfer. I would like to express my sincere gratitude to the colleagues involved. Your skill and dedication have earned our full respect. Thank you very much for your hard work. My wish for the new old company is that it seamlessly follows on with this success and that its engineers continue to perform their role as the link between RWE and industry clients with great success.

Matthias Hartung
We live in an information era and a knowledge-based society. Today our world relies more on data and files than ever before. Yet knowledge hasn’t been highly valued only since the inception of the internet or social media. Expertise was and still is a defining entity of societies, whether ancient or modern. Information alone isn’t enough to create value for an industrial society. It needs primary production and for that it requires energy and raw materials. Engineers and technicians under the umbrella of RWE Technology International have tapped both these resources for its customers for 50 years. With their global consultancy services they help clients execute successful projects in raw material and energy production.
In order to apply the decades of experience gained from the company’s open cast mining internationally, Rheinische Braunkohlenwerke AG, Cologne, established a subsidiary company, Rheinbraun-Bergbauberatung GmbH, on 17 February 1965.

The subsidiary basically emerged from a specialist department of the mining company and was managed by Hans-Joachim Leuschner (technical) and Franz-Josef Schmitz-Josten (commercial).
Mr Leuschner, you were jointly responsible for founding Rheinbraun-Bergbauberatung in 1965. What was your motivation back then? The driving force behind this idea was the fact that overseas companies kept inquiring about operational experience with conveyor belts and continuous mining systems. Viewed purely historically the first conveyor belts were, admittedly, not in the Rhineland but in the Schwandorf opencast mine in Bavaria. Due to the proximity to Bonn – and through manufacturers’ contacts with foreign companies and direct contacts – visitors kept coming to the Rhenish lignite mining area. Finally, we said: ‘We can’t keep doing this for nothing in the long run.’

How open were they at the time to the idea of an external services business? Who supported you at the time? CEO Erwin Gärtner, who also advocated the creation of Uranerzbergbau GmbH (uranium exploration and mining company), strongly supported the creation of a consulting division. Nuclear energy was then in its early stages and we wanted to be involved in the fuel supply of nuclear power stations. Erwin Gärtner stood alone against the Essen parent company RWE, which actually believed that overseas mining shouldn’t be the business of RWE.

How did the external consulting business develop? The business started with consulting and was still very small initially. Later though the operations-management projects in Bukit Asam and Elbistan came along, which dramatically grew the business. The operations-management projects were actually a result of the fact that people were saying: ‘We cannot leave our clients alone with the equipment in the long term. There’s a market here in which we can increase sales of our service.’

At the same time, the manufacturing industry was interested in Rheinbraun’s ability to improve the marketing of equipment if consulting services could be offered as well.

Understandably, the main focus of planning and consulting lay in lignite mining and in open cast mining technology. Besides the company’s experience-based business objective, it was also possible to tap into new business fields in the first few years.

Bucket-wheel excavator equipment and the related belt conveyor equipment also grew in appeal with the expansion of large ports for the handling of ore – for example, while consulting for the Iron Ore Company of Canada on the operation and maintenance of a new trans-shipment port in Sept-Iles, on the estuary of the Saint Lawrence River.

The Rheinbraun power plant department was also already working during these first few years to provide specialist advice for the OECD at the lignite-fuelled power plant in Kosovo: Solutions were developed to eliminate heating surface fouling in boilers.

Rheinbraun-Bergbauberatung carried out numerous open cast mining projects and provided technical consultation abroad in the first years of its existence. Hence by 1970, besides the development of the Beterega, Girla and Tismana open cast mines in the Rovinari basin in Romania, technical consulting and expertise were provided for most overseas mining companies as well as for banks, institutions and authorities such as the KfW development bank, the OECD and the Federal Agency for Development Aid.

Fields of activity included lignite mining in the Balkans and lignite mining in Neyveli in southeast India, West-African phosphate mining in Morocco, in Senegal and former Spanish West Sahara, iron ore mining in Brazil and oil sand mining in Canada.

Hans-Joachim Leuschner was member of the Executive Board of Rheinbraun from 1971 until 1993.
The decade from 1971 to 1980 sets a course for growth in international mining consulting. Services are provided in oil sand/oil shale, iron ore, uranium and phosphate mining. However, it’s primarily the new lignite projects that require mine planning and the designing of operating resources. Their owners continue to rely on support from the Rhineland in the following decades.

As early as 1968, Rheinbraun-Bergbauberatung GmbH, known as Rheinbraun Consulting GmbH (RC) after 1971, had produced an expert report on the development of the Neyveli opencast lignite mine in India. On behalf of the Federal Ministry of Economic Cooperation and Development, RC took over the planning of the Neyveli I opencast mine from 1970, and of Neyveli II from 1974, as well as the design of opencast mine equipment.

The seventies: demand for German opencast mining equipment is booming.
Guests from India and RC consultant Werner Vogt (second from left) at the viewpoint of the Fortuna-Garsdorf opencast Mine.

At around the same time, the Puentes de Garcia Rodriguez lignite project is developed in Spain. Here mine planning, equipment design and specifications were also provided by RC.

The 1970s lay the foundation for operations-management projects in the 1980s. A feasibility study is performed on the development and operation of the Kislaköy opencast mine in the Afsin–Elbistan coal basin in Turkey on behalf of Türkiye Kömür İşletmeleri (TKİ) in 1972. From 1973, further detailed planning, design and specifications of opencast mine equipment are carried out.

One of the studies conducted by RC in 1978 for the Bukit Asam opencast lignite mine in Indonesia leads in 1980 to RC being commissioned to carry out detailed planning and to supervise bucket-wheel excavator operations.

Projects on behalf of EGAT in Thailand and PPC in Greece are further milestones in establishing the Rheinbraun Consulting ‘brand’. While the lignite industry developed, services were already provided there for the power plants.

The company finally sets foot on the American continent with an office in Denver, and later another in Dallas, as well as support for the activities of Uranerzbergbau GmbH in Canada.

What made you go to India?
I worked in Rheinbraun’s Frechen, Zukunft and Inden opencast mines from 1960. After a successful application, I was in Neyveli on behalf of Rheinbraun Consulting from 1970 to 1972. Besides supporting the operation, my duties as mining advisor involved supporting the Indian engineers in mine planning.

The work of Rheinbraun-Bergbauberatung at this time can be viewed against the background of a worldwide boom in demand for continuous extraction and materials-handling systems in opencast mining. The World Bank, the European Investment Bank and the KfW financed numerous mining projects and required extensive engineering services as part of project development – from the first feasibility study through to detailed planning, but also technical support during project implementation.

Was that a one-man show?
Hans Neffgen joined me in the role of a mechanics consultant. He formerly had been Head of Assembly at Lübecker Maschinenbau-Gesellschaft who had been the most important supplier for the start-up equipment of Neyveli I. He eagerly and successfully empowered Indian companies so they were able to supply Neyveli with spare parts from domestic sources.

How did things progress after that?
In the following years, RE played a leading role in the planning of Neyveli II as well as the re-equipment of Neyveli I, particularly in drawing up specifications for mining equipment and belt conveyors, as well as in the technical and commercial evaluation of manufacturers’ offers.

RE has only been working for Neyveli I again since 2013. What was your follow-up project after that?
From 1974 I was the project manager for the Elbistan project in Turkey. It involved the planning of the Kislaköy opencast mine to supply the 1,200 MW power plant that was built next door. We had particular problems there with the hardened rock layers in the overburden of the area to be developed, as well as with strata that were in some cases hard to drain.

I was head of RC’s mining department from 1976 and I also sometimes worked as a project manager until I was appointed at the Clausthal University of Technology at the end of 1984. I would like to give a particular mention to the recultivation study on the oil sand mines near Fort McMurray on the Athabasca river which we prepared on behalf of the Alberta provincial government in cooperation with a Canadian partner.
LIGNITE MINING IN GREECE.

From 1968 to 2006, Rheinbraun Engineering carried out extensive studies on the potential uses and extraction of Greek lignite.

The company operating the opencast mines and power stations is the predominantly state-owned Dimosia Epichirisi Elektrismou, whose shares trade under the name ‘Public Power Corporation’ (PPC). It operates opencast mines chiefly in northern Greece.

OVERARCHING CONSIDERATIONS
A long-term cooperation was commenced in 1968 with the first consultation on the Ptolemais opencast mine. From May 1993 to June 1996, RE developed a technical master plan for the mining areas of Ptolemais, Amyndeon and Megalopolis.

Furthermore, RE conducted surveys on groundwater, geotechnics and other issues concerning the Mavropigi opencast mine, Sector 6 and the Kommina project.

AMYNDEON
Here in May 1981 it was necessary to identify the advantages and disadvantages of two bucket-wheel excavator types. Just under a year later, the German engineers evaluated the economic and financial data of the Amyndeon complex. In mid-1994, they assessed the long-term planning for the development of the Amyndeon opencast mine. A landslide occurred there on 18 January 2006, on which RE presented a geotechnical analysis in May 2006.

