A world designed to last

Enhanced heat transfer technologies

For efficient, sustainable and lower-carbon process solutions



TECHNIP ENERGIES

A unique enhanced heat transfer portfolio

Heat transfer is at the heart of industrial performance across oil & gas, gas processing, refining, petrochemicals, and emerging low-carbon applications.

Advanced heat transfer technologies enable more compact, efficient, and sustainable process designs, delivering lower energy consumption, reduced equipment footprint, and significant carbon footprint reduction. By optimizing both CAPEX and OPEX, these solutions create value throughout the project lifecycle, from greenfield developments and brownfield expansions to plant revamps and debottlenecking initiatives.

The result is enhanced operational performance, improved energy efficiency, and a measurable contribution to decarbonization objectives.

Field-proven solutions

For more than 20 years, Technip Energies and Wieland Thermal Solutions have partnered to develop and deploy advanced heat transfer technologies in world-scale LNG and ethylene facilities.

Driven by a long-term innovation roadmap and a strong focus on market needs, our collaboration has consistently transformed research and development into industrially proven solutions. By combining process expertise, technology innovation, and execution capabilities, we deliver enhanced energy efficiency, reduced equipment footprint, optimized project economics, and lower carbon emissions.

Backed by decades of successful industrial applications, our technologies help operators achieve higher performance, greater sustainability, and long-term operational reliability.



Wieland & Technip Energies: Transforming Innovation into Operational Excellence.

From laboratory testing and technology validation to engineering, fabrication, and project delivery, our partnership accelerates the journey from innovation to industrial success.

R&D

Tube Development

Advanced tube development and qualification

- Laboratory testing and performance assessment
- Manufacturing process validation

Heat exchanger design and optimization

- Tube integration into exchanger concepts
- Thermal and hydraulic performance
- Optimization
- CFD-based validation
- HTRI-integrated design methodologies

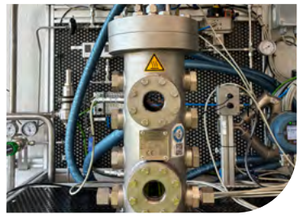
T.EN - WIELAND COOPERATION

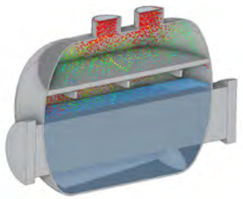
PROJECTS

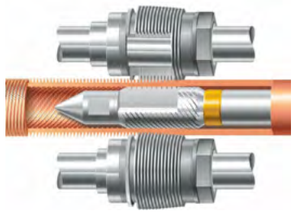
Project Execution

End-to-end technology deployment

- Complete Design package (thermal, mechanical and detailed engineering)
- Thermal performance guarantees
- Project management and technical documentation
- Corrosion protection strategies
- Tube fabrication, degreasing and quality control for carbon steel enhanced tube











One partnership. One value chain. From innovation to execution.

Two product lines are available today for process heat exchangers for oil and gas industry applications (LNG, ethylene, refineries, etc.)

GEWA-PB TUBE - BOILING

- External nucleate boiling structure
- Internal helical fin structure
- Especially suitable for horizontal shellside boiling of C_2, C_3 as well as higher molecular weight clean hydrocarbons.
- Allows for minimal cold approaches together with a maximal overall heat transfer performance

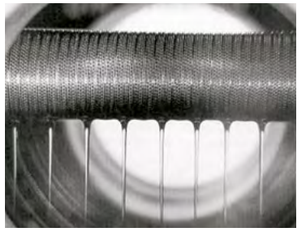




New Tube Materials: Austenitic Stainless Steel

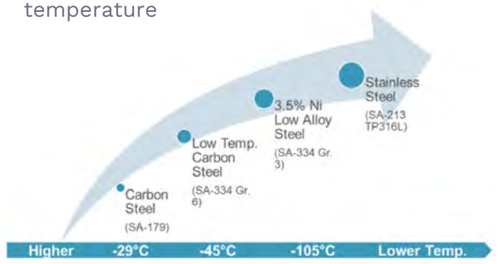
GEWA-KLF TUBE - CONDENSING

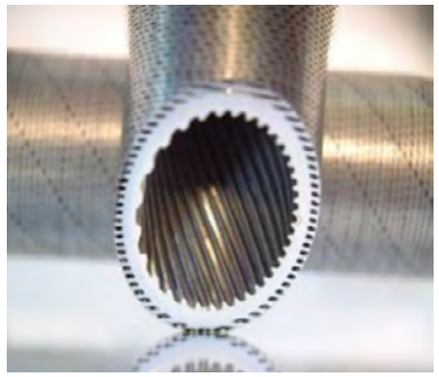
- Externally and internally enhanced surfaces
- Internal available structures allowing for a robust operation with typical cooling water systems
- Lower fouling rates compared to conventional tubes





