how green is tex

some thoughts

bachotex 2023 meeting
Introduction

• tex can sometimes be demanding
• this means that users want fast machines
• powerful computers often have a higher baseline usage
• tex services / compile farms spend much time idling
• server rooms often need to be cooled
• usage has to compete with background media usage (music, web, zoom)
• energy prices went through the roof in 2022
• green energy is not always available (at night, hopefully idling)
• we an use solar power during the day (but need some margin)
• we have to take very long term usage into account

servers
farm
solar
Engines

- the size of the code base
- dependencies on other systems (libraries)
- compilation by experts or users (dependency)

luatex code base
luametatex code base
texlive installation
context installation
Deployment

- archives (many copies)
- installation (bandwidth, 5-10GB vs 0.3GB)
- updating (deltas)
- maintenance (teamwork)
Hardware

- costs (future machines)
- lifetime (compare to cars)
- processor, disk, memory
- runtime (not faster)
Running

- format files (concept)
- initialization (initial, successive)
- resources (fonts, patterns, styles, sources, images)
- local vs remote access (file servers)
- change in usage (web, local, often, occasional)
A recent engine

- independent code base
- optimizing memory access
- accept single core
- assume caching in memory
- optimize critical scanning
- identify bottlenecks
- prevent push back
- etc
Infrastructure

- reuse hardware
- accept less redundancy
- aim for low power
- energy neutral
## Calculation

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price per kwh: 0.50