TID product portfolio

BASIC facilities — energy and water management

Integral and partial services · 8 BASIC projects · 60 EHN-BASIC combinations

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TRIVIA INDUSTRY TECHNOLÓGIA INTEGRÁTOR ÉS KIVITELEZŐ KFT.

What is the structure of the TID product portfolio and its customer promise?

TID's unified value proposition is built on four building blocks: the good is the physical, catalogable equipment; the service is the design-implementation process; the product is the unified package of these two; and the facility is the system-level, proven solution. Some of the facilities also appear as BASIC products, pre-typed (TPZ) industrial investment packages — with faster interpretation and lower implementation risk.

01 15 portfolio items

6 integral products (system-wide) + 9 partial facility services. The entire life cycle from design to operation.

02 8 BASIC projects

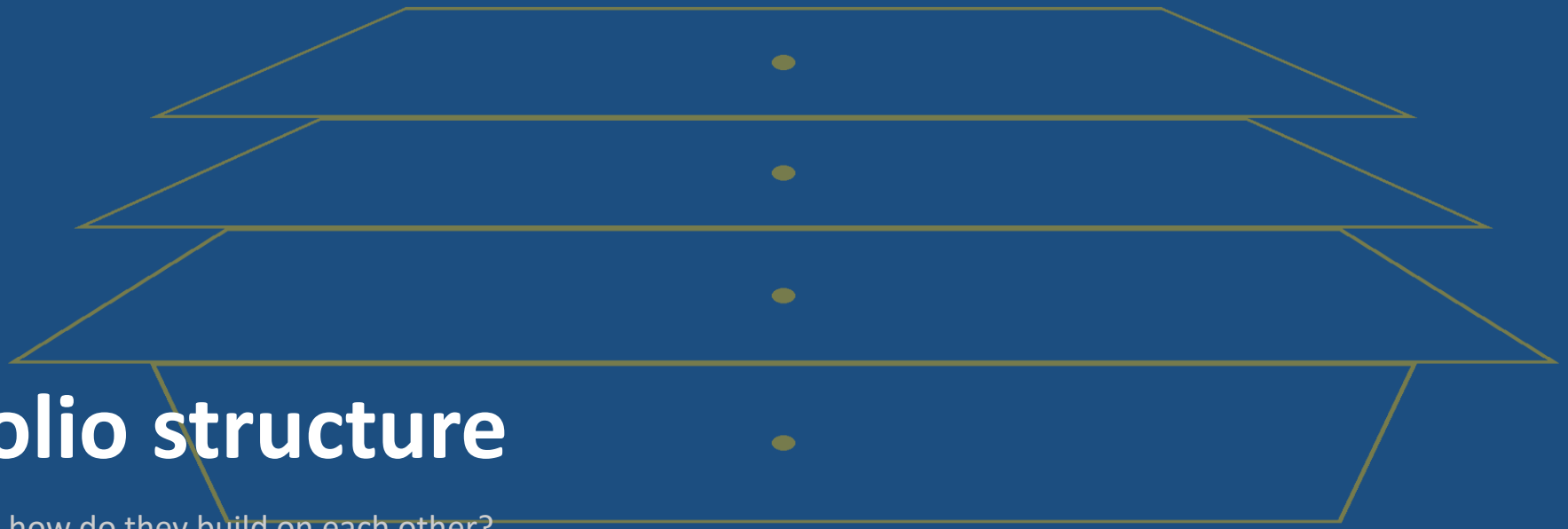
Cooling tower / air cooler / WOIMA boiler / heat exchanger / heat accumulator — with industrial, power plant, nuclear power plant and chemical industry references.

03 60 EHN-BASIC combination

Energy efficiency integrated equipment packages in 13 categories — heat recovery, heat pump, ORC, steam system, vacuum, external utilization.

TID role: technology integrator and contractor — with its own engineering resources and equipment from world-renowned brands (Kelvion, Sumitomo SHI-FW, WOIMA, KraftBlock).

1



Product portfolio structure

Goods, services, products, facilities — how do they build on each other?

Product portfolio — four layers built on top of each other

Unified value proposition: equipment, process, package and system

1

GOODS [2.1.0]

Physical, catalogable equipment

2

SERVICE [2.2.1]

A series of activities that are time-bound and controllable

3

PRODUCT [2.3.0]

A unified package of goods + services

4

FACILITY [2.3.1]

Complex product: system-level combination of equipment

Above the layer of "integrated products" appear the NPM EPC service (network-based project management) and BASIC as a standardized facility package.

