



True Industry 4.0 solution for everyone

## BUSINESS OBJECTIVES

The most important factor affecting manufacturing is

**PRODUCTIVITY.**

Maintaining and improving productivity by reducing downtime is a continuous effort essential for business to be profitable and competitive.

## BUSINESS OBJECTIVES

The most important influence on productivity is

**MANAGEMENT.**

For a company to perform well, it must be well managed.

## BUSINESS OBJECTIVES

Effective management requires

**FACTS.**

Making decisions by intuition or by using wrong data is not management.

## BUSINESS OBJECTIVES

The best and easiest way to understand job shop productivity, is to compare the data of budgeted and actual

# WORKCENTRE UTILIZATION.

Automated real-time data collection of machine utilization provides the necessary input for such a comparison.

## BUSINESS OBJECTIVES

Accurate and automated real-time shop floor feedback also allows managers to be

**PRO-ACTIVE.**

Addressing problems now, as they occur, not tomorrow, is the most effective tool for continuous productivity improvement.

## BUSINESS OBJECTIVES

Managing productivity with facts also improves the relationship between management and

**EMPLOYEES.**

Employees will very likely experience more satisfactory work-life balance, greater flexibility and autonomy in decision making and problem solving.

## ERP

Despite the heavy investment in MRP or ERP software, most job shops struggle to find the answer to the above objectives.

The main reasons for this is:

- ▶ Lack of true real-time machine monitoring
- ▶ Reliance on machine operator to enter the data
- ▶ Job costing analysis used as a "productivity evaluation" tool
- ▶ Comparing inaccurate job estimates with inaccurate shop floor data

## ERP

When discrepancies are identified, it is hard to understand their cause.

Is difference between estimated and actual production times caused by estimating software, estimator, machine operator, product designer or the **customer...?**

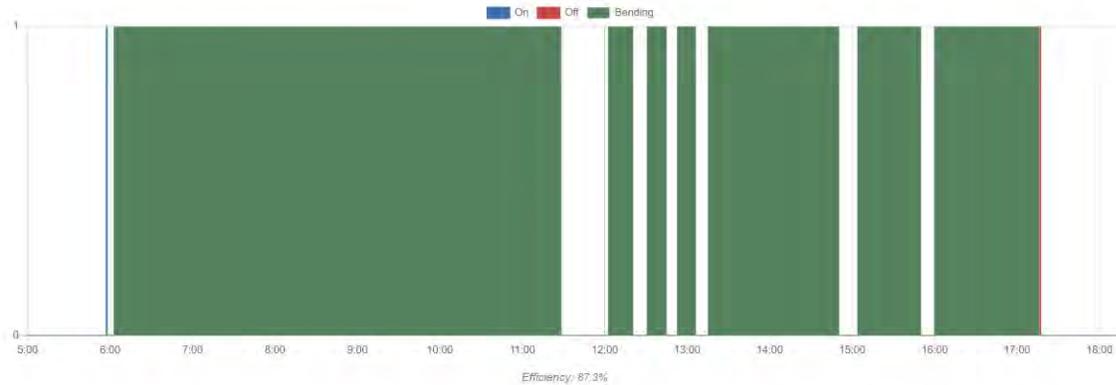
Trying to calculate actual machine utilization from distorted shop floor data only compounds the error. It is quite common to see 20 to 30% difference between calculated and actual machine utilization collected by machine monitoring, exposing huge reserves.



## ERP

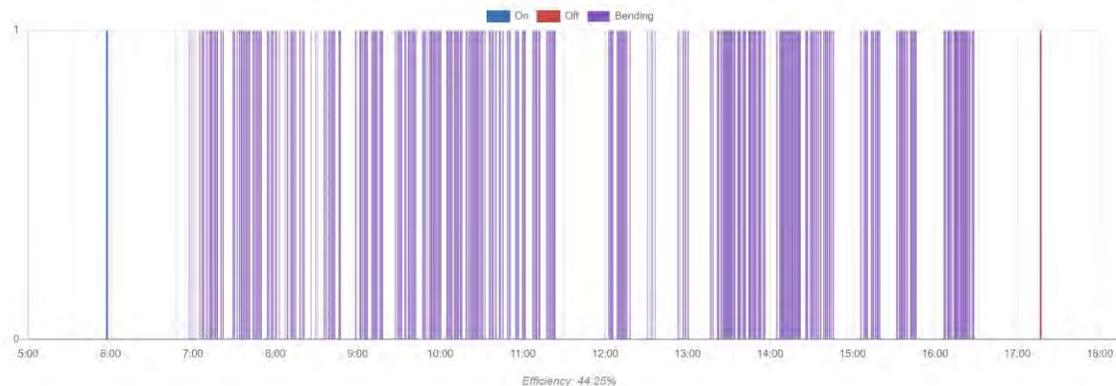
MACHINE UTILIZATION CALCULATED BY MRP SYSTEM FROM THE DATA ENTERED BY MACHINE OPERATOR - 87.3%  
This inaccurate data is also used to compare estimated and actual operation times.

Detail machine activity - 30/05/2019  
0011 / Forming - Press brake / Schiavi / HFB S 100-30



TRUE MACHINE UTILIZATION CALCULATED USING ZOOMFAB MONITORING SYSTEM AND ANALYTICS - 44.25%  
Meaningfull real-time information provides visibility and awarness, both essential for pro-active management. Advanced analytics also calculates the impact on hourly rates, revenue and profit.

Detail machine activity - 30/05/2019  
0011 / Forming - Press brake / Schiavi / HFB S 100-30



Majority of ERP systems will record start and end of the job, but would not reveal the true extend of machine inactivity. Setup times, which are often longer than estimated are hidden...

## ERP + MES

Adding MES (Manufacturing execution system) to ERP is one of the solutions, unfortunately it is not practical for a typical job shop for managing PRODUCTIVITY:

- ▶ Requires unrealistic discipline, which is very difficult to maintain - this affects the accuracy of shopfloor data
- ▶ Unable to resolve number of shop-floor situations (single operator running multiple machines, multiple jobs using single setup, etc.)

# ZOOMFAB®

Introducing ZOOMFAB®, an Industry 4.0

## BUSINESS MANAGEMENT AND PRODUCTIVITY IMPROVEMENT TOOL.

It is based on an IIoT platform that uses automated machine data collection, advanced analytics, AI and a variety of easy to use but powerful modeling and simulation functions.

# ZOOMFAB®

To describe it in simple terms, ZOOMFAB® is a productivity improvement tool which actually makes money.

**BETTER PRODUCTIVITY =  
MORE PROFIT**

ZOOMFAB® will significantly improve manufacturing productivity for any company, regardless if it is overloaded with work, doing just right or struggling with downturn.

# ZOOMFAB®

ZOOMFAB® provides business with 3 most critical "commodities", which are critical for its existence:

- ▶ Increases production capacity
- ▶ Increases profit
- ▶ Provides better control

# ZOOMFAB®

How is it done?

