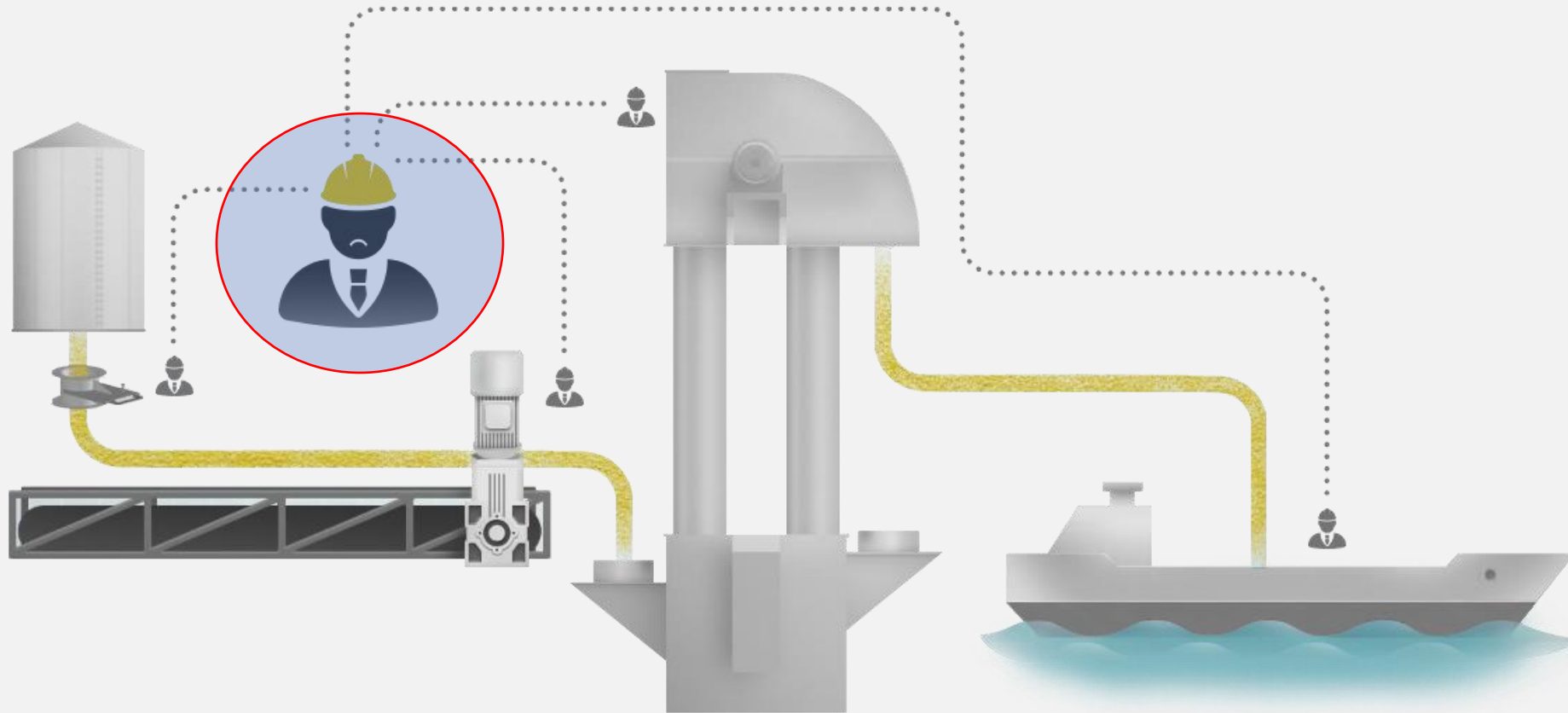


Intelligent and Efficient Solution for Grain Transshipment (SENUMAC)



Challenges in grain terminals



-  Unreliable data of graine volume
-  High electric power consumption
-  Dependence on operator's experience (manual mode)
-  Emergency shutdowns
-  Manual mixing of grain classes