Product portfolio — two main systems

Integrated system-level products vs. partial, life-cycle services

INTEGRATED PRODUCTS

Unified value proposition — system-wide package

Goods	[2.1.0]
Service	[2.2.1]
NPM EPC service	[2.2.2]
Product (Goods+Services)	[2.3.0]
Facility (complex)	[2.3.1]
Facility (BASIC)	[2.3.2]

PARTIAL SERVICES

Lifecycle facility services

Technical & economic planning	[3.4.1]
Document digitization	[3.4.2]
Energy efficiency improvement	[3.4.3]
Environmental impact assessment	[3.4.4]
Site asset valuation	[3.4.5]
Operation and maintenance	[3.4.6]
Condition diagnostics	[3.4.7]
System digitalization	[3.4.8]
Technical remote monitoring	[3.4.9]

One value proposition, four tangible benefits

Measurability

All performance can be verified — with handover documents, protocols, and measured values.

Accountability

Product and process undertaken together — system-level verifiable functionality.

Risk reduction

BASIC: typed, documented, pre-compiled package — less implementation uncertainty.

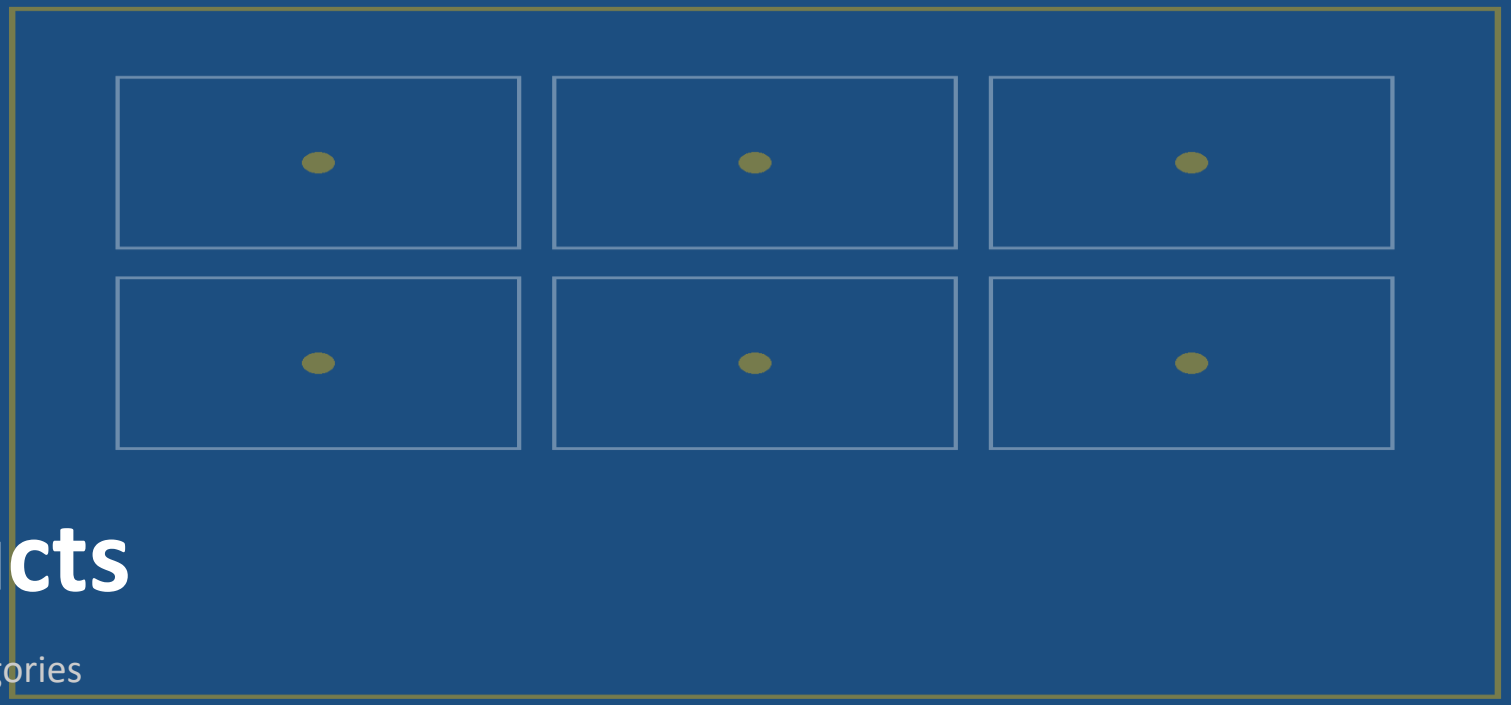
Lifecycle coverage

From design to operation — one integrator, one system of responsibility.

