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Thursday 18th October 2018

SUSTAINABLE
ADVANCED
MANUFACTURING

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European Union
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Sunderland

Case Study Presentation
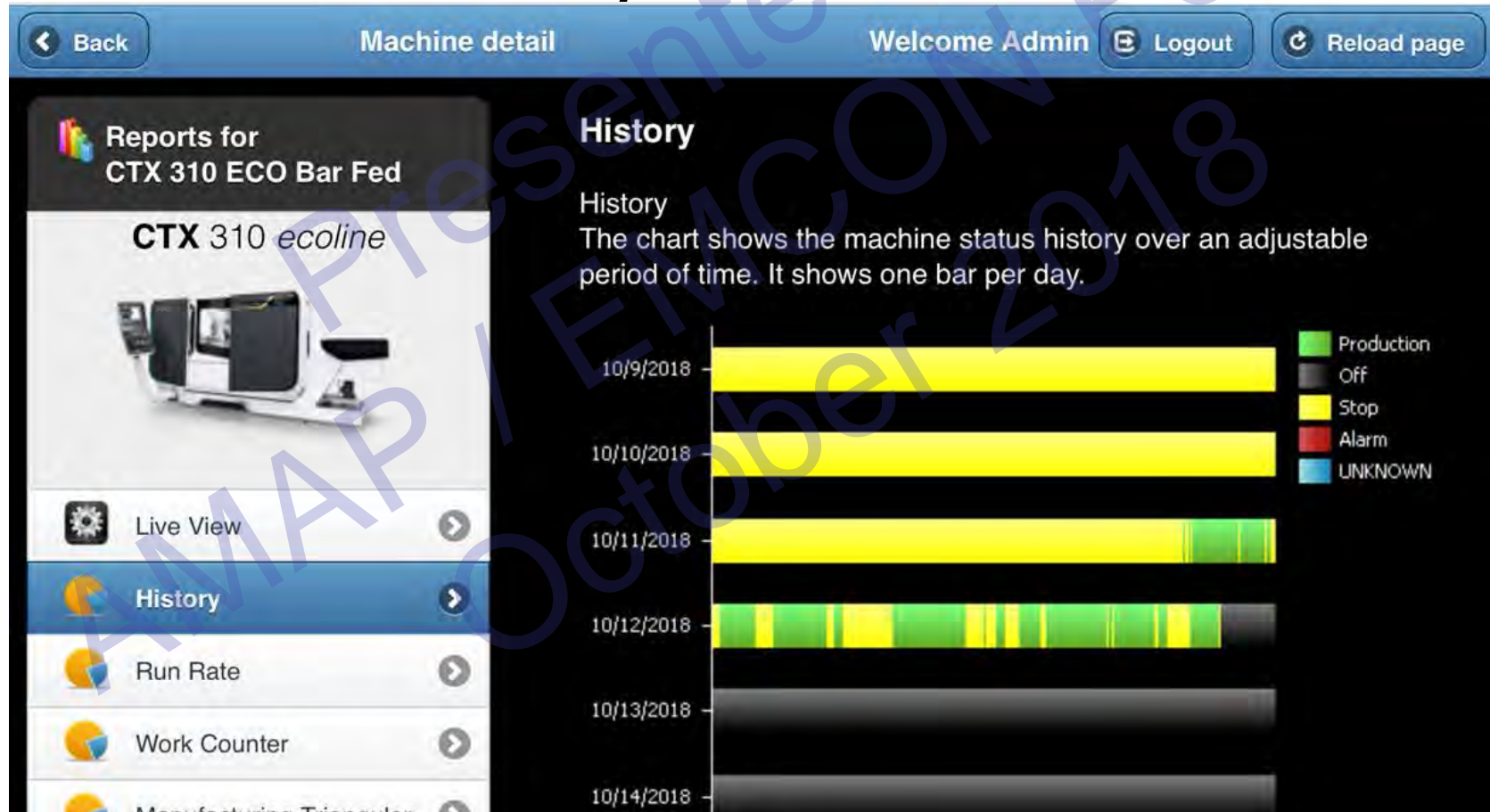
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Energy Consumption to improve Productivity and Maintenance

