

Costs and Carbon Comparison: Thin vs Thick Clients

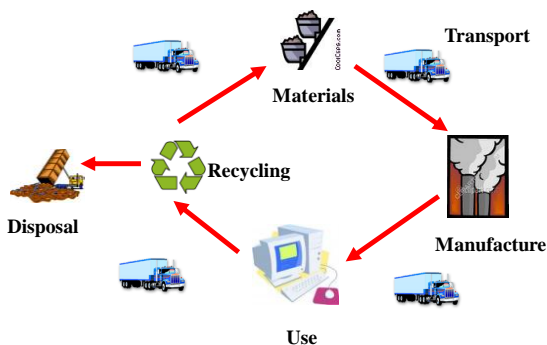
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Sustainable IT in Tertiary Education (SusteIT)

- JISC funded project
- Strategic review of ICT in FHE
- Identifying and disseminating good practice
- Guidance documents and case studies
- Tools: **Cost & Carbon Comparison Tool**
- www.susteit.org.uk

Life Cycle Impacts



Thin vs Thick Clients - Operational

Factor	Thin Clients	Thick Clients
Computing Power	Simpler applications	Most applications
Costs	Typically £300 but additional server and licence costs	£300-£600
Downtime	Very small	Can be significant
Security	Low risk	Medium-high risk
Space	Medium-low	High

Thin vs Thick Clients – Environmental

Factor	Thin Clients	Thick Clients
Materials	Smaller, lighter 2-4 kg	Larger, heavier 7-11 kg
Energy in use	Medium 15-30 W Server energy higher	High 60-80 W
Refresh cycle	Longer 6-8 years	Shorter 4-5 years

Cost and Carbon Comparison Tool - Thick vs Thin Clients

For thin and thick clients, tool calculates:

- Capital costs (clients, servers)
- Operational costs (licences, management, energy)
- Intangible costs (e.g. productivity losses)
- Carbon emissions from energy in use
- Space utilisation

Cost and Carbon Comparison Tool: Thick vs Thin Clients - Thick Clients Operational Energy and Carbon

Type in the blue areas below to amend default figures if required

Assumptions about device numbers, device power rating, energy costs and carbon emissions should be amended in the "Key Assumptions" worksheet

Equipment	Number	Watts (Active, Idle)	Watts (Standby)	Hours/year (Active, Idle)	Hours/year (Standby)	Hours/year (Total)	kWh/y per user	Aircon	Total kWh/y	Energy cost (£/y)	Carbon emissions (kgCO2/y)
Staff workstations	100	1	1	2,300	5,400	0	9		876	105	470
Student workstations	100	1	1	2,000	6,600	0	9		876	105	470
Staff monitors	100	1	1	3,300	5,400	0	9		876	105	470
Student monitors	100	1	1	2,000	6,600	0	9		876	105	470
Air conditioning overhead								0.3	1,051	126	565
Total									4,555	547	2,445

Cost and Carbon Comparison Tool: Thick vs Thin Clients - Thin Clients Operational Energy and Carbon

Type in the blue areas only to amend default figures

Assumptions about device numbers, device power rating, energy costs and carbon emissions should be amended in the "Key Assumptions" worksheet

Equipment	Number	Watts (Active, Idle)	Watts (Standby)	Hours/year (Active, Idle)	Hours/year (Standby)	Hours/year (Total)	Air con overhead	kWh/y per user	Total kWh/y	Energy cost (£/y)	Carbon emissions (kgCO2/y)
Staff workstation	100	1	1	2360	5400	0		9	876	105	470
Student workstation	100	1	1	2000	6600	0		9	876	105	470
Airconditioning overhead							0.0		0	0	0
Servers											
Thin client	2	1		8760				0.5	13	26	3
Terminal server	2	1		8760				0.5	13	26	3
Total									1905	217	969

Cost and Carbon Comparison Tool: Thick vs Thin Clients - Results

Do not amend values in this worksheet

Results shown below for evaluation period of **8** years

Results	Thick Client	Thin Client	Costs/Savings Thin Clients
Numbers of devices (#)			
No. clients	200	200	
No. thin client servers (including disaster recovery)	0	2.0	
No. terminal servers (including disaster recovery)	0	2.0	
Capital Costs (£)			
Purchase cost clients (incl. VAT)	400	200	
Purchase costs of thin client servers		4	
Purchase costs of terminal servers		4	
Sub-total capital costs	400	208	192
Operational Costs (£)			
Thin client software licence costs	Not applicable	200	
Thin client Windows licence costs	Not applicable	1,600	
Terminal server Windows licence costs	Not applicable	0	
Energy consumption costs (including servers & a/c)	4,373	1,732	
Management support costs	440,000	44,800	
Server maintenance costs	Not applicable	32	
Sub-total operational cost	452,373	48,364	404,009
Intangible Costs			
Productivity impacts	0	0	0
Total costs over evaluation period	452,773	48,572	404,201
Carbon Emissions (kg CO2)	19,570	7,251	11,817
Space utilisation (m2) (assuming devices permanent ov	200	200	0

Input Values - Real Example

	Thin Clients	Thick Clients
No.	100	100
Refresh cycle	6 years (clients) 5 years (servers)	4 years
Power	15 W; 1 W	79 W; 4 W
Clients per supporter	288	100
Downtime (hr/wk)	0	0.25
Space (m2)	0.135	3

Results – Real Example (8 years)

	Thick	Thin	Thin Client Savings
Capital costs (£'000)	119	42	77
Operational Costs (£'000)	2253	105	148
Intangible costs (£'000)	160	0	160
Total costs (£'000)	532	148	384
Carbon (kg CO ₂)	129	80	49

Key Variables Affecting Energy

- Power of client in different modes
- Time spent in each mode (some thin clients are 'always on')
- a/c overhead for computer suites and server rooms
- Lifetime of client (impacts on lifecycle energy)

Issues

- Operational costs generally higher than capital– largely management support costs
- Energy costs low proportion of operational costs
- Productivity costs can be very high!
- Total energy usage largely depends on usage rather than server energy

Will Thin Clients Save the Planet?

- Compared to standard desktop – lower energy/carbon in use; reduced pollution/waste over lifecycle
- Compared to very low energy PC or laptop – environmental differential reduced
- Need to weigh up operational factors, costs and environmental issues

THANK YOU!

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