- ▶ Reducing downtime caused by interruptions (machine problems, material logistics or quality)
- ▶ Eliminating excessive setups (tooling, discipline, machine programming errors, competence)
- ▶ Improving organization by allowing pro-active management

# ZOOMFAB®

ZOOMFAB provides visibility which allows:

- ▶ responding to interruptions by alerting maintenance or other dedicated resources (not production management, which is busy with production management)
- ▶ analyzing and reducing setups, in this order by better organization, improvement of discipline, improving operator competence, reviewing machine programming solution, tooling availability and tooling condition
- ▶ improving organization of production management, communication within management, communication with machine operators and staff, team building

# ZOOMFAB®

ZOOMFAB provides simple and effective:

- ▶ real-time visibility
- ▶ analytics

ZOOMFAB is -

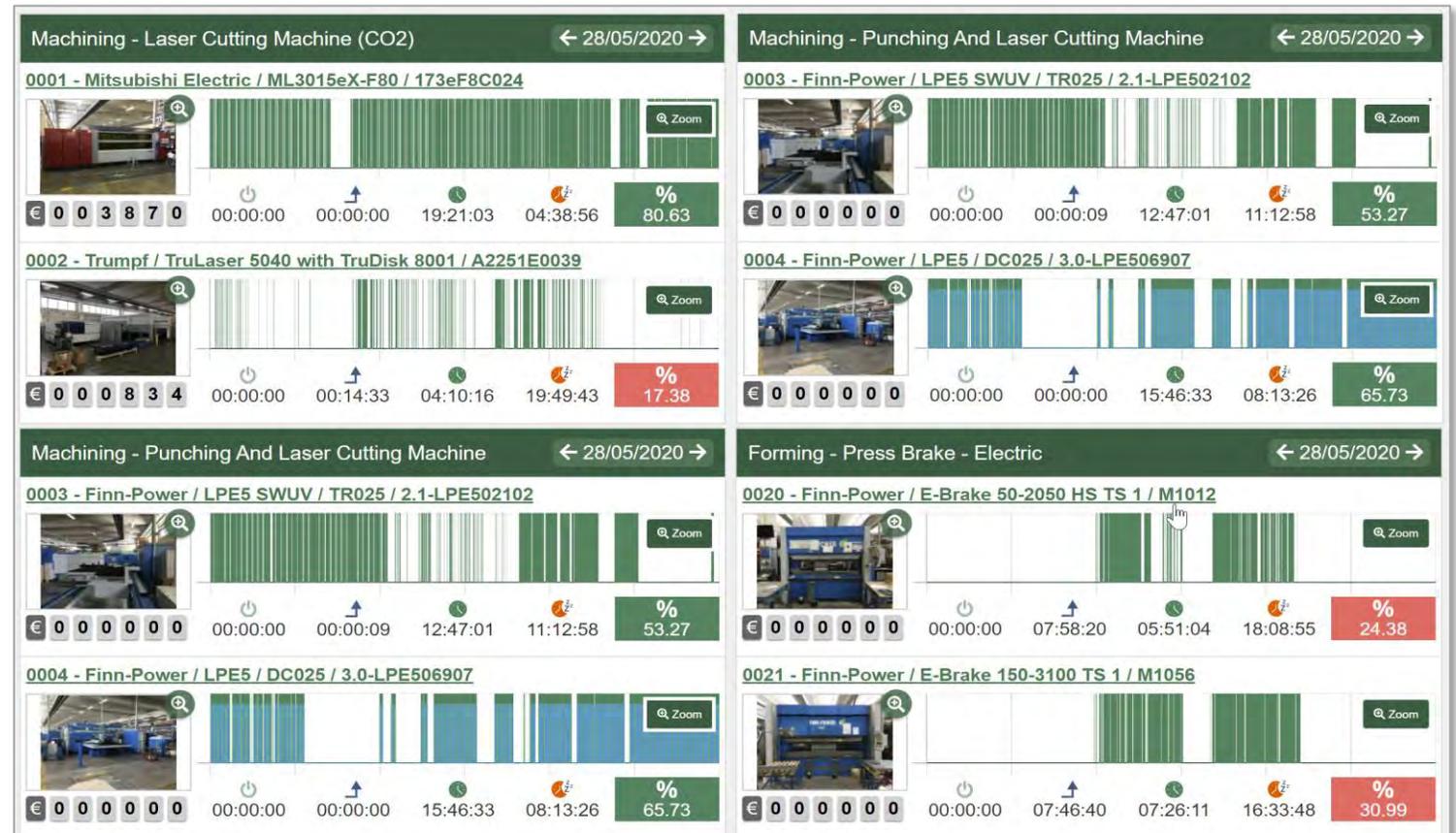
- ▶ cheap to acquire and implement
- ▶ requires no additional resources
- ▶ there are no other hidden expenses associated with hardware or software customization, upgrades, and maintenance

# WHAT IS HAPPENING ON THE SHOP FLOOR RIGHT NOW?

ZOOMFAB provides real-time machine and workcentre monitoring, reporting and analytics.

Instant availability of data supports **pro-active** management.

Days of printed reports, boardroom analysis, adjustments and arguments are forcing management to be **reactive**.

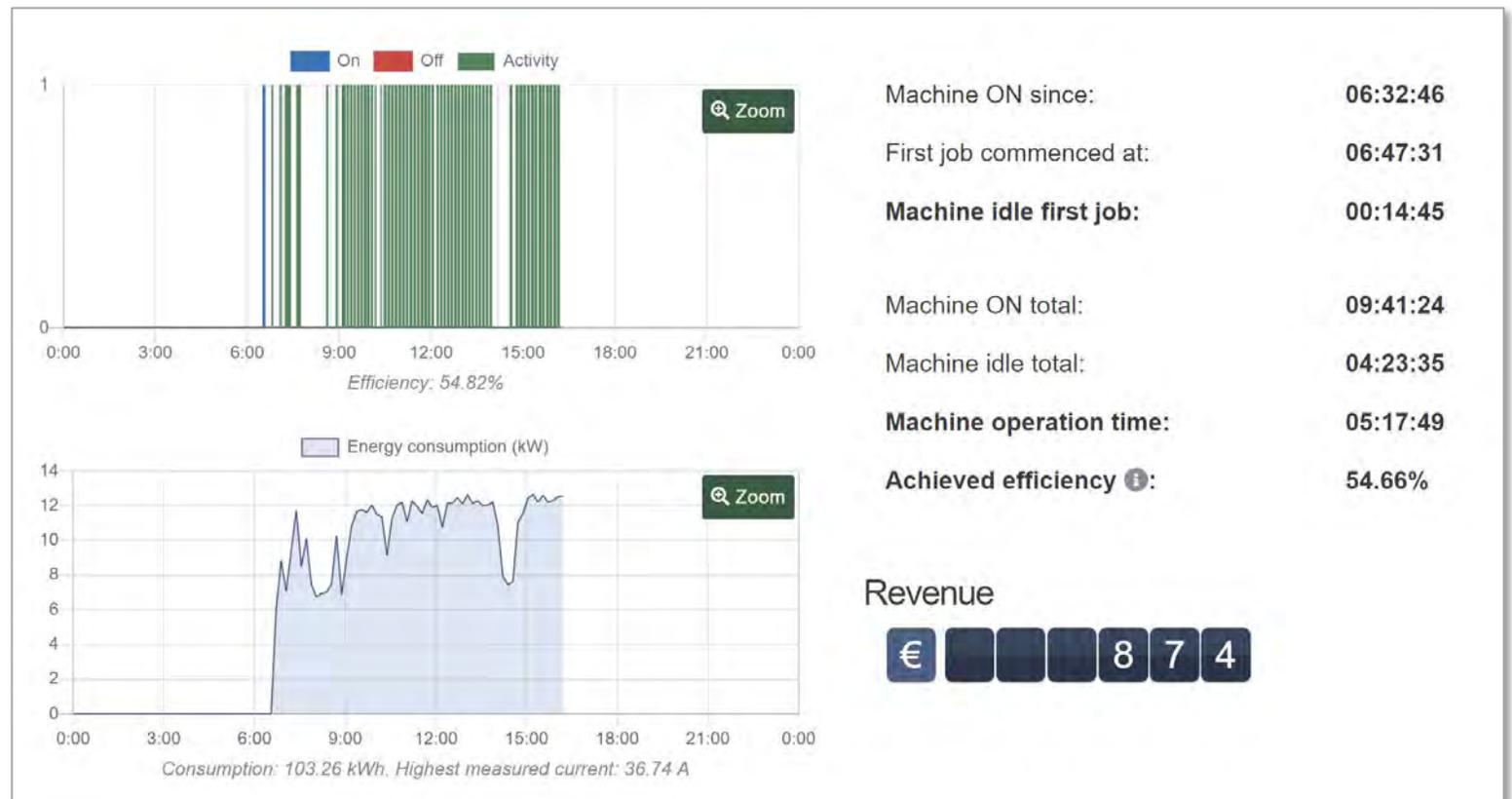


# WHAT IS HAPPENING ON THE SHOP FLOOR RIGHT NOW?

ZOOMFAB shows in real time when a machine was switched ON and when it started processing the **first job**.