2

Integrated products

Six interconnected system-level product categories



[2.1.0] – [2.3.2]: the lowest layer is the product, the highest is BASIC

[2.1.0] Σ Goods

A physical, tangible, identifiable, orderable and deliverable technical object — suitable for item number management.

[2.2.1] Σ Service

The dynamic part of the product: a series of activities that unfold over time, building on each other; its goal is a pre-determined, verifiable result.

[2.2.2] NPM EPC service

Network-based project management for industrial investments — scope, deadline, cost, quality, documentation all together.

[2.3.0] Product (Goods + Services)

Unified value proposition: not just equipment, not just labor — an integrated solution undertaken together and accounted for.

[2.3.1] Facility — Complex product

An interconnected set of equipment and subsystems; customer value can be proven at a system level.

[2.3.2] Facility — Σ BASIC product

Standardized (TPZ), repeatable investment package — with a fixed structure and lower implementation risk.

NPM EPC service and the BASIC standard facility package

NPM EPC Service [2.2.2]

Network-based project management

Unified order

Scope, deadline, cost, quality, documentation.

4-phase operation

Preparation → decision → execution → control.

Network model

Responsibility and status/event identifiers.

Auditability

Traceable project progress on a document basis.

Modularity

Modular parameterizable operation.

Σ BASIC product [2.3.2]

Standardized, repeatable investment package

Fixed structure

Complex system pre-typed (TPZ).

Quick interpretation

Comparable in offer, lower risk.

Minimum documentation

Technical content, cost and schedule frameworks.

Module system

Selected versions and accessories.

