

HONEYWELL

LNG

From the first concept to full operation,
Honeywell is there with you



Honeywell

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OUR VIEWPOINT

LNG is the transitional fuel the world needs now

The world is moving toward renewable energy sources, but it's not there yet. Those new sources can't fulfill current or short-term future demand, but the use of fossil fuels is under pressure.

LNG is often seen as a "bridge" fuel in energy transition efforts; an alternative with lower carbon emissions compared to other fossil fuels such as coal and oil.

Because of LNG's lower greenhouse gas emissions and geopolitical forces disrupting pipeline operations, the global demand for LNG continues to grow.

To economically meet the demand, it's essential that companies adopt comprehensive solutions that address the value chain's many processes. Honeywell's solutions for critical parts of the LNG value chain provide the flexibility that allows companies to adapt their business models. We can help your growing needs, ranging from capital and operating expenditures while digitally transforming operations for better control and monitoring.

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BRIAN GLOVER

President and CEO
Honeywell UOP





LNG BY THE NUMBERS

Strong global demand continues as markets evolve

The global LNG market is expected to grow by 90% to 700 million metric tons/year (mmt) in 2040¹. Much of the consumption increase is being driven by political forces and energy instability in Europe, where LNG inventories are projected to increase from 38% of capacity to more than 90% by November 2023².

To support that growth, infrastructure is coming online; as of April 2022, 136.2 MTPA of liquefaction capacity was under construction or approved for development³. Spending on that new infrastructure is projected to increase globally by 50% to \$42 billion by 2024⁴.

The increased LNG capacity comes largely from the United States, Qatar, and Australia. Production capacity will triple to an estimated 29 billion cubic feet per day by 2030⁵, and U.S. projects are expected to account for more than 70% of all new production capacity between now and 2030⁶.

What would the financials look like for your business? [Read more](#) on relative capital and operating expenditure estimations among different Honeywell UOP technologies and the significant impacts they have on the efficiency of the liquefaction process.

