

# Conducting an Energy Audit

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# What is an Energy Audit?

- To save energy, you must first understand how its used
- At its simplest, an energy audit is a survey of energy use:
  - Highlight opportunities to reduce energy use
  - Quantify available savings
  - Outline potential paybacks - prioritise

# Conducting an Energy Audit

- The following questions need to be answered about how you use energy:
  - What?
  - Where?
  - When?
  - Why?

# Conducting an Energy Audit

- Walk around to key energy uses and investigate:
- kW rating
- Run hours

**W22 Premium** IE3 - 91.2%

03FEV10 0000000000

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~ 3 FRAME 132M-04 INS. CL. F Δt 80 k IP55 DUTY S1

S.F.	AMB.	ALT.	V-Δ/Y	Hz	kW	min <sup>-1</sup>	A	P.F.
1.00	40°C	1000 m.a.s.l.	380/660		7.5	1460	14.4/8.29	0.87
			400/690	50	7.5	1465	13.9/8.06	0.85
			415/-		8.5	1470	13.5/-	0.84
			440/-	60	8.5	1760	13.9/-	0.87
			460/-			1765	13.5/-	0.86

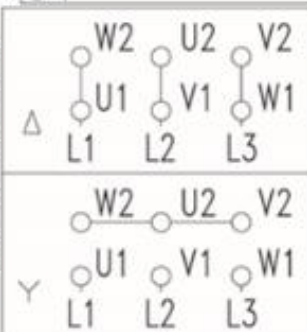
→ 6308-ZZ MOBIL POLYREX EM 78 kg

→ 6207-ZZ

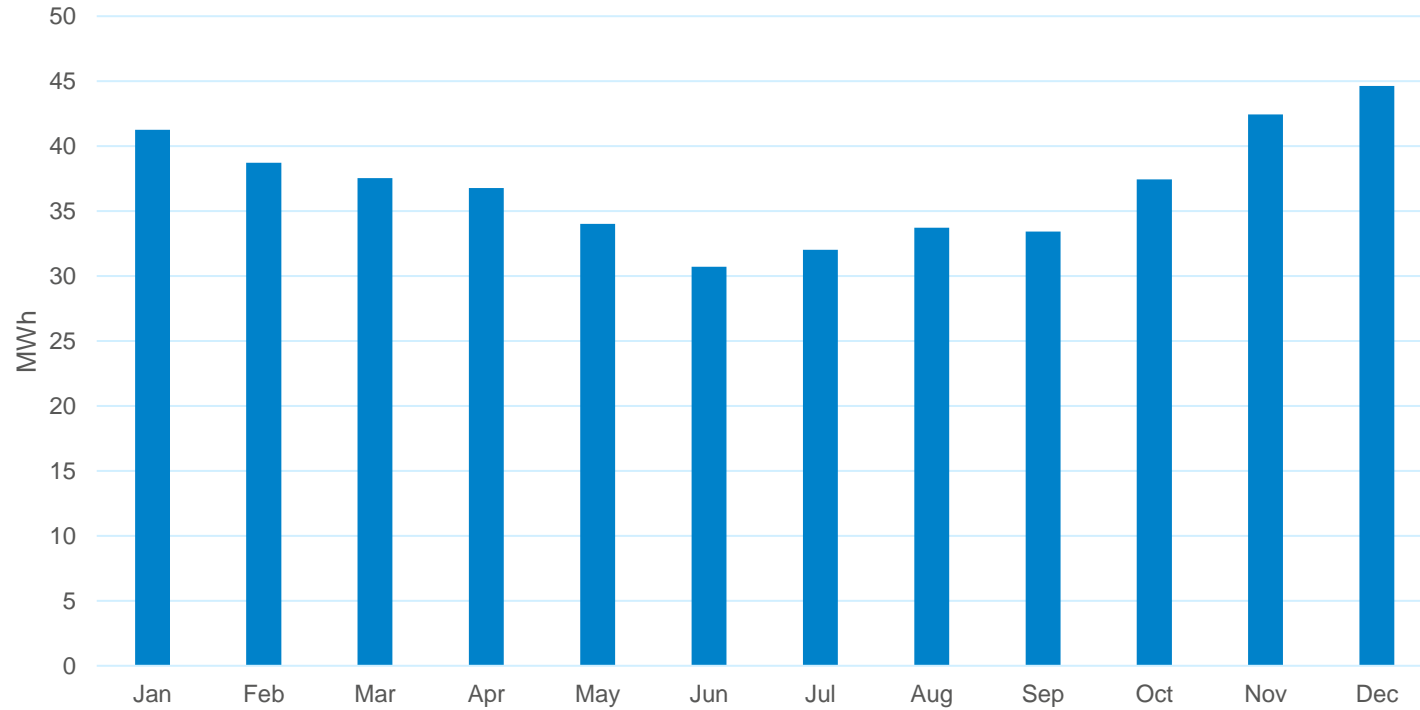
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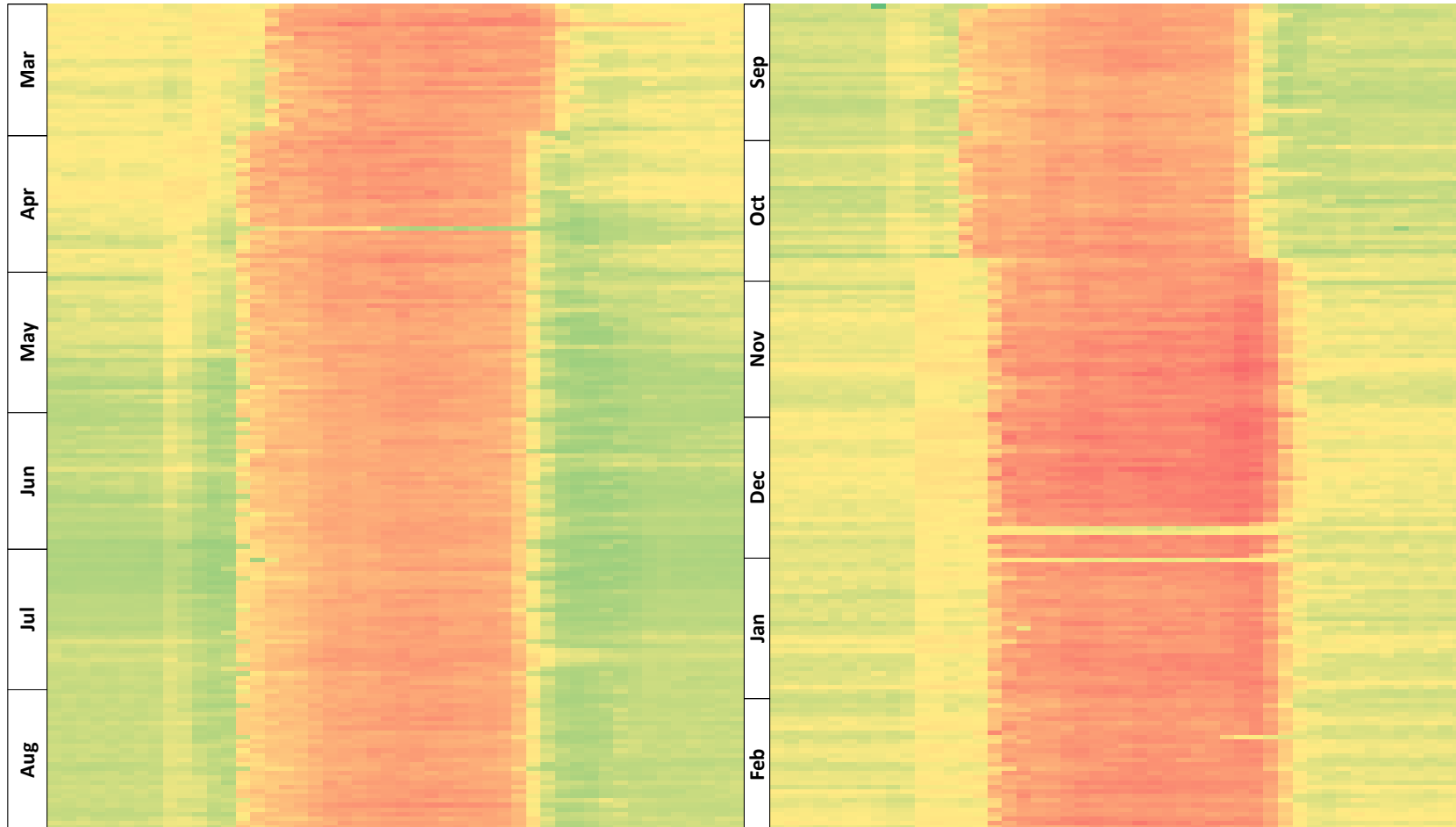
ME95 SP LR 50962 LR 38324 CE RU VDE 0530 IEC 60034



