

PARTNERED CONTENT

Leveraging Innovations in Compression to Support Low-Carbon LNG Facilities

An interview with **Dr. Marcus Bruecher**, SVP Compression, Siemens Energy



As a leading provider of equipment for LNG plants, how is Siemens Energy currently supporting the industry's efforts to decarbonise?

Bruecher: Siemens Energy brings unique value to LNG customers with our portfolio that covers most of the critical equipment required for an LNG plant. That

breadth lets us deliver integrated solutions to boost production while minimising CO₂ emissions—from power generation and electrical distribution to the full suite of gas compression trains.

We bring deep experience across all the LNG compression applications. Our installed base of main refrigerant (MR) compression trains continues to grow across multiple liquefaction processes. We are also the global leader in boil-off gas (BOG) compression, with more than 240 single-shaft centrifugal units in operation, most of them equipped with our advanced movable inlet guide vanes (mlGV) for precise and efficient capacity control.

Beyond MR service, we supply high-efficiency booster compressors, as well as end-flash gas, residue gas, methane recycle, regeneration gas and nitrogen compressors for nitrogen rejection units (NRUs), all tailored to each facility's specific process needs. By optimising both individual compressor performance and the interactions among multiple compression services, we help operators lower emissions, enhance reliability and maintain the flexibility required to meet increasingly demanding LNG production targets.

What recent projects have Siemens Energy been involved with where these technologies were implemented?

Bruecher: One example is the Woodfibre LNG project in Canada, the world's first net-zero LNG export facility at 0.04 tons of CO₂e per ton of LNG produced.¹ Siemens Energy is supplying a large portion of the liquefaction island's rotating and electrical equipment—MR compression, cryogenic BOG and feed gas booster trains, along with synchronous motors, VFDs, converter transformers, harmonic filters, switchgear and e-houses. We also worked closely with the customer and the utility during FEED, supporting electrical grid studies for optimising the solution and ensuring operational reliability.

Another is ADNOC's Ruwais LNG project in Abu Dhabi,

a low-carbon development powered by clean energy.² We are providing cryogenic BOG compressors and NRU compressors. The BOG trains feature our advanced mlGVs, which optimises the flow angle for controlling the flow entering the compressor. The train configuration enables high-efficiency performance across varying loads and pressures, and flexible ship-loading and holding operations without recycling flow or requiring additional quenching.

How have BOG compression requirements evolved as the industry becomes increasingly electrified?

Bruecher: As LNG plants electrify, BOG compression must handle higher pressures to enable re-liquefaction in the main cryogenic heat exchanger, as gas turbines no longer consume BOG as fuel. This improves emissions performance and maximises BOG recovery.

BOG generation rates vary significantly between holding and ship-loading operating modes, therefore robust control strategies and the right compressor configurations to manage these variations without compromising reliability or efficiency are necessary. Flexibility is key, requiring designs with wide turndown and stable low-flow operation. Effective designs, such as what we offer, addresses compressor stability at low-flow conditions and ensure that the full range of operating points fits within the compressor map to avoid recycling and expensive LNG injection (or quenching).

What challenges do you see in the coming years as operators move to reduce emissions and improve sustainability?

Bruecher: The industry is making tremendous progress in lowering LNG's carbon intensity by shifting toward e-LNG and reducing emissions from gas-turbine-driven plants. Both types of facilities present unique opportunities and challenges for decarbonisation.

In FLNG, where MR compression is typically gas turbine-driven, having a technology like the SGT-750 gas turbine with high efficiency and single digit NO_x even at part loads is key to minimising emissions—one reason Delfin recently selected Siemens Energy for their FLNG program in Louisiana.

Moving forward, compressors and their drivers will remain central to efficiency gains and energy optimisation. Siemens Energy is well-positioned to support our LNG customers, and we are excited to see what the future holds. •

¹ Source: <https://woodfibrelng.ca/>

² Source: <https://www.adnoc.ae/en/our-projects/ruwais-lng>