

Green RSE and Green HPC Training

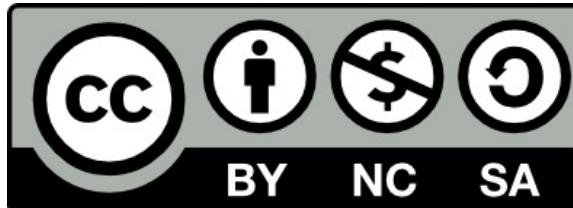
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Green RSE in the UK

- Lots of interest and activity on this
- Relevant resources
 - NetDRIVE: <https://eng.ox.ac.uk/netdrive>
 - Environmentally Sustainable Computational Science (ESCS) Forum: <https://forum.escs-community.org/>
 - GreenRSE SIG within Society of RSE: <https://socrse.github.io/green-sig/>
 - Green DiSC: <https://www.software.ac.uk/GreenDiSC>
 - Digital Humanities Climate Coalition Toolkit: <https://sas-dhrh.github.io/dhcc-toolkit/>
- How do we coordinate better across different countries?

Green HPC Training: Motivation and inception



- Develop training materials to introduce greenhouse gas (GHG) emissions issues in the context of HPC systems
 - Accessible to all HPC stakeholders: researchers/users, RSE/RTP, service operations staff, people responsible for designing procurement processes
 - Not aiming for a technical course on programming for emissions efficiency
- Based on the existing, open-source Green Software Practitioner course from the Green Software Foundation:
<https://learn.greensoftware.foundation/>
 - Modified and expanded to focus on HPC systems and use ARCHER2 as an example throughout

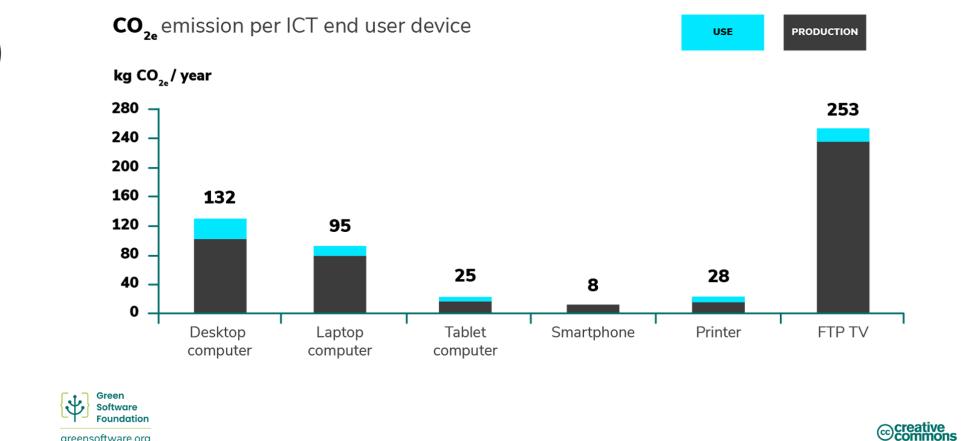
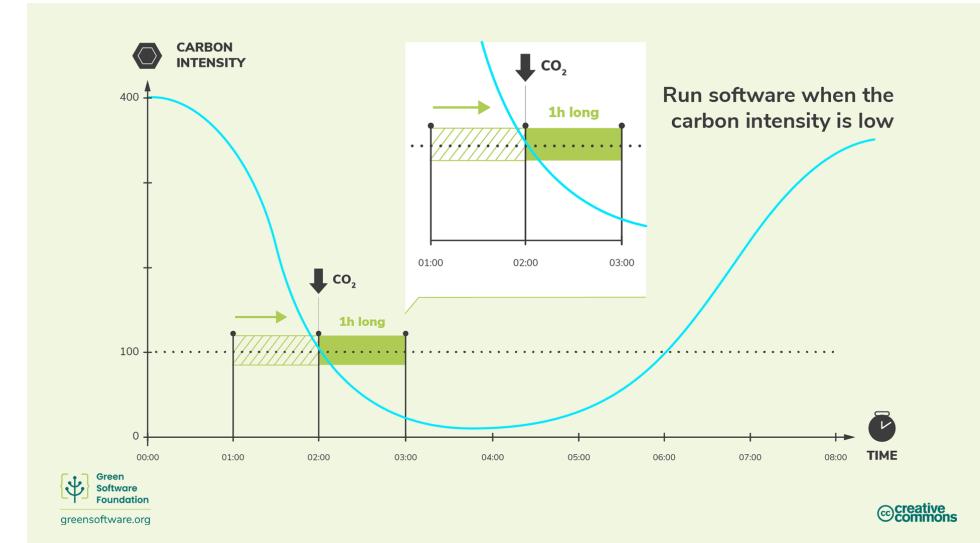
<https://carpentries-incubator.github.io/green-software-hpc/>



Main topic areas

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- **Energy Efficiency**
 - Scale of emissions from electricity generation
 - PUE and energy proportionality
- **Carbon Awareness**
 - Introduction to energy markets: dispatchability and curtailment
 - Demand shifting and demand shaping
- **Hardware Efficiency**
 - Embodied emissions and amortisation
 - Impact of increasing utilisation and performance on emissions efficiency
- **Measurement**
 - Approaches for measuring emissions (embodied and operational)
 - Defining metrics to measure, predict and quantify emissions reductions
- **Reducing Emissions**
 - Differences between carbon neutral and net zero
 - Carbon abatement and carbon offsets
 - Approaches to reducing emissions from HPC system use



Summary



- Lots of work and interest in Green RSE topics in the UK
- ***How can we connect worldwide work in this area together?***
- Continuing to deliver Green HPC workshops
 - Gathering feedback and improving materials
 - Would be keen to hear back from others who have used/taught the material
- ***What other (training) resources are needed to support RSEs in understanding and reducing emissions?***
- If interested see Green RSE channel on RSE Society Slack workspace to connect with people