



Contribution ID: 556

Type: **Parallel session talk**

Green Accelerators? Lessons learned from ESS.

Wednesday 23 August 2023 10:10 (20 minutes)

The costs of operating big science facilities, for example accelerators, are very large, and depend critically on the price of primarily electricity, but also of water and other utilities. This means that facilities must be energy and resource efficient. Facilities should at the same time also be environmentally sustainable. Finally, in these times with very high energy prices, all efforts must be made to keep the cost of operations at a reasonable level.

In fact, these targets pull in the same direction.

Efficient use includes not only the actual electrical efficiency of the existing equipment; it also means optimizing the whole facility for use of all energy. This will also help limiting the operations cost.

At ESS a goal was to incorporate elements for sustainability already at the design stage in order to increase sustainability [1, 2]. ESS today sells the high temperature cooling water to provide the local heating grid with energy, and provisions exist to use also lower-temperature water for heating purposes. The contribution will exemplify the trade-offs and considerations that were made, and what could have been implemented in a better way.

A lot more can be done, and given the huge electrical power use almost any measure to save power will pay off quickly. The contribution will go over some of the possibilities and combinations that exist: Energy storage, solar panels, novel DC/DC converters to power equipment directly from solar panels, bio-fueled gas turbines, energy brokerage (buying electric power on term contracts to limit market exposure).

ESS is also an active participant in various EU-programs that target sustainability, energy innovation, and flexible use of power [3, 4]. Many accelerator sites have large areas where for example solar panels or energy storage facilities can be installed. This kind of sustainability is part of the future for ESS.

References

1. T. Parker (ed), ESS Energy Design Report, ESS-0001761 (2013)
2. S. Peggs (ed), ESS Technical Design Report, ESS-2013-001 (2013)
3. iFAST, Horizon 2020 proposal No 101004730 (2020)
4. FlexRICAN, Horizon 2023 proposal No 101131516 (2023)

Collaboration / Activity

Accelerators for HEP

Primary author: Dr SUNESEON, Anders (European Spallation Source ERIC)

Co-authors: Mr HEDIN, Kent (European Spallation Source ERIC); Dr ESHRAQI, Mamad (European Spallation Source ERIC); Mr KALAFATIC, Marko (European Spallation Source ERIC); Dr LINDROOS, Mats (European Spallation Source ERIC)

Presenter: Dr SUNESEON, Anders (European Spallation Source ERIC)

Session Classification: T13 Accelerators for HEP

Track Classification: Accelerators for HEP