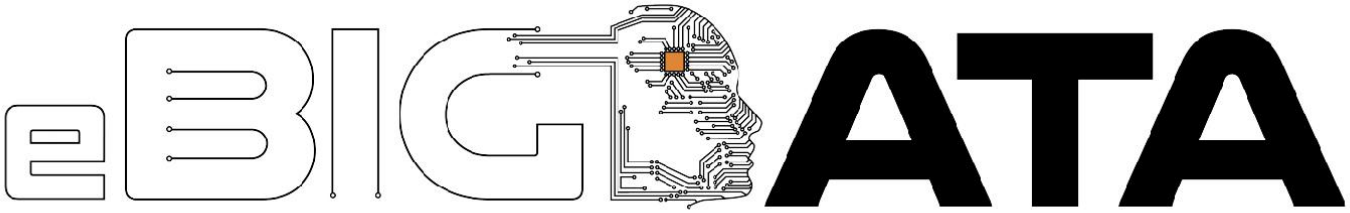


AI4MFC

Master Flow Control driven by AI

eBigData Team

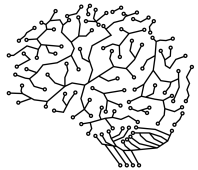
eBigData is a cutting-edge startup that specializes in integrating artificial intelligence (AI) into industrial environments to manage and optimize pump and compressor systems. This breakthrough technology is not only unique on a global scale, but also represents the culmination of **years of research, development, and real-world AI testing** within industrial settings.

Our product:

AI4MFC

Master Flow Control driven by AI

See how it works → https://ai4in4.com/



AI4MFC - what it is

Industrial AI-Controller

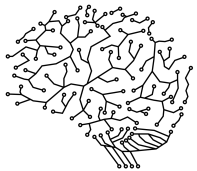
Plug and go

Software

AI4MFC is a set of algorithms and mathematical models forming an IT system that utilizes **machine learning (ML) for controlling and optimizing the energy efficiency** of industrial pump systems, compressors, industrial air conditioning, and heat pumps.

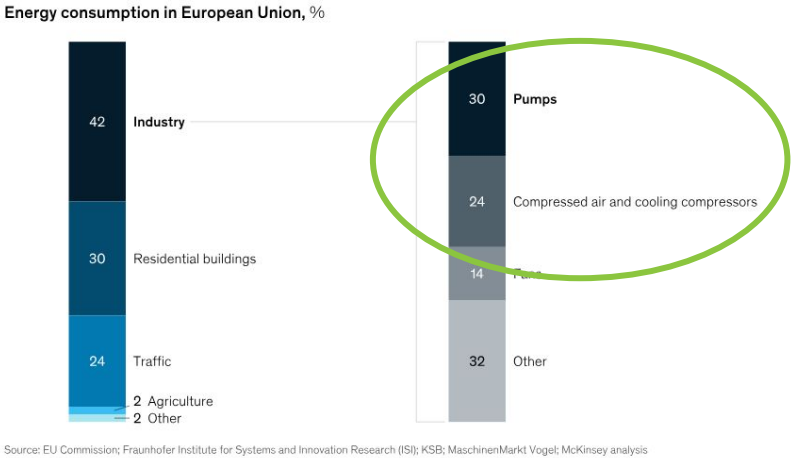
Hardware

Industrial Computing Unit



AI4MFC Software + Hardware = AI4MFC ML Tool

AI4MFC - validity of the tool



The chart above shows that AI4MFC will answer the optimization needs for **54% of the energy consumed by the EU industry**, which translates into 25% of total energy consumption in EU.
In the case of shipping, energy efficiency analyses of ships indicate that **pumps can consume about 20% (up to 50% in extreme situations) of the electricity generated by their power plants**.

AI4MFC is a new quality in industrial control, providing **energy savings of 8-15% compared to leading systems, while significantly reducing carbon emissions**. AI4MFC is part of the trends of green energy transition, decarbonization of industry and environmentally and socially friendly sustainable development.
The chart and analyses shows that the tool has great application potential and can be of **significant importance** in increasing the **energy efficiency** of industry and maritime transport and their **decarbonization**.