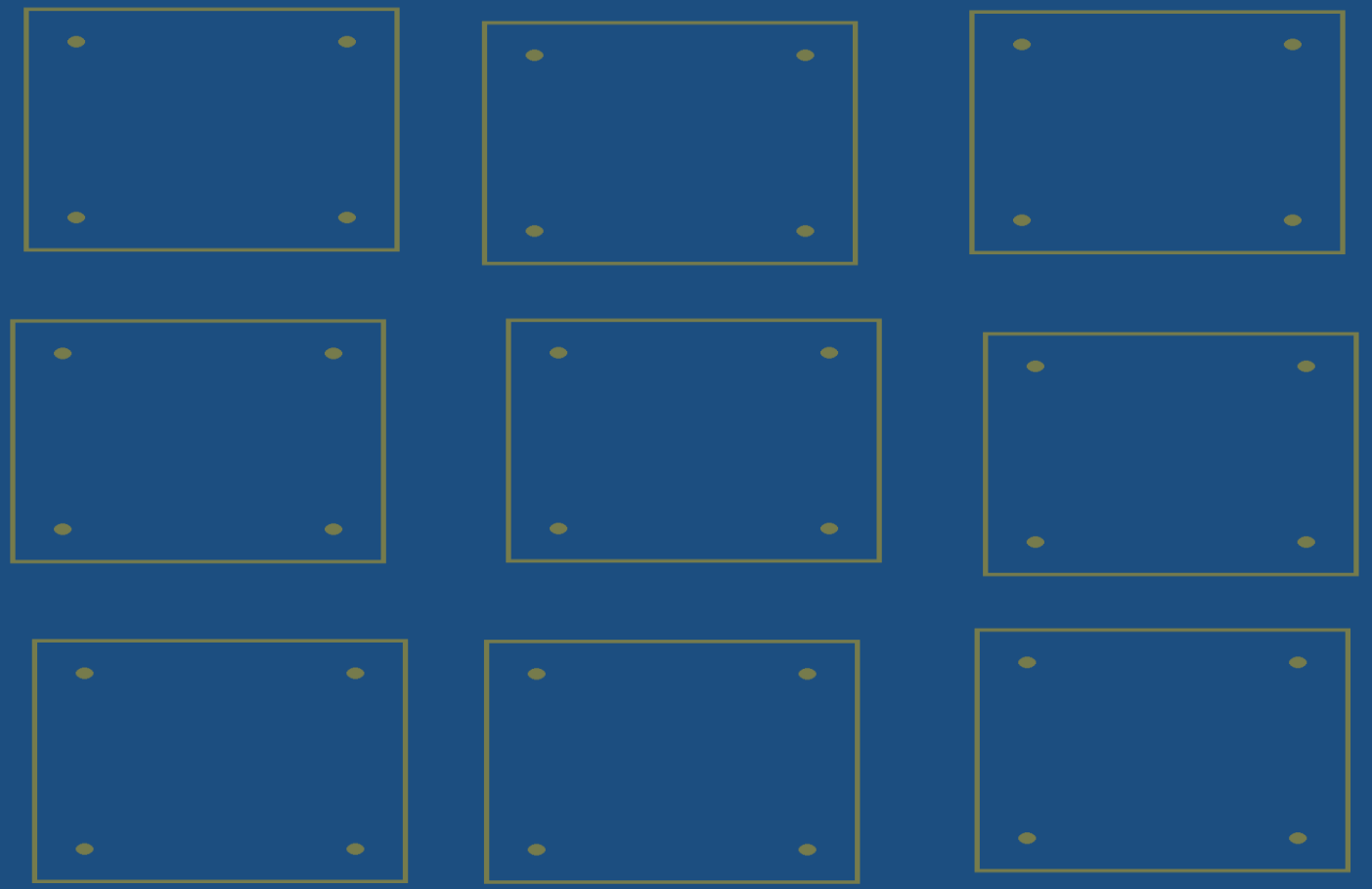
Transfer minimum

Standardized implementation process.

3

Partial services

Nine lifecycle services for facilities



Partial services — nine categories

[3.4.1] – [3.4.9]: one service element for each facility

[3.4.1]

Technical & economic planning

Clarification of requirements program, scope, and design phase requirements.

[3.4.2]

Document digitization

A searchable document library that can be used in operations.

[3.4.3]

Energy efficiency improvement

Measurable savings, verifiable emission reduction.

[3.4.4]

Environmental impact assessment

Evidence-based risk assessment, gaps and measures.

[3.4.5]

Site asset valuation

Replacement value, depreciation, insurability, renovation needs.

[3.4.6]

Operation & maintenance

Planned, measurable maintenance program; criticality.

[3.4.7]

Condition diagnostics

Thermal imaging, vibration, ultrasound — a proven list of defects, urgency.

[3.4.8]

System digitalization

Unified device and system trunk, facility hierarchy.

[3.4.9]

Technical remote monitoring

Continuous remote monitoring, early warning, response plan.

Partial services — life cycle map

From design to operation: where do TID services fit in?

Planning	Assets	Digitalization	Operation	Supervision
1	2	3	4	5
Technical & economic planning [3.4.1]	Asset valuation [3.4.5]	Document digitization [3.4.2]	Operation & Maintenance [3.4.6]	Status diagnostics [3.4.7]
	Environmental impact assessment [3.4.4]	System digitalization [3.4.8]	Energy efficiency [3.4.3]	Technical remote monitoring [3.4.9]

The 9 partial services can be used individually or as a package — each element has a definition by source.

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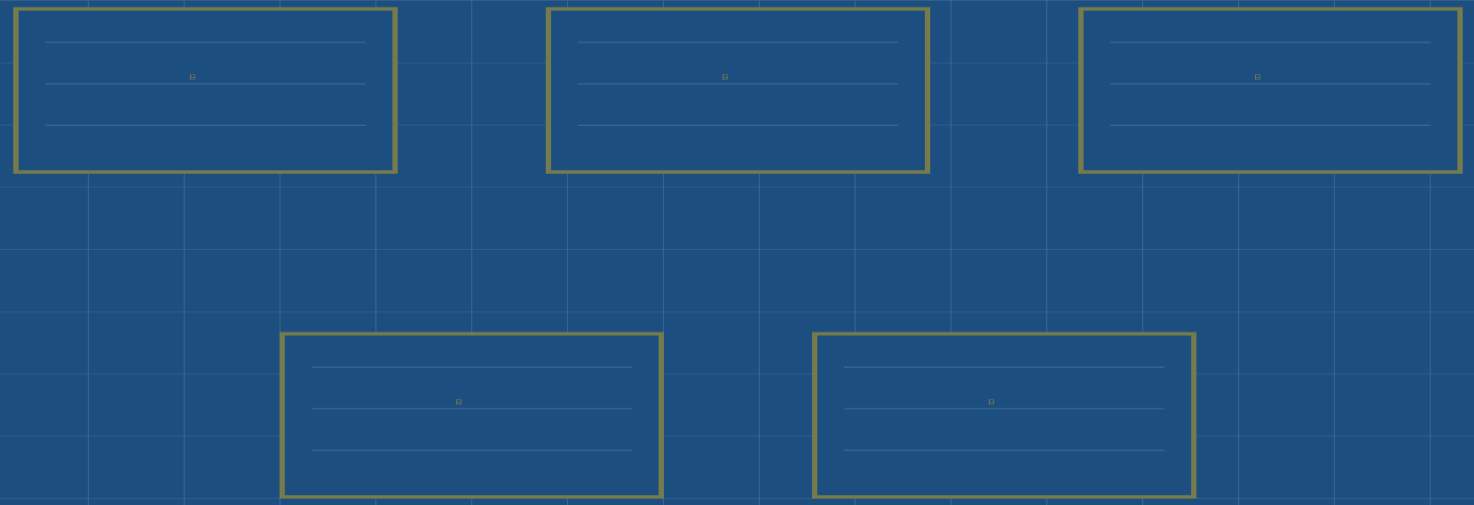
BASIC concept

