ENERGY SAVINGS WITH SENSOR DATA

Support for data-driven energy efficiency measures for public transport

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Nyttor och effekter

An overarching decision support tool using sensor data in public transport to reduce energy consumption is being developed. Several specific test cases to apply the tool have been identified. Here we will focus on the application to one particular case.

The case is to reduce energy consumption in *parking mode*. The aim is to set up a fully functioning all weather *parking mode* for metro trains, commuter trains, or trams that are parked either in a depot or in open space during non-operational hours. Primary goals are to achieve energy savings by: (1) lowering the indoor setpoint reference temperature (2) increase the recirculation of cabin indoor air (if possible), (3) lower the fresh ventilation air flow rate (if possible) and (4) ensure compliance with safety standards and without compromising the normal functioning of the HVAC unit.

The benefits are energy and cost savings for the operator as well as the public transport authority.

Aktörskonstellation

The key partners in the constellation are:

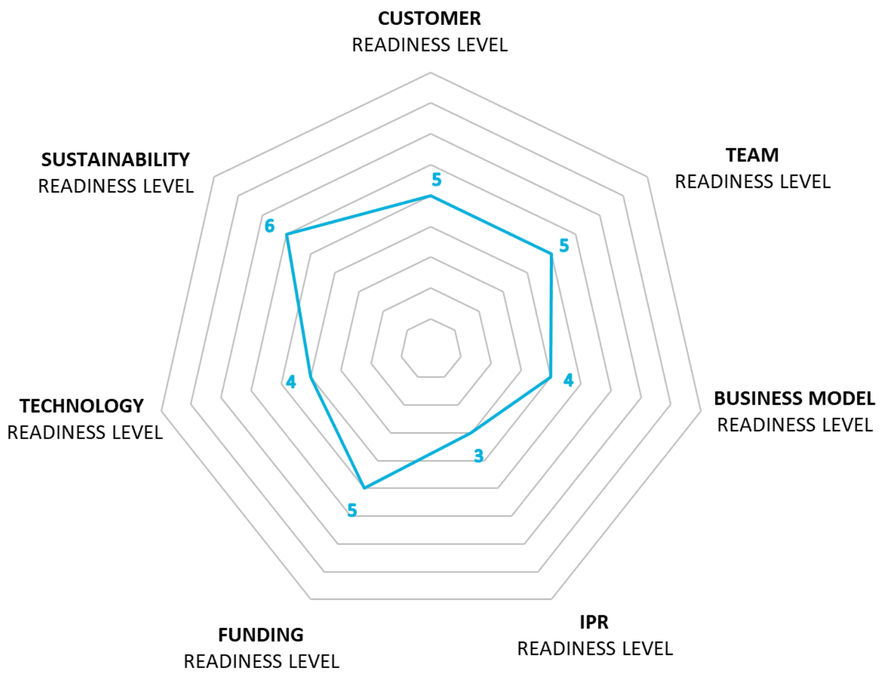
- MTR (metro operator) who have access to vehicles as well as data and parameter setting
- Trafikförvaltningen (public transport authority) to collect and analyse the data and project manage. They are the main actor to receive the benefits from the measure.
- KTH to perform modelling and data / cost analysis including details on settings for different variables to balance energy consumption and ensure comfort
- Alstom (provide vehicles + software) could be needed to make software adjustments
- SJ (commuter train operator), potentially for future applications (won contract which MTR previously had)
- Passengers, the final consumers – the energy saving measures must not negatively affect passenger comfort.

Leveranser

Following the application of the decision support tool, the following are expected:

- Definition and access of the data required
- Business model canvas (BMC) for the measure
- Cost benefit analysis (CBA) of measure
- Test plan to implement and test features and enhance CBA and BMC
- (*If successful test*): implementation plan for measure (including full BMC and CBA)

Innovationsstatus



The main client for the measure (parking mode) is *Trafikförvaltningen* who receive cost and energy savings in line with their strategy for green transition, and also provide data for their sustainability reporting and follow up of their own sustainability and business goals.

The team and funding is secured for the first stages and modelling (technical and business) has been done. First test in real-world environment is planned in Q4 2024 or Q1 2025.

Vidareutveckling och implementering

There are two clear areas for further development and implementation:

The decision support tool

The tool will be used in the application of this and other measures and will be adjusted and refined to best suit the stakeholders' needs and create most benefit. Benefit in this case is both energy savings and cost savings.

The measure *parking mode.*

Here the status is that we are in the test planning stage. The test should be performed Q4 2024 or Q1 2025. Following this there may be further tests and evaluation before a recommendation for implementation. Following the decision support tool and also for the interests of the actors involved, the test and implementation are planned in such away to gain maximal replicability of the measure. This includes replicability to other vehicles (same type e.g. metro, but also other type e.g. commuter trains) as well as replicability to other locations.

Parallel work to the project is ongoing in trafikförvaltningen whereby structure and technical support for management of sensor data for energy efficiency savings for public transport is ongoing and synergies are made with this work.

Med stöd från
VINNOVA Sveriges innovationsmyndighet
Energimyndigheten
FORMAS
Strategiska innovations-program
Infra Sweden