

SÉMINAIRE ÉNERGIE – ENVIRONNEMENT
Conférences 2023 - 2024

Why we need battery swapping for the future transport and electric systems

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**Uni Carl Vogt – Salle 1 (rez-de-chaussée)
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L'orateur

António Vallera graduated in Electrotechnical Engineering at IST, University of Lisbon, and obtained his PhD in the University of Cambridge (Cavendish Laboratory). He became a professor at the Faculty of Sciences of the University of Lisbon, and retired as vice-rector, but remained active in research.

His long interest in energy focused first on solar technology, but in recent years his main interest is the transition to decarbonized energy and transport systems.

La conférence

Decarbonization of road transport will have a large impact on the electric system: we consume much more energy in the form of diesel or gasoline than electric energy.

When simulating the impact of electric mobility in a decarbonized electric system, we were disappointed by the poor performance of such promising technologies as V2G (vehicle-to-grid) within any realistic assumptions.

This is the reason we decided to study the battery swapping alternative, which decouples battery charging from vehicle use; and the deeper we delved into the study, the more we were struck by how so many problems of the combined road transport and power system were solved by this model for road transport.

Battery swapping outperformed so outstandingly all other models that we were surprised to find that our study of the consequences of the BSwap model in a national electric system was the very first one to be published.

In this seminar, I shall illustrate the result of applying the battery swapping model using two exemplary system problems:

1. How a national grid with a power matrix dominated by solar and wind generation may tame its huge balance problem with the help of a BSwap mobility model.
2. How a small region, where solar PV is the only viable local energy resource, originally totally dependent on a low-quality national grid, may achieve (i) a more stable power supply with (ii) a lower cost, (iii) a very high integration of locally generated power, and (iv) a large decrease in emissions.

We hope other researchers and decision makers will deepen and extend this study, and include the BSwap model as an alternative for the future transport and power systems.