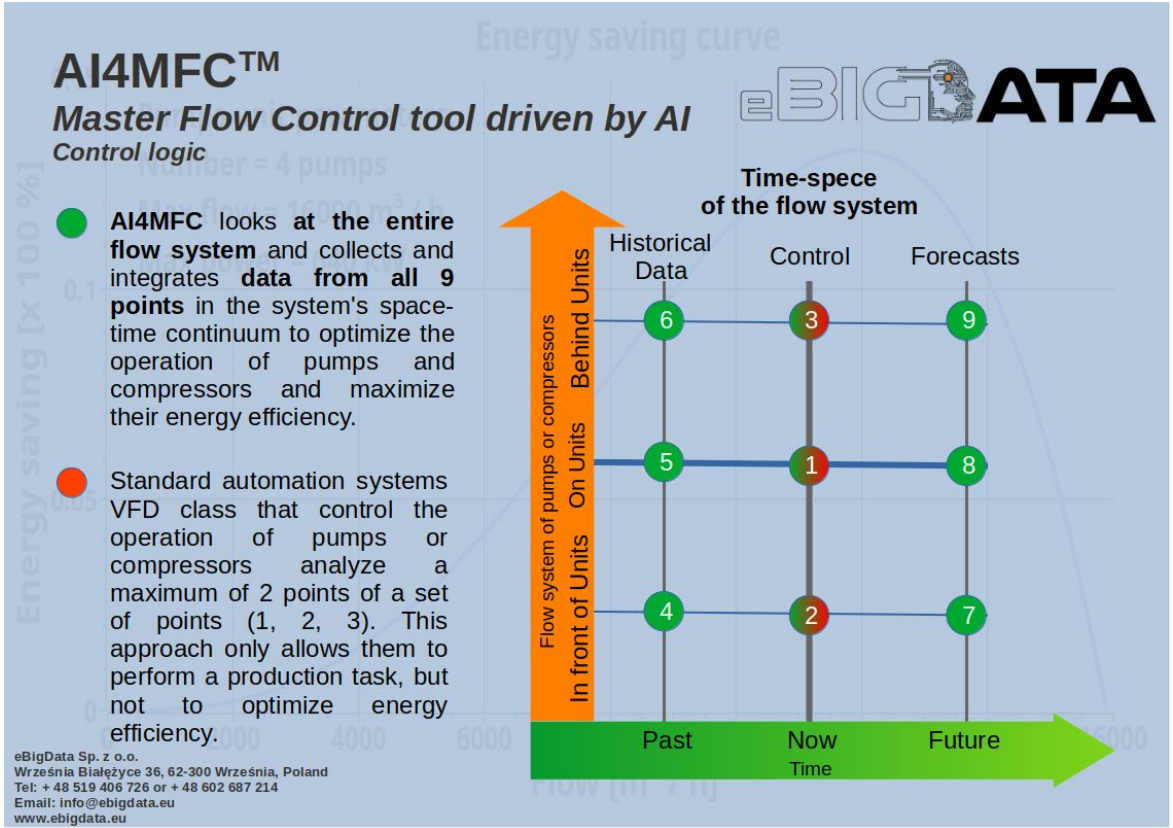
Saved energy is the cheapest energy to acquire.

AI4MFC is also part of the global trend of applications of intelligent solutions for pumps. A McKinsey report indicates that the market for such solutions will be worth about $30 billion in 2025. A similar level of value can also be estimated for the compressor market.
https://www.mckinsey.com/industries/industrials-and-electronics/our-insights/smart-fluid-hydraulics-preparing-for-the-imminent-revolution-in-the-fluid-systems-industry