Sources:
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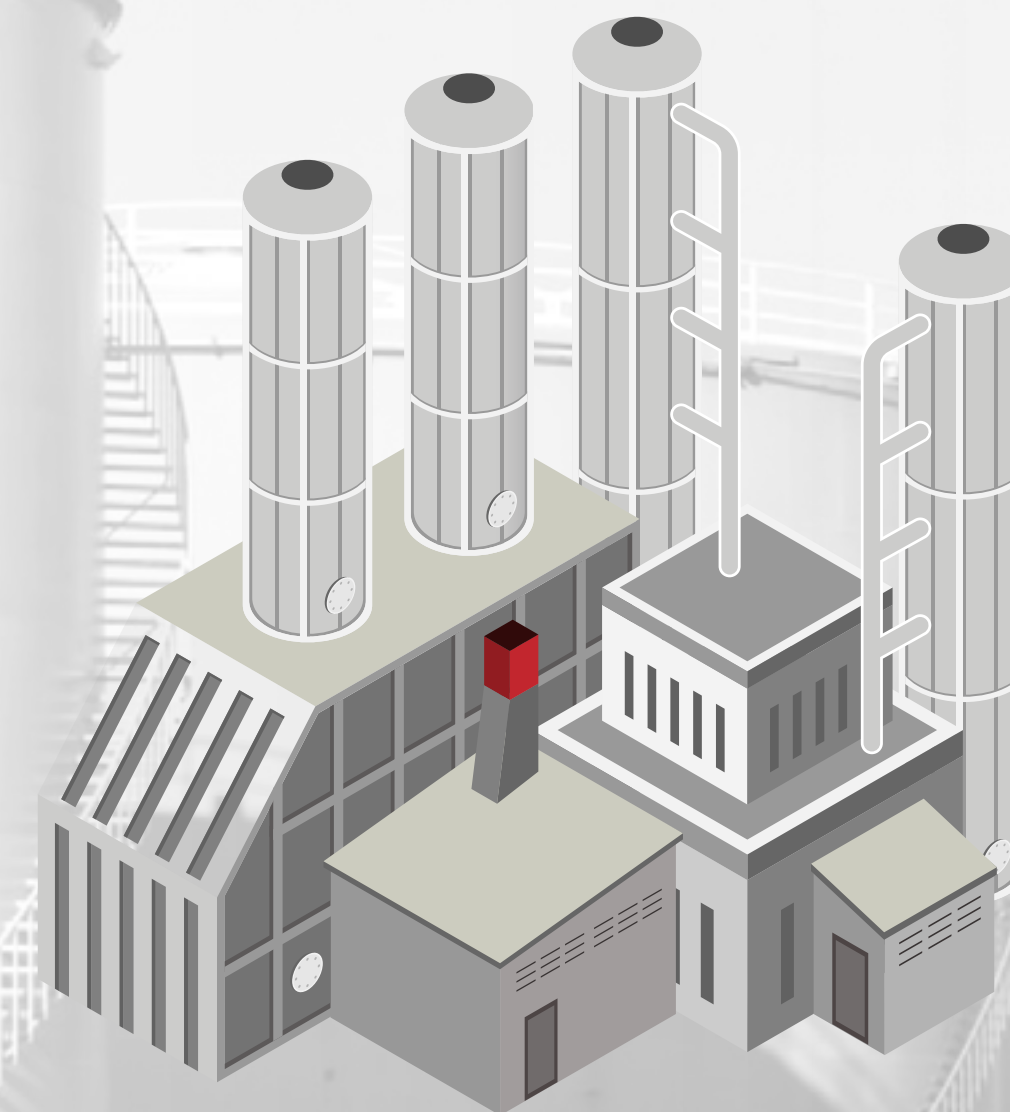
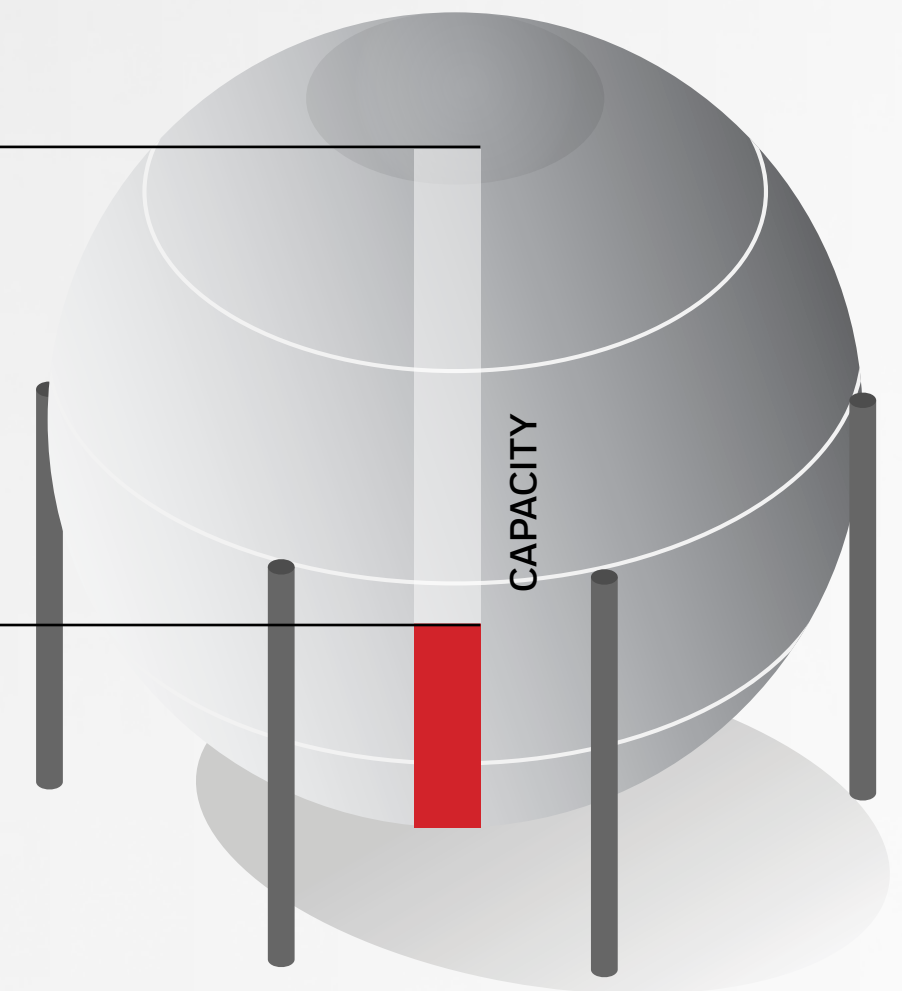
EUROPE

