Reference Projects
Thermal Power Plants

www.tecon.eu
Client: Przedsiębiorstwo Energetyki Cieplnej Wyszków

Business Area: Thermal Power Plants


Technical data:
- Gas turbine output: 1.43 MW_e
- Heat Recovery Steam Generator output: 3.55 MW_th
- Co-fired HRSG output: 4.35 MW_th
- DH water: 70/110°C
- Fuel: high-metane natural gas
- Vacuum deaeration plant capacity: 5 t/h
- New control and monitoring system

TECON services:
- Tender design verification
- Conceptual design
- Implementation schedule
- Basic design including 3D CHP station model
- Guaranteed performance calculations
- Turn-key bid submission

Description:
Modernisation of coal-fired Heat Plant into gas turbine CHP Plant as a new baseload heat source, i.e. for Hot Service Water needs.
COMBINED CYCLE CHP “GARBARY”, POZNAŃ
POLAND

Client: Zespół Elektrociepłowni Poznańskich S.A.
Business Area: Thermal Power Plants
Technical data:
- Gas turbine output: 8.8 MWₑ
- Backpressure steam turbine output: 1.8 MWₑ
- 36 bar / 435°C steam production: 15.2 t/h
- Co-generated thermal power: 12.1 MWₑ
- Max. technological steam extraction: 13 t/h
- Demi water plant capacity: 13 t/h
- Black start capability enabled
- New control and monitoring system

TECON services:
- Conceptual design
- Basic design
- Project implementation schedule
- Elaboration of final plant concept (diametrical change to tender design)
- Guaranteed performance calculations
- Turn-key bid submission
- Preparation of contract documentation

Description:
Modernisation of coal-fired heat plant into modern gas turbine-based combined cycle power plant.
COMBINED CYCLE CHP “GARBARY”, Poznań, Poland

HEAT RECOVERY STEAM GENERATOR

SUPERHEATER 1

SUPERHEATER 2

537°C

GAS TURBINE

Steam Turbine

Natural gas

Air

1.2 bar

10.0 bar

12.1 MWt

1.76 MWt

0.16 MWt

Cooling Water

TECHNOLOGICAL STEAM EXTRACTION

DHW NETWORK

HOT ECO

EVAPORATOR

COLD ECO

2.1 MWt
Client: Dolnośląski Zakład Termoenergetyczny S.A.

Business Area: Thermal Power Plants


Technical data:
- Gas engine electrical output: 0.58 MW<sub>e</sub>
- Co-generated thermal power: 0.78 MW<sub>th</sub>
- Heat Only Boilers: 2x3.2 MW<sub>th</sub>
- DH water: 70/100°C
- Fuel: high-methane natural gas
- Vacuum deaeration plant capacity: 2.5 t/h
- Water softening plant capacity: 2.5 t/h
- New control and monitoring system

TECON services:
- Tender design verification
- Basic design
- Project implementation schedule
- Guaranteed performance calculations
- Turn-key bid submission
- Preparation of contract documents

Description:
Retrofit of 2 coal-fired heat plant (gas engine-based CHP Plant as a new baseload heat source and 2 gas fired water boilers for peak demands).
OVERALL PRODUCTIVITY INCREASE OF WŁADYSŁAWOWO
PROJECT – FEASIBILITY STUDY
POLAND

Client: Energobaltic Ltd., Gdansk, Poland
Business Area: Thermal Power Plants
Time frame: 2003
Technical data:
Off-shore:
- 4-stage compression of associated gas
  - Flow: 100 000 Nm3/day
  - Discharge pressure: 130 bar
Dehydration unit
Co-generation Unit
  - Electric power: 3.5 MW
  - Steam production: 5.0 t/h
Sub-sea pipeline: 82 km, 4"
On-shore:
LPG Plant
  - design LPG production: 53.0 t/d
  - design C5+ production: 9.0 t/d
CHP Plant
  - 2 co-generation Units:
    - 5.3 MWe + 8.8 MWth each
  - 3 back-up boilers: 5.0 MWth each
Water Treatment Plant
Potential absorption chilling unit
  - Chilling duty: 4.5 MWch
Potential gas storage
  - Full capacity back-up: 8 hours