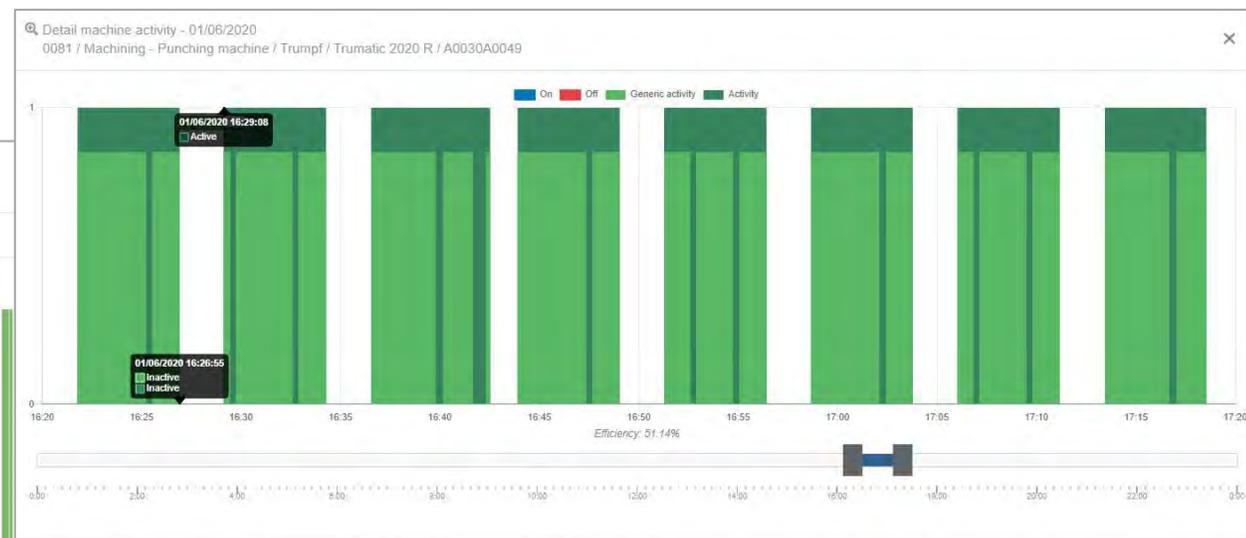
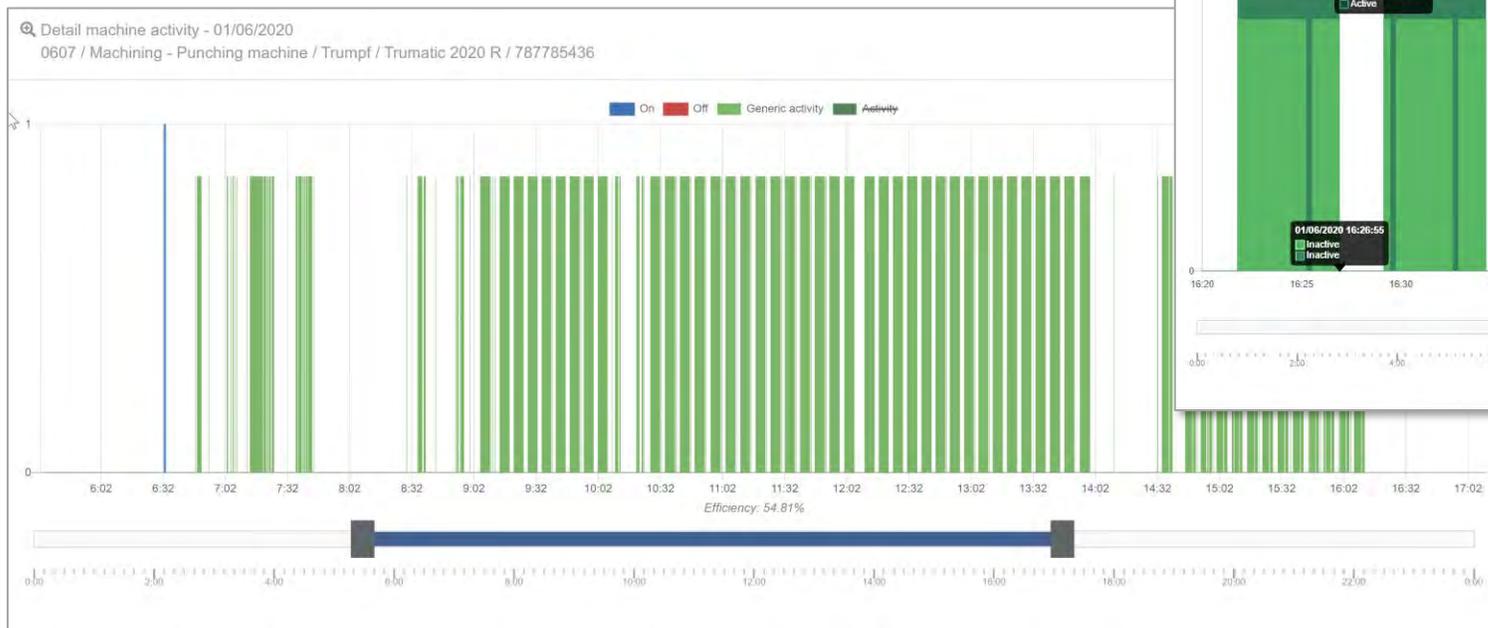
**Achieved efficiency** represents the percentage of time a machine was working against the time it was switched ON.

Graphical data reveals opportunities to improve machine utilization and process efficiencies.



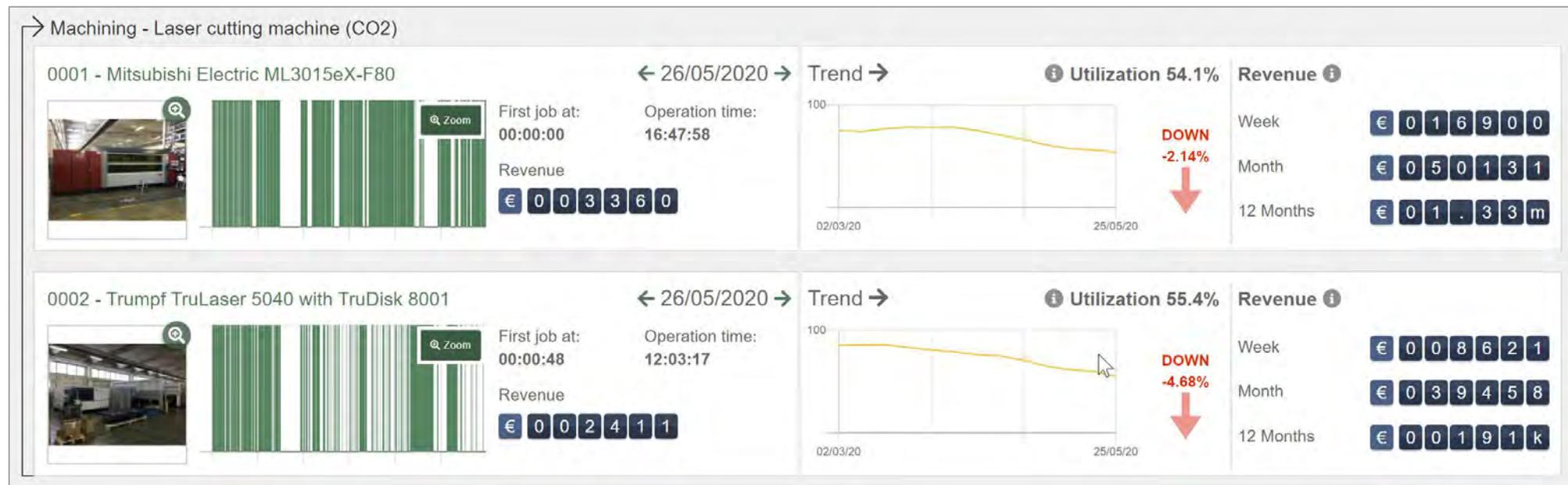
# WHAT IS HAPPENING ON THE SHOP FLOOR RIGHT NOW?

