#EGI2023

Strategies for Compensating the Environmental Impact of a Data Center

J. Pansanel

Introduction

Green Computing?

- Green computing does not exist!
- Computing is an extremely polluting industry
- Many elements from mining, chemistry, logistics, energy and huge quantities of pure water
- Won't even mention recycling, a real shame for the advanced civilization we're supposed to represent
- As IT specialists (software engineer, IT architect, …), we cannot solve all the problem
- But we can contribute to reduce our environmental footprint

IT Lifecycle

Responsibility of the consumer,
with a strong influence from the manufacturer

Responsibility of the manufacturer,
with an influence from the consumer

Global Vision

Assess your environmental footprint (EF)

- Metrics are the key point of the assessment
- Many parameters can be taken into account: overall power usage, water consumption, waste quantity, workload efficiency, PUE, …
- Environmental audit can help you to choose the right metrics
- Before to compensate, reduce it!
  - EU CoC: https://e3p.jrc.ec.europa.eu/communities/data-centres-code-conduct
  - Increase your cooling temperature, re-use heat
  - Separate as much as possible cold air flow and hot air flow
  - Free-cooling
  - Raising user awareness about environmental cost of IT
  - Use renewable energy
  - ...

EF Compensation

Carbon / Climate change related footprint

- One of the most simple item to compensate
- Be involved in the development of a carbone sink
- Require to know your carbon footprint (CF)
- CF = Electrical Energy Consumption x gCO_2eq / kWh of your energy provider
- Electrical Energy Consumption of the SCIGNE platform[1] in 2021: 640 000 kWh
- gCO_2eq / kWh in France[2] in 2021: 58
- Amount of carbon to compensate in 2021: 37 tons
- For comparison, amount of carbon per server (manufacturing phase): 1 ton

1. https://scigne.fr
2. https://www.eea.europa.eu/ims/greenhouse-gas-emission-intensity-of-1

EF Compensation

Carbon compensation

- Major players are using carbon markets to bought carbon credits (i.e. Google)
- Not adapted to the scale of an edge data center
- Financing carbon sequestration or mitigation projects:
  - Forestry, blue carbon (seagrass meadow, bog, sweatland)
  - Renewable energy
  - Energy efficiency / Fuel Switching
  - Waste disposal
- ~ 10 € per ton per year (agro-forestry)
- 2 labels for compensation:
  - Voluntary Gold Standard: https://www.goldstandard.org/
  - Verified Carbon Standard: https://verra.org/programs/verified-carbon-standard/

Recycling

E-Waste

- Management of WEEE is governed by several European directives (2002/95/CE, 2002/96/CE, 2011/65/UE and 2012/19/UE)
- Current status in Europe: https://environment.ec.europa.eu/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en
- Work with a certified partner for the full recycling of your e-waste
- Most countries have implemented these directives and provide solutions:
  - https://www.gov.pl/web/nfosigw/program-life-a-gospodarka-o-obiegu-zamkniety m
  - https://www.hse.gov.uk/waste/waste-electrical.htm
  - https://www.tyk.org.tr/en/
  - https://www.economie.gouv.fr/cedef/dechets-equipements-electriques-electroniques-deee
  - ...

The Process

Questions ?