AI4MFC - what features they have

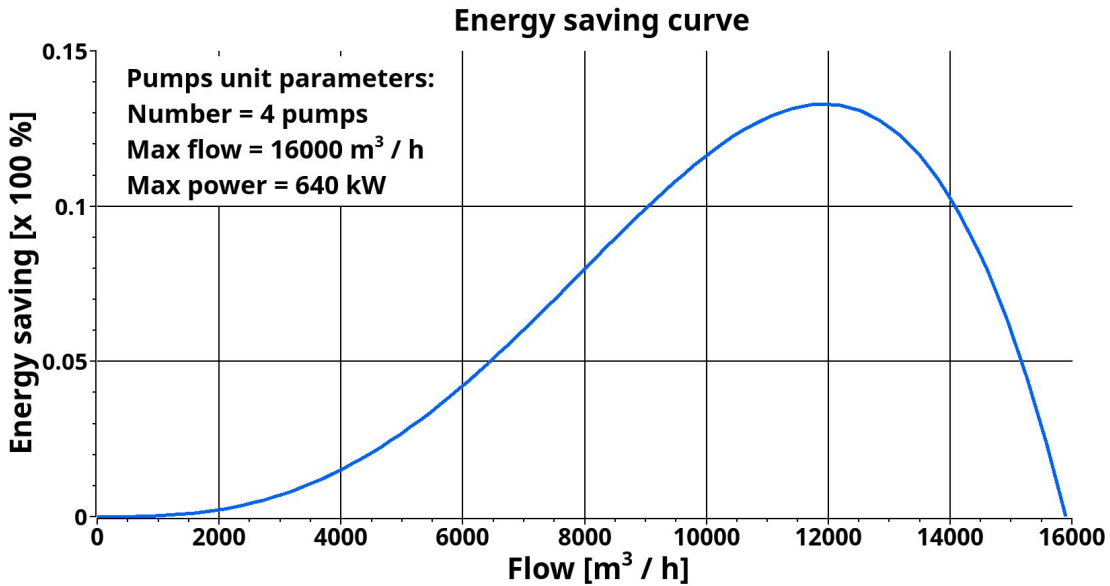
AI4MFC is an ML model that performs the task of master control. In its operation, it integrates (can integrate) data from various sensors, placed in front of, on and behind the gensets (pumps or compressors), which are recorded at different moments of time. **Historical data** (points: 4, 5, 6) is used to learn how the gensets are performing in a given installation. **Forecast data** (points: 7, 8, 9) are used to determine what production task the gensets are to perform and, supplemented by **current data** (points: 1, 2, 3), make it possible to determine the optimal operating parameters of the gensets under the given conditions in terms of energy efficiency. AI4MFC implements conditional optimization and its operation can be previewed here: www.ai4in4.com.

The ability to use data from all 9 points is an advantage of AI4MFC over standard industrial automation solutions, which typically use a maximum of two points from a set of (1, 2, 3). **AI4MFC is proactive control tool and provides an additional 10-15% energy savings compared to standard VSD/VFD-based solution.**