Pro-active management requires **real-time information**, which is meaningful, efficient, accurate and comprehensive enough allowing managers to **Observe**, **Orient**, **Decide** and **Act** (OODA loop).



# WHAT IS THE PRODUCTIVITY AND THE TREND?

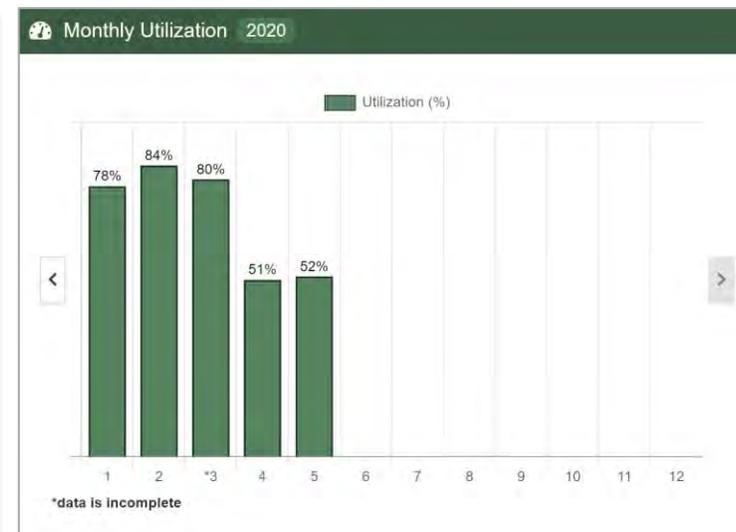
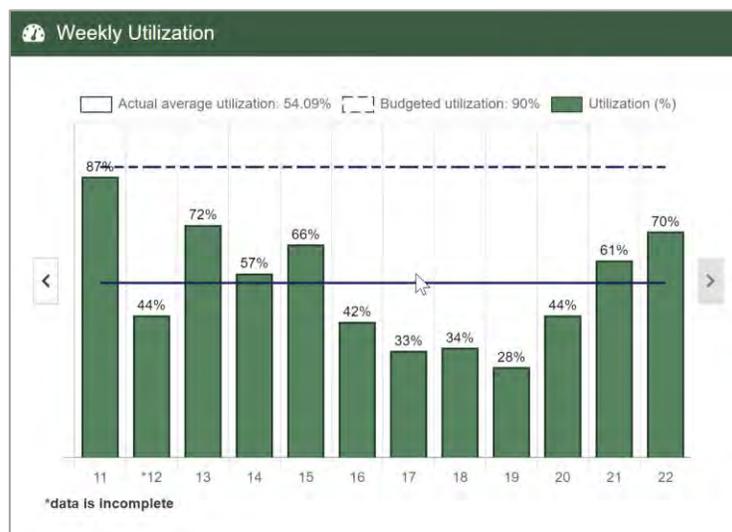
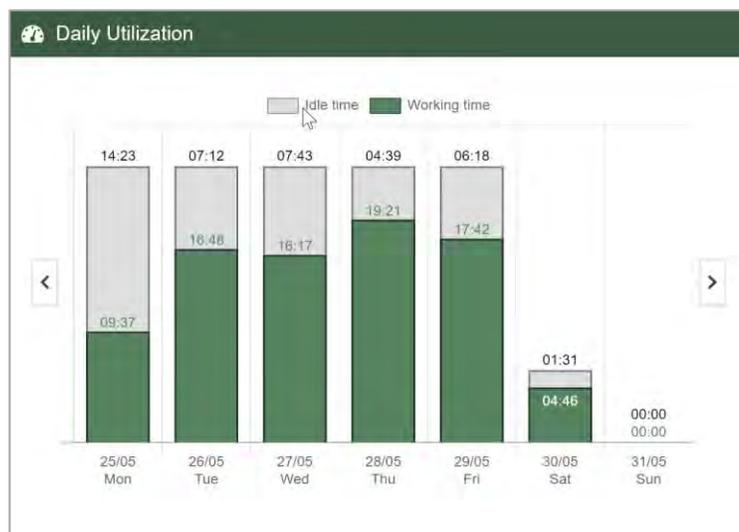
**Productivity** is the relevant output of labor and machinery for a certain period of time. It is **represented by efficiency** by which we can utilize both. The output target is set in the **budget** as the number of billable hours for each manufacturing operation.



# WHAT IS THE PRODUCTIVITY AND THE TREND?

ZOOMFAB monitors in real-time utilization of individual machines and work centres and compares the actual and budgeted results to determine if their productivity is on target.

ZOOMFAB's analytics provides a clear picture about the short and long-term trend, together with impact on profitability.



# BUDGET VS ACTUAL

ZOOMFAB calculates the revenue and profit for all monitored work centers and shows in real-time the comparison between budgeted and actual values.

The user can see which work centers are profitable and which are **losing money**.

Revenue	Budgeted revenue	Actual revenue
	€ 8.350.208	€ 7.139.557

Profit	Budgeted profit	Actual profit
	€ 3.860.395 (46.23%)	€ 2.925.517 (40.98%)

#05 LASER CUTTING 2D CO2 #4			
No. of machines	Budgeted revenue	Actual revenue	Utilization Bud.   Act.
2	€ 776.160	€ 781.722	75%   76%
Working h/w Bud.   Act.	Budgeted profit	Actual profit	Oper. rate/hr Calc.   Used
120   121	€ 461.726	€ 466.218	€ 87   140

#09 MACHINING VERTICAL (CNC) #7			
No. of machines	Budgeted revenue	Actual revenue	Utilization Bud.   Act.
2	€ 304.920	€ 266.805	50%   44%
Working h/w Bud.   Act.	Budgeted profit	Actual profit	Oper. rate/hr Calc.   Used
40   35	€ 109.735	€ 85.523	€ 136   165

#13 BENDING PRESS BRAKE (CNC) #10			
No. of machines	Budgeted revenue	Actual revenue	Utilization Bud.   Act.
5	€ 595.056	€ 482.255	46%   37%
Working h/w Bud.   Act.	Budgeted profit	Actual profit	Oper. rate/hr Calc.   Used
92   75	€ 194.257	€ 128.548	€ 122   140

#16 WELDING (ROBOTIC) #13			
No. of machines	Budgeted revenue	Actual revenue	Utilization Bud.   Act.
2	€ 155.232	€ 98.832	30%   19%
Working h/w Bud.   Act.	Budgeted profit	Actual profit	Oper. rate/hr Calc.   Used
24   15	€ 88.445	€ 50.335	€ 266   140

# HOURLY RATES

Failure to establish correct hourly rates for manufacturing operations can have dangerous consequences. Outdated or inherited hourly rates will impact:

- ▶ Budget
- ▶ Business competitiveness
- ▶ Price estimating
- ▶ Job-costing
- ▶ Ability to understand limits for price discounting before losses occur

Operation Hourly Rate		
budgeted hourly rate		€ 87,61
actual hourly rate		€ 91,86
<b>hourly rate used</b>	€	<u>140,00</u>

# HOURLY RATES

One of ZOOMFAB's most important functions is to calculate accurate [budgeted hourly rates](#) for manufacturing operations. Based on actual performance, ZOOMFAB also calculates [actual hourly rates](#).

