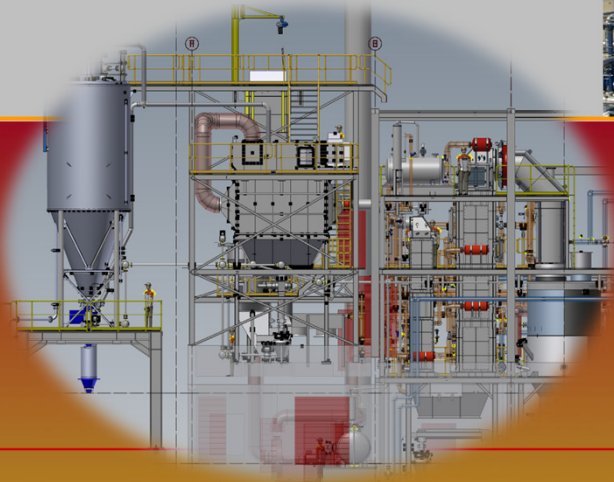


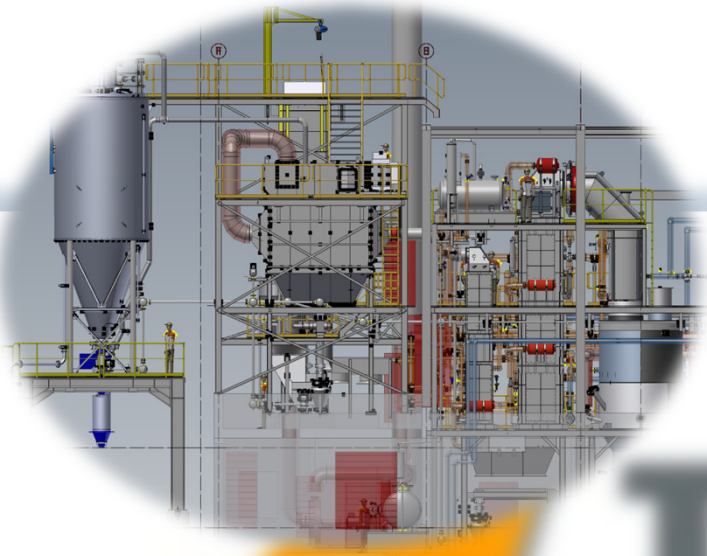
INTEC Engineering GmbH

Process heat and power generation



The INTEC Group

Heat and Power generation



INTEC
ENERGY SYSTEMS

INTEC Engineering GmbH Germany

- Founded in 1995, INTEC has developed into an internationally leading company for high temperature process heat and green power generation
- The INTEC group achieves a turnover of 25-35 million Euro p.a. generated by approx. 80 employees
- Since the beginning we have successfully expanded the network of own offices as well as representations around the world