PTOLEMAIS
In September 1982, the Ptolemais basin located in the Western Macedonia region was the focus of a study on developing Sector 6 in the south field. A few weeks later, RE made proposals of how the stripping capacity of 2,000-litre bucket-wheel excavators could be increased. In December that year, RE presented an expert report on the development planning of Sector 6.

In April 1983, RE specialists were involved with the work of removing the hard layers in the overburden of the Ptolemais south field. They presented a conceptual plan to PPC in January 1992 for moving the belt junction of the Ptolemais south field.

FLORINA
What kind of quality is the fibrous woody lignite in the Florina region and how can this raw material be used? The experts from Cologne dealt with this question in November 1994. A little later, in June 1995, they began work on the mining project study for Florina, which they presented in September 1996. This study involved exploring the local deposits in order to mine lignite for the Florina power plant at economically viable costs and with a reasonable return. Greek lignite is a cheap, domestic source of energy and today it provides more than 55 percent of Greek electricity.

It has been proven that there is around 277 million tons of lignite in the Florina basin.

This would allow the 330-MW power station to operate for another 50 years. The lignite has a net calorific value of 2,000 kilocalories per kilogramme, a water content of 40 percent, an ash content of 18 percent and a sulphur content of 1.5 percent. Overburden, interburden and the lignite itself are all mined by contractors using the shovel-and-truck method, using hydraulic excavators and dumpers.

From 1968 to 2006, Rheinbraun Engineering carried out extensive studies on the potential uses and extraction of Greek lignite.

The company operating the opencast mines and power stations is the predominantly state-owned Dimosia Epichirisi Elektrismou, whose shares trade under the name ‘Public Power Corporation’ (PPC). It operates opencast mines chiefly in northern Greece.

OVERARCHING CONSIDERATIONS
A long-term cooperation was commenced in 1968 with the first consultation on the Ptolemais opencast mine. From May 1993 to June 1996, RE developed a technical master plan for the mining areas of Ptolemais, Amyndeon and Megalopolis.

Furthermore, RE conducted surveys on groundwater, geotechnics and other issues concerning the Mavropigi opencast mine, Sector 6 and the Kommina project.

AMYNDEON
Here in May 1981 it was necessary to identify the advantages and disadvantages of two bucket-wheel excavator types. Just under a year later, the German engineers evaluated the economic and financial data of the Amyndeon complex. In mid-1994, they assessed the long-term planning for the development of the Amyndeon opencast mine. A landslide occurred there on 18 January 2006, on which RE presented a geotechnical analysis in May 2006.

PTOLEMAIS
In September 1982, the Ptolemais basin located in the Western Macedonia region was the focus of a study on developing Sector 6 in the south field. A few weeks later, RE made proposals of how the stripping capacity of 2,000-litre bucket-wheel excavators could be increased. In December that year, RE presented an expert report on the development planning of Sector 6.

In April 1983, RE specialists were involved with the work of removing the hard layers in the overburden of the Ptolemais south field. They presented a conceptual plan to PPC in January 1992 for moving the belt junction of the Ptolemais south field.

FLORINA
What kind of quality is the fibrous woody lignite in the Florina region and how can this raw material be used? The experts from Cologne dealt with this question in November 1994. A little later, in June 1995, they began work on the mining project study for Florina, which they presented in September 1996. This study involved exploring the local deposits in order to mine lignite for the Florina power plant at economically viable costs and with a reasonable return. Greek lignite is a cheap, domestic source of energy and today it provides more than 55 percent of Greek electricity.

It has been proven that there is around 277 million tons of lignite in the Florina basin.

This would allow the 330-MW power station to operate for another 50 years. The lignite has a net calorific value of 2,000 kilocalories per kilogramme, a water content of 40 percent, an ash content of 18 percent and a sulphur content of 1.5 percent. Overburden, interburden and the lignite itself are all mined by contractors using the shovel-and-truck method, using hydraulic excavators and dumpers.
The years between 1981 and 1990 could be cited as the ‘Golden Decade’ in the annals. It was the period in which the name gained worldwide prominence among professionals.

Extensive consulting, e.g. for EGAT in Thailand, for PPC in Greece and for NLC in India, brought full customer satisfaction, which thereby became a trade mark of the company. Due to these successes, offices were opened in Canada and Australia which operated as representative offices in the regions, established and maintained contacts and initiated new contracts.
Opencast mine planning and systems operation are the core competencies of RC.

The Bukit Asam project on Sumatra began in mid-1978 as part of the ‘Bukit Asam Mining Development and Transportation Project’ with an opencast mine, employee accommodation, a mine-mouth power plant, a railway line, a port on Sumatra and a power plant with port on Java.

Since the whole project was supervised by the World Bank and collaterally managed by four ministers, the Bank of Indonesia and three state operating companies, the choice of the most efficient mining solution was an important precondition, given that the project’s power plant on Java already had a year’s head start in project development. The consultants in charge of project development had no experience with bucket-wheel excavator equipment. A subcontractor was therefore found: RC. With a stripping ratio of about 3:1 the task at hand was to ensure a fuel supply of 3 million tons per year and to guarantee ‘on the job’ training for Indonesian personnel.

PROJECT DEVELOPMENT

In the follow-up to the four-week fact-finding mission on Sumatra in January 1979 there was a tough, three-stage, months-long fight concerning the total costs accompanying the mining option. Finally, the Indonesian government made a decision in February 1980 in favour of bucket-wheel excavator equipment. RC was henceforth the prime contractor for project work of the Air Laya mining section. This was the greatest success for RC in the project, resulting in a project duration spanning ten years and a total turnover of approximately 100 million deutschmarks.

The Indonesian government finally took the decision on the implementation of the whole project in August 1980. In August 1981 RC joined Morrison Knudsen International (MKI) in the joint venture ‘Bukit Asam Mine Constructors’ (BAMCO) with the following tasks:

> Aggregation of geological information (1st deployment wave headed by Thomas v. Schwarzenberg); detailed mine planning,

THE SUCCESS STORY OF BUKIT ASAM.

With the development of opencast lignite mines the demand for ‘hands on’ work continued to play a decisive role alongside planning consulting in many areas of the world. It was common to encounter purely rudimentary or non-operational skills with large-scale opencast mine equipment. Rheinbraun personnel input their skills in the RC projects.

These were performed outstandingly in integrated mining consultation for the two large-scale projects of the Bukit Asam Air Laya mine of PTBA in Sumatra, Indonesia, and the Elbistan mine of TKI in Anatolia, Turkey.

Besides the extensive geological, hydrological, geotechnical, planning and machinery consultation, counterpart consultation in opencast mining was also successfully employed. Up to 100 Rheinbraun personnel were involved to help and advise the local professionals and decision-makers.

These extensive deployments over several years have been possible due to the closure of a few Rheinbraun briquette factories and the ultimate switch from train operation to conveyor operation in opencast mining, so that experienced personnel were available and successfully employed in these projects.

Parallel to these opencast mining activities were the first consulting successes in power plant engineering and in upgrading. Many of these projects were created as integrated coal/energy/upgrading projects and correspondingly set up at the same time.
tender documents for main mine and auxiliary equipment; workshop and warehouse equipment; power supply; communications technology; earth and construction work for boxcuts; belt junction; surface facilities; train loading station with upstream bunker and the corresponding bid evaluations and tender negotiations upon award for the manufacturers. Engineering in Cologne, Boise and Jakarta were directed by Josef Gallisch.

> Other important tasks included construction of employee accommodation, monitoring of production, transportation and assembly of main mine equipment (2nd deployment wave headed by Lothar Torner), development of an organisational structure for future operations including job descriptions for every position, set-up and operation of a training centre, organisation and management of the start-up phase for the opencast mine, including a 14-day performance test.

MKI was an excellent partner for RC and efficiently carried out its share of the project tasks in project management and administration, controlling, procurement and civil construction.

**COMMISSIONING AND OPERATIONS MANAGEMENT FOR THE MINE**

A different opencast mine in the Rhineland acted as an advisory partner for each RC development project. The Hambach mine was partnered with Bukit Asam.

After the successful cold testing of the first equipment group at the assembly sites and the transportation of the equipment through former rice paddies to the deployment site, the opencast mine started operations with excavators 1 and 2, as well as spreader 1 on 1 November 1985 (3rd and biggest deployment wave headed by Karl-Günter Sans). Excavators 3 and 4, as well as spreader 2 were deployed on 24 February 1986. The fifth excavator was deployed on 1 May 1986. The performance test was passed successfully in August 1986. The then CEO of Rheinbraun, Hans-Joachim Leuschner, congratulated ‘his men’ on the site in person, emphasising the support of the parent company to its subsidiary.

**TRAINING FOR TRANSFER OF RESPONSIBILITY**

The Indonesian personnel trained at the Rheinbraun mines and during the assembly of the main mine equipment formed the nucleus for further ‘hands on’ training activities in the mines and the workshops, as well as ‘hands off’ theoretical instruction at the training centre. The success of this knowledge transfer by RE, achieved by sending around some 120 employees (max. 60 at any one time in 1985/86) continues to this day; it is made possible only through the permanent and ongoing theoretical and practical training of the Indonesian personnel through all levels of the entire project.