- Various materials depending on project requirements
- Enhanced surface structure for maximized nucleate boiling at minimal superheat temperature





References

Over the past two decades, Technip Energies and Wieland have established a proven track record in delivering enhanced heat transfer solutions for world-scale LNG and ethylene projects. From new plant constructions to revamps and debottlenecking initiatives, the partnership has supplied more than 150 heat exchanger systems, enabling higher efficiency, improved plant performance, and sustainable value creation for operators worldwide.

LNG

Following the successful implementation of our first projects in Qatar, the technology rapidly gained market acceptance and was subsequently deployed in numerous LNG facilities worldwide. Today, these applications contribute to approximately one-third of the global LNG production capacity, demonstrating the robustness, reliability, and industry-wide recognition of our enhanced heat transfer solutions.

ETHYLENE

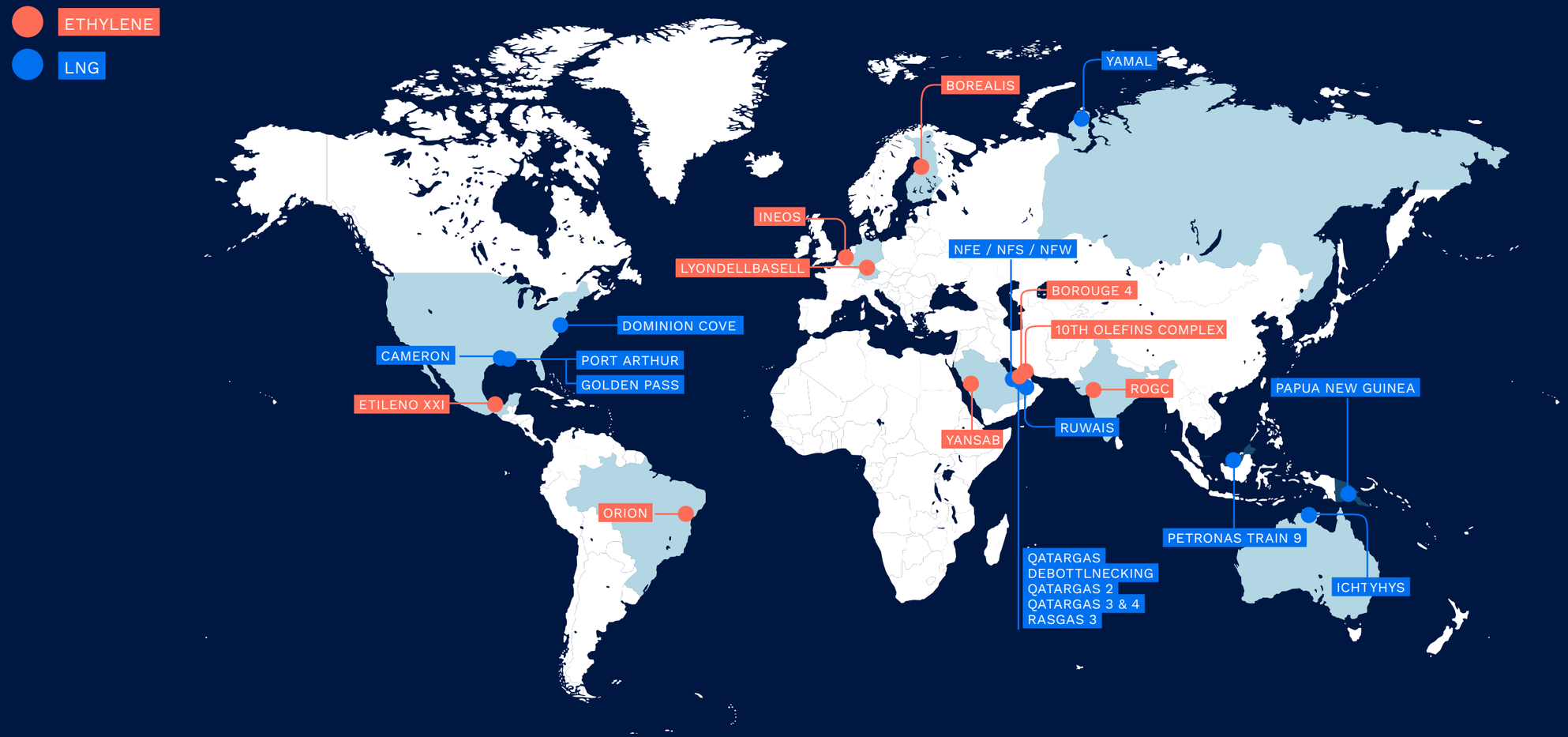
GEWA-PB and GEWA-KLF tubes have been successfully deployed across numerous major greenfield projects, as well as a broad range of plant revamp and debottlenecking applications, consistently delivering enhanced thermal performance, increased capacity, and improved operational efficiency. the robustness, reliability, and industry-wide recognition of our enhanced heat transfer solutions.

