

# inGenious Flex industrial demand response system

## Main benefits



### Optimising existing assets

By treating your own plant like a flexible grid, inGenious Flex auto-balances loads to each other's needs and availability. Limits are set based on forecasts and user preferences. Integrates any local solar, wind, and storage to maximise their value.



### Lowering electricity costs

Reduce network charges caused by multi-tariff or dynamic billing systems. inGenious Flex auto-shifts demand into cheaper periods and uses local energy whenever beneficial. Slow down the rising costs of electricity without slowing down production.



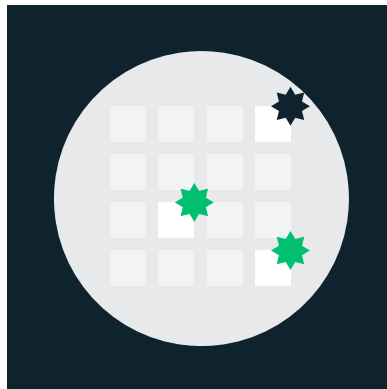
### Selling flexibility to the grid

Participate in grid balancing programmes by offering demand response to your market operator. inGenious Flex determines the cost-optimal way to be flexible and manages bidding automatically, generating profit alongside savings.



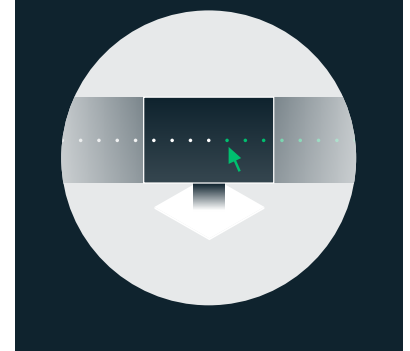
### Profile analysis and prediction

Gathering and historizing data from all connected sources, the system creates a complete consumption profile at both global and prosumer levels. For each business goal, accuracy is balanced against complexity by creating forecasts at different granularities and horizons.



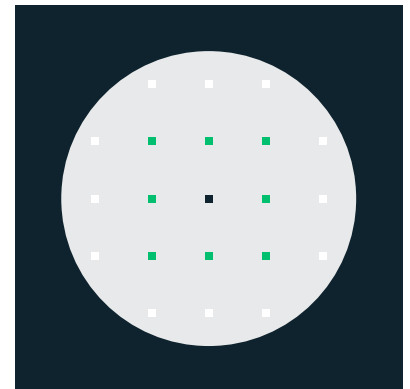
### Seamless integration anywhere

Developed by energy and process automation engineers with a system-agnostic approach, inGenious Flex runs in any environment. Alongside existing SCADA/EMS, at the edge, in the cloud, or a mix of all, it be installed at a greenfield or retrofit onto existing infrastructure.



### Control without manual operation

While the system calculates and executes its best schedule on its own, control is never entirely out of human hands. At any point, a user can override the algorithm's decision locally or remotely. Other prosumers then adapt to respond to the change without interruptions.



### System nesting to multiply gain

inGenious Flex can nest into itself or other systems for a multi-level set of subsystems, where each group is a prosumer in the higher-level system. Economic priorities can be optimised for each level based on asset ownership: plant, enterprise, community, or state.