When actual hourly rates exceed the [rates used](#), the user is warned as this will impact the financial results, price estimating and job costing.

OPERATION	BUDGETED HOURLY RATE	ACTUAL HOURLY RATE	HOURLY RATE USED
 Punching (CNC)	€ 124,42	€ 130,57	€ 165,00
 Laser cutting 2D (CO2)	€ 87,61	€ 91,86	€ 140,00
 Laser cutting 2D Fiber	€ 109,03	€ 122,86	€ 180,00
 Punching and laser cutting	€ 125,35	€ 120,50	€ 165,00

# WHERE ARE WE MAKING AND LOSING MONEY?

Rather than analyzing times for individual jobs, ZOOMFAB monitors machine and work centre utilization and calculates revenue and profit based on **ACTUAL hourly rates**.

This is a much better method to understand which work centers are profitable and which are losing money.

05 LASER CUTTING 2D CO2 #4			
No. of machines	Budgeted revenue	Actual revenue	Utilization Bud.   Act.
2	€ 776.160	€ 723.446	75%   70%
Working h/w Bud.   Act.	Budgeted profit	Actual profit	Oper. rate/hr Calc.   Used
120   112	€ 461.726	€ 419.161	€ 92   140

	#1		#2	
	Budgeted	Actual	Budgeted	Actual
Revenue	€ 388.080	€ 505.410	€ 388.080	€ 218.036
Profit	€ 222.993	€ 317.734	€ 238.733	€ 101.428
Utilization	75%	98%	75%	42%
Working h/w	80   60	80   78	80   60	80   34

# HOW CAN WE MAKE MORE PROFIT?

Having more work doesn't always mean **making more profit**.

And **increasing prices** by adding a higher profit margin may also not work as the company becomes **less competitive**.

The best way to increase profit is by **improving productivity** and **reducing energy waste**.

The user can also use the **“What if?”** simulation tool to rearrange the factory to **maximize profit**.

0003 - Trumpf L3050			
	Budgeted	Actual	Estimate
Revenue	\$ 479K	\$ 265K	\$ 323K
Profit	\$ 241K	\$ 69K	\$ 116K
Utilization	80%	44%	54%
Working h/w	48   38	48   21	26

0003 - Trumpf L3050			
	Budgeted	Actual	Estimate
Revenue	\$ 479K	\$ 265K	\$ 442K
Profit	\$ 241K	\$ 69K	\$ 211K
Utilization	80%	44%	
Working h/w	48   38	48   21	35

0003 - Trumpf L3050			
	Budgeted	Actual	Estimate
Revenue	\$ 479K	\$ 265K	\$ 489K
Profit	\$ 241K	\$ 69K	\$ 249K
Utilization	80%	44%	49%
Working h/w	48   38	48   21	39

# HOW FAR CAN WE DISCOUNT THE PRICES?

There are 3 types of hourly rates: **budgeted**, **actual** and **used**. Only actual can give us a correct indication of how far we can reduce prices and still make some profit.

**ZOOMFAB** is the only tool in the industry which does that.

It also includes a **modeling** and **simulation** tool which determines actual hourly rates under different factory scenarios so the company can make profit even when it is pressed to discount work.

09 MACHINING VERTICAL (CNC) #7				
No. of machines   Est.	Budgeted revenue	Actual revenue	Estimated revenue	Utilization Bud.   Act.   Est.
2   -	€ 304.920	€ 266.805	€ 533.762	50%   44%   -
Working h/w Bud.   Act.   Est.	Budgeted profit	Actual profit	Estimated profit	Oper. rate/hr Calc.   Used   Est.
40   35   70	€ 109.735	€ 85.523	€ 255.105	€ 147   165   115

	Budgeted	Actual	Estimate		Budgeted	Actual	Estimate
Revenue	€ 152.460	€ 123.341	€ 246.756	#1	€ 152.460	€ 143.464	€ 287.006
Profit	€ 37.994	€ 19.496	€ 97.895		€ 71.741	€ 66.026	€ 157.210
Utilization	50%	40%			50%	47%	
Working h/w	40   20	40   16	80   32		40   20	40   19	80   38

# DO WE NEED ANOTHER MACHINE? WHAT KIND AND WHEN?

To better understand ROI, ZOOMFAB provides the following information:

- ▶ Electricity consumption (measured)
- ▶ Laser cutting gas flow rates, consumption and cost (measured)
- ▶ Heating gas consumption and cost
- ▶ Number of machine strokes/cycles
- ▶ Cost of maintenance and repair
- ▶ Machine utilization profile / reliability
- ▶ Machine profitability



# DO WE NEED ANOTHER MACHINE? WHAT KIND AND WHEN?

ZOOMFAB's *What if?* module provides the user with all the answers needed to understand the current level of machine utilization, available reserves and risks of not having spare capacity or backup.

On the right is an example of selling one of two existing machines and setting up a 3<sup>rd</sup> shift on a remaining machine.

05 LASER CUTTING 2D CO2 #4				
No. of machines   Est.	Budgeted revenue	Actual revenue	Estimated revenue	Utilization Bud.   Act.   Est.
2   1	€ 776.160	€ 781.722	€ 845.562	75%   76%   109%
Working h/w Bud.   Act.   Est.	Budgeted profit	Actual profit	Estimated profit	Oper. rate/hr Calc.   Used   Est.
120   121   131	€ 461.726	€ 466.218	€ 592.397	€ 81   140   56