On 31 October 1986 the BAMCO contract ended and MKI left the project. RC was now the sole provider of subsequently required operational consultation since MKI was unable to input expertise here. The corresponding OTAS (Operational and Training Assistance Services) contract resulted in the second biggest deployment wave headed by Ludwig Hofmann. During the OTAS period, the objective was to ensure that the Indonesian personnel were guided step-by-step towards independence in operations management.

The OTAS contract expired on 31 July 1988 and was seamlessly replaced by the MMA (Mine Management Assistance) contract (5th and final deployment wave, headed by Helmut Beißner). This took the project into its tenth year. The MMA team’s main task was to give the Indonesian management staff and supervisors the final training they needed to handle the future management of the mine and to transfer full responsibility to them in three steps as part of a counterpart model.

**SUSTAINABILITY**

In Tanjung Enim, after the last team had left PTBA with their best ‘good luck’ (or ‘naik baik’) wishes, the project was transferred to PTBA in September 1989.

Based on the true development work carried out on this project by Rheinbraun, Bukit Asam has developed into a sustainable project that is successfully approaching its final opencast mining stage.
When and for how long were you in Australia?
I went there in 1981 and returned to Germany in 1987. Somehow, my interest in foreign travel had come to the attention of Mr Peretti, RC’s director at the time. In any case, in 1976, about 3 weeks after my return from my first journey to Australia, he asked me if I would be interested in coming to RC.

How was the decision made to establish a subsidiary in Australia?
The trigger was the second oil crisis of 1979/80. The oil crisis appeared to make lignite’s use as a raw material attractive. At that time, there were subsidised projects for the liquefaction of lignite in the Latrobe Valley in Victoria.

Rheinbraun had previously participated in a relevant study financed by the German Federal Ministry of Research and we already had good connections with the State Electricity Commission of Victoria.

We wanted to start up a mining operation with a capacity of 30 million tons per year to create liquid fuel.

Were you successful?
No, things went very differently. It soon became clear that there were no more projects for Rheinbraun, and after the oil crisis, prices fell back to a level that made a project like that uneconomical.

What happened then?
We went over to consulting. It was difficult initially. At first we were able to sell our expertise in continuous technology in oil shale in Queensland. Later, we had further projects in lignite, such as Wakefield, Sedan and Kingston, but also a project for Western Colliens in the Collie Basin in Western Australia.

Our most important project, however, was the planning of an open-cast lignite mine in New Zealand, called Project Ohineray. For this project, I commuted regularly between New Zealand and our office in Melbourne.

I then returned in 1987. Two years later, our activities in Australia came to an end.

When did you go to Elbistan?
Rickes: My first visit to Elbistan was in 1980, during the equipment construction phase. During this time, RC was already intensively engaged in planning work, and a group of Turkish engineers were training in the mines and power plants. In the middle of 1981 I went to Turkey as project director with a team of around 50 employees.

Eger: From 1985 to the end of 1986 I was working in the same role on-site and had been able to visit for the first time in autumn 1984.

What were the greatest challenges?
Rickes: Initially, the long-distance line needed to supply power to the mine from the Atatürk dam in the east had not yet been completed. This meant that as soon as we started up a bucket-wheel excavator, the local power grid went down and the lights went off in the neighbouring town. The second problem was that although we had Rheinbraun personnel available, our own people had no experience of comparable projects and not everybody could cope with the local living and working conditions, which were sometimes very primitive.

Eger: We also had to learn how to work together with the Turkish colleagues whom we were tasked with teaching and training. We were constantly tempted to do things ourselves. Mining performance fell severely in the harsh winter of 1984/85, and we had to prove that the bucket-wheel excavator technology had been the right choice for the World Bank-funded project, which we eventually managed to do.

What about outside of work?
Rickes: We lived in a camp that had been especially constructed for the expatriates and the Turkish management at the Elbistan site. The first winter was hard because we couldn’t always run the oil heaters due to a lack of fuel. It got better in the second year. We had brought our own cook who did a turkey for Christmas, for example. That helped us through the difficult initial period.

Eger: Yes, the first weeks after arrival were the hardest, even later after the project had started. Good relationships with the Turkish colleagues were therefore extremely important and were strengthened and deepened at joint celebrations.

Paul Werner Rickes, project manager for RE and later director of Inden Mine.
Hartmut Ernst, former executive manager of RE.
Wolfgang Eger, project manager for RE.
raw water from the spring well galleries used to drain the Hambach mine. After minimal physical processing with aeration and filtration at the Paffendorf waterworks, it could be transported along a 40 kilometre-long tap water supply pipeline to Wahlscheid for transfer to the two cities. We were awarded very long-term delivery contracts, which finally lapsed in 2010. The facilities at the Paffendorf waterworks had an extremely high capacity of up to 6,000 cubic metres per hour, and were set up to ensure that both cities could be supplied even in an emergency. Demand rates were agreed and billed for the provision of this capacity, ensuring a profitable water business for us.

Why was the contract not extended after 2010?

The quality of the Rhine has improved significantly since the 1970s and 1980s, with the positive development of environmental protection technology in the area of water resulting also from political regulation in Germany and Europe. For this reason, there was less pressure on municipal utilities to secure high-quality water from other sources. Furthermore, RWE has withdrawn from the business with the Düsseldorf municipal utilities and sold its shares to EnBW, which had constantly challenged our water operations. In addition, forecasts of increased water consumption in the 1970s and 1980s proved untrue as demand reduced in Germany due to intensive water-saving measures on the consumer side. This also led to overcapacity in both municipal utilities.

It did not make economic sense to extend the contract and delivery stopped in 2010. During the period of the contract, we delivered a total of 250 million cubic metres of high-quality drinking water to the municipal utilities.

In 1988, RC got into the water business. The company was now called ‘Rheinbraun Engineering und Wasser’. What was the trigger for that change?

By its very nature, the consulting business is subject to greater market-driven fluctuations and therefore so is revenue over the course of the year or over individual years. To secure continuous income for Rheinbraun Consulting, the water business represented a very stable sector that could compensate for temporary losses in other areas. Our business experts therefore added this area to our range of consulting competencies. This resulted in the creation of Rheinbraun Engineering und Wasser GmbH.

How did the company get into the sector and business in terms of technology perspective?

Due to the generally poor condition of the Rhine, the cities of Düsseldorf and Neuss could no longer use the river as a secure source for the production of drinking water. People were looking for long-term, clean and safe alternatives and they found them at Rheinbraun. We had a reliable and long-term source of good raw water from the spring well galleries used to drain the Hambach mine. After minimal physical processing with aeration and filtration at the Paffendorf waterworks, it could be transported along a 40 kilometre-long tap water supply pipeline to Wahlscheid for transfer to the two cities. We were awarded very long-term delivery contracts, which finally lapsed in 2010. The facilities at the Paffendorf waterworks had an extremely high capacity of up to 6,000 cubic metres per hour, and were set up to ensure that both cities could be supplied even in an emergency. Demand rates were agreed and billed for the provision of this capacity, ensuring a profitable water business for us.

Why was the contract not extended after 2010?

The quality of the Rhine has improved significantly since the 1970s and 1980s, with the positive development of environmental protection technology in the area of water resulting also from political regulation in Germany and Europe. For this reason, there was less pressure on municipal utilities to secure high-quality water from other sources. Furthermore, RWE has withdrawn from the business with the Düsseldorf municipal utilities and sold its shares to EnBW, which had constantly challenged our water operations. In addition, forecasts of increased water consumption in the 1970s and 1980s proved untrue as demand reduced in Germany due to intensive water-saving measures on the consumer side. This also led to overcapacity in both municipal utilities.

It did not make economic sense to extend the contract and delivery stopped in 2010. During the period of the contract, we delivered a total of 250 million cubic metres of high-quality drinking water to the municipal utilities.

In 1988, RC got into the water business. The company was now called ‘Rheinbraun Engineering und Wasser’. What was the trigger for that change?

By its very nature, the consulting business is subject to greater market-driven fluctuations and therefore so is revenue over the course of the year or over individual years. To secure continuous income for Rheinbraun Consulting, the water business represented a very stable sector that could compensate for temporary losses in other areas. Our business experts therefore added this area to our range of consulting competencies. This resulted in the creation of Rheinbraun Engineering und Wasser GmbH.

How did the company get into the sector and business in terms of technology perspective?

Due to the generally poor condition of the Rhine, the cities of Düsseldorf and Neuss could no longer use the river as a secure source for the production of drinking water. People were looking for long-term, clean and safe alternatives and they found them at Rheinbraun. We had a reliable and long-term source of good raw water from the spring well galleries used to drain the Hambach mine. After minimal physical processing with aeration and filtration at the Paffendorf waterworks, it could be transported along a 40 kilometre-long tap water supply pipeline to Wahlscheid for transfer to the two cities. We were awarded very long-term delivery contracts, which finally lapsed in 2010. The facilities at the Paffendorf waterworks had an extremely high capacity of up to 6,000 cubic metres per hour, and were set up to ensure that both cities could be supplied even in an emergency. Demand rates were agreed and billed for the provision of this capacity, ensuring a profitable water business for us.