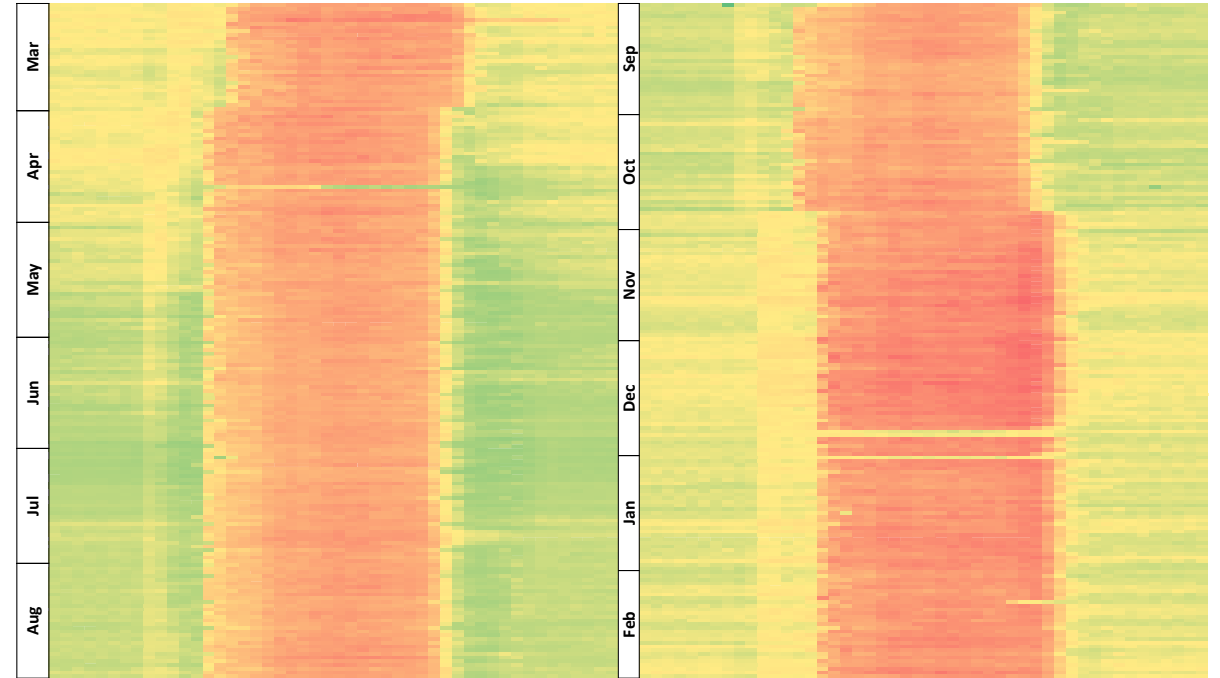
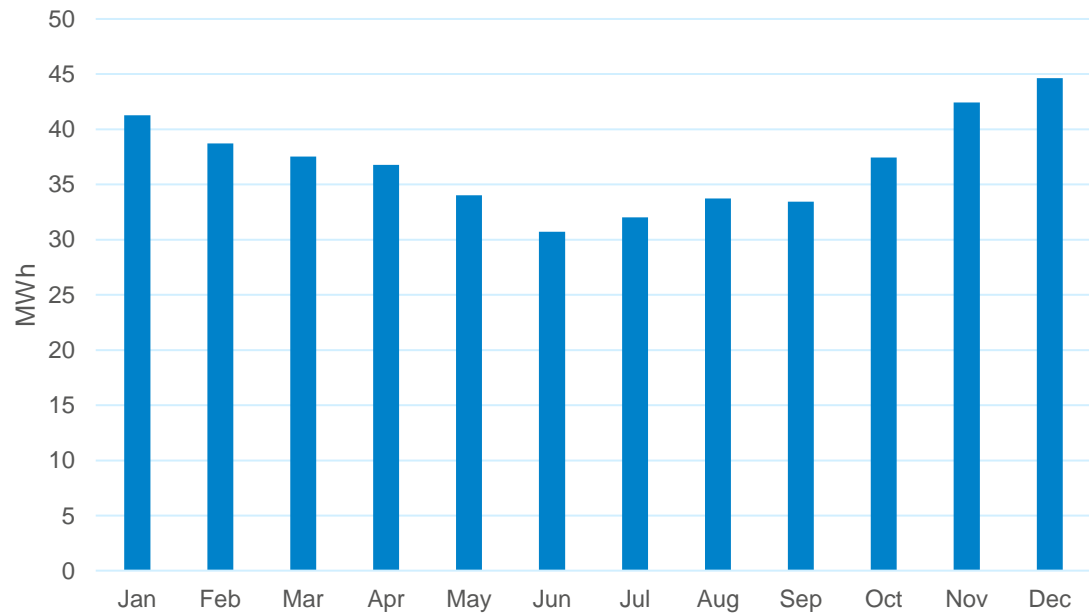
# Importance of Data