90+%*

November 2023

38%

Currently



INFRASTRUCTURE

\$42B
2024

50%

2023

GLOBAL



SUCCESSFUL PROJECT DESIGN AND EXECUTION

The new reality of LNG requires innovative approaches from the start

The need to take advantage of short-term opportunities while keeping an eye on long-term business impact means producers need to design with flexibility in mind. Honeywell LEAP™ solutions allow producers to take a custom holistic approach that unifies design and execution for both today and tomorrow's needs.

Working with a global LNG design and execution partner brings together world-class process and technology for faster builds with less money. The proprietary LEAP project execution model revolutionizes lean automation project execution with innovative universal input/output, virtualization, and cloud engineering. The result: LEAP can potentially shave millions of dollars from the cost of a large capital project while, shorting schedules.

When the right systems can work together at full throttle, producers can get maximized production with maximum output and maximum efficiency.

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Honeywell LEAP provides up to an estimated

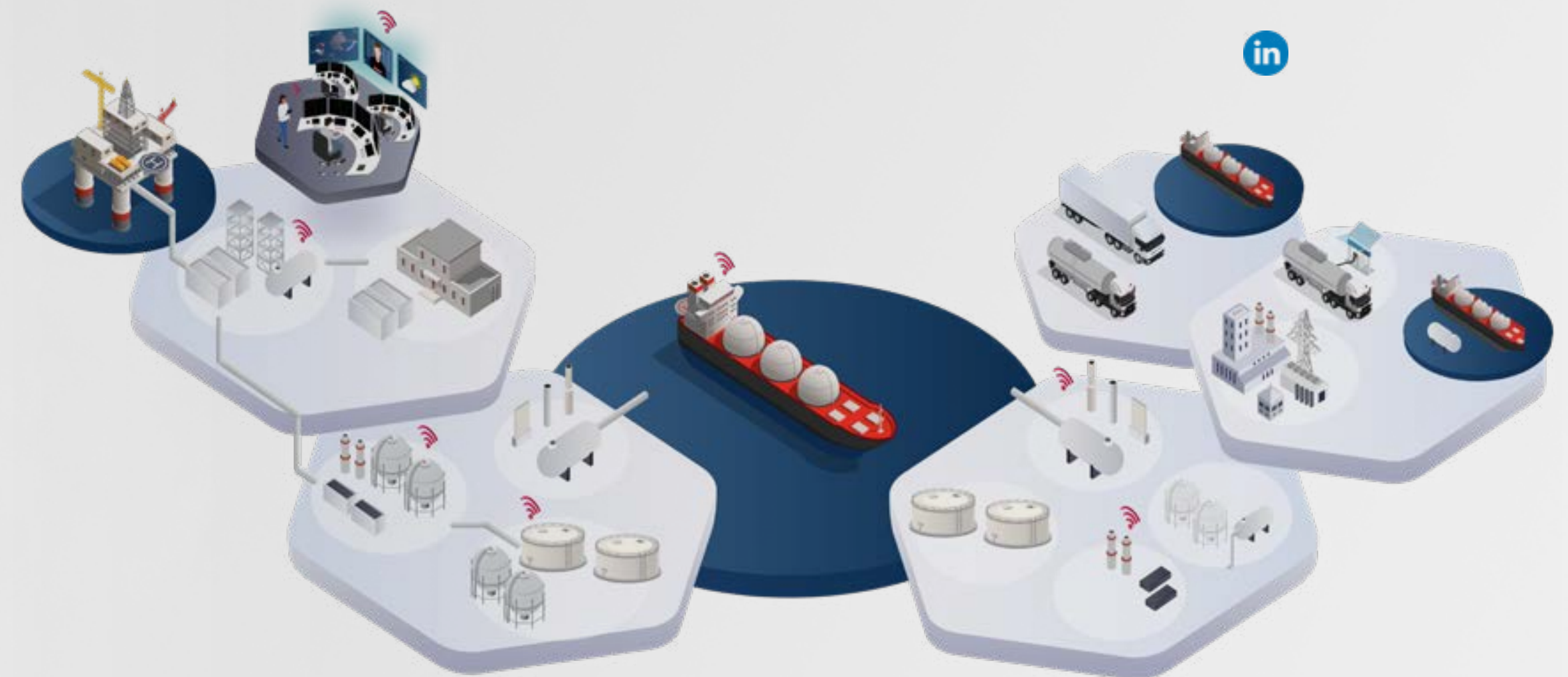
30%
CAPEX savings

25%
Schedule flexibility



JOHN COLPO
Global Marketing Manager at Honeywell

Responsible for strategy and marketing in Oil and Gas at Honeywell Process Solutions.





PRETREATMENT AND LIQUEFACTION

Innovation throughout the LNG train

Pre-treatment is more important than ever, and getting it right is critical to downstream success. In today's environment, every day is Showtime; producer success depends on meeting gas specifications while maintaining steady operations.

There's no room for error. The liquefaction of natural gas is an effective way to monetize the world's fastest growing fossil fuel, and there is a fundamental rewiring of LNG transportation around the planet.

New kinds of fields require not only wide-ranging new technologies, but deep operational knowledge. Solution providers must have a depth of technology and experience so their customers can succeed.