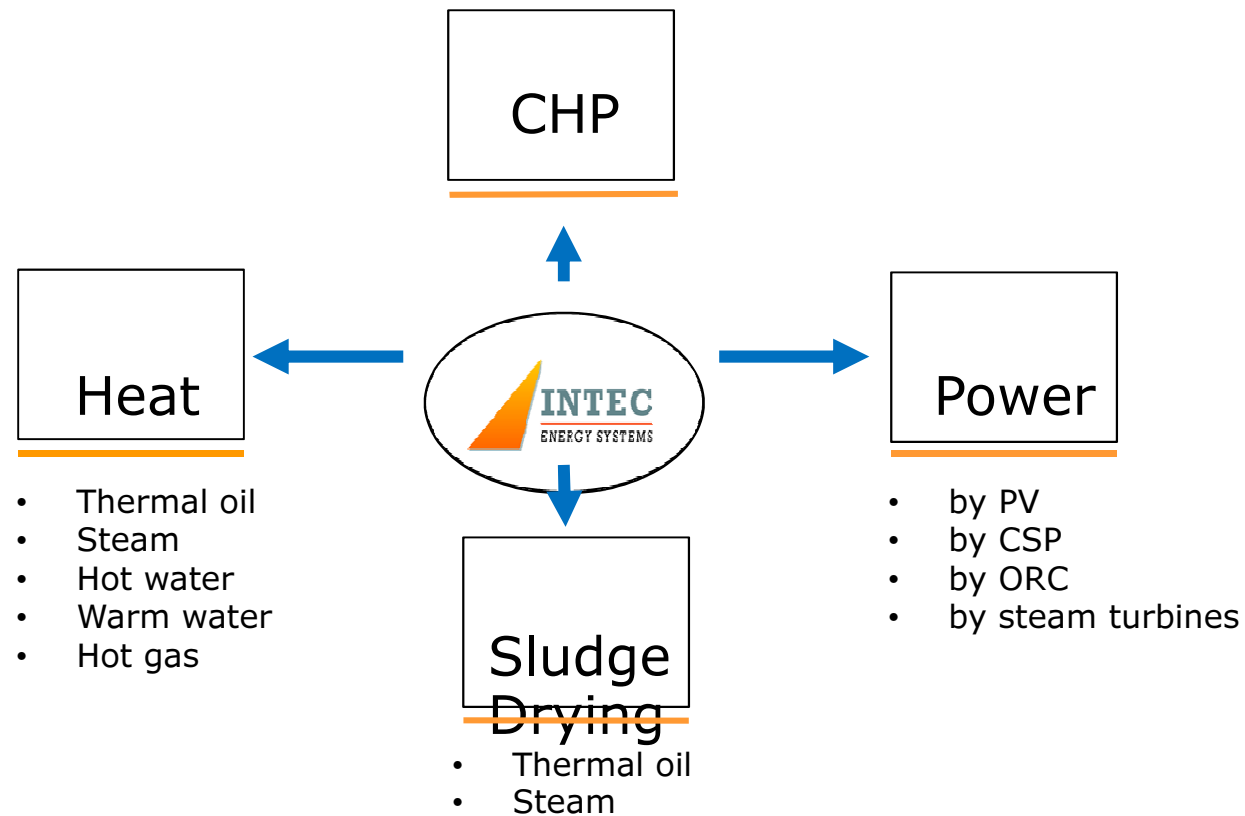


INTEC headquarters in Bruchsal, Germany

INTEC Business



Companies within the INTEC group are offering services and equipment for various heat and power applications



A family of heat to power solutions

Status Quo

- More than 2100 installations in 80 countries
- More than 5200 MW thermal energy installed
- Participated in projects with more than 370 MW electrical energy installed



INTEC Engineering GmbH Germany

- Experienced sales and project engineers for project development
- Design department for customized systems
- Modular systems for plant design
- Manufacturing of key components at our production facility in Bruchsal/Germany
- Supply of key components and local clients manufacturing or turn-key installations as requested by clients
- Experienced supervisors and service engineers



Thermal Oil Heaters

INTEC Type: ET

Thermal oil as heat transfer medium offers the advantage that it can be operated without any pressure build-up until temperatures of 320 °C. Feed line temperature of max. 400 °C using synthetic oil or up to 550°C using molten salt can be achieved.

INTEC thermal oil heaters are characterized by the following features:

- Optimized heat transfer and high efficiency design
- Tailor-made design to individual customer requirements
- Environmental friendly operation due to low emission values
- High operational reliability
- Low operating costs
- Long service life



Thermal Oil Heaters

vertical or horizontal design

- Range of capacity: 50 to 30,000 kW
- Fired by natural gas or fuel oil
- High fuel efficiency up to 95 %
- Air pre-heater, stack optionally
- Easy maintenance
- Safe design and operation
- Up firing option



Waste Heat Boilers

INTEC Type: ETA

Heat recovery boilers using the energy of flue gases to heat up liquid heat transfer medium or steam.