Why was the contract not extended after 2010?

The quality of the Rhine has improved significantly since the 1970s and 1980s, with the positive development of environmental protection technology in the area of water resulting also from political regulation in Germany and Europe. For this reason, there was less pressure on municipal utilities to secure high-quality water from other sources. Furthermore, RWE has withdrawn from the business with the Düsseldorf municipal utilities and sold its shares to EnBW, which had constantly challenged our water operations. In addition, forecasts of increased water consumption in the 1970s and 1980s proved untrue as demand reduced in Germany due to intensive water-saving measures on the consumer side. This also led to overcapacity in both municipal utilities.

It did not make economic sense to extend the contract and delivery stopped in 2010. During the period of the contract, we delivered a total of 250 million cubic metres of high-quality drinking water to the municipal utilities.
The decade from 1991 to 2000 also brought several far-reaching changes for RE. The merger of Rheinbraun with RWE resulted particularly in the large-scale implementation of savings over several years. Comprehensive savings on personnel and other areas were the biggest challenges here. The merger resulted in the consolidation of RE competencies in power plant consultancy and surveys of the corresponding mines.
Important projects of the 1990s:
Los Pelambres (top), Wismut (middle) and MATRA (bottom).

After the fall of the Iron Curtain and the corresponding realignment towards the East, there was suddenly undreamed of potential for financial commitments and also for the acquisition of energy generation plants in those countries. Potential investments were assessed and implemented in the former GDR and at MATRA in Hungary, both in the area of power plants and later also in mining.

There were other due diligence deployments for the power plants and their associated mines in Poland, Bulgaria, Romania and Kosovo, both for RWE and the EU. In addition to the potential acquisitions, the urgently required technological improvements and the specific energy and environmental situation were significant issues here.

On-site consulting in mining technology was scaled down as personnel was extremely limited due to the staff reductions.

RE was also advised against becoming involved in a number of potentially profitable consulting projects, as RWE wanted to avoid any possible conflicts of interest with a view to future acquisitions or holdings.

In its worldwide business operations and the rest of Europe, however, mining consulting remained RE’s main focus.

Uranerzbergbau GmbH, also known as ‘Uranerz’ was founded in 1968 as a ‘gentleman’s agreement’ between Rheinbraun director Erwin Gärtner and the Deilmann brothers, owners of a drilling and oil company from Bad Bentheim.

The objective was to find and develop raw materials for Germany’s then emergent nuclear industry and thereby secure long-term supplies for domestic nuclear power plants. Uranium exploration and the acquisition of holdings was subsidised by the federal government of Germany.

From that point on, Uranerz was active worldwide, mostly in traditional mining countries such as Canada, the US and Australia, and was soon successful. After participating in the operational project at Rabbit Lake, Canada, the company experienced its breakthrough in 1975.

Uranerz geologists discovered and developed the Key Lake deposit in northern Saskatchewan, Canada, one of the biggest and richest deposits in the Western world at the time. The company continued with its successful exploration operations worldwide in parallel with the development of the deposit and the construction of the processing plant and infrastructure. Using in-situ leaching, the company developed minable deposits in Nebraska, US, and prospective areas in Australia, Rheinbraun acquired a holding in the Ranger project in Australia and exploration continued in Africa, Europe and even in Germany (Black Forest).
Since 1992, a significant portion of the consulting activities of the Uranerz GmbH consulting group consisted of ongoing project assessment and evaluation of the clean-up activities of the federal government-owned enterprise Wismut GmbH as well as providing advice to its shareholders.

This was commissioned by the German Federal Ministry of Economics. With the merging of both companies in 2002, the Uranerz consulting contract, which had been put out to tender several times, was transferred to RE GmbH and remained there until the end of 2007.

After reunification, the Federal Republic of Germany took on sole social and financial responsibility for the shutdown of the former Soviet-German mining company SDAG Wismut and the clean-up of the legacy of over 40 years of extracting and processing uranium ore.

The federal government made a total of 7.1 billion euros available and commissioned Wismut GmbH (founded in 1991) to carry out this task.

Starting in the late 1940s and continuing until the end of mining operations in 1990, SDAG Wismut extracted a total of 231,000 tons of uranium. The ores were extracted and processed with very little consideration for the environment. Opencast mines, underground mines and ore processing plants were built at various locations in Saxony and Thuringia – in some cases in densely-populated areas.
Jochem Becker, former senior officer of RE.

How did the project consulting contract for the appraisal of the Wismut GmbH clean-up operations come about?

As a shareholder in newly-founded Wismut GmbH, the German Federal Ministry of Economics needed external expertise in the area of extraction and processing of uranium ore to evaluate the shutdown and clean-up plans and to assess the technical feasibility and cost effectiveness of the planned clean-up measures. Due to its holdings in companies in Canada and the US, Uranerzbergbau GmbH was able to offer both of these and secure the contract in the tender competition.

What special challenges were there?

It was important to establish a trust-based relationship with Wismut employees. This was achieved quickly as the tasks and problems when using uranium ore were the same in East and West. The consultant was able to draw from his international experience when providing solution proposals for the required clean-up measures. A particular challenge for the consultant at the beginning was to gain an overview of the extensive network of Wismut operations in 1992, with its 6,700 employees, many locations and equipment units.

How was UEB Consulting expanded to other countries and mining sectors?

There were uranium mining companies with similar problems to those faced by Wismut in many countries in Eastern Europe. UEB managed to work together with these companies on a multinational project subsidised by the EU within the framework of the PHARE programme. The objective was to take stock of the radioactive legacy waste of the uranium mining operations in the respective countries and to plan pilot projects that could be used to test clean-up solutions.

In addition to its experience with uranium, the UEB advisory group also had the technical equipment and staff to model deposits, assess their content and, on that basis, calculate the economic viability of a project. These skills could also be sold on in many cases as consultation services.

When operations ceased, there were 1,500 kilometres of open mine workings, 56 open shafts, 48 tailings and overburden dumps with 311 million cubic meters of radioactive residue from the processing of uranium ore and one residual void. A total area of 3,700 hectares had some level of radiation contamination.

The consulting contract included checking plans for securing contaminated legacy materials, assessing the annual work programmes of Wismut GmbH, as well as ongoing support and appraisal of clean-up measures with regard to technical, commercial and personnel aspects. This required monthly visits to the different sites. Technical support for complex approval procedures was also required. The consulting contract also included the assessment of follow-up and long-term tasks that were to be performed after the end of the actual clean-up work, such as treating contaminated ground water and seepage water from secured mines and slurry ponds.

Until 2000, the scope of the consulting contracts was around 1,000 man-days/year, falling to 330 man-days/year in subsequent years. The consulting activities ensured that the federal funds were used economically.

Due to their history as uranium mining companies or their close ties with RWE, Uranerz and later RE could rely on scientific and technical personnel with wide-ranging operational knowledge of mining and processing of uranium ores, specific expertise in mining, water and environmental law, as well as practical experience for the rehabilitation of former mining areas. Furthermore, employees with business training were able to apply their expertise in the organisation and management of large-scale mining operations via their role as consultants.

How did the project consulting contract for the appraisal of the Wismut GmbH clean-up operations come about?

As a shareholder in newly-founded Wismut GmbH, the German Federal Ministry of Economics needed external expertise in the area of extraction and processing of uranium ore to evaluate the shutdown and clean-up plans and to assess the technical feasibility and cost effectiveness of the planned clean-up measures. Due to its holdings in companies in Canada and the US, Uranerzbergbau GmbH was able to offer both of these and secure the contract in the tender competition.

What special challenges were there?

It was important to establish a trust-based relationship with Wismut employees. This was achieved quickly as the tasks and problems when using uranium ore were the same in East and West. The consultant was able to draw from his international experience when providing solution proposals for the required clean-up measures. A particular challenge for the consultant at the beginning was to gain an overview of the extensive network of Wismut operations in 1992, with its 6,700 employees, many locations and equipment units.

How was UEB Consulting expanded to other countries and mining sectors?

There were uranium mining companies with similar problems to those faced by Wismut in many countries in Eastern Europe. UEB managed to work together with these companies on a multinational project subsidised by the EU within the framework of the PHARE programme. The objective was to take stock of the radioactive legacy waste of the uranium mining operations in the respective countries and to plan pilot projects that could be used to test clean-up solutions.

In addition to its experience with uranium, the UEB advisory group also had the technical equipment and staff to model deposits, assess their content and, on that basis, calculate the economic viability of a project. These skills could also be sold on in many cases as consultation services.

When operations ceased, there were 1,500 kilometres of open mine workings, 56 open shafts, 48 tailings and overburden dumps with 311 million cubic meters of radioactive residue from the processing of uranium ore and one residual void. A total area of 3,700 hectares had some level of radiation contamination.

