# The evolution of turbocharging technology at MAN Energy Solutions



The ongoing evolution of turbocharging technology is manifesting notably through the innovations led by MAN Energy Solutions (MAN ES) and its PBST brand, which focuses on the development of advanced turbochargers. As businesses navigate the complexities of stricter emissions regulations and a growing commitment to sustainability, MAN ES is positioning itself at the forefront of this transformation.

Alexandre Ménage, the head of R&D turbochargers at MAN ES, highlighted the company's strategic emphasis on continuous improvement and operational experience, stating, “Our turbochargers are continuously developed further and improved over decades of experience not only based on simulation, design or testing but also taking the operational experience in the field as major input for optimisation into account.” This reflects a commitment to delivering high-performance, reliable turbocharging solutions tailored for a variety of fuel types, including marine diesel oil and natural gas, while reducing emissions.

Central to the PBST strategy is the introduction of the new Turbocharger Performance Center. This facility is described as a key part of MAN ES’s focus on developing competencies and state-of-the-art simulation tools. Ménage further articulated this vision, noting, “To achieve that we take a pioneering role in the development of competencies and know-how, simulation tools and test facilities.” The ambition is evident in the diverse turbocharger portfolio, designed specifically to cater to the varied requirements of different engine types across shipping, industrial, and energy sectors.

Reflecting on the broader evolution of turbochargers, it is clear that their role has expanded beyond merely boosting engine power. These components are now essential in meeting sustainability goals without compromising efficiency. PBST has embraced advanced materials, manufacturing techniques, and aerodynamic optimisation to ensure their turbochargers deliver exceptional performance and adhere to stringent environmental standards.

One notable innovation in the PBST lineup is the TCP series, a high-pressure turbocharger designed for medium- and high-speed engines. Capable of reaching compressor pressure ratios of up to 6.6, this series addresses the specific needs presented by future fuels such as ammonia and methanol. Daniel Struckmeier, head of sales and licensing for turbocharger and exhaust aftertreatment, remarked, “Turbochargers are our passion... With our new TCP/TCF series we are pushing the limits of turbocharging as we know it.”

Digitalisation and artificial intelligence (AI) play a pivotal role in this technological transformation. The PBST brand has developed the PrimeServ Assist platform, which optimises engine performance through real-time data analytics. This innovation allows turbochargers to monitor themselves and predict maintenance requirements, significantly reducing downtime, especially in industries reliant on efficient operational timelines such as shipping.

The company plans to further this transition by exploring fully autonomous turbomachinery systems. Since 2021, MAN ES has initiated steps towards near-autonomous operations, with a wider aim for complete autonomy by 2028. By integrating AI and smart sensor technology, PBST turbochargers are evolving to function as self-optimising systems, thus revolutionising the turbocharging industry.

As industries progressively adapt to sustainable practices, MAN ES is at the forefront of this transition, aligning its product offerings with the International Maritime Organization’s (IMO) decarbonisation goals, which target a 50% reduction in greenhouse gas emissions from shipping by 2050. The development of dual-fuel and hybrid-engine compatible turbochargers further complements this commitment, providing pathways for operators to meet current emissions standards and future-proof their operations.

Real-world applications underscore the effectiveness of PBST turbochargers across various sectors. In maritime contexts, these turbochargers fuel a range of vessels, from cargo ships to luxury yachts, enabling compliance with strict emissions regulations without sacrificing performance. Similarly, in the energy sector, the TCP series has shown effectiveness in hybrid power systems, facilitating the integration of renewable energy sources alongside traditional fuels.

As the shift toward greener technologies gains momentum, MAN ES and its PBST turbocharger solutions appear poised to play a crucial role in helping industries navigate the challenges and opportunities presented by a changing energy landscape.

Source: [Noah Wire Services](https://www.noahwire.com)

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