AI4MFC - result of operation

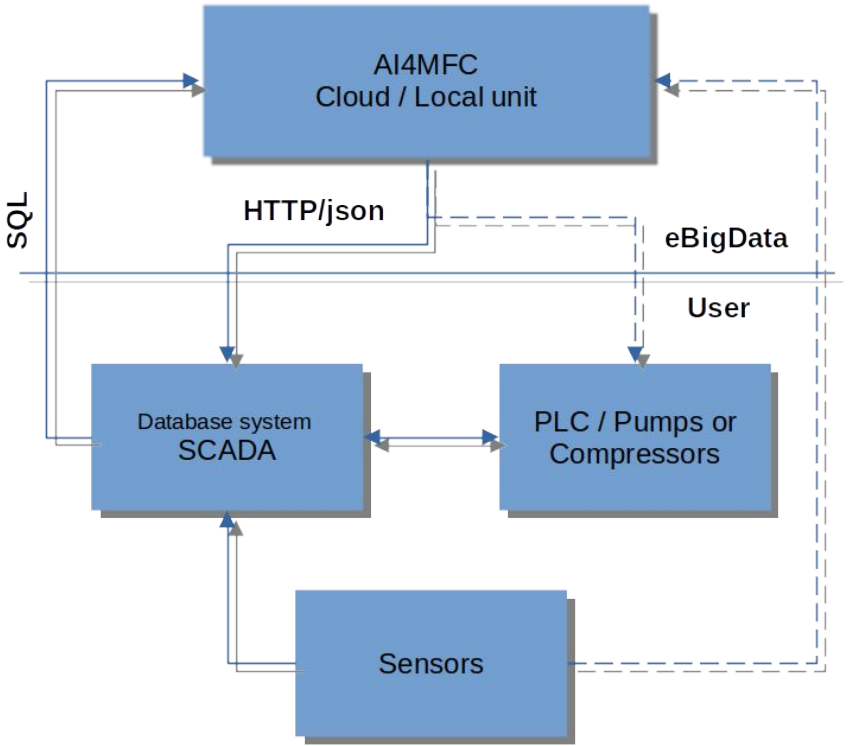
AI4MFC
result of action



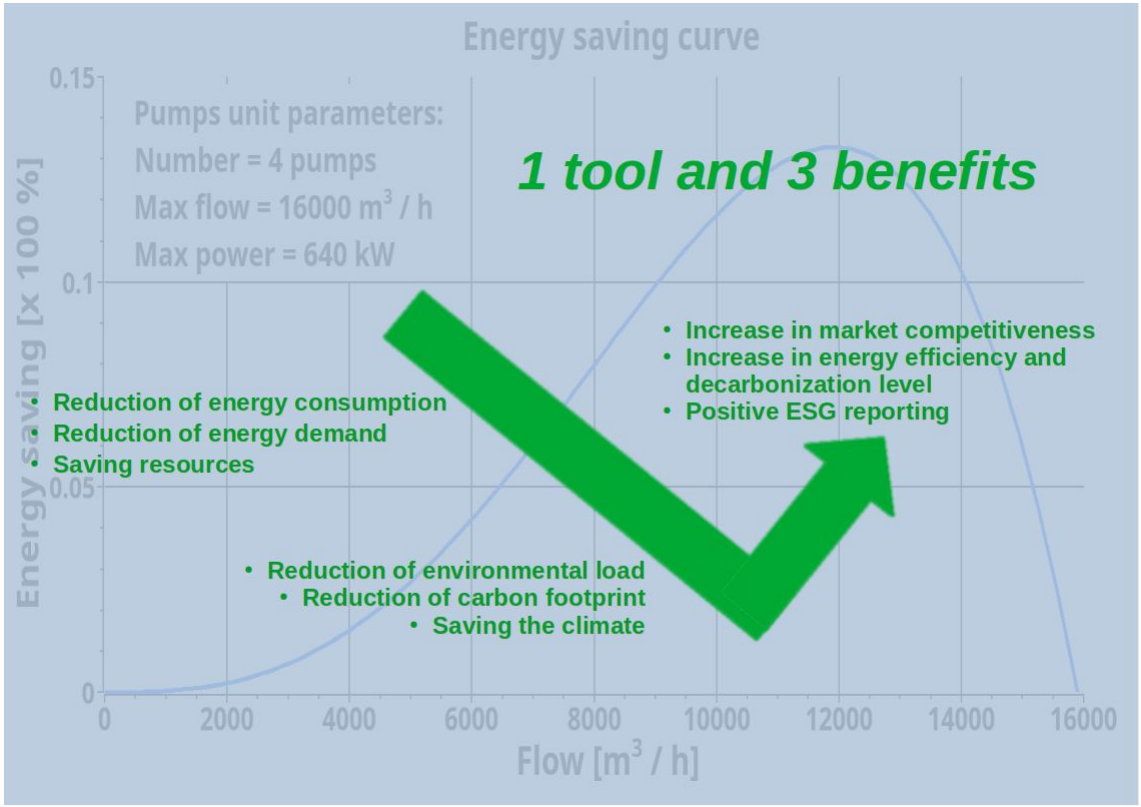
AI4MFC - example implementation scheme

AI4MFC physically comes in the form of a computing module with the necessary modules and computing libraries of the tool installed. The unit plugs into the user's local computer network to communicate with the databases necessary for its operation.