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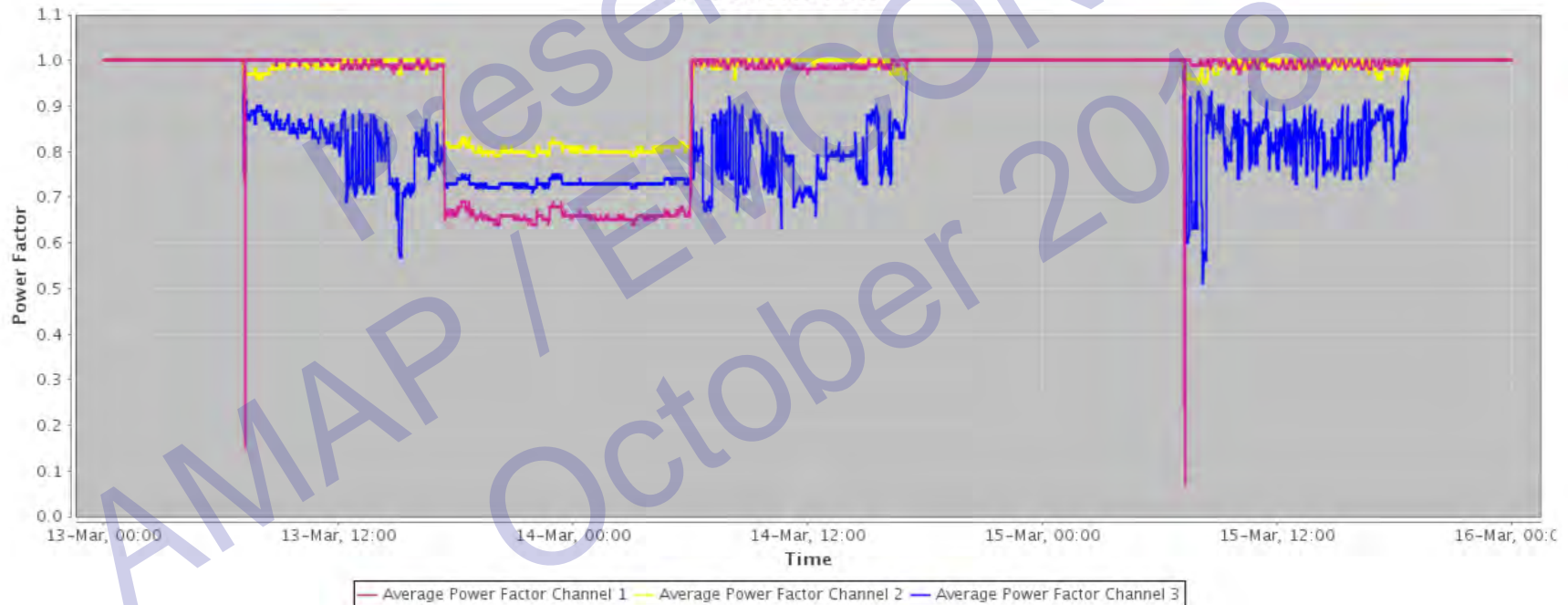# Energy Consumption to improve Productivity and Maintenance

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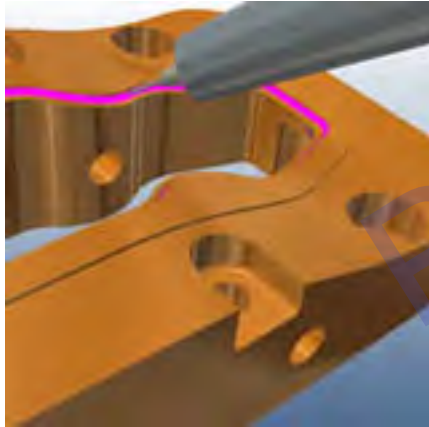