Available as:

- One pass radiation heater
- One pass convection heater in tube bundle design
- Three pass heater
- One pass heater with multiple concentric coils



High Pressure Steam Boilers

INTEC Type : iNOOK

Natural circulation boiler

- High pressure boiler for closed circuits
- Up to 10 t/h, 100 barg
- Fired by natural gas or fuel oil



Steam Generators

- Indirect, thermal oil heated steam generators
- Capacity up to 40 t/h of saturated steam
- Pressure up to 60 bar
- Easy regulation
- Operation without permanent attendance (no boiler man)
- Complete systems with water treatment equipment



Solid Fuel Firing Systems

Reciprocating step grate

- Step grate or fluidized bed design
- Capacity up to 100 MW
- Reliable operation with high availability
- Low emission values for CO and NOx
- High efficiency
- Automatic fuel feeding and de-ashing
- Operation with “low quality fuel” or high moisture up to 180 % o.d.b.
- Burning solid wastes like bark, chips, wood waste, off-cuts, trimmings, production waste, sanderdust and even critical fuels such as rice husks, cotton stalks, sunflower seeds etc.



Solid Fuel Firing Systems

Fluidised bed combustion

- Fluidised bed combustion with controlled ash recirculation
- Capacity up to 50 MW
- Ash cooling heat exchanger positioned outside of combustion area
- Automatic fuel feeding and de-ashing
- Reliable operation with high availability
- Low emission values for CO and NOx
- High efficiency
- Waste heat recovery media: thermal oil, steam, hot water
- Burning solid wastes like biomass, coal, sewer sludge, production waste



Energy plants

- Complete energy plants for particleboard, MDF or OSB production with heat transfer by thermal oil, steam or hot gas

Capacity range: up to 100 MW

- Fuels like bark, wood chips, production waste, fines, sanding dust, saw dust, rice husk, empty fruit bunches and other biomass fuels.
Other fuels like coal, natural gas or fuel oil may be used additionally
- Low emissions, modular design, high reliability



Power and co-generation plants with biomass

- Complete systems for power plants, output up to 20 MWe
- Fuels like bark, wood chips, production waste, rice husks, other biomass fuels, coal, municipal waste, RDF, sewage sludge may be used
- High degree of local manufacturing is possible



Power plants with Organic Rankine Cycle

- Offered by INTEC GMK GmbH in Germany

INDUCAL®

Waste heat recovery



GEOCAL®

Geothermal



ECOCAL®

Biomass



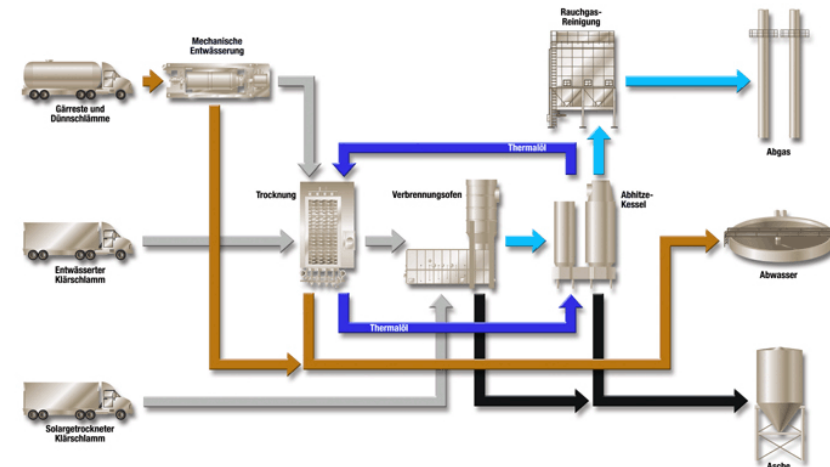
Thermal Sewage Sludge Utilisation

Thermal utilisation - Efficient energy generation

The innovative INTEC disposal and utilisation concept is based on a combination of the sludge dryer with the sludge combustion and the process heat generation in one plant.

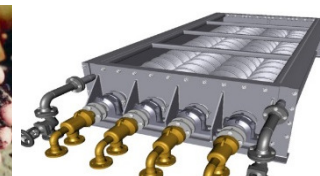
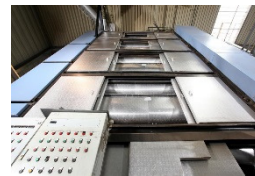
Due to finely tuned equipment, the complete plant does not release any environmentally harmful substances into the air or soil.