SENUMAC Technology – benefits



Increases productivity up to 20%



Reduces electric power consumption up to 20%



Minimizes human factor impact



Automates mixing grain classes

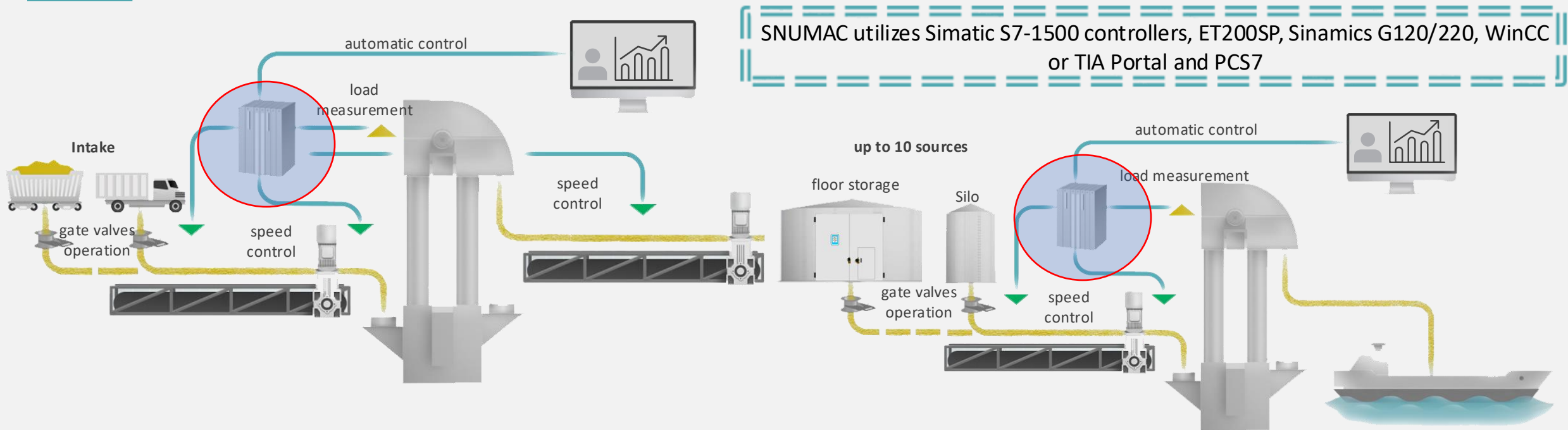


Reduces carbon emission up to 20%



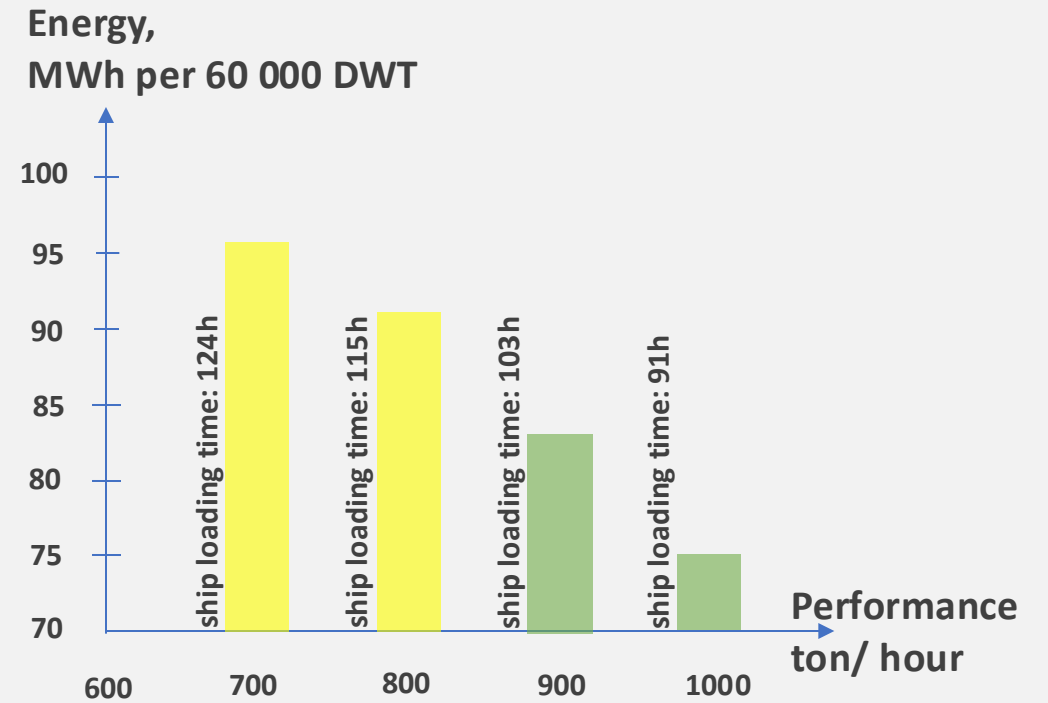
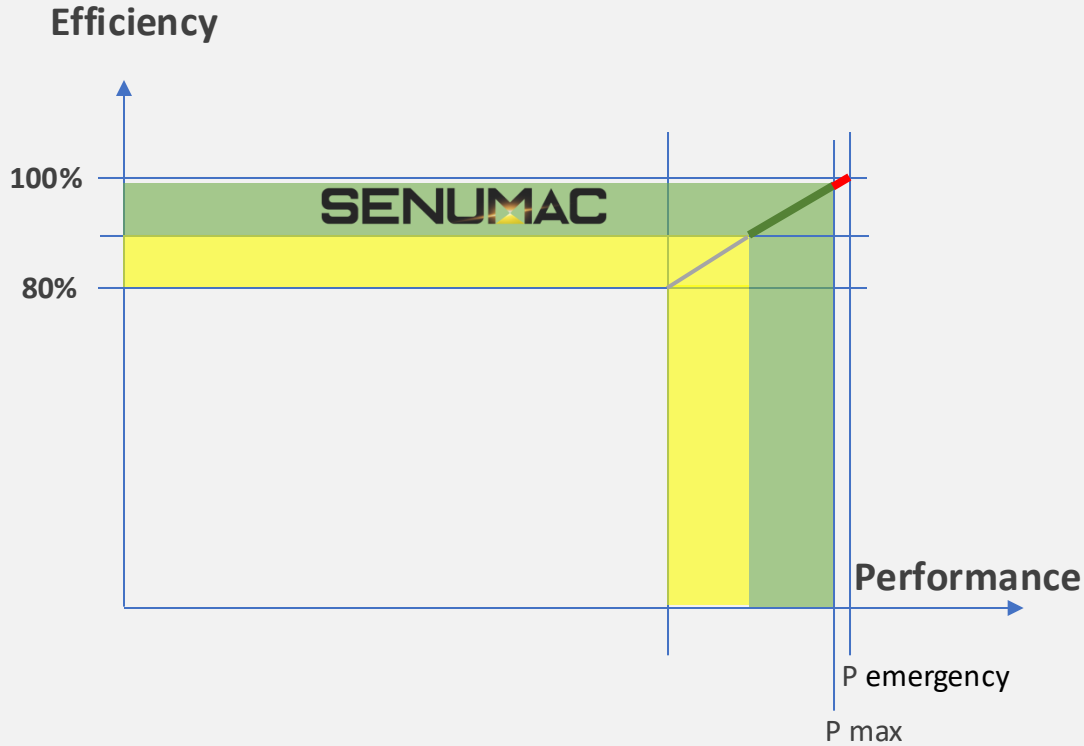
Excludes emergency shutdowns