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# Conducting an Energy Audit

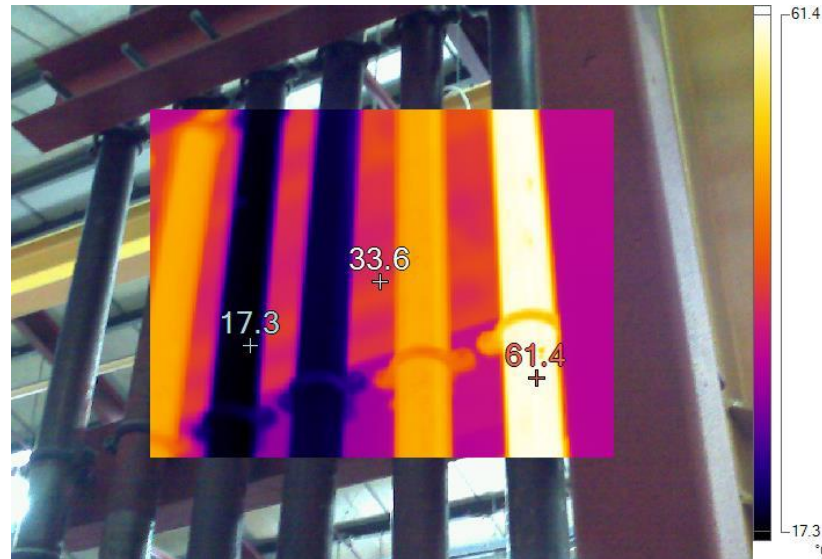
- Site walkaround and data analysis will answer the what, where, when, and why
- Next, identify areas where energy can be reduced:
  - Stop doing it
  - Do it differently
  - Replace the system





# Improving Efficiency

- Reduce Load:
- Adjust heating/cooling setpoints
- Upgrade old/inefficient equipment
- Improve insulation
- Optimise processes
- New installations