Interesting patterns
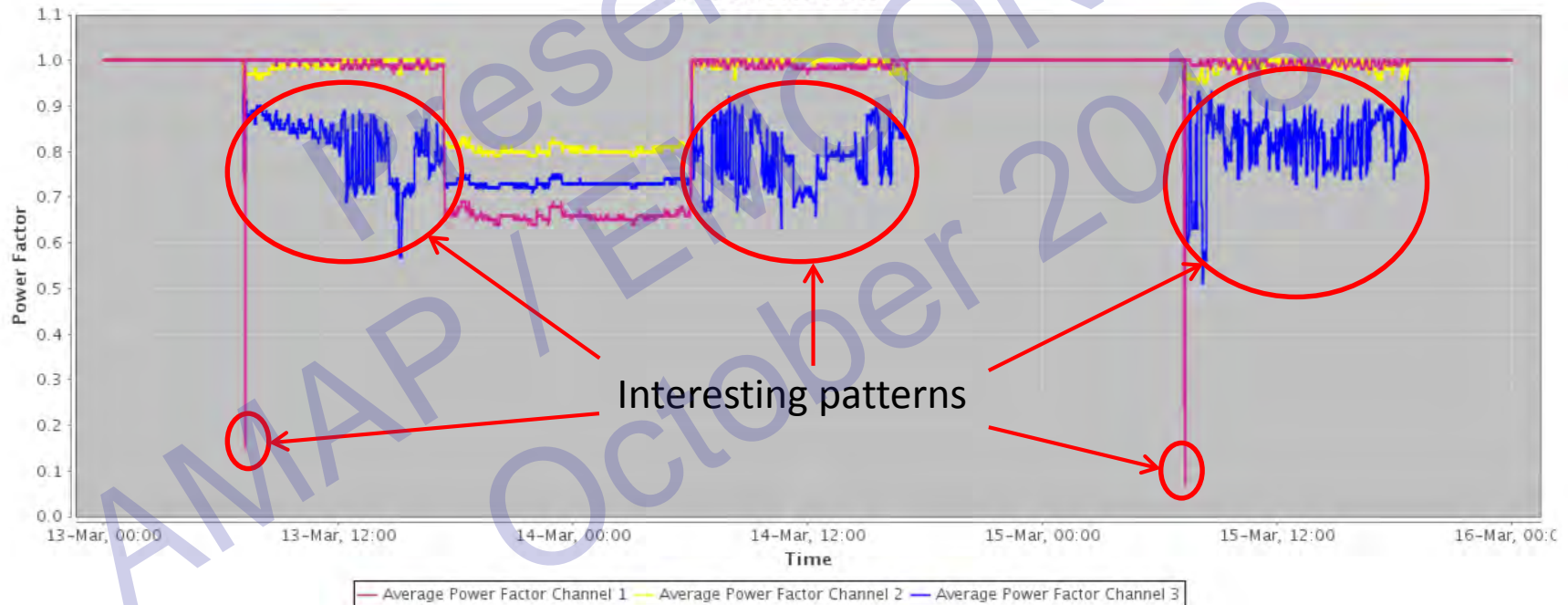
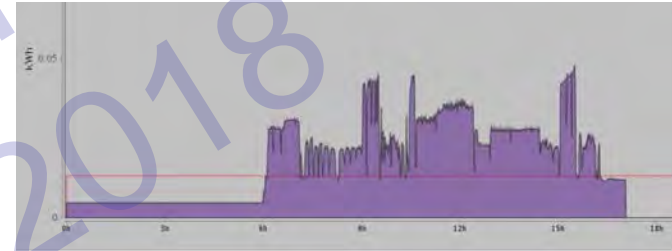# Energy Consumption to improve Productivity and Maintenance