SENUMAC Technology - Implementation



- SENUMAC allows for the **automatic control of both grain storage loading and grain transshipment to the ship.**
- SENUMAC allows the **bucket elevator to be used as a flow meter,** eliminating the need for additional instrumentations.

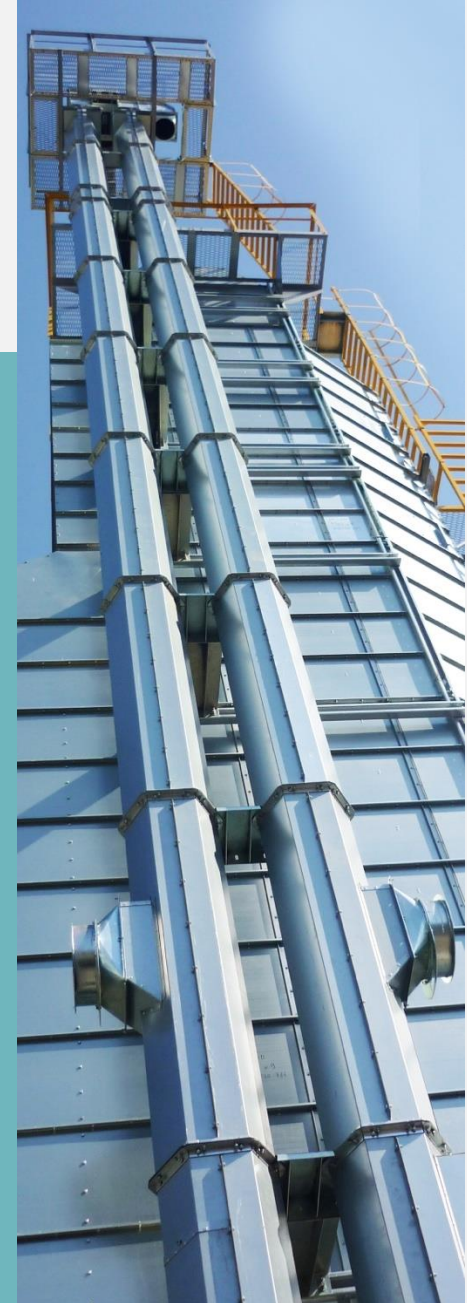
Where does the efficiency come from?