QATAR ENERGY

2003/4/5	2008/8/10	2026/2028/2030	
QGI train 1/2/3	RGIII, QGII, QGIII, QGIV	NFE, NFS, NFW	
9,9 MTPA	**31,2 MTPA**	**24 MTPA**	= **TOTAL CAPACITY FOR QATAR ENERGY: 65,1 MTPA**

EXXON

2003/4/5	2008	2014	2025	
QGI train 1/2/3	RGIII, QGII	PNG LNG	Golden Pass LNG	
9,9 MTPA	**15,6 MTPA**	**4,2 MTPA**	**6 MTPA**	= **TOTAL CAPACITY FOR EXXON: 35,7 MTPA**



"We had implemented in our Mexican complex four exchangers with Wieland Technology:

- Deethanizer Condenser – ¾" OD GEWA-PB boiling tube,
- C2 Splitter Reboiler – ¾" OD GEWA-PB boiling tube
- Ethane Vaporizer – ¾" OD GEWA-PB boiling tube
- C3 Refrigerant Condenser – ¾" GEWA-KS condenser tube.

All of them are performing well. As a precaution to guarantee a smooth performance, we suggest to take care to maintain the equipment under nitrogen all the time from fabrication until start-up."

— Jose Luis Vela Barradas, Braskem Idesa Cracker Manager

"We have been recently upgrading our C3 splitter capacity with an open heat pump system using Wieland enhanced GEWA-PB boiling tube for the C3 thermosiphon reboiler/ condenser. Since start-up the performance early 2018 is as expected. We had been very pleased with the support by the Wieland team from the engineering phase as well as during the equipment fabrication until start-up."

— Development Manager–Olefins

"Qatargas is using Wieland enhanced tube technologies, namely the GEWA-PB tube in the C3 refrigerant chillers and the GEWA-KS tube in the main C3 refrigerant condensers in all LNG mega trains (trains 4, 5, 6, 7). Since the start-up in 2009 with trains 4 and 5, Qatargas is extremely pleased with the functioning of these enhanced heat exchangers. We previously had very successfully utilized the Wieland enhanced GEWA-PB boiling tubes in our low pressure propane chillers to debottleneck LNG trains 1, 2, and 3, which allowed the desired LNG capacity upgrade."

— Keith Merkley, former Asset Manager LNG Train 4 and 5, Qatargas

LNG Production

Driving LNG Performance with Enhanced Heat Transfer Technologies

Today, more than 185 Mtpa of LNG liquefaction capacity is based on enhanced heat transfer technologies, demonstrating their widespread adoption across the LNG industry.

Enhanced heat exchangers for propane evaporation and condensation enable:

- Reduced CAPEX through more compact heat exchanger designs, lowering equipment, piping, structural steel, and civil construction requirements.
- Lower CO_2 emissions and power consumption by reducing fuel gas demand for refrigeration drivers, contributing to plant decarburization objectives.
- Higher LNG production per unit of compression power, improving the overall efficiency and economics of LNG liquefaction facilities.
- Increased LNG production during debottlenecking projects by replacing plain or low-finned tube bundles with GEWA-PB® enhanced tubes, while maintaining essentially unchanged power consumption.