The consulting contract included checking plans for securing contaminated legacy materials, assessing the annual work programmes of Wismut GmbH, as well as ongoing support and appraisal of clean-up measures with regard to technical, commercial and personnel aspects. This required monthly visits to the different sites. Technical support for complex approval procedures was also required. The consulting contract also included the assessment of follow-up and long-term tasks that were to be performed after the end of the actual clean-up work, such as treating contaminated ground water and seepage water from secured mines and slurry ponds.
The Maritsa project began in Bulgaria in 1998 with the signing of a ‘Project Development Agreement’ between Rheinbraun AG, the State Agency for Energy and Energy Resources and the Bulgarian state-owned company, Mini Maritsa Istok EAD.

More precisely, two PDAs were signed in that period, the second between RWE Energie AG and the Maritsa Istok 2 (MI2) lignite-fuelled power station. The entire complex at Maritsa consists of three opencast lignite mines: Troyanova 1, Troyanovo Sever (or ‘2’) and Troyanovo 3 (the numbers 1, 2 and 3 reflect the order in which they were commissioned), and the power stations Maritsa Istok 1 (150 MW), 2 (1,450 MW) and 3 (840 MW). Historically, ever since all three mines and the power stations had entered into service, lignite extraction had always measured between 20 and 22 million tons, with a workforce of just under 8,000.

The PDA covered the establishment of a joint project development company responsible for then organising and implementing technical, economic, geological and legal project management. The groundwork was completed in June 2000 when the Mining Company Maritsa East (MCME) was entered into the Radnevo commercial register. Rheinbraun had two thirds of the interests in MCME and Mini Maritsa Istok (MMI) had one third. The CEO was a German and the chairman of the Supervisory Board was a Bulgarian, the former chairman of the Energy Committee (the State Agency had subsequently been changed into a committee).

The feasibility study was completed in June 2001. It budgeted for investments of around 900 million deutschmarks in the first five years. Thereafter, however, the Maritsa project hit stormy weather. Firstly, there was a change in government and one of the first steps the new ministers took was to replace the Board members of the companies under their supervision, including the Board of MMI. The CEO viewed the chances of privatisation more sceptically than his predecessor. After a short period of reduced activity, a joint electricity market study was conducted in collaboration with the Ministry of Energy and Energy Resources (MEER, the Energy Committee had since been upgraded to a Ministry), the NEC (National Electricity Company), MMI and MI2, including Bulgaria’s neighbouring states.
Furthermore, based on the feasibility study, profitability calculations were made that showed that all variants of the Maritsa project would meet the Group’s targets for returns. Following these positive results, the first talks about project financing were held and discussions began with MEER over a concession contract and a Memorandum of Understanding (MoU) regarding the access of RWE Power to M12. On the basis of the MoU, a due diligence analysis could have been carried out on M12.

Through the former CEO, Jan Zilius, RWE Power drafted and submitted an offer to acquire a two-thirds stake in MMI and for the joint construction and running of a new 600-MW lignite-fuelled power plant at Maritsa. The offer was structured in such a way that MMI could finance their share of the costs in the new power plant with the proceeds from the sale of their two-thirds interest. According to the Minister of Energy, our bid complied with the national energy strategy which was being set up at that time. However a Bulgarian energy strategy was not approved before the end of the legislative period.

The Bulgarian partner, MMI, announced the end of RWE’s Maritsa project, stating that MEER had commissioned it to organise the tendering process for the new lignite power plant and to determine the winner. According to MMI, this order led it into a hopeless conflict of interest; after all, they couldn’t organise the tendering process and determine the winner while taking part in the tender with RWE Power at the same time. MCME was dissolved by mutual consent shortly afterwards.

At the end of the 1960s/beginning of the 1970s, Rheinbraun employees were employed in development aid for the lignite site in Neyveli, southeast India.

The Rheinbraun mining consultancy services came to the Indian project a short time later. Extensive studies were carried out into possible uses of the Neyveli lignite and multiple solutions developed for drainage, bucket-wheel excavator technology, coal mining and usability.

The Vastan mining area lies in the Taluka Mangrol district, near the city of Surat in the state of Gujarat, some 300 kilometres north of Mumbai (formerly Bombay). The Vastan Mining Project Study was initially commissioned by Gujarat Industries Power Corporation Ltd. to a Polish consultancy, but was awarded shortly afterwards to RE to develop the deposits and to use the lignite for the 500-MW power station in Surat at an economic cost and for a reasonable return on investment. Vastan lignite is a domestic energy source.

The four 125-MW units were commissioned between 2000 and 2010. The regional electricity production and supply were further improved through the project, and industrial production in particular was enhanced. There are still around 73 million tons of natural lignite resources in the Vastan coal basin, of which around 40 million tons have been classified as reserves. The power plant consumption stands at 1.3 million tons per month. With the reserves, the power plant has enough to supply it for another 30 years.
Copper ore mining continues to be the most important industry in Chile. It was under RE’s supervision that the tunnel conveyor belt of the Los Pelambres project was planned, set up in 1999 and put into operation.

Opencast mining processes were essential for these deposits in order to extract the ore with an average copper content of 0.63 percent. Because of the risk of avalanches in the mining area, which is between 2,800 and 3,800 metres above sea level, ore processing was set up at a safe site at a height of 1,600 metres. As a result, the coarsely crushed ore had to be transported to the processing facilities.

It was decided that the best transportation option for this project would be a downhill conveyor installed in a tunnel. Owing to the length and gradient of the conveyor belt system, the stresses in the steel-cord belt were used as the relevant design criteria, resulting in a nominal belt strength of ST 7,800 N/mm. It was important to avoid additional dynamic stresses from transient operating conditions as much as possible.

High-performance drives were installed which use a frequency-dependent high-voltage converter to allow gentle starting and braking under all loading conditions. The nominal capacity of an individual drive unit is 2,500 KW for a deployment 3,000 metres above sea level.

In accordance with the projected processing capacity of the concentrator for the first five years, the motorisation of the tunnel conveyor belt was set to process 85,000 tons daily and afterwards for 127,500 tons of copper ore.

Various transportation alternatives were considered. The company decided to build a conveyor in a tunnel measuring 12 kilometres. The decisive reasons for this were that the tunnel offered protection against avalanches and minimised the transportation distance. However this meant that the resulting gradient and tractive forces, in particular on the conveyor belt, determined the design. A redundant conveyor belt transport system was rejected for cost reasons (larger cross-section of tunnel).

The transport capacity was designed assuming a friction factor of f=0.012 (regenerative belt conveyor), in accordance with DIN 22101; a reserve factor of f=1.35; 160 operating hours per week; an availability of the transport system, including the loading belts, of 0.87; and operations seven days per week.

The result was a transport system made up of three individual conveyor belts, of 5,968, 5,336 and 1,516 metres in length. The average gradient is 11 percent; the last belt has a gradient of 24 percent in places.

RE experts were on site or at reach even after commissioning and testing of the project. They supported operations, overhauls and maintenance of the conveyor. The results achieved led to further increases in transport and processing capacities.

In 2011, the GTO thyristors of the ten power converters were replaced by IGC thyristors which helped improve availability. At the same time, the control units were upgraded from S5 to S7. When it comes to repairing and manufacturing of drive pulleys, Los Pelambres repeatedly has relied on RWE Power’s Technical Centre in Germany.
As early as 1971/72, the Electricity Generating Authority of Thailand commissioned RE to carry out a study on the extension of the Mae Moh opencast lignite mine in northern Thailand.

Further opencast mine studies followed in later years on lignite mining and delivery and on overburden dumping. In 1974, RE provided consultancy services on the coal supply for the power plant and on boiler design. In 1977, a study was conducted on enlarging the opencast mine to supply the 525-MW power plant.

Over the following years, further studies were carried out for EGAT regarding the master plans for coal security and an expansion of opencast mine capacity. Already at the end of the 1970s, RE was involved in mining consultancy services on equipment tenders and the recultivation of depleted opencast mine sections for Mae Moh.

In 2007, research was conducted into opencast lignite mining up to a depth of 600 metres, with particular focus, in addition to lignite output, on the ground water and rain water quantities and the slope stability as a result of the depth.

RE still conducts annual equipment checks on the bucket-wheel excavators, spreaders and conveyor belts in the opencast mining areas for Mae Moh and its contractors and submits refurbishment proposals.

Since EGAT had already used subcontractors in opencast mines at an early stage, the consultations were extended to include the companies Sahakol Engineers Bangkok, Itathai, and later, Banpu. Between 1983 and 1995, RE managers in the Mae Moh overburden projects were appointed as supervisors and superintendents.

In the mid-1990s, feasibility studies were conducted for Sino Thai and Thai Laos Lignite Corp. for the Hongsa project in Laos. The Hongsa project is so advanced in its development that the power plant should soon be commissioned.

RE’S ACTIVITIES IN THAILAND.
Around the globe, some 70 billion tons of raw materials are extracted and used per year. This is twice as much as in the late 1970s. A continuously increasing world population, economic growth in the emerging markets and backlog demand in many countries will continue to raise the demand for resources to be used as raw materials or for energy production.