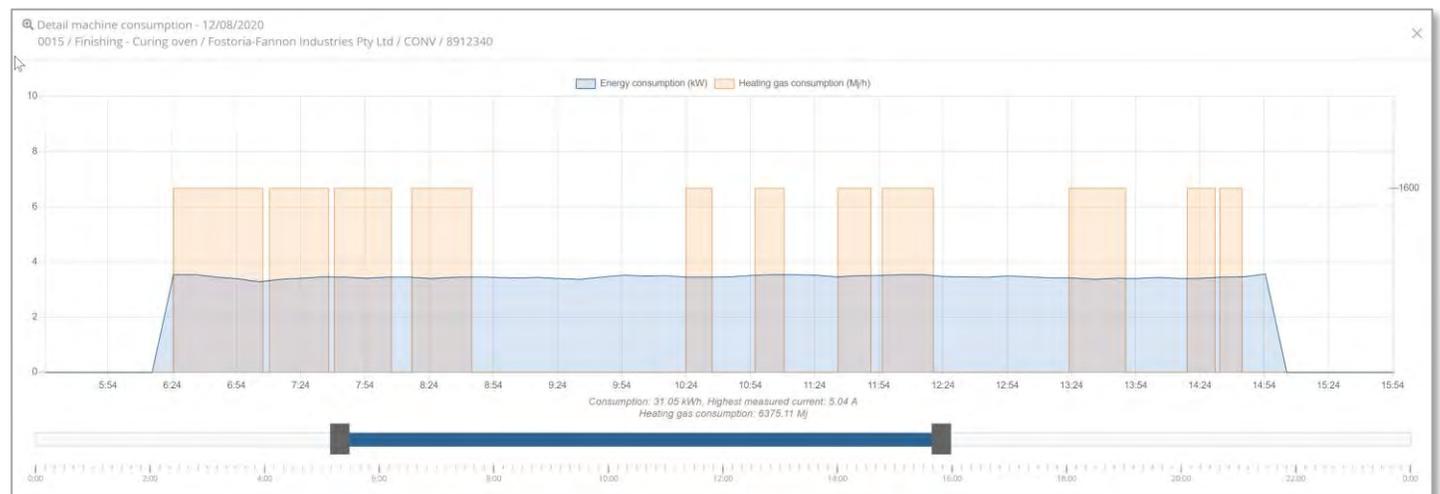
  

0605 - Bystronic Byspeed 3015 #1				0606 - Trumpf TruLaser 2030 #2			
Revenue	Budgeted € 388.080	Actual € 563.686	Estimate € 845.562	Revenue	Budgeted € 388.080	Actual € 218.026	Estimate € -
Profit	€ 222.993	€ 364.790	€ 592.397	Profit	€ 238.733	€ 101.428	€ -
Utilization	75%	109%		Utilization	75%	42%	
Working h/w	80   60	80   87	120   131	Working h/w	80   60	80   34	

# MONITORING BATCH POWDER-COATING (NEW)

ZOOMFAB provides information about

- ▶ Electricity consumption and cost
- ▶ Heating gas consumption and cost
- ▶ Utilization profile of powder application, oven pre-heating and baking
- ▶ Capacity and bottle neck identification



# MONITORING POWDER-COATING LINE (NEW)

ZOOMFAB provides information about

- ▶ Electricity consumption and cost
- ▶ Utilization profile of automated powder coating application and additional hand held powder coating guns
- ▶ Capacity and bottle neck identification

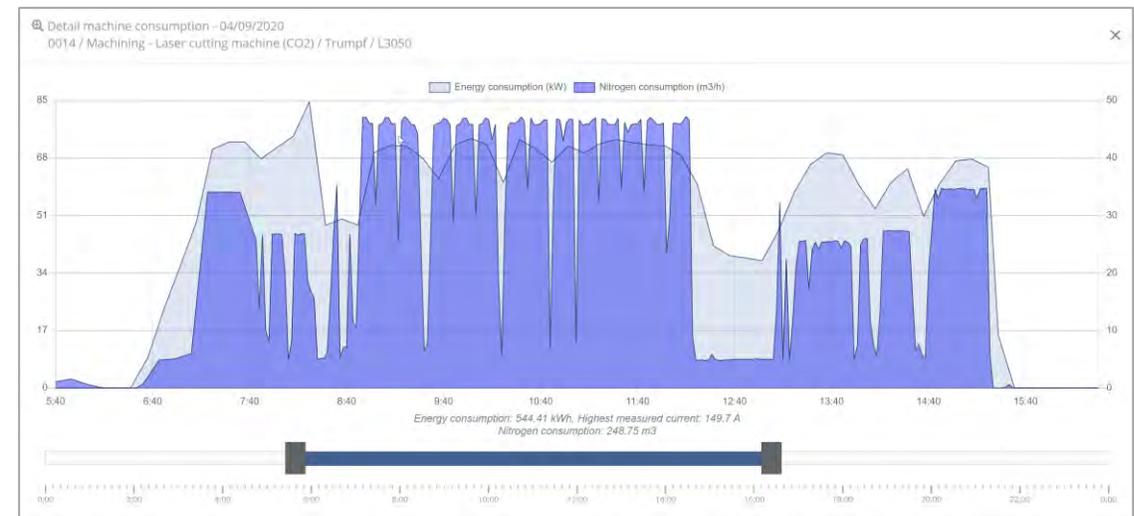
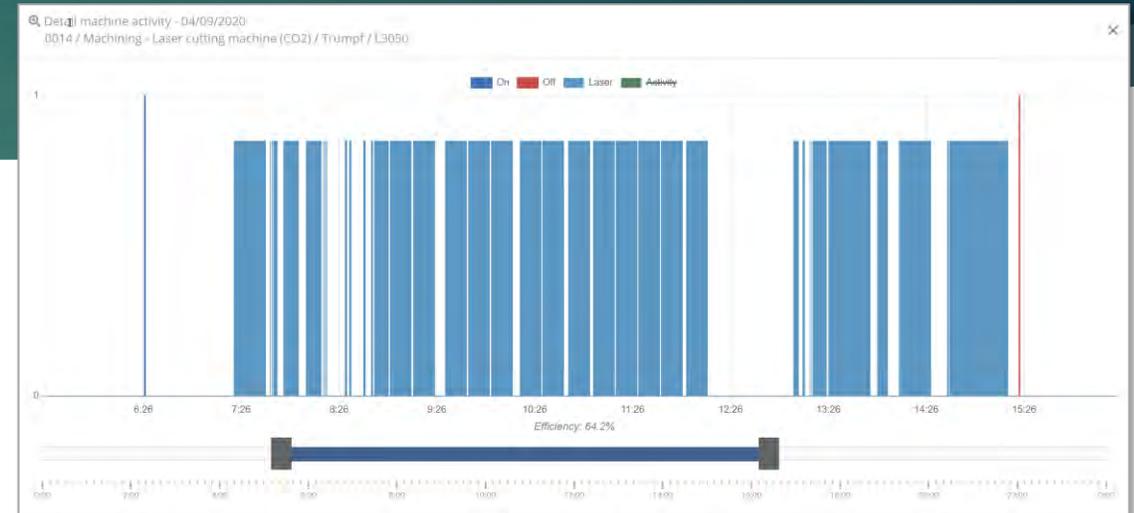


# LASER CUTTING GAS CONSUMPTION (NEW)

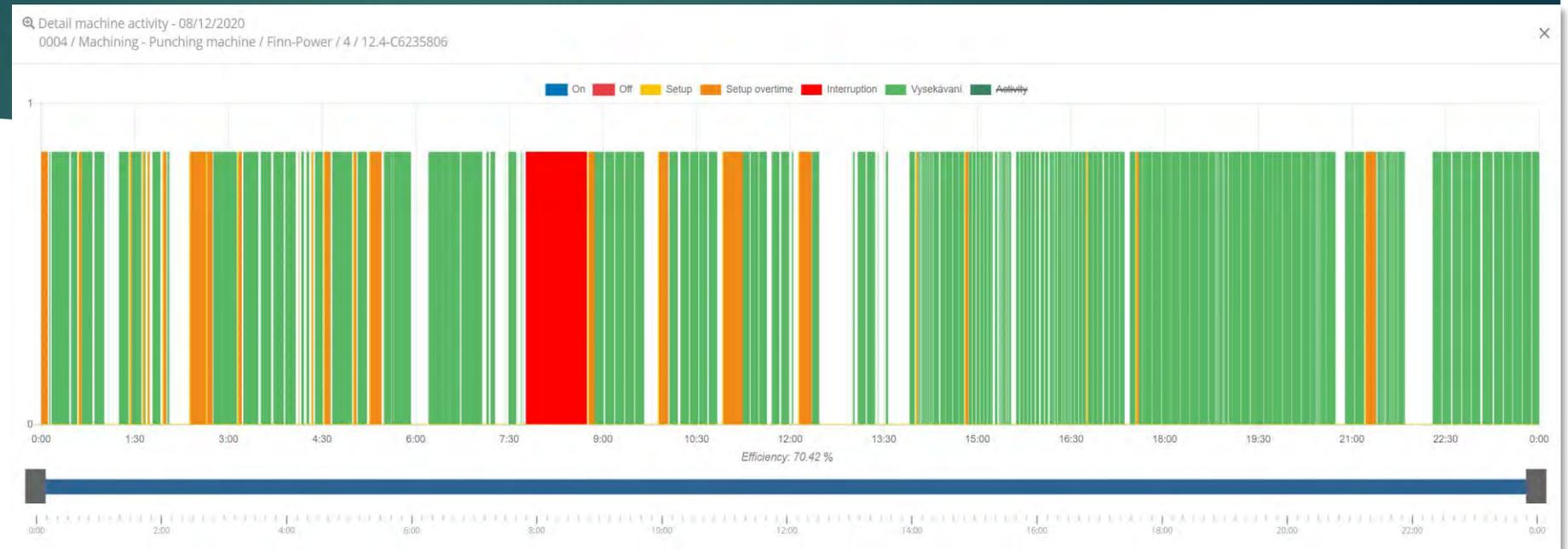
ZOOMFAB provides information about



- ▶ True measured nitrogen and oxygen gas flow monitoring up to 40 bar and 185 m<sup>3</sup>/hour
- ▶ Instant gas flow rate and cost of gas - help user to determine accurate hourly rates for laser cutting of different materials
- ▶ Daily, weekly and monthly consumption statistics