TECON services:
- Site survey
- Conceptual design and technical feasibility evaluation for:
  - modification of off-shore oil production facilities
  - modification of off-shore injection water system
  - off-shore gas-engine based co-generation unit
  - on-shore raw gas storage (8 hours of full capacity back-up)
  - on-shore absorption chilling unit, utilizing surplus heat in summer
  - on-shore gas-engine based co-generation unit
  - redundancy of on-shore fuel gas system
- Economical calculations
- Recommendations on implementation
Client: ACWA Power / Malakoff / Tengala / Nasional / MADA

Business Area: Thermal Power Plants

Type of work: Oil Fired Power Plant
Desalination Plant

Time frame: 2004 – 2006

Technical Data: Electrical Output: 900 MW
Desalination Plant: 882.00 m³/d (194 MIGD)

TECON Services:
- Suggestion for technical and economical alternatives
- CAPEX & OPEX estimation
- Energy & Mass Balance
- Development of functional technical specification
- Evaluation of EPC offers
- Power plant performance check
- Development of O&M Strategy
- Technical support for several documents (PWPA, EPC Contract, O&M Contract)
- Technical input for financing model

Description:
Implementation of a 900 MW and 194 MIGD independent power and water project on a BOO basis at Shoaiba in the Kingdom of Saudi Arabia.
Crude oil fired cogeneration of power and potable water from Red Sea. An independent Fuel Demand Model and Settlement System was installed to guaranty an automatic payment (reporting, invoicing) between the Power/Water Plant operator and the customer (SWCC).
ERECTI ON OF TWO COMBINED CYCLE POWER PLANTS
(GŁOGÓW / POLKOWICE )
POLAND

Client: Energetyka Sp. z o. o. Lubin, daughter company of copper manufacturer KGHM S.A.

Business Area: Thermal Power Plants

Time frame: 2004 (investment preparation phase)

Technical data:
- CC Plant rating (Polkowice): 185MWₑ
- CC Plant rating (Głogów): 90MWₑ
- Bi-pressured HRSGs: 80 bar/515°C
- 8 bar/215°C
- Auxiliary low LCV gas boilers: 4x60 t/h
- 80bar/490°C
- Raw water supply pipeline: 12 km/DN250
- New power transmission lines: 20 km/110kV
- Steam extraction for process and heating purposes
- Closed cooling circuits

TECON services:
- Conceptual design
- Process simulation for various concepts (thermal circuits as well as external multi-loop 110kV power grid modelling)
- Basic design
- EIA study
- Feasibility study
- Preparation of Functional Specification for Tender Documents
ERECTION OF TWO COMBINED CYCLE POWER PLANTS
(GŁOGÓW / POLKOWICE )
POLAND
EXXON MOBIL PRODUCTION
GROSSENKNETEN COGENERATION

Client: ExxonMobil Production Deutschland GmbH
(EMPG)

Business Area: Thermal Power Plants

Type of work: FEED & EPCM

Time frame: 2011 – ongoing

Data:
- Electrical Output GTG: 30MWe
- Steam production HRSG: 80t/h, 30bar, 370°C

TECON Services:
- FEED and Basic Design
- Process Design & Process Selection
- Concept & Cost Estimation
- Layout and 3D Plant Design
- Electric Power Supply
- Control and Operating Philosophy
- Equipment Selection & Design
- Specification of Utilities (Gas turbine, HRSG, Electrical and I&C equipment, Civil, BoP)
- EPCM and Detail Design
- Coordination of 18 Sub Vendors
- Civil Supervision
- Commissioning Supervision

Description:
EMPG operates a Sour Gas treating plant in Großenkneten (GK), Lower saxony. The plant consists of 3 Sulfinol trains where the sour gas components H2S and CO2 are removed from the gas via absorption. The removed gas is treated in 3 Claus-gas units to produce sulphur. The plant GK has a capability to treat up to 690.000 m³/h of sour gas.

The GK-Cogen project includes installation and integration of following new main components:
- Gas turbine driven 30 MW power generator (GTG, GENP) to provide GK plant and CS Hespenbusch with power.
- Heat recovery steam generator (HRSG, Bertsch) with additional firing and a capacity of 80 t/h high pressure steam to provide GK plant with process steam.
- 20-KV switch gears for integration into the electrical infrastructure at site.
- Modifying the existing 20kV switchgear in substation SAGE (GK grid connection station) for grid connection of GK Cogeneration
- Civil works and buildings (GTG-hall, Station-building)
- Balance of Plant (BoP) including pipe bridge, gas pressure reducing station, etc.