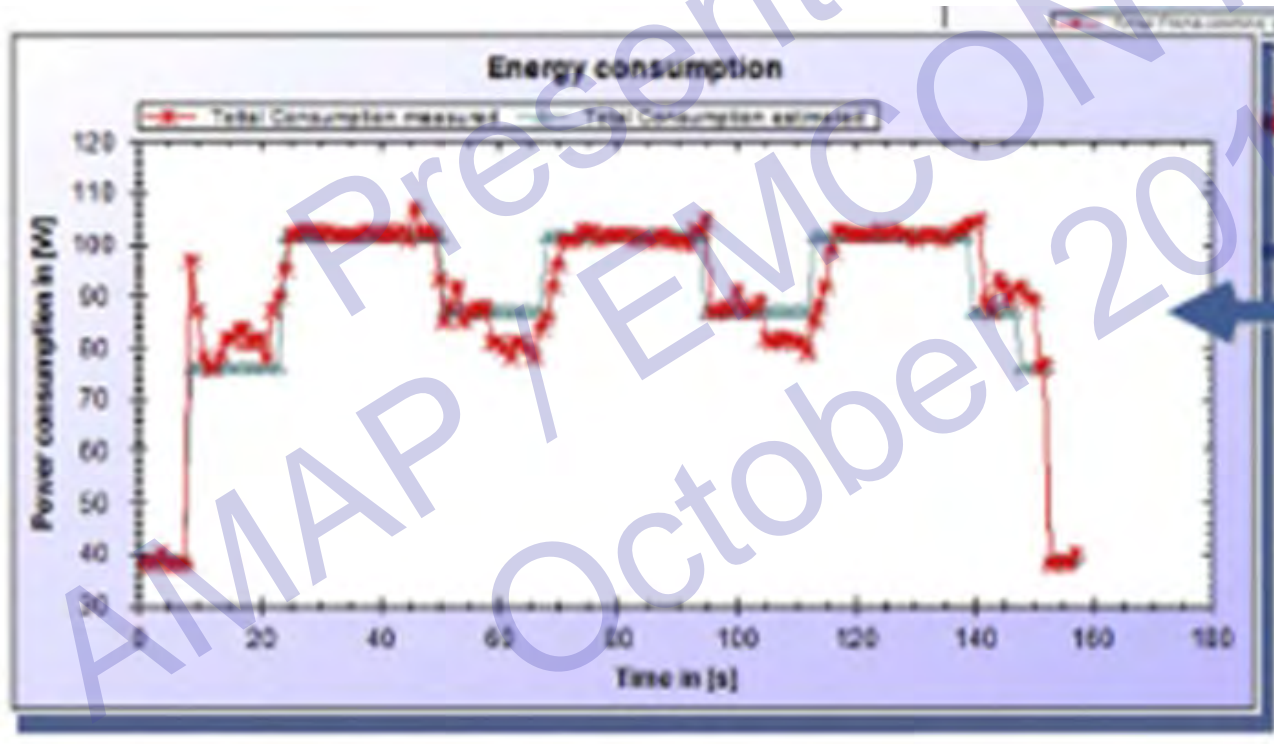
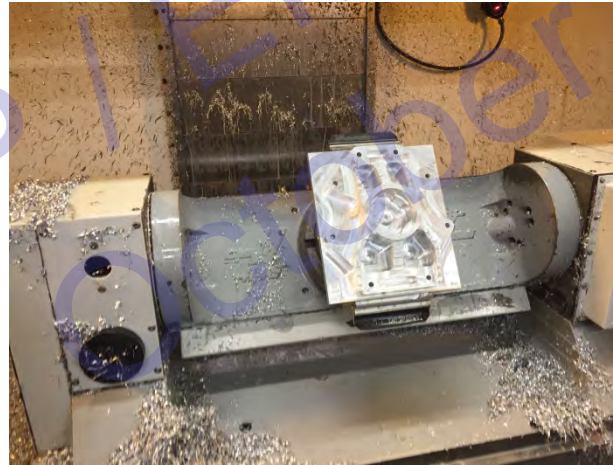Peng & Xu (2017) Show that it is possible to predict energy consumption using CAM