Standardized investment solution — structured project model, not a physical unit



Standardized, modularly scalable industrial investment solution

The BASIC facility product contains pre-defined design, construction and financing parameters within defined technical and economic categories. The concept aims to make facilities traditionally managed individually in industry — especially in the energy and technology sectors — available as pre-configured, documented project packages.

NOT	BUT	RESULT
• specific equipment • unique building • template product	• structured project package • digitally managed project model • demand-based component combination	• faster decision-making • less design effort • predictable construction risk

It is particularly advantageous where investors require predictable, well-structured and quickly deployable solutions with minimal individual design or permitting processes (energy market, chemical industry, infrastructure).

Structural pillars of standardization

01 Typical investment solution

Not a specific technical product, but a system-level offer package — individual project elements standardized to meet market needs.

02 Predefined parameterization

Design, construction, and financing conditions are pre-defined; they can be managed on a database basis for quick quotations.

03 Modular and scalable

The size and configuration of the investment can be flexibly adjusted — it is not a template product, but a demand-based combination of components.

04 Documented components

Machines, subsystems, technologies, construction procedures; legally and financially prepared constructions.

05 Virtual product model

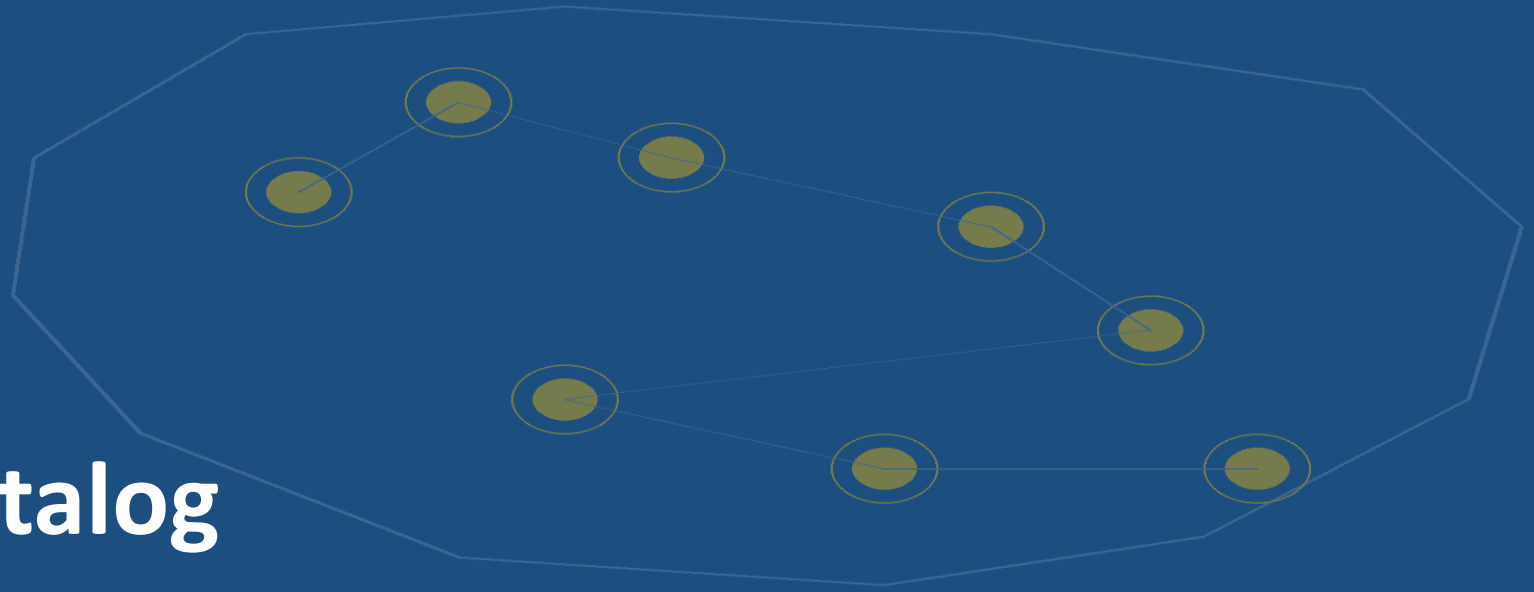
The "product" is not a physical unit, but a structured project package — each element with documentation, drawings, and cost models.