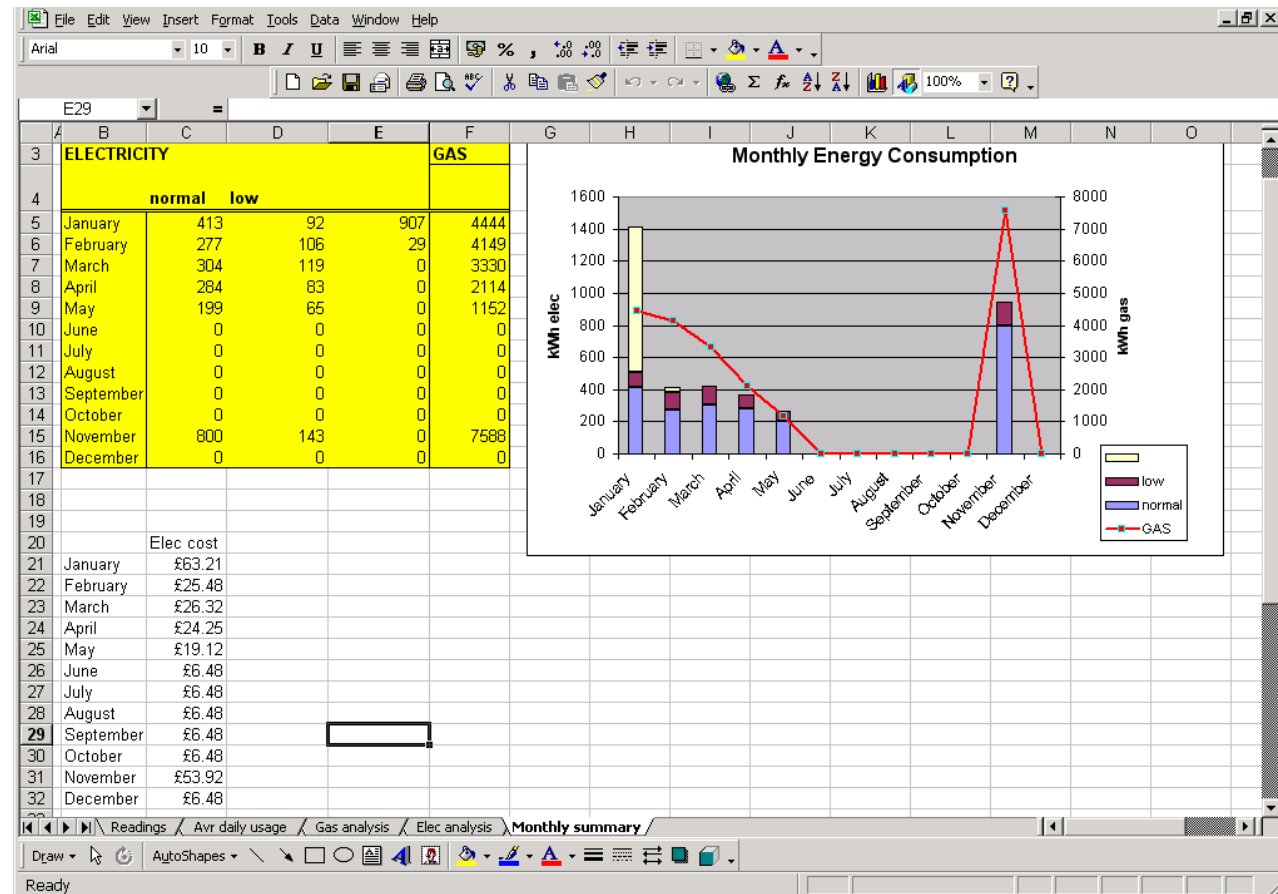
# Improving Efficiency

- Reduce Time:
- Switch off
- Improve metering/sensors
- Adjust heating/cooling setpoints
- Install timers
- Training & behaviour changes



# Improving Efficiency

- Quantify:
- Benchmark against production
- Ongoing data analysis
- Track performance & savings



# Adjusting Setpoints

- Degree-Day Analysis
- Measure of the difference between, and number of days, that the 'base temp' is:
- Below the ambient – heating degree days
- Above the ambient – cooling degree days

Setpoint	HDD	Saving
18°C	2,909	-
17°C	2,579	11%
16°C	2,264	22%



# Upgrading Equipment – Pumps

- International Efficiency (IE) rating
- IE5 capable of >94%

**W22 Premium** IE3 - 91.2%

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3 FRAME 132M-04 INS. CL. F Δt 80 k IP55 DUTY S1

S.F. 1.00 AMB. 40°C ALT. 1000 m.a.s.l.