Honeywell UOP offers the industry's most complete portfolio of LNG solutions, designed to ensure on-spec treated gas and reliable production of cryogenic liquids. Our broad range of leading LNG pretreatment solutions remove impurities including mercury, acid gas, water, and heavy hydrocarbons.

The most reliable, efficient and cost-effective technology to remove impurities and cool the gas translates directly to greater throughput, reduced utility consumption and maximum uptime.

Honeywell UOP has pretreated about

40%

of the world's LNG



BHARGAV SHARMA

Global Senior Business Leader at Honeywell UOP



See how one customer is using Honeywell technology.

LEARN MORE



PRETREATMENT AND LIQUEFACTION

Modularized pretreatment is the optimal solution

The race is on to be the next big supplier of LNG, especially to fuel-starved Europe. To rapidly meet the urgent demand for capacity, Honeywell UOP believes that modular construction is the winning strategy.

The benefits include:



Predictable, repeatable designs



Shortened schedules



Lower budgets



Faster start-up and ROI realization



Simplified maintenance and training



Reduced safety incidents during construction



Lessened exposure to risks related to natural disasters

Liquefaction usually takes 1 to 2 years after a project is commissioned. Honeywell's modularization, combined with other Honeywell systems and services, can cut many months off that schedule.

We have 20% of the liquefaction market share and 30% share of shipping. Our adsorbents dehydrate about 70% of the world's natural gas used in LNG production. And we've delivered more than 1,600 fully engineered and pre-fabricated modular process units to customers around the world. Our expertise and project execution can help you manage and monetize your resources more effectively and get to market faster.

Because today, more than ever, speed to market matters.

[LEARN MORE](#)



DIGITAL INNOVATION

Using our past to invent the future of LNG

The fast-changing world of LNG demands innovations that positions producers for a different kind of future: a digital future.