TECON was entrusted with the front-end-engineering-design (FEED) for this brown field plant ("Basic Engineering") plus extensive EPCM (engineering/procurement/construction – management) services ("Detail Engineering")
Client: Stadtwerk Winterthur, Energie und Entsorgung

Business Area: Thermal Power Plants

Type of work: Project planning and site supervision of district heating plant upgrade


Data:
- Building dimensions: LxWxH = 28.7x16.5x11.45 m
- Existing structures:
  - 2 hot water boilers (each 18.6 MW)
  - 2 steam / hot water converters (each 14.5 MW)
  - Expansion vessel, pumping system
- New boiler line:
  - 1 steam boiler (approx. 15 MW)
  - 1 hot water boiler (approx. 15 MW)
  - 1 storage tank (possibly serving as expansion vessel) with a capacity of 200 m³

TECON-Services:
- Conceptual design
- Permit application design
- Preparation of tender documents and tender evaluation
- Detailed design
- Site supervision for construction and M&E works
- Operation start-up
- Integration of existing district heating plant into new structure
- Construction works during continued operation of district heating plant and waste incineration plant.

Description:
The public utilities of Winterthur – Stadtwerk Winterthur – plan on upgrading the existing district heating plant by an additional district heating plant with the objective of serving an extended district heating network.

The new system is only intended to meet peak demands, which cannot be covered by the existing district heating plant. Both plants provide district heating services to commercial and private consumers. A small, limited amount is delivered to two users in the form of steam. This medium is not used to generate electric energy.
Client: ACWA Power / Gulf Investment Corporation / Mitsubishi Corporation

Business Area: Thermal Power Plants

Type of work: Technical Advisory Service

Time frame: 2006 – 2007

Data:
- Plant Capacity: 212,000 m$^3$/day (47 MIGD), 850 MW oil-fired power plant
- Technology: Reverse Osmosis (RO)
- Unit Size: 13,250 m$^3$/day (2.95 MIGD)

TECON Services:
- Selection of Technology & Plant Configuration
- CAPEX & OPEX Estimation
- Energy & Mass Balance
- Development of functional technical specification
- Technical evaluation of the EPC Contractor's proposal
- Power Plant Performance Check
- Support of the environmental studies, Development of a plant availability model
- Development of O&M Strategy
- Technical support for several documents (PWPA, EPC Contract, O&M Contract)
- Technical input for financing model
- Support for environmental studies
- Assistance with insurance program and debt financing

Description:

New installations:
- Desalination process, seawater intake, outfall and cooling system, potable water storage tanks, new fuel oil unloading facilities, crude oil storage tanks, flue gas desulphurization (FGD) system, potabilization system, electrical special facilities, BOO Project
Client: AES Middle East Development

Business Area: Thermal Power Plants

Type of work: Technical Advisory Service

Time frame: 2007

Data: 2600 MW gas-fired combined cycle power plant and 60 MIGD desalination plant.

Plant Capacity: 272,000 m³/day (60 MIGD)
Technology: Multi-Stage Flash (MSF)
Feed stock: Arabian Gulf Water
Product Water Quality: TDS 200 ppm

TECON Services:
- Suggestion for Technical and Economical Alternatives
- Development of functional technical Specification
- CAPEX & OPEX Estimation
- Evaluation of offers incl. clarification meetings
- Environmental Study

Description:
Kharama of Qatar had prequalified international developers to bid for the development, financing, construction and operation of a major power and desalination plant in Ras Laffan. AES/Sumitomo consortium was one of the three expected bidders. TECON was negotiating a project basket deal, with the project being a part of the basket.

Technical advisor - configuration study, technology selection, conceptual design, plant NPV based overall optimization, technical input for the financial model, desalination process, potabilization system, potable water storage tanks, pump stations
Client: ACWA Power Projects, Riyadh

Business Area: Thermal Power Plants

Type of work: Technical Advisory Service

Time frame: 2008 – 2009

Data:
- 1,500 - 1,700 MW oil-fired Power Plant
- Plant Capacity: 150,000 m³/d (33 MIGD)
- Desalination Plant
- Technology: Reverse Osmosis (RO)
- Feed Stock: Red Sea Water
- Product Water Quality: TDS 30 ppm

TECON Services:
- Preliminary Design
- Basic Design
- Development of MFS (Minimum Functional Specification)
- Development of technical attachments for the EPC Contract
- Support during Allocation Process
- CAPEX & OPEX Estimation

Description:

TECON was in negotiations with several international and local developers regarding Technical Advisor Services for the Yanbu IWPP project.