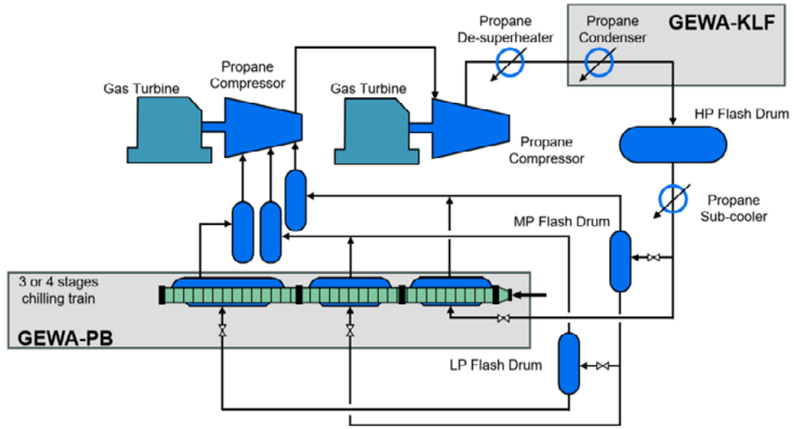
The result is a compelling combination of higher capacity, improved energy efficiency, lower carbon footprint, and optimized project economics.



Driving LNG Performance with Enhanced Heat Transfer Technologies

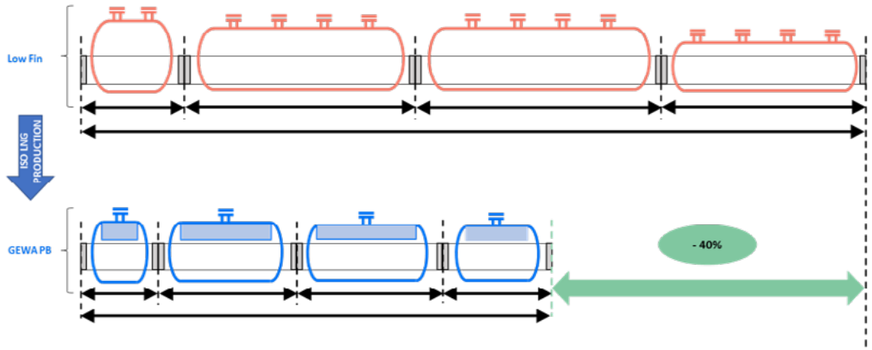
GEWA-PB®
Propane reboilers (Feed Gas & Mixed Refrigerant)

GEWA-KLF®
Propane condenser



Efficiency Beyond Conventional Limits

GEWA-PB technology combined with the Smart Enhanced Chiller pushes the limits of propane precooling performance. Higher efficiency, reduced equipment footprint and enhanced LNG plant economics.