06 Speed and transparency

Time and cost efficiency in project initiation and execution — ideal where lead time is key.

5

BASIC project catalog



Eight implemented or developed BASIC projects — industry, power plant, nuclear power plant, chemical industry

BASIC project catalog — eight projects

Cooling technology · natural gas · biomass · chemical industry · thermal storage

1.0	Cooling tower / wet open cycle — industrial	1.1	Cooling tower — biomass power plant (Kelvion CMDR)
1.2	Cooling tower — Paks 1 nuclear power plant (Kelvion CMDI)	2.0	Air cooler / dry — natural gas compression (Kelvion)
3.0	WOIMA modular boiler (Sumitomo SHI-FW)	4.0	Heat exchanger + closed cooling circuit — food industry
5.0	Air cooler + wet tower hybrid (Kelvion)	6.0	Heat accumulator (KraftBlock) — steam supply optimization

TID representative brands — for BASIC projects

KELVION	Sumitomo SHI-FW	WOIMA	KraftBlock
Cooling towers, air coolers, heat exchangers (FR/DE)	Modular grate-fired boilers (FI/JP)	Waste-to-Energy modular boiler system	High-temperature heat accumulators (DE)

BASIC 1.0 — Cooling tower / wet open cycle

Industrial technology - water recooling with double cycle

Product description

Recooling of treated water heated in the industrial technological process with an open system, counter-flow wet cooling tower — by evaporating a fraction (1–3%) of the cooling water flow. The physical principle of heat removal is the release of the heat of evaporation into the atmosphere.

Implemented application

Technical challenge: the customer's 50 m^3/h flow rate is lower than the minimum for the smallest cooling tower type — DT = 50 °C, 74 → 25 °C.

TID solution: double circuit with 30 m^3 buffer — a delivery pump from the buffer tank increases the volume flow to 250 m^3/h, then the cooling tower cools it back to 34.8 → 25 °C.

Make-up water requirement: 5.69 m^3/h — TWB (wet bulb temperature): 22 °C.

50 m^3/h	**250 m^3/h**	**DT 50 °C**	**30 m^3**
technology-water	internal circulation.	thermal staircase	buffer

BASIC 1.1 — Cooling tower / biomass power plant

Recooling of circulating power plant cooling water with Kelvion CMDR 840

Product description

Supplementing the insufficient cooling capacity of a condensing power plant (biomass-fired) — next to existing open system counter-flow cooling towers, by reusing the former cold water collection basin. Utilizing hydrostatic pressure difference, without a booster pump.

Implemented application

Equipment: Kelvion Polacel CMDR 840-DMS-150-PS/2 (2×3 = 6 cooling tower units, dimensions 9,940 × 3,800 mm, scale 1:90).

Heat load requirement: 8,500 m³/h cooling water flow, 38 → 28 °C recooling at 21.6 °C wet bulb temperature (TWB) — safely even in summer.

Connection: DN1200–DN400 pipelines, ultrasonic flow measurement, frequency-controlled fan motors.

8,500 m³/h	38 → 28 °C	6 pcs	CMDR 840
cooling water	ΔT 10 °C	cold storage	Kelvion

BASIC 1.2 — Cooling tower / Paks 1 nuclear power plant

Operational optimization with stricter environmental standards

Technical context

Single-flow Danube water cooling — according to Decree 15/2001. (VI. 6.) KöM, the river water temperature 500 m below the inlet can be max. 30 °C (i.e. max. 33 °C at the inlet point). According to the KHT's prognosis, the Danube water temperature is expected to be 26.38 °C in 2032 and 28.64 °C in 2085 — this forces a power reduction.

TID solution — three-phase investment

Equipment: Kelvion CMDI 3000-DMS-180-PS/2 — 15 cooling units, 4 cooling cells each, ~11,000 m³/h cell-level capacity.

Highlight: of the total flow of 400,000 m³/h, 162,600 m³/h is extracted, cooled in a cooling tower, and then released back — with biocide-free surface-forming filling and filtered running water intake.

Payback: 5–7 calendar years; reliable, deregulation-free operation during critical summer periods.

162,600 m³/h	15 pcs	33 °C	5–7 years
highlighted current	cooling unit	norm-limit	return on investment

BASIC 2.0 — Air cooler / dry

Recooling of compressed natural gas with ambient air

Product description

Recooling of natural gas temperature increased by compression at natural gas booster compressor stations — a waterless, dry technology, which is especially beneficial in areas with water shortages. Energy consumption is concentrated exclusively on driving the fans.