Technical Advisor - Configuration Study, Technology Selection, Conceptual design, plant NPV based overall optimization, functional specification, technical evaluation of EPC proposal, support of environmental studies, technical input for the financial model.

Scope: Desalination process, potabilization system, potable water, storage tanks, pump stations.
Client: Fortum Czestochowa SA

Business Area: Thermal Power Plants

Type of work: EPCM

Time frame: 2007 – 2010

Data: Thermal Output: 120 MW
      Electrical Output: 64 MW
      Combined heat and power plant with heat extraction

TECON Services:
- EPCM Services
- Total responsibility for steam turbine and fluidized bed boiler
- BoP: Design, Basic & Detailed Engineering, Expertise Acquisition, QA & QC
- Construction Site Control
- HSE Responsibility
- Project-Controlling (Time & Cost)

Description:
Design of combined heat and power plant (CFB boiler technology with backpressure steam turbine), integration into existing district heating system and water boilers. Valuation of tenders in order to select subcontractors, subcontract management, expediting, schedule & budget control, management of construction works, start-up supervision. Plant take over signed in 2010.
Client: OMV Gas International GmbH

Business Area: Thermal Power Plants

Type of work: Owner’s Engineering


Technical Data: Electrical Output: 17 MW
District Heating: 10 MW (optional)
Waste Heat Recovery Plant after Gas Compressor Station

TECON-Services:
• General design
• Conceptual design
• Permit application design
• Preparing of EPC tender documents
• Evaluation of technical proposals
• Leader of technical negotiations
• Owner’s Engineer Services

Description:

Complete engineering, advisory services and leading of technical negotiations with EPC contractors for a waste heat recovery plant after a gas compressor station with three gas turbines (Type PGT25) and all buildings needed in Weitendorf in the Austrian province Styria.

The waste heat recovery plant recovers heat from the flue gas of the nearby located gas compressor station, collected in a newly built flue gas duct. Superheated steam is produced in a heat recovery steam generator to drive a steam turbine. The air cooled condenser cools the exhaust steam of the steam turbine into a liquid. The condensate is feed back to the feed water tank. The steam circle is closed by the feed water pump.

To optimize the efficiency it is possible to install an additional heat exchanger for district heating.
Client: ACC Al Arrab Contracting Co. Ltd.

Business Area: Thermal Power Plants

Type of work: Basic Engineering

Time frame: 2007 - 2011

Technical Data: Simple Cycle Power Plant

Electrical Output: 242 MW

400-500 MW gas fired Power Plant

TECON Services:
- Project Management Support
- Basic Design
- Engineering Support
- Assistance during Construction Supervision
- Commissioning and Testing
- Assistance during Workshop Inspection

Description:

In the year 2008 Power Plant Tabouk was consisting of following turbines from GE (5 x Frame 6, 2 x Frame 7) and Alstom (1 x ABB FT11). Extension V is being built by NCC (3 x Frame 7).

SEC concluded a contract for Extension VI to NJM. NJM, a member of Al-Arrab Contracting Co. Ltd. – ACC, ordered 2 gas turbines with auxiliaries from Siemens and was as EPC responsible for the whole power plant including ET, I&C, BoP.

The Gas Turbines are delivered by Siemens/Westinghouse. The chosen gas turbines are SGT6-3000E with 121 MWel output per unit at ISO-conditions. Under ambient conditions the power output will be about 60-80 MWel.

Furthermore there are 2 uploading oil stations, 1 untreated oil tank (15000 m3), 1 fuel oil treatment plant, 1 treated oil tank (15000 m3), forwarding distillate oil pumps. The untreated oil has to be transported to the Power Plant by tanker.

TECON was in charge of project management support and basic design during offer phase till detail engineering.
Client: Najm Al Jazira
Business Area: Thermal Power Plants
Type of work: Engineering & Project Management Services
Time frame: 2007 - 2011
Technical Data: Electrical Output: 75 MW
Simple Cycle Power Plant
TECON- Services:
• Project Management Support
• Basic Design
• Overall Engineering Support
• Assistance during Construction Supervision Commissioning and Testing
• Assistance during Workshop Inspection

Description:

SEC concluded a contract for Extension VI to NJM. NJM, a member of Al-Arrab Contracting Co. Ltd. – ACC was awarded as EPC Contractor and responsible for the whole power plant including ET, I&C, BoP.