This is, though interrupted for some time by the economic crisis, the overall trend. Against this backdrop, the consulting activities of RWE’s experts on behalf of mining and energy companies all over the world will continue to be of great importance.
When RWE Power was founded, responsibility for RE moved to a new Executive Board portfolio for hard coal and nuclear power generation, so that RE was able to provide EU-sponsored consultancy services to Russian and Ukrainian nuclear power plants. The aim was to improve the safety of these plants. The projects are still being successfully run today and are a cornerstone of the RE power station consultancy services. Opportunities for cooperation also opened up for CO₂ projects, while making the most of synergies in overseas representative offices. At the same time, the power station consultancy services were starting to be developed to capitalise on the expertise from the RWE power station fleet. Here, in contrast to mining, market entry was tough because of greater competition.

In 2002, the incorporation of Uranerz into RE, as well as other projects, brought in a number of highly-qualified consultants and employees, many of whom are still working at RWE Technology International with great success today. The Wismut project in particular, where the uranium ore consultancy services originated, used the team at full capacity.

The Group’s purchase of RWE npower, as it is called today, added an extensive range of power station consultancy services worldwide. However, after being absorbed into RWE Technology International with great success today. The Wismut project in particular, where the uranium ore consultancy services originated, used the team at full capacity.

The Group’s purchase of RWE npower, as it is called today, added an extensive range of power station consultancy services worldwide. However, after being absorbed into RWE Technology International with great success today. The Wismut project in particular, where the uranium ore consultancy services originated, used the team at full capacity.

The Group’s purchase of RWE npower, as it is called today, added an extensive range of power station consultancy services worldwide. However, after being absorbed into RWE Technology International with great success today. The Wismut project in particular, where the uranium ore consultancy services originated, used the team at full capacity.

The Group’s purchase of RWE npower, as it is called today, added an extensive range of power station consultancy services worldwide. However, after being absorbed into RWE Technology International with great success today. The Wismut project in particular, where the uranium ore consultancy services originated, used the team at full capacity.

There were complex management and steering mechanisms connected to this. The Group also increasingly used RPI for its own acquisition projects, both for scouting purposes and for due diligence analyses. The cooperation at RPI led to a few successful joint projects. Finally RWE npower stopped offering consultancy services as part of its cost-cutting measures.

Towards the end of the decade and with the founding of RWE Technology, the key for RE now was to maintain the success of the mining consultancy services and to find a new structure for power station consultancy services within the Group.
The opencast mine, dumping areas and power station of the Hongsa project that will supply Laos and Thailand with electricity.

One of the flagship projects of RE between 2005 and 2010 was the development of a bankable feasibility study and, subsequently, an operating plan for the Hongsa opencast lignite mine, as part of the Hongsa Mine-Mouth Power Plant Project in Laos.

With over 550 million tons of coal, the deposit is among the largest energy resources in Laos.

An important aspect of the order was that the feasibility study and the later master plan would be drawn up in close cooperation with staff of the project owner, the Thai company Banpu Power Co Ltd., in the Rhenish coalfields, so as to conduct regular tours of the Rhenish opencast mines in order to explain work processes using continuous extraction equipment and materials handling, as well as the planning steps and framework conditions.

The project development, with the long-term involvement of RE in the opencast mining and equipment planning, resulted in a mining licence being awarded at the end of 2009.

The technical and economic planning results by RE were some of the factors which led to the negotiation of a 25-year electricity supply contract with the Electricity Generating Authority of Thailand (EGAT). On that basis, the entire project financing of 3.71 billion dollars was secured by nine Thai banks in August 2010.

The three 600-MW Chinese-designed power station units are now nearing completion and the Hongsa opencast mine is under development. RE is also providing support for the entire project through on-site inspections of the continuous mining equipment and the automated coalyard, before their commissioning.

From 2003 to 2005, Rheinbraun Engineering und Wasser GmbH carried out a major feasibility study into the possible exploitation of the Thar lignite deposits.

The study was commissioned by the Sindh provincial government. It was designed to show decision-makers ways in which to tap the deposits and what the costs and returns might be. The country wants and needs to develop its electricity generation and supply further to accelerate its industrial output. Thar lignite is therefore absolutely indispensable as an available domestic source of energy.

The Pakistan Geological Service has shown that there is around 180 billion tons of lignite in this area. Of a specified deposit in block I, around 180 million tons should be mined over the course of 30 years for a new 1,000-MW power plant. The net calorific value of the lignite is slightly higher than that of the Hambach opencast mine, the water content is 47 percent, the ash and sulphur content is slightly higher.

Additional opencast mines and power plant units should follow in the near future.

Continuous opencast mining was planned for the upper 80 metres of loose sand. The slightly hardened lower strata and the lignite should intermittently be obtained with shovel and truck, and conveyor transport was also planned here for the outside dump and the coal bunker.

The water supply is a major problem both for the power generation process and for cooling. Water is very scarce in the region and, during the two to three months of the monsoon season, there is only 100 to 200 millimetres of precipitation. The ground water is very brackish due to the proximity to the sea and could not be used without expensive processing. Moreover, the average water inflow is not enough for power plants with capacities of over 2,000 MW. RWE Rheinbraun therefore planned to use WTA technology. The coal was to be predried in the fluidised-bed process and the extracted water to be captured, purified and used as process water.

For safety, a pipe was used to bring in additional water from the Indus River, 180 kilometres away.

Until now RE has been engaged both in opencast mining consultation and in power plant planning for the Thar project.

The opencast mine, dumping areas and power station of the Hongsa project that will supply Laos and Thailand with electricity.
In mid-1999, after the end of the Kosovo conflict, the formerly autonomous Serbian province of Kosovo was in a ruinous state.

Hundreds of thousands of inhabitants of Kosovo fled, some 650 towns and villages were destroyed or badly damaged and the roads were impassable in places. The lignite-fuelled power stations, Kosovo A and B, with their respective opencast mines, Mirash and Bardh, were in an extremely precarious situation owing to a lack of maintenance and investment and they could not meet Kosovo’s energy needs.

The province was placed under UN protection (UNMIK: United Nation Mission in Kosovo) and, for military purposes, under the supervision of KFOR, a multinational force led by NATO that included German armed forces. It was impossible to miss the presence of the military and the police deployed on the streets by UNMIK.

The EAR (European Agency for Reconstruction) was founded in Pristina in February 2000. International help started to arrive.

In the short-term, what mattered most was to rebuild the energy sector in Kosovo, inspect power plants and opencast mines, get the most urgent repairs underway and supervise them, organise the procurement of the most important spare parts and resources and support the operations management.

RE was commissioned to carry out work in the mining sector by EAR, in collaboration with the French company EDF, from April 2000 to mid-2002. Electricity production more than doubled over this period from barely 650 gigawatt-hours to around 1,600.

It was essential both in the medium and long-term to get the energy sector in Kosovo back on its feet again strategically. A basic study on this was completed at the orders of the World Bank in September 2002. RE has made a decisive contribution to lignite strategies, developing a long-term strategy for the lignite industry and demonstrating that lignite has excellent, long-term economic potential in Kosovo.

Political developments in Kosovo have unfortunately not matched expectations. The Republic of Kosovo declared independence from Serbia in 2008 and was recognised by 109 of the 193 UN Member States. It is, however, still too early to talk of a final peace agreement. German soldiers are still stationed in Kosovo for KFOR today. Even today there are violent conflicts from time to time, particularly in the north on the border with Serbia.

This could also be one of the reasons why investors have shied away until now, and why the essential steps towards an out-and-out modernisation of the lignite industry in Kosovo have yet to be taken.

The Kosovo B lignite-fuelled power station near Pristina was connected to the grid in 1983, supplying almost 700 MW.
How did the nuclear consultancy services of RWE come about?
The RWE nuclear consultancy services came about soon after the fall of the Soviet Union through an EU initiative of the former German Chancellor Helmut Kohl and German energy suppliers. It aimed to pave the way towards broad cooperation between nuclear operators in western and eastern Europe. The EU TACIS Programme was established in 1992/93. Direct partnerships were forged between German nuclear power plants and eastern European ones. EU-funded projects for transferring specialist knowledge and nuclear consultancy services across all areas, as well as technical refurbishment, were implemented between 1993 and 2006 between all German and Russian/Ukrainian nuclear power plants. The essential recommendations by the IAEA on safety improvements were applied. And so the international RWE project management successfully took form in eastern European countries.

What were the specific challenges of implementing it in Russian and Ukrainian power plants?
The specific challenges were team-building, the language barrier and very different starting points in terms of the technology and administrative/organisational structures of operators and regulatory authorities. It was, however, a success and partnerships were formed which have, to a large extent, lasted over two decades. A fundamental aspect is that the specialists involved from the RWE nuclear branch are still known to this day as professional and dedicated teams. RWE expertise has had a positive influence on nuclear power plant operations in eastern Europe in a number of technical and organisational matters. Between 2006 and 2008, the EU changed the focus of the projects, but even today RWE runs projects with its nuclear teams – including with good consortium partners – as part of the EU cooperation programme, INSC.