Implemented application — national natural gas transmission system

Demand: Cooling of natural gas with a volumetric flow rate of 3 × 500,000 = 1,500,000 Nm³/h from 70 °C to 50 °C with ambient air.

Equipment: Kelvion Thermal Solutions (FR) — 3 air coolers, 2 parallel tube bundles each, 285 finned tubes in 6 rows; 3 fans per air cooler with frequency control.

Transportation: break-bulk cargo (DHL Project Global), oversized cargo by road; on-site crane directly onto the supporting structure.

1.5 M Nm³/h	70 → 50 °C	3 × 6 rows	9 pcs
natural gas	ΔT 20 °C	pipe bundle	fan

BASIC 3.0 — WOIMA modular boiler

Sumitomo SHI-FW grate-fired combined cycle steam and power plant

Product description

Hungarian industrial consumer for its own production expansion and for the steam supply of neighboring plots/municipal systems. The concept is delivered by SHI-FW (Sumitomo Heavy Industries — Foster Wheeler) boiler plant under the representation of TID — from the EU standard production facilities of the Japanese-owned, Finland-based manufacturer founded in 1927.

Technical content

Central part + 1×–4× boiler line: fuel capacities in 10 / 15 / 20 MWtüa modules — 10–40 / 15–60 / 20–80 MWtüa capacity.

Steam parameter: 400 °C, 40 bar (bound module parameter).

Steam turbine OEM partners: Howden, DePretto, ShinNippon — In a TID contract, SHI-FW guarantees the performance of the entire facility (including the turbogenerator). Scheduled phased implementation is supported.

10–80 MW	400 °C / 40 bar	1×–4×	SHI-FW
fuel	steam parameter	boiler line	OEM partner

BASIC 4.0 — Heat exchanger + closed cooling circuit

Food industry technology - pollution-free recooling of water

Product description

Food process water must remain in a closed loop (to avoid contamination), but a traditional open-cycle cooling tower requires more than the minimum flow rate. The solution: a gasketed plate heat exchanger separates the closed and open loops — evaporation heat removal only affects the auxiliary cooling loop.

Implemented application

Demand: 50 m³/h process water recooling from 74 → 25 °C (DT ≈ 50 °C) in a closed circuit.

Solution: plate heat exchanger (Kelvion) + open cycle wet cooling tower, cooled to 34 → 24 °C with 250 m³/h auxiliary cooling water flow.

Result: closed process water does not suffer from evaporation or other losses; water treatment costs are significantly reduced.

50 m³/h	250 m³/h	DT 50 °C	0 %
technical water (closed)	auxiliary circuit	thermal staircase	pollution

BASIC 5.0 — Air cooler + wet tower hybrid

Hybrid cooling of process fluids in water-scarce areas

Product description

In areas with a water shortage, an air cooler is suitable for cooling process fluids — except during extremely hot summer periods, when the air cooler would only be significantly over-sized. According to the joint TID/Kelvion study: an additional heat exchanger installed after the air cooler, which is fed by a periodically operating wet cooling tower.

Hybrid advantage

For a significant part of the year, the air cooler is self-sufficient — the wet tower is not in operation.

During extreme summer periods, the wet tower is switched on intermittently — avoiding oversizing the air cooler and the associated high energy consumption.

Result: minimal need for make-up water (only during critical periods), energy-efficient base operation, size-optimized investment.

> 70%	< 30 %	Min.	Hybrid
year — air cooler	year — wet	make-up water	system

BASIC 6.0 — Heat accumulator (KraftBlock)

Electric steam generation with heat storage — peak time shift

Product description

In industry, many users use steam-heated steam generators to heat liquid media. The source of electricity can be renewable (solar panels) or taken from the grid during off-peak hours — part of the steam produced is stored in a heat accumulator and used by the user during peak load periods.

Implemented application — Transdanubian pet food manufacturer

Phase 1: installation of a new substation + mains-heated steam generator + KraftBlock heat accumulator.

Phase 2 (planned): solar panel supply supplement — thermal accumulator that can be charged from its own renewable source.

Result: electricity price optimization (off-peak purchase), renewable integration, steam supply rationalization.