The gas turbines incl. auxiliaries were delivered by Siemens. The chosen gas turbines were SGT-600 with 25 MWel output per unit at ISO-conditions. Under ambient conditions the power output would be about 75 MWel.

Furthermore uploading oil stations, untreated oil tanks, a fuel oil treatment plant, treated oil tanks, and forwarding distillate oil pumps to be installed.

TECON was in charge of project management support and basic design during offer phase and project execution.
Client: Malakoff Berhad, Kuala Lumpur

Business Area: Thermal Power Plants

Type of work: Technical Advisory Services

Time frame: 2008

Technical Data: Electrical Output: 1,200 MW
1,200 MW HFO-fired power plant

TECON Services:
- Development of the MFS (Minimum Functional Specification)
- Analysis of Tender Documents
- Analysis and Selection of Power Plant Configuration
- Analysis and Inputs for Profitability Calculations
- Support with Negotiations

Description:

The Rabigh IPP project involved the development, design, financing, construction, commissioning, testing, ownership, operation and maintenance of a new 1,200 MW HFO-fired power plant and associated facilities. TECON’s scope of work within this project is described above. The Project was located south of the existing SEC Rabigh power station, approximately 150km to the north of the city of Jeddah, on the western coast of the KSA (Red Sea).
Client: Suez Energy Middle East, Abu Dhabi

Business Area: Thermal Power Plants

Type of work: Technical Advisory Services

Time frame: 2009 – 2010

Technical Data: Electrical Output: 1,700 – 2,000 MW
Gas Fired Power Plant

TECON-Services:
- Elaboration of technical and economical Alternatives
- Development and Evaluation of the minimum Requirements
- Coordination of the Consortium
- Technical Adviser

Description:

Technical Advisor services for PP11 IPP project in Saudi Arabia

TECON was appointed by the Bidding Consortium as Lenders Technical Adviser on behalf of the Core Mandated Lead Arrangers, and other Syndicate Banks that envisaged participating in the project financing. TECON was mandated to provide technical advice and to conduct an independent technical review of the Riyadh PP11 Independent Power Project, a project regarding the development, financing, design, construction, commissioning, testing and operation of a new gas fired CCGT power plant and associated facilities.
Client: Mobil Producing Nigeria Unlimited / Exxon Mobil

Type of work: FEED

Time frame: 2009 – 2011

Technical Data:
- Electrical Output: 500 MW ISO simple cycle gas turbine generators (optional 500 MW ISO combined cycle power plant)
- Power Transmission Line: 330 kV HVTL power transmission line, double circuit, double conductor, with 55 km length, 50 km 16-inch offshore pipeline

TECON- Services:
- Early Works
- FEED IPP & TL
- FEED Offshore Package
- Phase 1: ITTs
- Phase 2: Procurement

Description:
Mobil Producing Nigeria Unlimited was planning the implementation of the JV Power Project including a gas fired power plant, a power transmission line from QIT (Qua Iboe Terminal) to Ikot Abasi with an offshore pipeline from the Oso platform to QIT. The project was called Joint Venture Power Plant (JVPP), which indicates the partner of MPN, the state-owned company Nigerian National Petroleum Corporation (NNPC). The construction of the high-voltage power line will be carried out in close cooperation with Power Holding Company of Nigeria (PHCN).

The Early Works included a comparison study of simple cycle power plants and combined cycle power plants, where technological aspects as well as regional distinctions in Nigeria were considered.

TECON performs its services of the current Front End Engineering and Design (FEED) contract for two parts of the plant:
- 1) actual gas turbine power plant with a planned capacity of 500 MWel minimum and
- 2) 330 kV high voltage power line, which connects the plant with the national grid.