It is not necessary to purchase any energy or fuel in order to dry the sludge and wet residues or for their incineration. The energy released by the incineration is used to generate process heat for the drying process. In addition, the optional power generation enables electricity costs to be further reduced.



Thermal Sewage Sludge Utilisation

- Sewage sludge dryers and incinerators:
Contact dryer for sanitizing, drying and increasing the calorific value of municipal and industrial sewage sludge, wet fractions, oil sludge, fermentation residues and water sediments
- Dryer operation with hot oil or steam



**Thank you for
attending!**

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INTEC Rohrtechnik GmbH

Quality „Made in Germany“

- INTEC manufacturing takes place at our own workshop in Germany
- Production of step grates, heater coils and tube bundles, complete heaters and boilers
- Certifications according:
 - Marine industry: GL, LR, BV, RINA, DNV
 - ASME U and S stamp
 - TR TS (Russia)
 - Chinese Boiler & Pressure Vessel Manufacture Licence



Electrical Heaters

INTEC Type: ETE

- Range of capacity: 20 to 15,000 kW
- Available as pre-mounted units



Air Preheaters

- For heat recovery from flue gas
- Preheating of combustion air
- Stainless steel execution possible
- Cross-counter flow for improved efficiency



Secondary Control Circuits

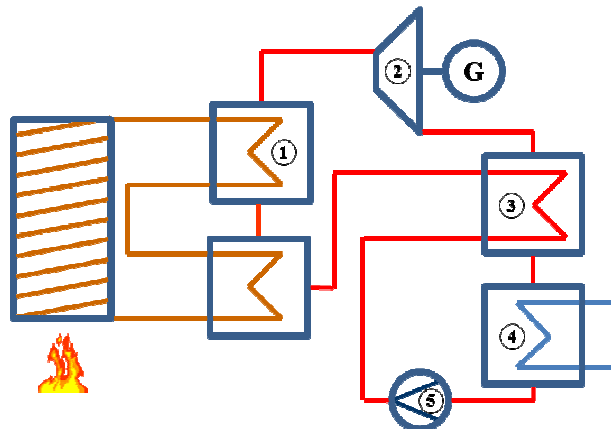
- Secondary control circuits for heating and cooling processes
- Precise control of heat transfer to consumer
- Delivery as completely preassembled unit with pumps and accessories as option
- Low loads and forces on pump through fixed point construction



Power plants with Organic Rankine Cycle

ECOCAL ORC-Module

- Power generation based on biomass firing systems
- Process temperature up to 320°C



Power plants with Organic Rankine Cycle

INDUCAL ORC-Module

- High temperature application: usage of waste heat energy from industrial or biogas process;
process temperature up to 330°C
- Low temperature application: usage of warm water waste streams from industry;
process temperature up to 100°C



