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iRecovery® and Heat Leap: Strategic Solutions for Efficiency and Low-Carbon Steel Production

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Electrical steelmaking is at the forefront of sustainable innovation, delivering major gains in energy and resource efficiency. Yet, even today, up to 30% of the energy input in EAF steel production escapes through off-gas emissions—representing lost value and increased environmental impact. Tenova's iRecovery® system transforms this challenge into an opportunity. By capturing the thermal energy in EAF waste gas, iRecovery® converts it into steam through an advanced evaporative cooling process. This steam can be reintegrated into the steelmaking cycle for internal use (e.g., vacuum degassing) or used to generate clean electrical power or for district heating.

Decarbonization with large EAFs requires a rapid reduction of off-gas temperature, which means absorbing a massive amount of energy very quickly. iRecovery® is the ideal solution because it achieves this goal without introducing moisture—avoiding an increase in gas volume and filter size—while simultaneously generating clean energy in the form of steam and electricity. It is the smartest way to manage primary energy in large-scale EAF operations.

But the energy recovery potential does not stop there. The concept of Heat Leap introduces an additional layer of efficiency: a high-performance heat pump that leverages the thermal power extracted from the EAF cooling circuit and combines it with the electrical input of the pump to deliver extra heat to district heating networks. This approach transforms residual energy into a valuable resource for urban infrastructure, reducing fossil fuel dependency and supporting circular energy models. By integrating Heat Leap with iRecovery®, steel plants can not only minimize energy waste but also become active contributors to sustainable city heating systems—creating a synergy between industrial processes and community energy needs.

The result: reduced energy waste, lower costs, and a greener steel production process that extends its benefits beyond the plant boundaries. iRecovery® and Heat Leap systems together represent a strategic enabler for decarbonization, efficiency, and competitiveness in modern steelmaking. This combined approach positions steel plants as key players in the global transition toward low-carbon economies, reinforcing their role in shaping a sustainable industrial future.

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