Furthermore TECON’s services comprised topographical and geotechnical surveys, the basic engineering of certain components, the preparation of the Invitation To Tender (ITT) documents and the criteria to evaluate the bids in subsequent phase of contract awarding. TECON was also responsible for the project management of the FEED contract.
Client: Enerjisa Enerji Uretim A.S. of Turkey

Type of work: Asset Evaluation

Time frame: 2009 – 2010

Technical Data:
- Electrical Output: 450 MW
- Coal Fired Power Plant

TECON- Services:
- Analysis of Coal Drying Processes
- Analysis and Comments on all Tender Documents according to EU-, ISO, VDI, EEEC, IEC – Standards and BAT (Best Available Practices)
- Analysis of Technical Concept
- Evaluation of Offers

Description:
Asset evaluation for Tufanbeyli coal-fired power plant project concerning:

1) An analysis of the Coal Drying technologies and to check whether coal drying (or pre-drying) technology is feasible and will be available for “Tuvanbeyli Coal” in reasonable time.

2) A review and check of the Bidding Specification against the known general good practice and TECON experience valid for this kind of power plant documents by considering
   - a) whether the project is in line with EU-Standards, especially referring to the IPPC-directive, rules are laid down in the IPPC-Reference document on Best Available Techniques (“BAT”) for Large Combustion Plants (Latest review July2006).
   - b) whether it meets the requirements of ISO, VDI, EEEC, IEC, etc. standards and regulations,
   - c) whether this project is up to current international standards related to lay-out, design and construction methodology, according to our experience.

3) A crosscheck of the offers and evaluation of all deviations to the bidding specifications.
Client: INFRA Project Development GmbH
Innsbruck, Austria

Business Area: Thermal Power Plants
Type of work: Concept Study
Time frame: 2010 – 2011

Technical Data: Concept of a Cogeneration Plant for a complex Concrete Plant in Russia

TECON-Services:
- Electrical Output: approx. 8 MW
- District Heating: approx. 20 MW (hot water and steam)

Client:
- Conceptual Design
- Estimation of CAPEX and OPEX

Description:
The study comprised a selection of plant configurations, clarifications with possible components suppliers, elaboration of basic technical documents (e.g. Process Flow Diagram, Process Simulation, Single Line Diagram, Plant Layout) and estimation of OPEX and CAPEX.

The analysis was based on the following preselected plant configuration/features:

- Four gas motors x 1,950 MW (plus one stand by)
- One Emergency Diesel Generator x 2,000 MW
- Two heat recovery boilers with auxiliary firing
- The related auxiliary equipment/systems
- Island operation
COMBINED CYCLE CHP PLANT, STALOWA WOLA
POLAND

Client: Elektrociepłownia Stalowa Wola S.A.

Business Area: Thermal Power Plants

Time frame: 2011 – ongoing

Technical data: Electrical rating: 400 MW\textsubscript{el}
District heat nominal output: 225 MW\textsubscript{th}
15 barg steam production: 30 t/h
Configuration: 1GT + 1HRSG + 1ST
Gas turbine: F class
Boiler: horizontal, triple pressure, natural circulation
Steam turbine: extraction-condensing
Condenser cooling: open circuit

TECON-services: Comprehensive Owner’s Engineer services, i.e.:
- EPC technical specification review
- EPC Contractor selection support
- GT Long Term Service Agreement advisory support
- Schedule and budget controlling
- EPC Contractor’s design documentation vetting
- Expediting
- Cooperation with financing banks
- Comprehensive technical consulting
- Multidisciplinary site supervision
- Site Acceptances
- Commissioning and start-up assistance
- Warranty period supervision

Description:
Owner’s Engineer services for construction of a combined cycle CHP Plant with district heat production capability, of power ca. 400 MW\textsubscript{el} in Stalowa Wola.
COAL-FIRED CHP, BIELSKO BIALA
POLAND

Client: TAURON Wytwarzanie S.A.
Business Area: Thermal Power Plants
Time frame: 2011 – 2013
Technical data:
- Electrical rating: 51 MW\textsubscript{el}
- District heat nominal output: 108 MW\textsubscript{th}
- Boiler technology: CFB
- Steam turbine: extraction-condensing
- Condenser cooling: closed-circuit
- Peak shaving hot water storage for district heating: 20,000 m\textsuperscript{3}

TECON-services:
Comprehensive Owner’s Engineer services, i.e.:
- Design vetting (for the Power Island and all Balance of Plant contracts)
- Design co-ordination between all the contractors (>10)
- Schedule and budget control
- Expediting
- Site supervision (including nomination of Site Manager for the entire job), covering co-ordination between all the contractors
- Contractors’ HSE supervision
- Technical consulting
- Commissioning assistance