-35%
Kettle Diameter

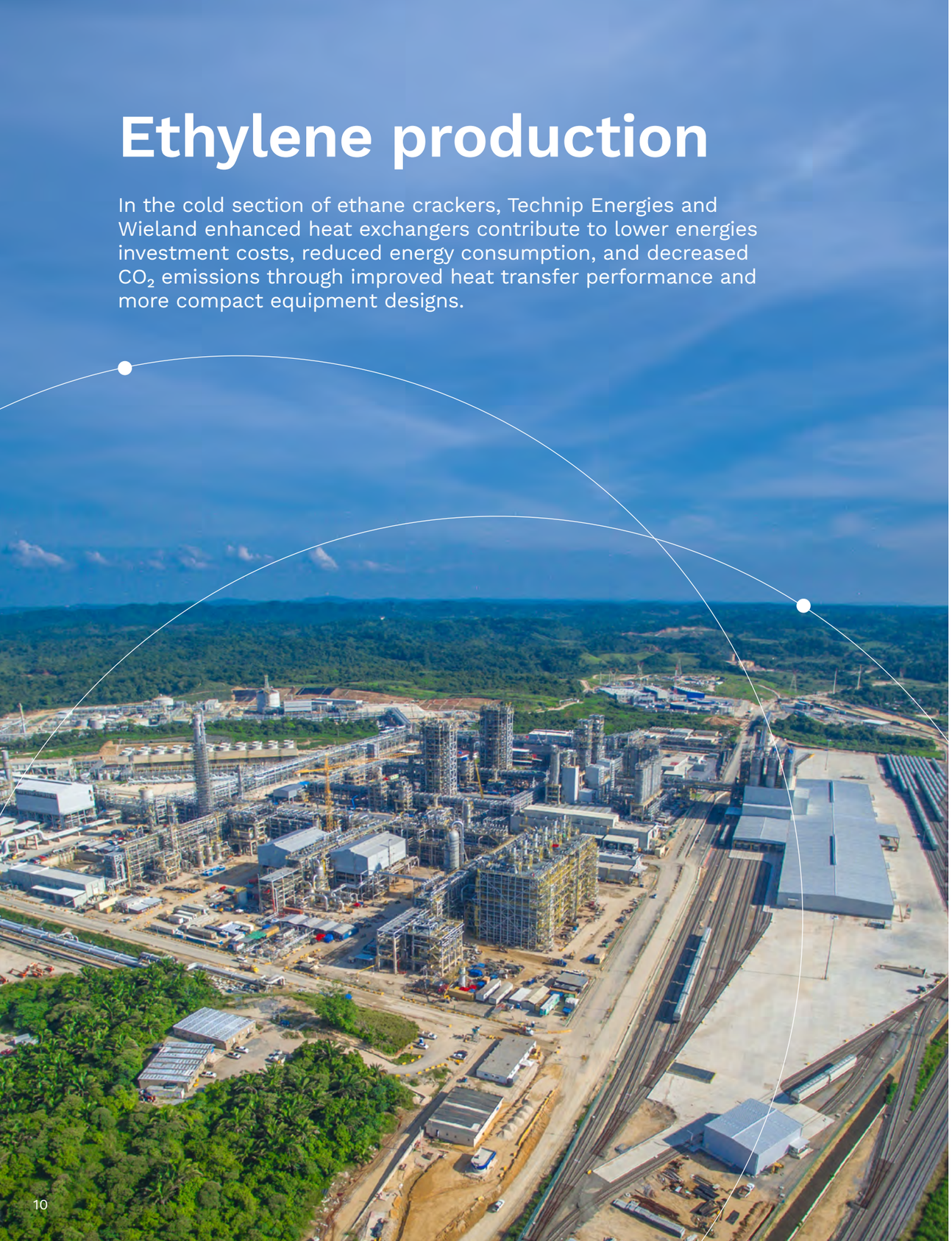
-40%
Total train length

-45%
CAPEX

-4%
Energy consumption

Ethylene production

In the cold section of ethane crackers, Technip Energies and Wieland enhanced heat exchangers contribute to lower energies investment costs, reduced energy consumption, and decreased CO_2 emissions through improved heat transfer performance and more compact equipment designs.



Boiling and condensing applications

GEWA-PB®

- Deethanizer Condenser
- C_2 Splitter Condenser
- Depropanizer Condenser
- C_2 Splitter Reboiler
- C_3 Splitter Reboiler
- Ethane Vaporizer
- Ethylene Refrigerant Condenser

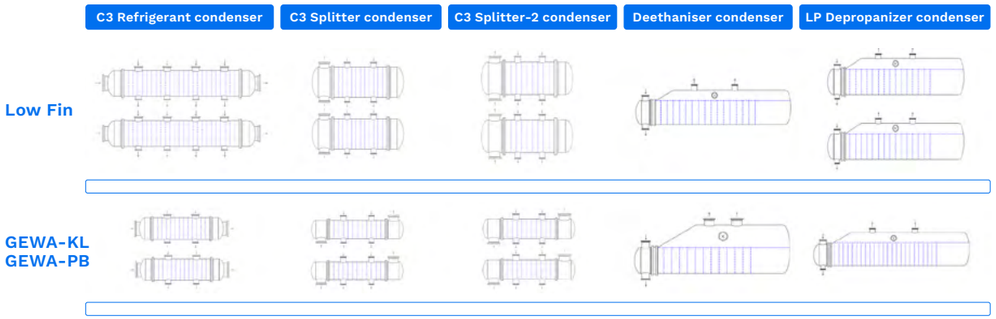
GEWA-KLF®

- C3 Splitter Condenser
- Propylene/Propane Condenser

By enhancing thermal efficiency in key boiling and condensation services, GEWA-PB® and GEWA-KLF® tubes enable more compact exchangers, lower utility consumption, reduced CO_2 emissions, and improved overall plant economics.