Power plants with Organic Rankine Cycle

GEOCAL ORC-Module

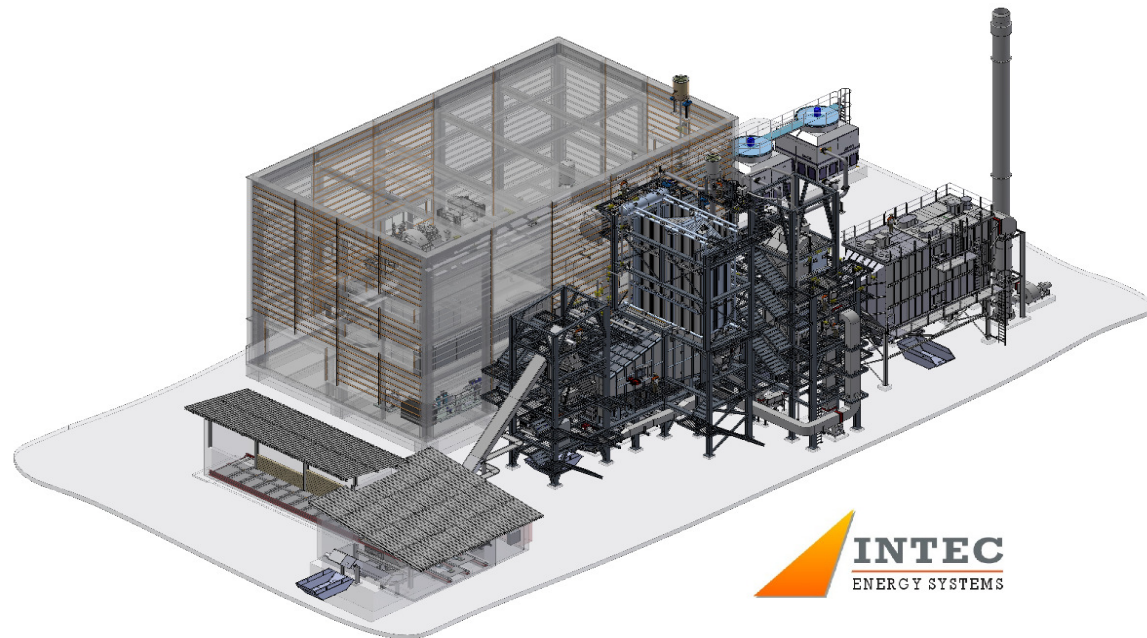
- Power generation based on geothermal heat sources
- Process temperature up to 110°C hot water



INTEC Group

REFERENCES

10 MWe Power Generation Plant in Abashiri/Hokkaido



INTEC Group

REFERENCES

RDF fluidised bed combustion (FBC) system for steam and power production



 **KOLON INDUSTRIES**

Total output: 15,5 MWth

Fuel: RDF

Installation: Incheon / South Korea

Customer: Municipality Incheon

INTEC Group

REFERENCES

Wood waste fired hot gas generator with thermal oil heating system and steam generation



Firing Capacity: 60 MW
Step grate firing: 45 MW,
Sander/screen dust: 19 MW,
Thermal Oil heater: 25 MW,
Indirect steam generator: 15 MW,
Hot gas: 34 MW
Installation: Spain
Customer: Kronospan (Unopan)

INTEC Group

REFERENCES

Recycled waste wood fired incinerator for steam and power production (CHP)



Richi Weiningen

Firing Capacity step grate: 16,5 MW
20 t/h steam @32 bar and 380°C
3,2 Mwe Power Production
12 MW for green house and building heating
Installation: Zürich, Switzerland
Customer: Richi Weiningen

INTEC Group

REFERENCES

**Co-generation plant with rice husk combustion
in cooperation with LAWI-Engineering GmbH**



BUAYAI BIO POWER

Firing Capacity: 30 MW
Electrical output: 6 Mw_{el},
Steam for rice mill production
(paddy dryers etc.)
Fuel: Rice husk
Installation: Thailand
Customer: Buayai Bio Power

INTEC Group

REFERENCES

Hybrid solar-biomass plant in Spain (worldwide the only one in commercial scale)



Firing Capacity: 2 x 25 MW (biomass),
6 MW Gas fired Thermal Oil Heater

Electrical net Output: 22,5 Mwe
Yearly Power Production: 98.000MW
181.000m² Collectors installed on
700.000m² Land

Installation: Spain

Customer: Thermosolar Borges

INTEC Group

REFERENCES

**Coal fired fluidised bed combustion (FBC) system
for thermal oil heating with flash tank**



Total output: 2 x 13,8MW (Anthracite Coal)

Thermal oil system: 2 x 11,6 MW

Installation: Taiwan

Customer: Lea Lea Synthetic Fibre

INTEC Group

REFERENCES

Sewage sludge dryer and incinerator for steam and power production



Firing Capacity: 5,7 MWth
1 Mwe Power Production
Fuel: Sewage Sludge
Installation: Karlsruhe, Germany
Customer: City of Karlsruhe