Description:
Construction of a coal-fired combined heat and power unit in Bielsko-Biała.
Client: ExxonMobil Production Deutschland GmbH (EMPG)
Business Area: Thermal Power Plants
Type of work: FEED & EPCM
Time frame: 2011 – ongoing
Data:
- Electrical Output GTG: 30MWe
- Steam production HRSG: 80t/h, 30bar, 370°C

TECON Services:
- FEED and Basic Design
- Process Design & Process Selection
- Concept & Cost Estimation
- Layout and 3D Plant Design
- Electric Power Supply
- Control and Operating Philosophy
- Equipment Selection & Design
- Specification of Utilities (Gas turbine, HRSG, Electrical and I&C equipment, Civil, BoP)
- EPCM and Detail Design
- Coordination of 18 Sub Vendors
- Civil Supervision
- Commissioning Supervision

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The GK-Cogen project includes installation and integration of following new main components:
- Gas turbine driven 30 MW power generator (GTG, GENP) to provide GK plant and CS Hespenbusch with power.
- Heat recovery steam generator (HRSG, Bertsch) with additional firing and a capacity of 80 t/h high pressure steam to provide GK plant with process steam.
- 20-KV switch gears for integration into the electrical infrastructure at site.
- Modifying the existing 20kV switchgear in substation SAGE (GK grid connection station) for grid connection of GK Cogeneration
- Civil works and buildings (GTG-hall, Station-building)
- Balance of Plant (BoP) including pipe bridge, gas pressure reducing station, etc.

TECON was entrusted with the front-end-engineering-design (FEED) for this brown field plant ("Basic Engineering") plus extensive EPCM (engineering/procurement/construction – management) services ("Detail Engineering")
Client: Spółka Energetyczna “Jastrzębie” S.A.

Business Area: Thermal Power Plants

Time frame: 2011 – ongoing

Technical data: Technology: multi-fuel Combined Heat and Power Plant
Fuel: hard coal + biomass + coal mining process residues
Main equipment: 1 x CFB boiler, 1 x steam turbine
Electrical output: 75 MW<sub>el</sub>
Thermal output: 112 MW<sub>th</sub>
Chilling duty: 10 MW
Gross electrical efficiency in condensing mode: 36.6%
Overall efficiency in district heating mode: 82.5%
Yearly electricity production (gross): 543,000 MWh/a
Yearly heat production (gross): 230,000 GJ/a

TECON-services:
- Conceptual design review
- Basic design
- Building permit design
- Environment Impact Assessment
- EPC tendering procedure conduct
- Elaboration of EPC tender documents
- Negotiations with EPC bidders
- Final contract award recommendation
- Permitting process on behalf of the Customer
- Technical consulting

Description:
The project comprises the conceptual and basic design, as well as the building permit design and consulting for the EPC phase of a 75 MW<sub>e</sub> and 112 MW<sub>th</sub> power unit with CFB Boiler at “Zofiówka” CHP in Jastrzębie Zdrój, Poland.
ULTRA-SUPERCritical COAL- FIRED POWER PLANT
POLAND

Client: Elektrownia Ostrołęka S.A.

Business Area: Thermal Power Plants

Time frame: 2012 – ongoing

Technical data:
- Unit size: 1,000 MWel
- Fuel: hard coal
- Technology: supercritical Rankine cycle with multiple LP/HP condensate preheating and steam re-heat
- Net efficiency: ca. 45%
- Live steam parameters: ≥ 600°C, ≥ 250 bar(g)
- District heat nominal output: 135 MWth
- Cooling system: closed
- Biomass fraction: up to 20% (thermal input)

TECON-services:
- Evaluation of EPC tender documents and recommendation on improvements
- Official clarifications in front of EPC bidders
- Assessment of EPC tenders
- Final award recommendation
- EPC contractors’ design review
- Schedule and budget control
- Expediting
- Reporting for financing organizations
- Technical and legal consulting
- Site supervision
- Commissioning assistance
- Warranty period supervision

Description:
Owner’s Engineer for Ostrołęka C Supercritical Power Plant, which is one of the very first applications of 1000 MWel conventional coal fired unit in Poland. The Power Plant location and capacity has a vital significance for Polish HV transmission system.

The Project was suspended in October 2012, future steps not yet ultimately decided by Energa.
Client: PCC Rokita S.A.