V-Δ/Y	Hz	kW	min <sup>-1</sup>	A	P.F.
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W2 U2 V2  
U1 V1 W1  
L1 L2 L3

W2 U2 V2  
U1 V1 W1  
L1 L2 L3

6308-ZZ MOBIL POLYREX EM 78 kg  
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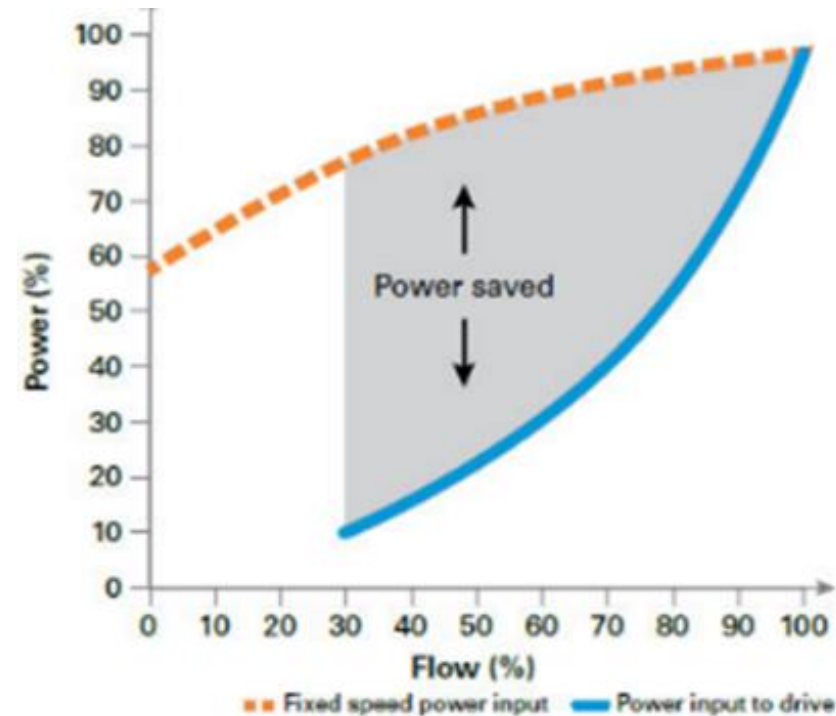
ME95 LR 50962 LR 38324 CE RU VDE 0530 IEC 60034

Rating	Hours	Losses: kWh/year	Reduction
2kW - IE3	4,000	743	-
2kW - IE5	4,000	511	31%



# Upgrading Equipment – Pumps

- VSDs
- Modulate motor speed to match the demand
- At constant speed:  
50% reduction in flow gives 10% saving
- At variable speed:  
50% reduction in flow gives 80% saving



# Upgrading Equipment – Lights

- LED lights use up to 60% less energy to deliver the same lighting levels, compared to conventional bulbs

- Additional benefits:
  - Faster response to timing/controls
  - Adjustable spectrum

Lighting	Hours	MWh/year	Saving	
1,000kW HPS	2,000	2,000	-	-
700kW LED	2,000	1,400	30%	£180,000

A scenic landscape of rolling green hills under a sunset sky. The sun is low on the horizon, casting a warm glow over the fields. A path leads from the foreground towards the sun. The sky is filled with soft, colorful clouds. In the foreground, there are several thin, white, wavy lines that look like musical notes or a decorative graphic element.

# Thanks for listening!

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