In order to maintain high performance, the tool requires regular servicing in the form of analyzing its performance and retraining it.

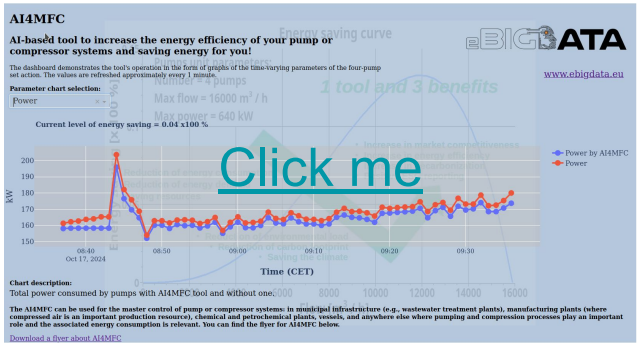


AI4MFC - mains benefits for users



The main benefits of the AI4MFC tool:

1. **reduction of energy consumption** of pumps /compressors;
2. **reduction of the carbon footprint** of pumps / compressors;
3. **increase in the profitability** of the operation of pumps / compressors;
4. **increase in the stability of the process** carried out by pumps / compressors;
5. **ability to track the technical condition** of pumps / compressors;
6. **ability to work with clean and dirty** energy sources



AI4MFC - example of implementation, materials

- video about the implementation: https://www.youtube.com/watch?v=wgAS5twa45g&t=56s

Key results of the project:

- the implementation of AI4MFC in place of VFD-based control;
- reduction in energy consumption by an average of 11%
- smoother pump operation resulting from proactive pump control by AI4MFC

AI4MFC - simple case study for large plant

Defined parameters	Values	Unit	
Average daily power consumed by pumps / compressors =	1,5	MW	
Number of working hours during in year =	8760	h / year	
The average level of savings generated by AI4MFC in year =	10	%	
The aerage price of energy =	175	euro / MWh	
Energy equivalent for peak panel output equal to 1kWp =	0,95	MWh / year	
The average cost of building a PV farm with a capacity of 1MWp =	950000	euro / MWp	excluding service costs, energy storage, taxes, etc. data for 2024r

Calculated parameters	Values	Unit
Annual energy consumption =	13140	MWh / year
Annual energy savings generated by AI4MFC =	1314	MWh / year
Annual savings generated by AI4MFC =	229950	euro / year
Equivalent power of a PV farm =	1,38	MWp
The cost of building an equivalent PV farm =	1314000	euro

Minimal cost ratio of AI4MFC implemntation to PV farm implementation =	2,9

AI4MFC - simple case study for large ship

Defined parameters	Values	Unit	
Average daily power consumed by pumps / compressors =	0,8	MW	
Number of working hours during the voyage =	840	h / voyage	35days*24h
The average level of savings generated by AI4MFC during the voyage =	10	%	
The efficiency of a diesel-electric system on a vessel =	45	%	
Heat of fuel combusion (LHV) =	43	MJ / kg	
Density of fuel =	0,846	kg / L	
Price of fuel =	650,2	dollars / T	

Calculated parameters	Values	Unit	
Power consumption during the voyage =	672	MWh / voyage	
Power saving during the voyage with AI4MFC =	67,2	MWh / voyage	
Fuel saving during the voyage with AI4MFC =	12,5	T / voyage	
Amount of savings during the voyage with AI4MFC =	8129	dollars / voyage	

https://bulugo.com/bunker-prices/

AI4MFC - summary

- **AI4MFC saves energy at 8-15% on average per year**
- AI4MFC supports the decarbonization of installations and reduces the carbon footprint;
- AI4MFC works with clean and dirty energy sources
- AI4MFC is much cheaper to implement and use than source-conversion solutions (dirty energy-> green energy)
- **AI4MFC provides the cheapest energy, the one that does not need to be produced**

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