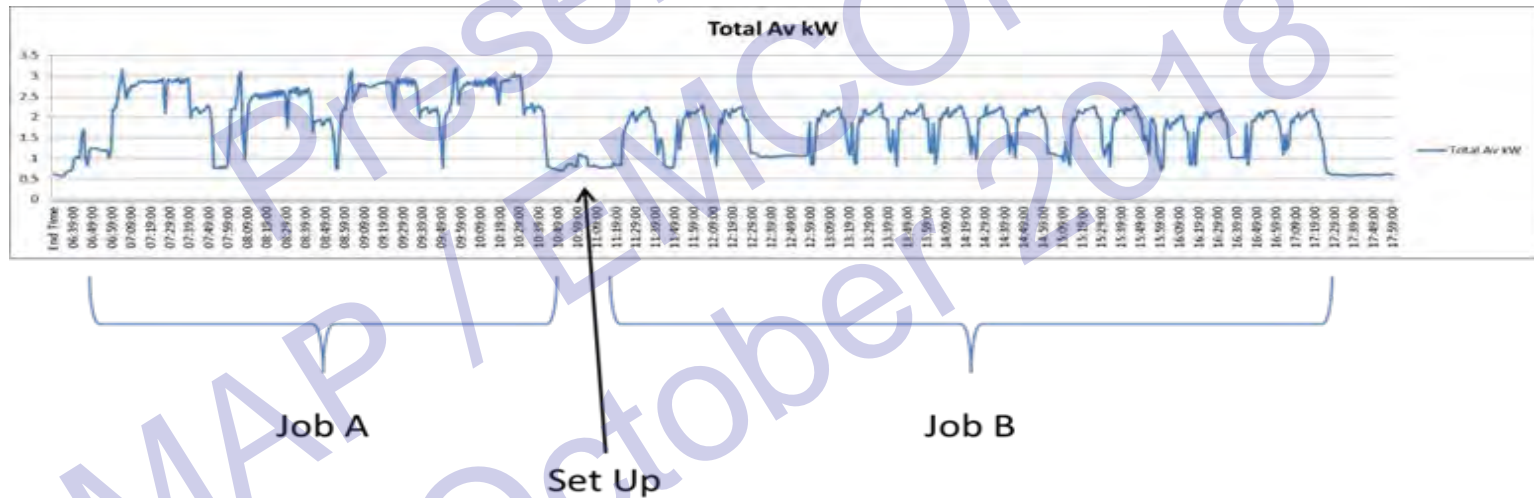# Energy Consumption to improve Productivity and Maintenance

