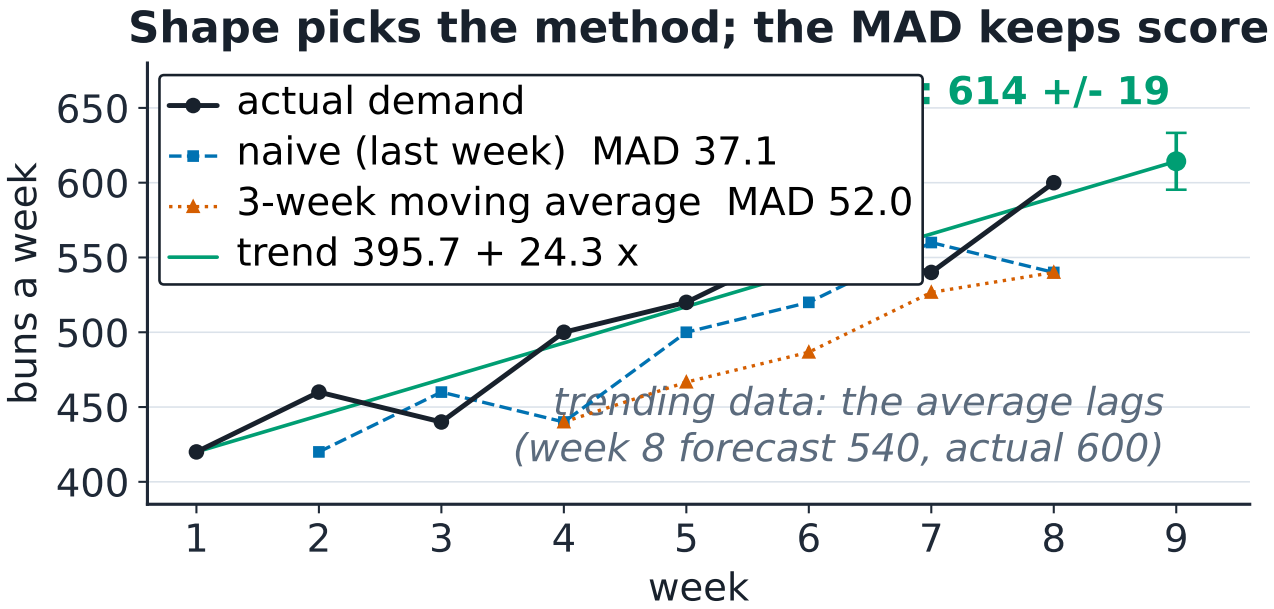
Exercise walk-through

10.7
Sustainability in operations

University Business

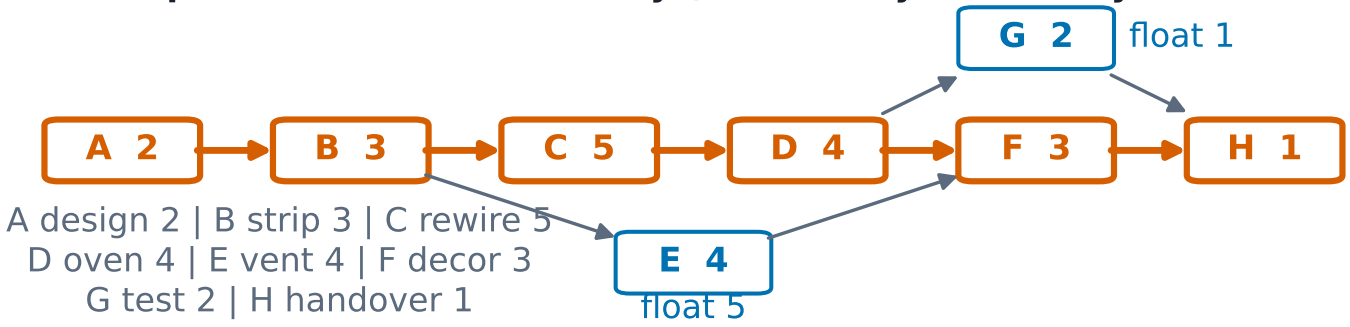
Forecasting: shape picks the method



The trend line beats the averages: week 9 forecast 614 +/- 19.