Honeywell is a leader in digital innovation across the entire LNG value chain and has one of the most comprehensive digital solutions for the LNG industry’s autonomous and remote operations, predictive maintenance, training simulators, advanced process control and more.

We help get the most out your assets and resources, giving customers the potential to increase LNG production and deliver additional cargoes with no facility expansions.

Our suite of digital tools for liquefaction, shipping and regasification help producers run their operations safer and faster, helping them drive more value to the bottom line.

As the leading developer for LNG simulation and optimization software – with an estimated 30% of the market – our innovation helps assure that every day is your best day of the year.

5%
Energy cost reduction

An estimated
10%
Plant start up time

1-2%
LNG production increase

5-10%
Opex savings



VINEET LISRADO
Global Technical Lead—
Oil and Gas industry
at Honeywell



DIGITAL INNOVATION THAT CREATES VALUE:

Throughput increase, improved startup and transient operations, asset reliability, energy cost reduction, enterprise visibility, managing market disruption

LEARN MORE



DIGITAL INNOVATION

Innovation in action: Year 1 ramp-up

Speed is always important to meet quickly emerging market opportunities, but the quality of a fast ramp-up is critical. A house built on a shaky foundation won't last long.

New market realities demand new technologies and innovations. We bring together our digital innovation to deliver an integrated MAC (I-MAC) approach in oil and gas capital projects.

That holistic approach brings together several islands of solutions: client requirements, project management consultants, engineering, procurement and construction firms, automation vendors, and IT solution providers.

We have 28 engineering centers supporting I-MAC, delivering projects executed on time and on budget. We partner with more than 2,700 certified project managers, engineers and designers around the world, with more than 8 million hours of engineering and support delivered every year – all focused on your continuing success.

28

Engineering centers

>8M

hours/year in engineering and support

Our holistic approach helps respond to quickly emerging market opportunities.







LEARN MORE



FULL LIFECYCLE SUPPORT

Ensuring that producers are ready on Day 1 – and every day after that

Building a new facility is just the start. Optimizing it over its entire lifecycle is critical to success. The Honeywell Performance Package, including our dedicated Performance Hub, delivers results over the asset’s entire life. We focus on:

-  End-to-end optimization
-  Safety and operational excellence
-  Asset reliability
-  Productivity
-  Analytics and insights
-  Sustainability

The results: up to 10% faster startup, LNG throughput with an estimated improvement of 2 to 5% and OPEX reduction of up to 10%. Cutting unplanned downtime by 5 to 8% at a 10 MPTA plant means an increase of just under 1 cargo/year.

We help you perform better, stay nimble in a fast-moving environment, and mitigate risk.



When I think of Honeywell I think of solutions that improve both efficiency and reliability. Honeywell emerged as our preferred vendor of choice because of its direct LNG experience and expertise in that field. Honeywell’s suite of products helped Atlantic LNG both stabilize operations and enhance our production.

DAWN BEEKEE

Instrument and Controls Engineer, Atlantic LNG

LEARN MORE



TAKEAWAYS: ONE HONEYWELL LNG

Delivering value in the new world of LNG

In a time of unprecedented volatility and opportunity, Honeywell provides producers leadership and proven results across the entire integrated gas-to-LNG value chain.

Whether it's a project to bring gas from the wellhead or platform or a project at the tail end of processing and liquefaction, One Honeywell LNG can serve you. From controls to process technology to digital transformation, we are there to help drive your success through the entire lifecycle.

Our digital innovation ensures that you're ready on Day 1. From the earliest concept through remote operations to our global performance hub, we ensure that your projects are safe and reliable while meeting business and operational goals.

Our goal is your success through the entire project lifecycle.

LEARN MORE



HEMANT PANDIT

Senior Director, Digital Solutions at Honeywell UOP



Our approach is value driven and focuses on maximizing EBIDTA