Compare

Predict

Collect

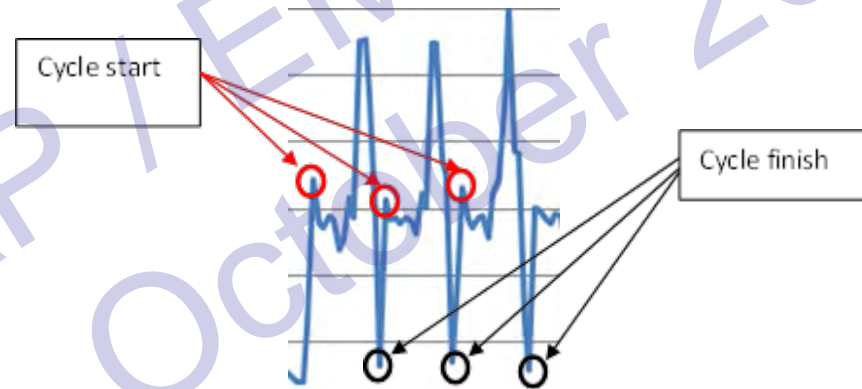# Energy Consumption to improve Productivity and Maintenance

|	Theoretical	Experimental Cut 1		Experimental Cut 2		Experimental Cut 3			Experimental Cut 23		Experimental Cut 24		Experimental Cut 25	
		Minute 1	Minute 2	Minute 1	Minute 2	Minute 1	Minute 2		Minute 1	Minute 2	Minute 1	Minute 2	Minute 1	Minute 2
Measured Power (kW)		2.23	1.97	1.76	1.96	2.28	1.84		2.25	1.75	1.60	1.79	2.05	1.77
Aux Power (kW)		0.82	0.82	0.81	0.81	0.81	0.81		0.81	0.81	0.81	0.81	0.81	0.81
Cutting Power (kW)	1.3	1.41	1.15	0.95	1.15	1.47	1.03		1.44	0.94	0.79	0.98	1.24	0.96
Time (hour)	0.0333	0.0167	0.0167	0.0167	0.0167	0.0167	0.0167		0.0167	0.0167	0.0167	0.0167	0.0167	0.0167
Energy used (kWh)	0.043	0.024	0.019	0.016	0.019	0.025	0.017		0.024	0.016	0.013	0.016	0.021	0.016
Total (kWh)	0.043	0.043		0.035		0.042			0.040		0.030		0.037	

Average over 25 cuts was 0.037kWh

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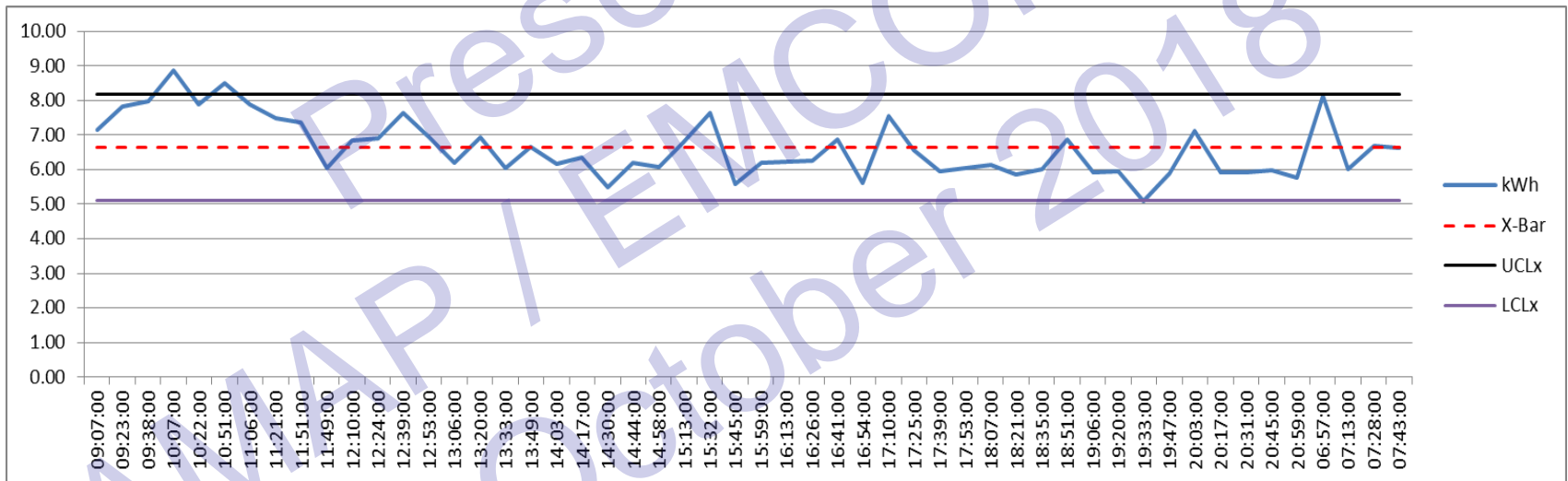
Energy Consumption to improve Productivity and Maintenance

- Process control can be established very quickly
  - Machine utilisation
  - Process parameters
- Machine condition is monitored and controlled in real time
- Cycle time improvements may be compared with energy usage to arrive at optimum solutions
- Cap Ex decisions are enhanced through better data