Project management: the critical path is the project

Critical path A-B-C-D-F-H = 18 days; crash C by 2 and D by 1 to reach 15

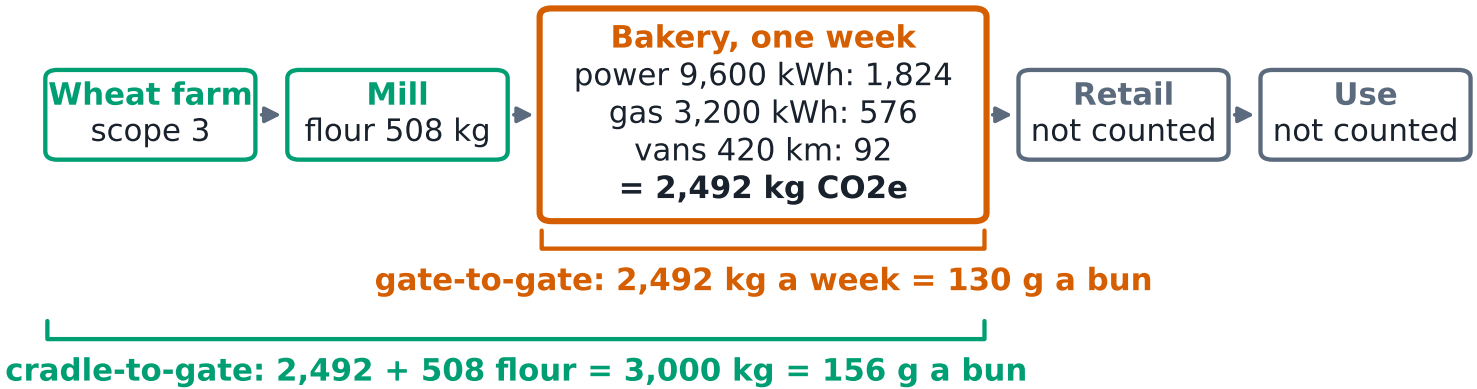




Critical path 18 days; at day 10, CPI 0.824 and EAC 72,800.

Sustainability in operations: the boundary is the claim

Same bun, two footprints: the boundary is the claim



renewable tariff at 0.06 kg/kWh cuts electricity 1,824 to 576: the site week halves to 1,244; the flour does not move

2,492 kg a week gate-to-gate; 3,000 kg with the flour counted.

Exercises 2.1·2.2

2.1 A pastry kitchen: 6,000 kWh electricity (0.19 kg/kWh), 2,000 kWh gas (0.18), 300 van km (0.22); 12,000 pastries a week. The gate-to-gate footprint and grams per pastry. [4]

2.2 Flour 600 kg a week at 0.55 kg CO2e a kg. The cradle-to-gate total and the rise in per cent. [3]

Exercises 2.1·2.2

2.1 A pastry kitchen: 6,000 kWh electricity (0.19 kg/kWh), 2,000 kWh gas (0.18), 300 van km (0.22); 12,000 pastries a week. The gate-to-gate footprint and grams per pastry. [4]

2.1

- $6{,}000 \times 0.19 = 1{,}140$; $2{,}000 \times 0.18 = 360$; $300 \times 0.22 = 66$; total 1,566 kg.
- $1{,}566{,}000/12{,}000 = 130.5$ g a pastry.

2.2 Flour 600 kg a week at 0.55 kg CO2e a kg. The cradle-to-gate total and the rise in per cent. [3]

2.2

- Flour $600 \times 0.55 = 330$ kg; cradle-to-gate 1,896 kg.
- Rise $330/1{,}566 = 21.1\%$.

Exercises 2.3·2.4

2.3 A renewable tariff at 0.06 kg/kWh. New site total, the site fall in per cent, and the cradle-to-gate fall in per cent. [4]

2.4 Trays: 26,000 single-use a year at 0.25. Returnable at 6.00, a two-week cycle, 97% returns, washing 0.04 each. Pool cost, running cost, saving, payback, and the breakeven return rate. [4]

Exercises 2.3·2.4

2.3 A renewable tariff at 0.06 kg/kWh. New site total, the site fall in per cent, and the cradle-to-gate fall in per cent. [4]

2.3

- Electricity $6{,}000 \times 0.06 = 360$; site $360 + 360 + 66 = 786$ kg.
- Site fall $1 - 786/1{,}566 = 49.8\%$; cradle-to-gate $1 - 1{,}116/1{,}896 = 41.1\%$.

2.4 Trays: 26,000 single-use a year at 0.25. Returnable at 6.00, a two-week cycle, 97% returns, washing 0.04 each. Pool cost, running cost, saving, payback, and the breakeven return rate. [4]

2.4

- 500 trays a week; pool $1{,}000 \times 6 = 6{,}000$. Losses $500 \times 0.03 \times 52 = 780$ trays $= 4{,}680$; wash $26{,}000 \times 0.04 = 1{,}040$; running 5,720.
- Saves $6{,}500 - 5{,}720 = 780$ a year; payback $6{,}000/780 = 7.7$ years.
- Breakeven: losses may cost $6{,}500 - 1{,}040 = 5{,}460$, so $1 - 5{,}460/156{,}000 = 96.5\%$ returns.