Range with tipycal DCS

Range with Senumac

Implementation results



Data BEFORE modernization	Data on Feasibility Study	Data AFTER modernization
Electric power cons.: 1,14 kWh per ton	0,97 kWh per ton	-17,5% 0,94 kWh per ton
Electric power per year: 3 863 MWh	3 298 MWh	-17,5% 3 196 MWh
Average performance: 743 ton/hour	824 ton/hour	+16,5% 865 ton/hour
	<p>Energy Saving 560 MWh per year</p> <p>Reduce carbon emission: 147 ton CO₂ per year</p> <p>PAYBACK PERIOD 3 year</p>	<p>Energy Saving 660 MWh per year</p> <p>Reduce carbon emission: 173 ton CO₂ per year</p> <p>PAYBACK PERIOD 1,8 year</p>

Experience

SENUMOL

● Implemented

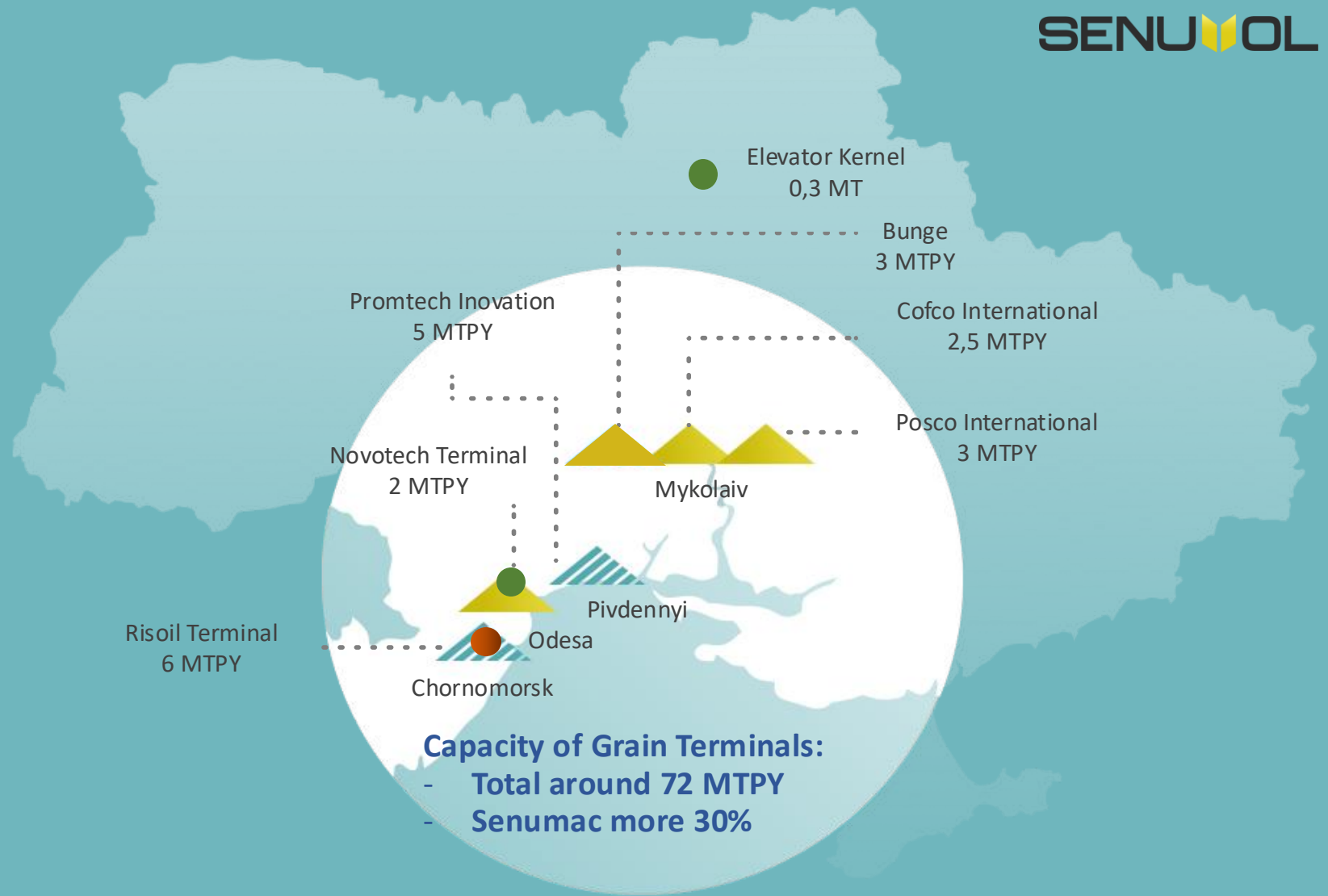
● At the stage of implementation

SENUMAC

▲ Implemented

▲ At the stage of implementation

MTPY Million tones per year



Capacity of Grain Terminals:
 - Total around 72 MTPY
 - Senumac more 30%

CONTACTS



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