Peak offset	Solar panel	KraftBlock	2 phases
tariff	integration	storage	scheduling

6

EHN-BASIC combinations

60 integrated energy efficiency equipment packages — in 13 categories

EHN-BASIC combinations — 13 categories

60 integrated packages — pre-screening professional view, not implementation plan

Direct heat recovery

Economizer, gas-water, air-preheating

Condensation heat recovery

Flue gas condensation, latent heat

Fluid heat recovery

Process water, washing water, wastewater

Heat recovery

Heat pump: cooling water / waste water / HT

Steam and enthalpy utilization

Flash steam, steam header

Cooling-heating integ.

Desuperheater, refrigerator heat

Compressed air and heat integration

Compressor heat recovery

Steam system loss management.

Steam trap monitoring, condensate

Boiler house integration

Degasser, blowdown, feed water

Vacuum and pressure systems

Vacuum pump heat recovery

External utilization

District heating, community energy

Water-heat-wastewater integration

Membrane filtration + heat exchange

Flue gas + electrification hybrid

ORC waste heat to electricity

Each combination carries a control and remote monitoring qualification, as well as a maturity category (Standard / Applied / Advanced).

EHN-BASIC highlighted combinations

Six representative examples from the 60 packages

EHN-BASIC-01 — Standard

Economizer + feedwater preheating

Flue gas sensible heat loss → boiler feed water preheating. Fuel savings with low technological risk.

EHN-BASIC-02 — Employee

Flue gas condensing hot water

Sensible + latent flue gas heat → buffer/hot water; higher recovery rate and water recovery option.

EHN-BASIC-07 — Employee

Heat pump / waste heat recovery

Low temperature cooling water → higher value hot water or heating circuit. Key technology in case of industrial waste heat.

EHN-BASIC-10 — Standard

Flash steam + LP steam header

Flash steam utilization from pressurized condensate for low-pressure steam consumers or feedwater preheating.

EHN-BASIC-55 — Standard

Steam trap monitoring

Blow-through traps, lost condensate and flash steam monitoring; recovery of latent steam, heat, water and chemical value.

EHN-BASIC-60 — Special

ORC + economizer hybrid

First heat, then electricity from high temperature flue gas. Combining heat recovery stages with electrical output.

Automation requirements for EHN-BASIC packages

Bypass type

Control is warranted due to bypass, temperature, pressure drop and protection conditions; remote monitoring is recommended for medium/large systems.

Typical application

Example: economizer, gas-water heat exchange, condensation heat recovery.

Heat pump

Load-dependent operation, efficiency and protection logic require regulated operation; remote monitoring is recommended to monitor COP/EER, electrical power and operating hours.

Typical application

Example: heat pump packages, high temperature enhancement.

Size-sensitive

The need for regulation and monitoring depends on the size, operational criticality and measurement requirements of the system.

Typical application

Example: steam trap monitoring, vacuum systems, boiler house integration.

EHN-BASIC graduation levels

Standard / Applied / Special — categorization of industrial prevalence

STANDARD

Common solution

Proven, documented, with low implementation risk; first choice in industrial practice.

Representative examples

- Economizer-based
- Fluid heat recovery
- Steam trap monitoring
- Refrigerator desuperheater

EMPLOYEE

Available in industrial practice, spreading

Introduced, but with specific application conditions; requires careful design and fitting.

Representative examples

- Heat pump packages
- Condensation heat recovery
- Air preheating
- Compressor heat recovery

SPECIAL

Innovative or in a special context

High temperature, ORC-based, or requiring external utilization — with a stricter set of conditions.

Representative examples

- ORC + economizer
- High-temperature heat pump
- Membrane water-heat integration
- External heat transfer

Epilogue — summary

TID portfolio: integrated value proposition, documented projects, mature combinations

Structured product portfolio

6 integral products + 9 partial services — a unified customer promise from design to operation.

BASIC as a TPZ product

Standardized, repeatable investment packages — faster decisions, lower design costs, predictable implementation.

Eight completed/developed projects

Cooling tower · air cooler · boiler · heat exchanger · heat accumulator — industry, power plant, nuclear power plant, chemical industry, food industry.

60 EHN-BASIC combination

Integrated energy efficiency packages in 13 categories — with control, remote monitoring and maturity certification.

TID — technology integrator and contractor — representing Kelvion, Sumitomo SHI-FW, WOIMA, KraftBlock.

TRIVIA INDUSTRY Technology Integrator and Contractor Ltd. (TID)

www.triviaindustry.net

Headquarters: 1021 Budapest, Hűvösvölgyi út 14.

Location: 1037 Budapest, Máramaros Street 47.

Phone: +36 70 341 5995 & +36 30 996 1940

Email: info@triviaindustry.com

Business development

office@triviaindustry.com

Technical management

tech@triviaindustry.com

Project office

project@triviaindustry.com

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