+Efficiente: Save Fuel, Perform More.

Construction has a huge impact on the environment: according to the Global Status Report for Buildings and Construction 2024-2025 - a publication by the United Nations Environment Programme (UNEP) - the construction industry causes 34% of carbon dioxide emissions and consumes over 32% of global energy demand. No wonder that contractors are under intense pressure to squeeze every kilowatt out of their machinery. Surveys show that two-thirds of equipment buyers now score bids on lifecycle emissions, while 70 % of European projects set formal sustainability targets. On the other hand, fuel is money. So, every litre saved improves both the contractor's margin and the carbon ledger.

In short, energy efficiency is no longer a nice-to-have—it is central to winning work, reducing operating costs and meeting net-zero mandates.

But while alternative fuels and electrification get the headlines, the biggest **immediate** impact across the fleet is coming from refinements in **diesel-hydraulic efficiency**.

So how can we get **more work done per litre of diesel**, while reducing emissions **within the framework of conventional diesel powertrains**?

While major diesel engine suppliers have achieved better efficiency over the past years through a range of technological upgrades, it is the hydraulics where most efficiency gains are now being mined. The introduction of electronics, which has enabled more precise control, greater automation, and optimized resource management offers great margins for improvement in terms of efficiency.

Conventional hydraulic systems often lose **20–30%** of engine energy due to multiple factors:

- **Pumping losses** (hydraulic losses, mechanical losses, and leakage losses),
- **Valve throttling losses** (using pressure drops to control flow),
- **Engine over-revving** (delivering more power than needed at a given moment),
- **Lack of integrated control** between engine and pump.

To address these inefficiencies, **Comacchio** developed the **HPE (High Power Efficiency)** concept back in 2019. Introduced with the launch of the CH 300 piling rig, the system allows to electronically control the **exact setpoint values for pressure and flow** delivered by the pump. The pump therefore provides the exact amount of oil needed, **adapting in real time to the demand**. The concept has evolved over the years to incorporate state-of-the art electronic components and dedicated software solutions, ensuring that these parameters are manged with the highest level of accuracy. Today, with the launch of the **"+Efficiente"** concept, **Comacchio** brings the diesel-hydraulic efficiency of its rigs to the next level.

Precise electronic control allows to avoid hydraulic power waste. **Comacchio** has integrated this advanced control system with a suite of **flow-optimizing solutions**, thereby improving overall fluid transfer efficiency and performance. The immediate result is lower fuel consumption, which can be **reduced by an average of 15%** depending on the type of machine and application.

Fuel consumption is therefore reduced not just from using less fuel, but from **more efficient energy transfer** to the work tool (rotary head), while consistently matching engine and hydraulic power to drilling conditions.

"When we talk about energy efficiency, we're not just talking about saving fuel — we're talking about getting more out of every drop" – the Comacchio engineering team explained "By reducing hydraulic and engine losses, the same machine can deliver faster cycles, better responsiveness under load, and more power to the tool. It's not just about being greener. It's about being better— meaning 'efficiency' translates directly into productivity."

Moreover, via the CAN bus interface, setpoint values and parameters can be adjusted individually to make the **functions more responsive and precise**, adapting the machine to the specific needs of the operators.

Last but not least: more efficient hydraulics means fewer hoses and connections, thanks to smarter routing and electrohydraulic control. The simplified architecture, combined with user-friendly diagnostics and improved modularity ensure that the **hydraulic system is easier to access and maintain**. Moreover, high-efficiency hydraulics generates less heat, resulting in less stress on oil and hydraulic components and therefore **longer component life**. This can extend hydraulic oil and filter service intervals, reduce component failures, and cut downtime.

*As a senior systems engineer on the project put it, "The **"+Efficiente"** system brings diesel-hydraulic efficiency to its full potential — so every drop of fuel goes toward productive work, not waste. Over a rig's lifecycle (especially in demanding applications like large-diameter drilling), this can translate into thousands of euros in savings per year, depending on fuel prices and usage intensity."*