Business Area: Thermal Power Plants

Time frame: 2012 – ongoing

Technical data: Plant output: ca. 40-50 MWe
Configuration: 1 GT + 1 HRSG + 1 ST (ST existing)
Live steam parameters: 80 barg, 510°C
Process steam: 14 barg

TECON services:
- Review of pre-feasibility study
- Tender stage consulting
- Elaboration of tender documents for the main contracts
- Negotiations with bidders
- Review of tenders
- Final award recommendation
- Design vetting
- Implementation of co-ordination & supervision for the main contracts
- Site supervision
- Commissioning supervision
- Schedule control
- Cost control

Description:
Brown-field construction of a CCGT Combined Heat and Power Plant for a chemical plant belonging to PCC Rokita S.A.
Client: Stadtwerke Hall in Tirol GmbH

Business Area: Thermal Power Plants

Type of work: Biomass-fired combined heat and power plant


Data:
- Thermal output: 27 MW
- Electrical output: 1.1 MW

TECON Services:
- Conceptual design
- Permit application design
- Detailed design
- Site supervision

Description:

Complete design and consulting services as well as construction supervision for the erection of a combined heat and power (CHP) plant (1.1 MW<sub>e</sub>, 27 MW<sub>th</sub>), a storage area including siding track and a storage facility for wood chips, bark and saw dust, as part of the district heating system serving the city of Hall in Tirol.

The Biomass CHP simultaneously generates thermal and electric energy by the combustion of biogenic energy sources such as wood chips, bark, saw dust, etc. In a combined heat and power system (cogeneration system), a medium is evaporated in a closed cycle and used to drive a steam turbine. This turbine is directly coupled to a generator to produce electric power. The condenser delivers condensation energy to the district heating network. This system makes optimum use of the heating value of the biomass and ensures optimum efficiency of the overall system.

In order to produce the necessary heat energy, a hot water boiler and a thermal oil boiler with a heating capacity of 7.5 MW each were installed. Two natural gas fired hot water boilers with a total capacity of 22 MW serve to cover peak loads and to compensate potential failures.

On account of the location of the plant, waste gas cleaning is to fulfil the most stringent requirements in accordance with the Austrian Immission Control Act (atmospheric pollution). To meet the permissible dust emission limit of 5 mg/m<sup>3</sup>, a wet precipitator was installed, and a SNCR process was applied to reduce nitrogen oxides.
PREPARATION AND COMPRESSION OF ASSOCIATED GAS, CO-GENERATION PLANT ON THE OIL-RIG “BALTIC BETA” POLAND

Client: Energobaltic Sp. z o. o. Gdańsk, Poland (compression)
Petrobaltic S.A. Gdańsk, Poland (co-generation)

Business Area: Thermal Power Plants

Time frame: 2002 – 2004

Technical data:
- 4-stage compression of associated gas
- Capacity: 100 000 Nm3/d
- Discharge pressure: up to 130 bar
- Electrical driver: 1.0 MWe
- Drying efficiency: down to 1.0 ppm H2O

Main purpose:
- Transportation of dense-phase gas
  via 82-km long subsea pipeline to on-shore LPG Plant and gas turbine – based CHP

Co-generation Unit
- Electric power: 3.5 MW
- Steam production: 5.0 t/h, 8 bar
- Base fuel: associated gas
- Start-up fuel: diesel

TECON services:
- Process simulations
- Basic Design
- Detailed Design
- Procurement, purchasing and deliveries
- Erection supervision
- Commissioning and start-up
- Trial run
- Warranty services
PREPARATION AND COMPRESSION OF ASSOCIATED GAS, CO-GENERATION PLANT ON THE OIL-RIG “BALTIC BETA”

POPLAND
Client: Technologie Gazowe Piecobiogaz Sp. z o. o.

Business Area: Thermal Power Plants


Technical data:
- CC Plant rating: 37 MWe
- Bi-pressured HRSG: 50 bar/520°C
  4 bar/175°C
- Air cooled steam condenser pressure: 0.05 bar(a)
- Process heat extraction up to: 16.5 MWth

Additional info:
- Gas and steam turbine in a common string configuration, with one generator
- Black start and island mode capabilities enabled
- New control and monitoring system, ESD system

TECON services:
- Preparation of technical part of the Bid
- Optimization of gas / steam power unit’s thermal configuration
- Guaranteed performance calculations
- Basic design for tendering