## EDC2

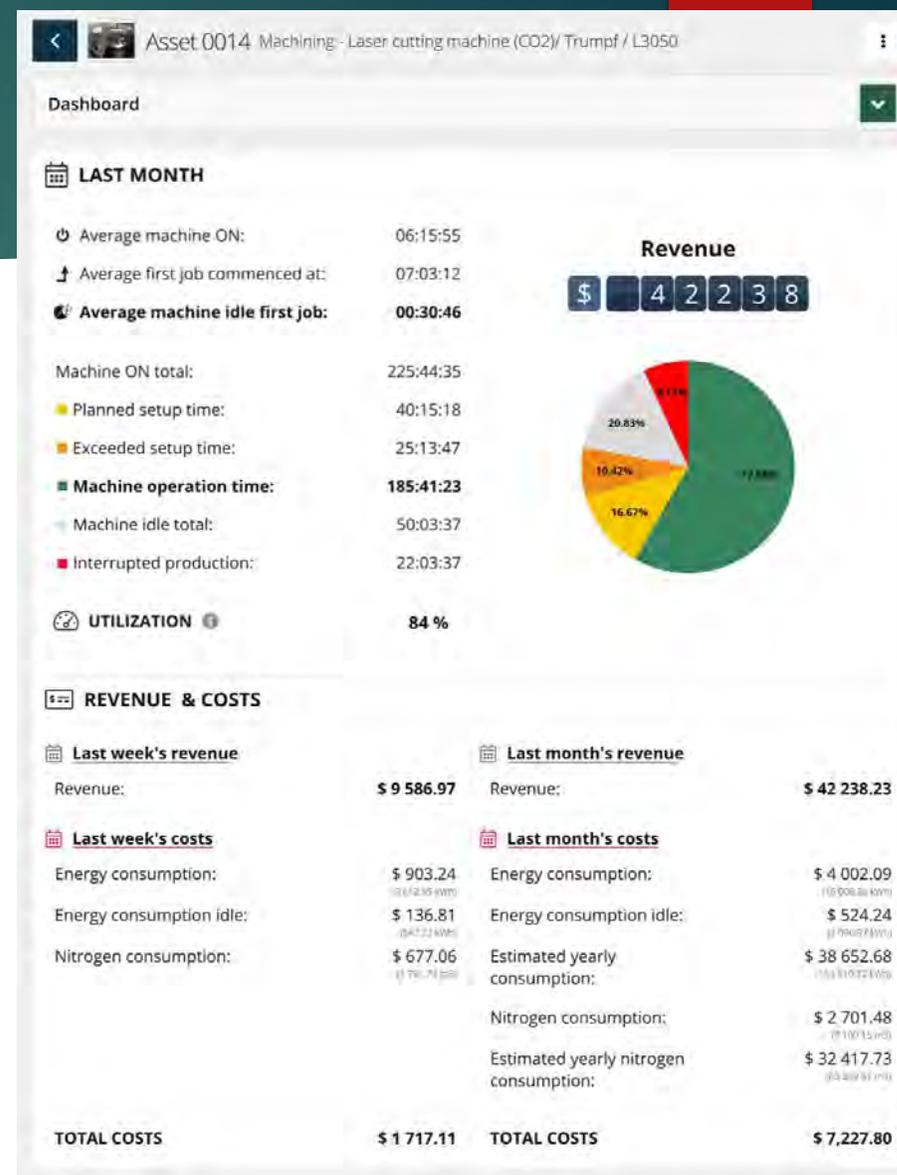
EXTENDED DATA  
COLLECTION 2

- ▶ In addition to the automated machine data collection, EDC2 allows operator to enter an additional information machine can't provide - **machine setup and production interruption**.
- ▶ Observe in real-time exceeded **setup times** and unplanned **interruptions**, which are often caused by bad management or logistical errors. They **have the largest impact on productivity, capacity and ultimately a profit!**

# EXTENDED DATA COLLECTION 2

## EDC2

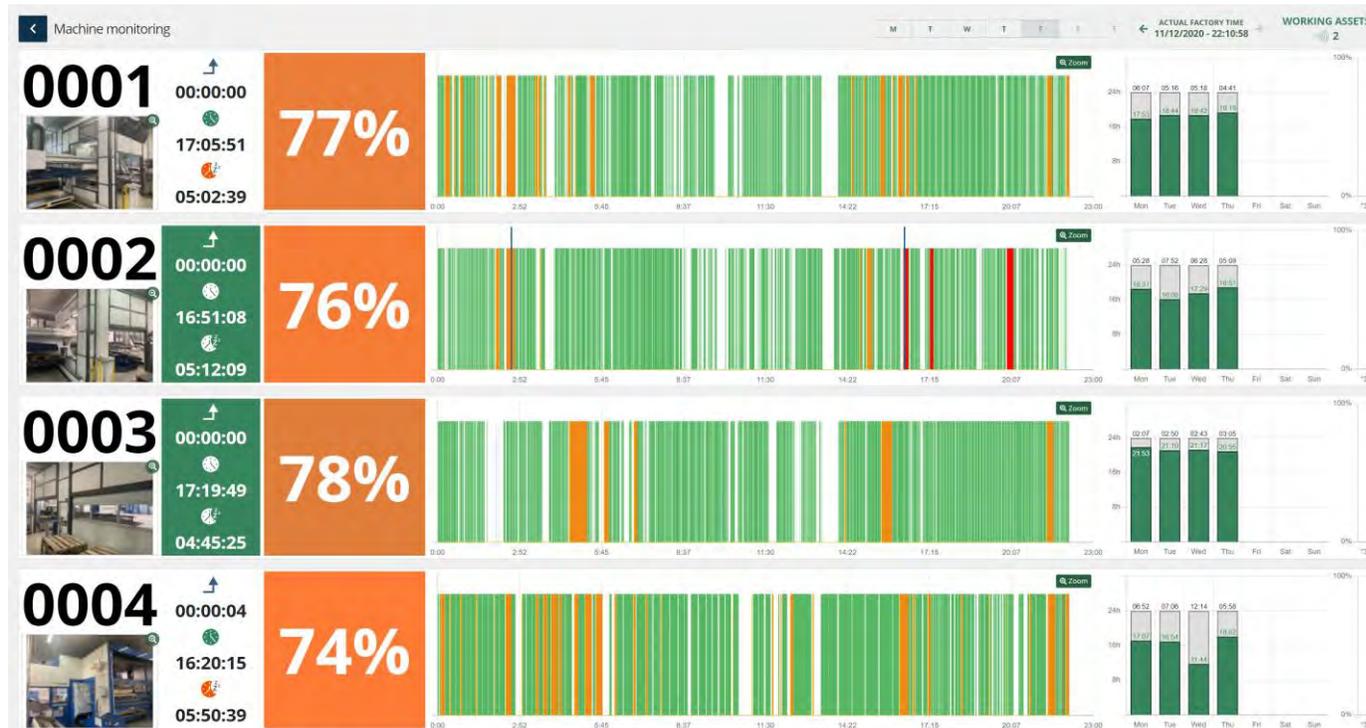
- ▶ Installing standalone EDC2 terminal is **quick and easy**. Signalization tower with magnetic base is optional.
- ▶ Collected data is processed into **daily, weekly and monthly statistics** and analytics.