Does the industry still have a future since Germany bid farewell to nuclear energy production?
RWE can continue to make a contribution to nuclear safety after the German withdrawal by refocusing onto areas such as decommissioning, intermediate storage, technical projects and international project management in the EU. The nuclear consultancy services of RWE are highly regarded in eastern Europe and enjoy an excellent reputation.
The subsidised development of renewable energy sources, especially wind and solar power, as well as the political decision to abandon nuclear energy as a result of the nuclear disaster at Fukushima in early 2011 have drastically changed the framework conditions for the German energy sector and therefore for RWE.

While previously the construction of power plant capacities in addition to or as replacements for existing plants was an important component of RWE’s market strategy, it is now clear that the construction of large-scale power plants is no longer politically desirable or economically viable.
This also has consequences for the consulting sector. RWE Technology, which was founded in 2010 as a project management and engineering company for RWE’s newbuild power plant projects, now also sells its engineering expertise outside the company. RE’s international experience and high profile are extremely valuable in this regard. For this reason, RWE Technology has been responsible for the commercial management of RE and for marketing its expertise abroad since 2012. It continues to use the RWE Power International brand name, however. The first large-scale projects, for example, are in Dubai, where a joint venture has been founded with the Dubai Electricity and Water Authority for the marketing of services in the Middle East, as well as in Hong Kong within the framework of operational support for China Light & Power (CLP).

In the area of nuclear power (specialising in EU-financed projects), a large, multi-year contract was awarded in 2013 after a long waiting period, to support the Ukrainian operator in setting up a project management unit in their country. This will manage and monitor projects for improving operational safety, as well as the handling of radioactive waste in several nuclear power plants.

The mining division is successfully focusing on marketing its expertise beyond lignite. Combined crusher-conveyor systems are attracting a great deal of interest due to increasing conventional transportation costs and volumes. This opens up opportunities for RE in Brazil. In Australia, the Thiess RWE joint venture is set up, which will provide operations management in future.

What is IPCC?
In mining, it stands for in-pit crushing and conveying. This procedure consists of a crusher that breaks up solid rock to be fed directly onto the belt conveyor. Using the belt conveyor can cut operating costs compared to the alternative of using a heavy-duty truck. The crusher can be mobile (i.e. fed directly from a front-end loader) and semi-mobile or stationary, if it is filled by heavy-duty truck.

That doesn’t sound particularly innovative. And it isn’t. The process has been around for decades and we use it in a number of quarries. The new factor is that mobile crushers with a conveyor capacity of up to 10,000 tons per hour can now be constructed and deployed for solid rock mining.

Where is this needed?
The mining boom after the global financial crisis has led to significant wage cost increases in some countries, such as Australia and Chile. Mining companies are tending to build bigger mines at greater depths that require larger volumes to be handled. Therefore, there is a whole sequence of project approaches for efficient IPCC technology that have brought us consulting contracts.

In Brazil, we are currently working very closely with Vale, one of the three biggest iron ore producers in the world. As of 2017, Vale will start a large opencast mine (S11D) near Carajas. It is expected to produce an output of 90 million tonnes of ore per year. Due to environmental requirements, the mine will be fully equipped with crusher-conveyor systems.

What services does RE provide?
For many years, RE has been successfully advising customers who operate belt conveyor systems in Chilean copper mining. We are now also doing the same in Australia and Brazil. These are concept and feasibility studies, designs, support during commissioning and appraisals during operation.

What about the bucket-wheel excavators?
As before, these are used only for loose rock. Here too there are projects (e.g. in Australia) where we have participated for Thiess RWE on a bid for the operations management of bucket-wheel excavator systems in the Gooolia Basin in Queensland. There are plans to develop hard coal opencast mines there with production capacities of up to 40 million tons of steam coal per year.

Of course we still predict demand for lignite. In 2013 we carried out another study for an open-cast mine in the Altin-Elbistan coal basin in Turkey, and RE is currently monitoring the delivery and assembly of a bucket-wheel excavator and a spreader for the Kolubara mine in Serbia.

This also has consequences for the consulting sector. RWE Technology, which was founded in 2010 as a project management and engineering company for RWE’s newbuild power plant projects, now also sells its engineering expertise outside the company. RE’s international experience and high profile are extremely valuable in this regard. For this reason, RWE Technology has been responsible for the commercial management of RE and for marketing its expertise abroad since 2012. It continues to use the RWE Power International brand name, however. The first large-scale projects, for example, are in Dubai, where a joint venture has been founded with the Dubai Electricity and Water Authority for the marketing of services in the Middle East, as well as in Hong Kong within the framework of operational support for China Light & Power (CLP).

In the area of nuclear power (specialising in EU-financed projects), a large, multi-year contract was awarded in 2013 after a long waiting period, to support the Ukrainian operator in setting up a project management unit in their country. This will manage and monitor projects for improving operational safety, as well as the handling of radioactive waste in several nuclear power plants.

The mining division is successfully focusing on marketing its expertise beyond lignite. Combined crusher-conveyor systems are attracting a great deal of interest due to increasing conventional transportation costs and volumes. This opens up opportunities for RE in Brazil. In Australia, the Thiess RWE joint venture is set up, which will provide operations management in future.
»It takes one or two days to get used to the new environment.«

Tell us about the project in Chile. We had our first direct contact with the state mining company CODELCO in 1982 during a client visit. Two years later, RE was commissioned, at the instigation of CODELCO, with the planning of several crusher-conveyor systems for transporting overburden and inferior ore.

How did things progress after that?
Of the three initially projected transportation systems, two for overburden and one for inferior ore, the decision was made in 1986 to construct a crusher-belt conveyor-spooler system, consisting of a semi-mobile gyratory crusher, six individual belt conveyors, of which one is a face conveyor with a spreader with a 60 meter-long boom. The system had a nominal output of 9,200 tons per hour and went into operation in January 1991. After passing its performance test, and the solving of some component problems, the system achieved a daily output of 220,000 tons per day in hard rock.

The system was supplied by Krupp Rheinhausen and had a contract value of around 90 million US dollars.

Higher fuel prices and the higher personnel costs of heavy-duty truck drivers were decisive factors in the success of the hard rock conveyor systems. In the period from 1991 to 2015, a total of seven crusher-conveyor systems were implemented in Chile and Peru with a transport capacity of up to 12,500 tons per hour all with the crucial participation of RE. Of these, two are regenerative systems in tunnels, two have horizontal curves, four systems have belt qualities of over ST 6,000 N/mm to ST 7,800 N/mm, and two systems have gearless direct drives of up to 5 MW/single drive.

What were conditions like high in the Andes?
Most of the projects are at an altitude of 3,000 meters above sea level. The extracted copper is transported through blasting and then loaded by rope shovel onto heavy-duty trucks to be broken up. Depending on the dimensions of the belt conveyors, a maximum grain size of around 35 centimetres in edge length is permitted, which can be configured by adjusting the position of the crusher cone and therefore the opening of the crusher gap. The belt conveyor transportation of this hard rock also requires a special set-up of the transfer substation so that the discharging conveyor is not directly impacted by the sharp edges of the broken overburden or ore. This is a special characteristic of the belt conveyor transportation of hard rock that we had not experienced in an own open cast mines.

Living at an altitude of 3,000 metres increases heart rate and blood pressure. You need one or two days to get used to this new environment. Depending on the oxygen content of the air, individuals can suffer headaches during this period of adjustment.

What potential do you see for South American mining?
As well as the planning and monitoring of new projects, there is great potential in consulting and maintenance, as well as in increasing the performance of existing belt conveyor systems. Another area would be the development of a training programme for the mine operators’ supervisory personnel for belt conveyor system maintenance.

 Barely two years after RWE Technology started up, business activities were expanded to include external consulting – what were the reasons for this?
In 2010, RWE Technology was founded with the objective of combining project management and the engineering competences of RWE at an international level. The corresponding areas in Germany, the Netherlands, and the UK were merged into a pan-European organisation that would manage and be responsible for RWE’s largest investment programme since its inception. Looking back, RWE Technology has managed an investment volume of over 12 billion euros. This has given it unique expertise and outstanding competencies. The creation of a foundation that can meet internal and external demand in the medium-term – thereby ensuring the retention of competencies and expertise, among other things – has been a strategic objective of RWE Technology since it was founded. However, the urgency of this objective was increased by changing conditions in 2011. We needed to develop external business in the area of power plants as quickly as possible.

And did that lead to the assumption of management responsibility for RE GmbH?
Yes, exactly: RE with its long years of experience in external business, established processes and tools, a worldwide network and the recognised brand name of RWE Power International, on the one hand, and RWE Technology with its competences, resources and experience, on the other, complemented one another perfectly.

How exactly was cooperation organised?
On a purely formal level, RE GmbH was managed by RWE Technology via a management contract. Much more important, however, is the close cooperation between the two companies: Joint processes, close cooperation at all levels, shared processes of change, and personnel ties between the two companies also enabled strong growth in the area of conventional power plants. RE had, of course, already done power plant consulting work previously, but with the combination of a strong “Sales & Proposal” unit and the newly available expertise and resources, it has been possible to more than triple turnover in this area since 2012. There was also an opportunity to develop new markets in the Middle East and to assist active consulting with former clients in Asia through the founding of a joint venture with the Dubai Electricity and Water Authority.
The planned construction site of the power plant.