Cost Savings

Compared with conventional plain and low-finned tube solutions, Technip Energies-Wieland enhanced tubes deliver significant savings in terms of equipment size, weight, and CO_2 emissions.

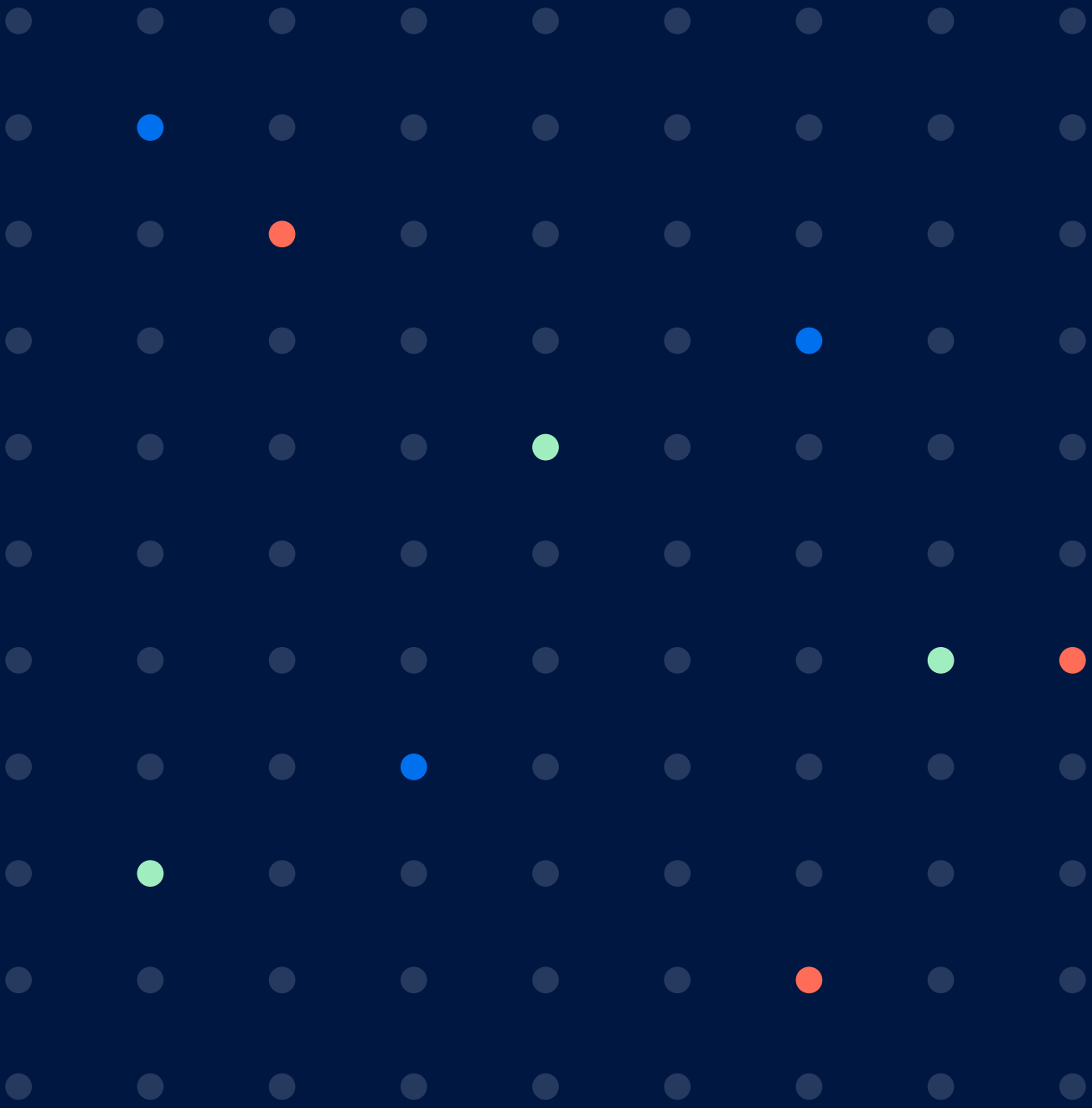


-65%
Surface area

-60%
Weight

-40%
CAPEX

-50%
CO_2 emission



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