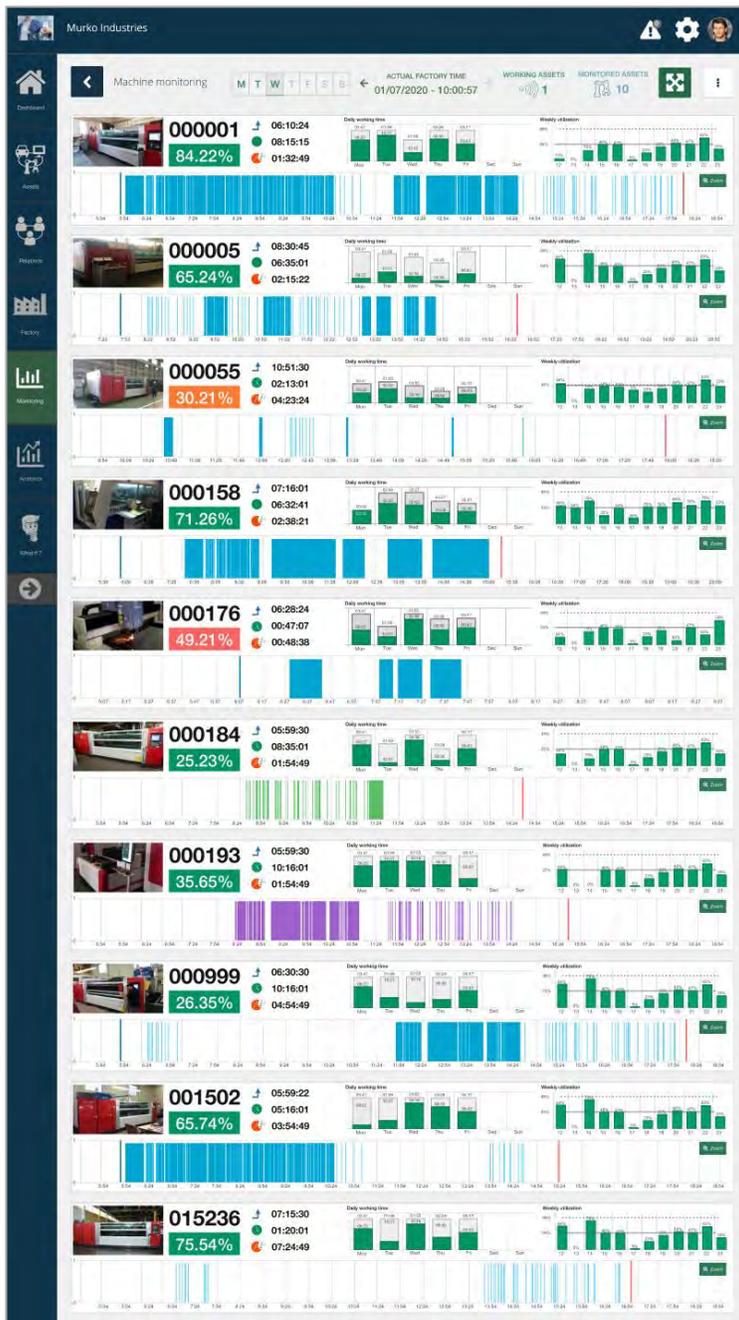


# EXTENDED DATA COLLECTION 2

## EDC2

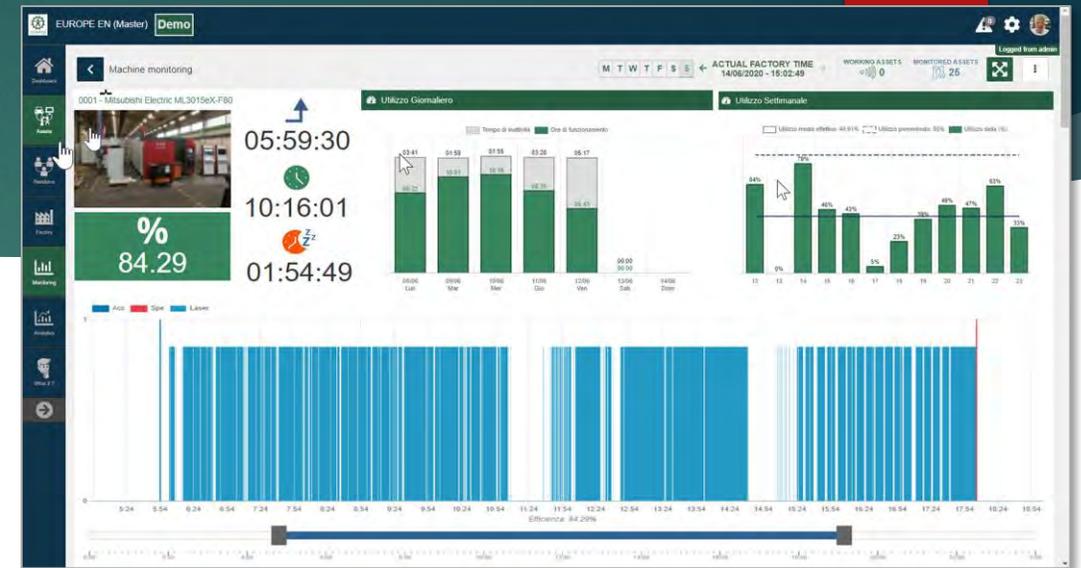
- ▶ **Real-time machine status** shows planned setup, exceeded setup, unplanned process interruption and idle time.
- ▶ **EDC warns operator** and management about exceeded setup time.
- ▶ **Planned setup time** is included in effective machine utilization and production efficiency calculation.





## SHOP FLOOR DISPLAY

## SHOP FLOOR SCREEN LAYOUT



- ▶ New layout is dedicated to **shop floor** use
- ▶ Landscape or portrait orientation
- ▶ Each monitor can be configured to show up to 10 machines of **any type** or a **complete workcentre**
- ▶ **High resolution graph** shows machine operation cycles, machine setup and periods of lost production
- ▶ **Daily and weekly machine utilization vs budget**

## WHY ZOOMFAB® ?

- ▶ ZOOMFAB® is a fully automated software and hardware system, which requires no human resources to operate
- ▶ ZOOMFAB® is using highly secure non-**invasive sensors which don't** interfere with machine controls
- ▶ ZOOMFAB® provides vital business data which is available 24/7 from any internet connected device
- ▶ ZOOMFAB® IIoT sensors can monitor any brand or type of machine tools, with or without CNC

## WHY ZOOMFAB® ?

- ▶ ZOOMFAB® provides real-time information which allows faster and smarter decisions
- ▶ ZOOMFAB® is a pro-active management tool allowing the user to see machine status and production efficiency, identify delays and take immediate corrective action
- ▶ ZOOMFAB® shows actual machine utilization and spare capacity
- ▶ ZOOMFAB® provides factory configuration simulation tools
- ▶ ZOOMFAB® is the ideal tool for team-work

Thank you for considering ZOOMFAB®