Based on the feasibility study for the possible exploitation of Thar lignite carried out by Rheinbraun Engineering und Wasser GmbH, our Pakistani client returned to RE in 2013 with a contract for the creation of a bankable feasibility study of a power plant project.

From 2005 to 2012, intensive opportunity and feasibility assessments were carried out in Pakistan for the construction of power plants close to open-pit mining projects, with six independent power plant units at 660 MW based on tried-and-tested international lignite power plant technology. Both fluidised-bed boilers and pulverised-fuel boilers were considered.

In 2013, it was already clear that the first units of the energy park would be funded for the most part with outside finance. An independent feasibility study is mandatory when seeking the corresponding financing approval.

Why and when is RWE getting involved in Hong Kong?
RWE operates power plants and also offers consulting and engineering services to external customers. This was and remains extremely advantageous for our project-specific work. But, of course, we are only involved with CLP in areas where very specific expertise is required. This makes sense, as Southeast Asia has many providers of standard engineering planning services with which we could not and would not want to compete.

Are we expecting any more contracts from CLP?
Yes, we are in contact with them about various topics. In addition to conventional power plant operations, we are now also discussing projects in the area of renewable energy sources and transmission and distribution networks. As I said, Southeast Asia is a growth market, and we’re on the ball!
RWE Technology’s decision to provide its services externally together with RE also required an assessment of the potential markets. The MENA region (Middle East-North Africa) soon emerged as one of the primary target markets.

This area has investment funds, is relatively stable politically and has extremely high growth rates.

However, the analysis quickly showed that marketing and acquisition could not be carried out from Germany, but that local representation was required. However, this requires the founding of a joint venture, as 51 percent of the equity must always be owned locally.

Independently of this, the Dubai Electricity and Water Authority was considering founding a service company and was looking for a European partner. After initial discussions about the expectations the respective parties had for the company, both sides decided on a path forward. However, contract negotiations then took over a year until the final contract signing ceremony in Dubai on 22 October 2012. It was then another six months before the

The first investment phase for the energy park will consist of a power plant unit with two fluidised-bed boilers at 330 megawatts and another unit with a 660-MW pulverised-fuel boiler. After the final investment decision, the planned implementation time is three years in each case.

We agreed to design the method of the study as if the Pakistani energy park was an in-house opportunity. The available, project-specific information was collected and collated together with the client. Where there was no local information, we entered our own assumptions.

This study consisted of nine key documents. These were divided into three main areas: technology, cost-effectiveness and organisation.

Upon its completion, the study was one of the main documents used as the basis for a letter of intent for the ordering of a turnkey 2x-330-MW fluidised-bed power plant.

RWE Technology International is still working on the Thar project, especially in advising the customer up to the final investment decision with their Chinese key supplier.
What was the object of the contract?
Hassyan is to be Dubai’s first conventional power plant tendered out to “Independent Power Producers”. Previous power plants in Dubai have been financed, built and operated domestically. Among other things, the tender requires technical documents, in this case a feasibility study and an initial environmental impact study. It was also necessary to estimate the investment and operating costs and to develop a financial model to determine the energy generation costs.

Why did Dubai decide on a coal power plant?
Dubai’s entire energy supply is currently dependent upon a single gas pipeline from Qatar. A decision was therefore made to diversify the emirate’s energy supply. In addition to photovoltaic and nuclear energy, there are also plans to develop coal-based energy generation by 2020.

What were the challenges of this contract?
Coal was a completely new fuel for the region. We therefore had to do a certain amount of teaching work. How do I use coal? How do I deal with the by-products? What is the correct emission standard?

The general working conditions were not easy, either. This started with coal logistics. Because the sea floor falls away very gradually (one metre per kilometre from the coast), the coal ship can only operate at a distance of around 20 kilometres from the coast. The coal has to be loaded onto lighters. The climate conditions are extreme: outside temperatures of up to 50 degrees and cooling water temperatures of over 40 degrees. DEWA also demanded the option of fuelling the boiler 100 percent with gas in the event of an interruption to the coal supply.

What did we learn from working with the customer?
Customers in the Middle East are very exacting. You are expected to be on-site at all times to answer questions and report on project progress. It is important to take this extra effort into account.

On the positive side, European engineering is very highly regarded.

»European engineering is highly regarded.«

Wolfgang Moll,
Portfolio Manager
Thermal Generation at
RWE Technology
International.
The planned restructuring includes the ‘Operational Excellence’ project, which is aimed at optimising the operation and maintenance of power plants. The plan is not only to leverage consulting expertise, but also to mainly rely on the company’s own employees to identify potential improvements. To do this, SEC also gathers suggestions, comparison standards and help from established companies, such as RWE.

The SEC contract included visits by six selected power plant managers and engineering managers in RWE power plants in the UK. The visitors would accompany RWE colleagues in their work for four weeks to learn how RWE operates and manages the power plants. To better understand this in ongoing operations, several presentations were held during the first week in Swindon, explaining the fundamentals of the RWE operations-management system.

The colleagues at RWE Generation UK organised an excellent programme. Cultural and religious considerations were also taken into account. The SEC employees were so pleased with the programme that they gave Kevin Nix and his team an ‘Appreciation Award’ at the end of their visit.

The Saudi Electric Company (SEC) is one of the biggest suppliers of electricity in the Middle East.

This, and the fact that it plans to double its capacity by 2030, make it a very interesting prospective customer. SEC is currently planning a complete restructuring and intends to transform itself from a completely vertical organisation to a company that meets a world-class standard in all respects.
Serbian energy provider EPS operates several opencast mines, power plants and a coal-drying plant in the lignite region of Kolubara, about 40 kilometres south of Belgrade.

Since 2006, funds from the KfW development bank and the European Bank for Reconstruction and Development (EBRD) have been used to support opencast mine retrofitting projects. This especially involves energy-efficient overburden removal and transportation, as well as coal quality management for the standardisation of the available fuel.

In its first four-year project, RE GmbH, as owner’s engineer, was responsible for supporting the EPS project office in the design, procurement and commissioning of a complete overburden removal system for the Tamnava West opencast mine.

RWE colleagues worked in Serbia to assist in everything from the creation of technical tendering documents to the evaluation of offers, from the production monitoring both with manufacturers and in the mine itself to the successful commissioning of an excavator, a nine-kilometre-long belt conveyor system, two drive stations and a spreader of the 8,500 m³ class.

During this period, the Serbian engineers paid many visits to the Rhenish opencast mines and also to our project partners MIBRAG Consulting International GmbH, where they learned much about the successful operation as well as the maintenance and upkeep of equipment such as bucket-wheel excavators, drive stations and overburden spreaders. Our RWE colleagues in the opencast mines were always very open to these visits and their expert presentations contributed to the commencement in 2012 of two further three-year projects, one under the leadership of RE, the other of MIBRAG.

In the first project, RWE Technology International is responsible for providing on-site support as owner’s engineer for another overburden removal system, this time in field “C” of the Kolubara opencast mine. A bucket-wheel excavator, a five-kilometre-long belt conveyor system, and a spreader of the 8,800 m³ class were specified technically by RE and supported through the tendering processes. They are currently being assembled and prepared for commissioning. The RWE colleagues provide the required expertise.

In the second project, a coal blending and storage area is installed for the Tamnava West mine. It consists of bunker sections, belt conveyor systems, bunker stacking and reclaiming equipment, the required coal quality management software, and a 12,000 m³-class spreader. Here, RWE Technology International is tasked with a comprehensive training and upskilling programme for the EPS personnel to increase awareness of the entire integrated coal quality management process from deposit modelling to mine planning, extraction, the blending process and the power plant.
It is difficult to make predictions, especially about the future. That is what Mark Twain once said. And he was right. When we cast our minds back ten or twenty years, could we have foreseen the present state of affairs in world politics and on the energy and commodity markets? Certainly not.

However, we may permit ourselves to view the future of RWE Technology International with optimism. For one thing, the world of the future will also have a need for adequate energy and raw materials, and some would even say a need for even more energy and raw materials. On that point, the technology and expertise will be needed to allow these resources to be exploited in full. The engineers and technicians of RWE Technology International are on hand to this end.
Moreover, we can be hugely confident as the new company is specifically tailored to perform its work: trim, flexible and growth-oriented. The merger on 1 July 2015 of RWE Technology GmbH and RE GmbH (formerly Rheinbraun Engineering), the latter already under the former’s management, into RWE Technology International GmbH pools expertise in the areas of engineering, project management and consulting into one company. The company is led by Ingo Birnkraut as Managing Director of Sales/CEO and by Wim Tjerkstra as Managing Director of Operations. The focus of our 200-employee-strong team is on our customers and on the solutions that RWE Technology International is developing for and in tandem with them. RWE Technology International is the central project management and engineering services company, which will continue to draw from the extensive expertise of the RWE Group in future and harness it for the success of its customers’ projects.