## Metal industry

# Flexible adaptation of induction furnaces

## Company profile

### Industry

Foundry, vertically integrated into automotive supply chain

### Service portfolio

Melting and casting of gray iron housings, flywheels, discs, and drums

### Production details

Connection voltage: 20 kV

Annual consumption: 10.5 GWh

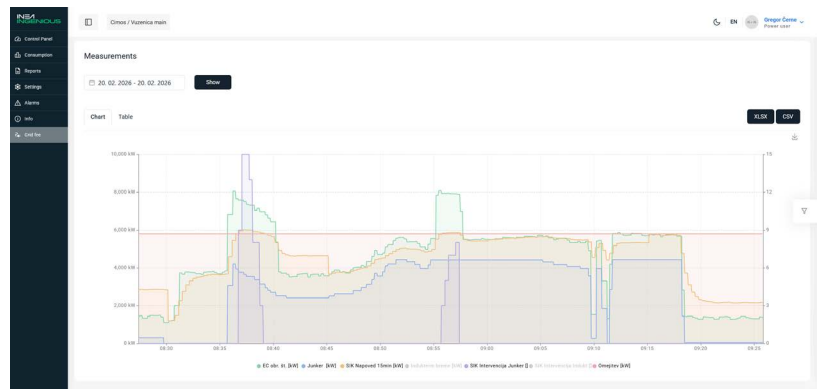
Operating regime: 16/5

## Challenge

The two induction crucible furnaces in the foundry contribute the majority of the 8.5 MW grid power draw. Since they were operated manually based on paper-based work orders, their startup peaks and initial melting phase often overlapped and even normal simultaneous power draw regularly exceeded the contracted power. This already incurred costs from active power exceedance and reactive power imbalance; those became even more expensive and hard to manage with the introduction of a multi-rate tariff system.

## Solution

The furnaces were controlled remotely via PLC with centralised monitoring of other loads. Set points were defined and flexibility profiles created, using the furnaces' high thermal inertia, which made them less sensitive to temporary power reductions: one analogue, the other in stages. When one furnace starts, the other can react by reducing its power within the set limit, then extend its process duration if necessary. Averaging power over the 15-minute billing period still allows short overlaps if the process requires.



## Results

**31 %**

**reduction in  
contracted power**

in the most expensive  
time-of-use period by  
shifting consumption

**< 3**

**power adjustments  
per working day**

to achieve optimal  
reduction in  
exceedance costs

**6 MW**

**total power of  
controllable load**

available for  
adaptation, over  
2/3 of site total

## Metal industry

# Reducing network charges in a multi-rate tariff system

## Company profile

### Industry

Thermal and mechanical metal processing

### Service portfolio

Hardening and tempering, thermal treatments (carburising, carbonitriding, vacuum hardening), gas and plasma nitriding, surface finishing, and CNC machining

### Production details

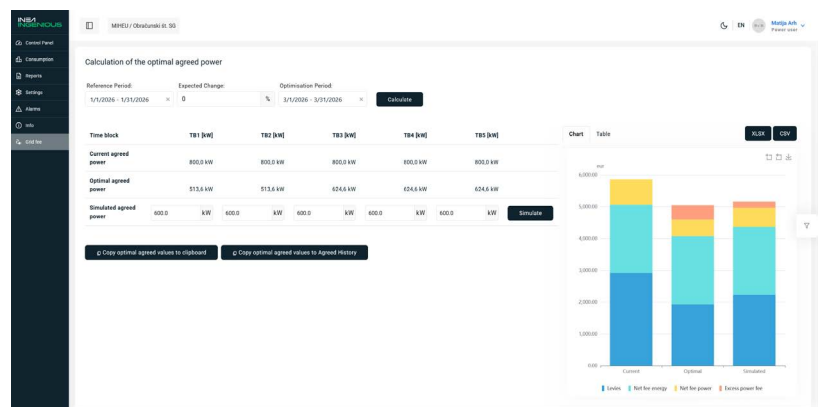
Connection voltage: 20 kV  
Annual consumption: 2.6 GWh  
Operating regime: 24/7

## Challenge

The newly-introduced shift from a two-tariff system to a seasonally dependent system with five time-of-use tariffs threatened to skyrocket the company's network charges. Their production processes were highly interdependent and sensitive to interruptions, with more than half of them running 24/7. Without an on-staff energy management specialist and a centralised monitoring system, they had low energy visibility, while their legacy furnace manufacturer requested € 20,000 per machine for remote control access.

## Solution

After a thorough analysis of load characteristics and consumption profile, we determined which loads could best adapt their power draw. The legacy equipment lock was circumvented by adjusting other process parameters while keeping everything monitored. Out of 1.3 MW of total loads, 260 kW of total flexibility was able to be extracted, and a 91 kW battery was added to better utilise their existing solar power.



## Results

**36 %**

**reduction in contracted power**

in the most expensive time-of-use period by shifting consumption

**14 %**

**reduction in annual electricity cost**

by optimisation of network charges and proportional levies

**< 3 year**

**return-on-investment period**

from savings generated by inGenious Flex

*From installation to handover, the on-site work was precise, delivered ahead of schedule, and caused no disruption. The system is reliable, with audit-ready energy and water data.*

– Domagoj Odak, Technical Director

