Autonomous shuttles

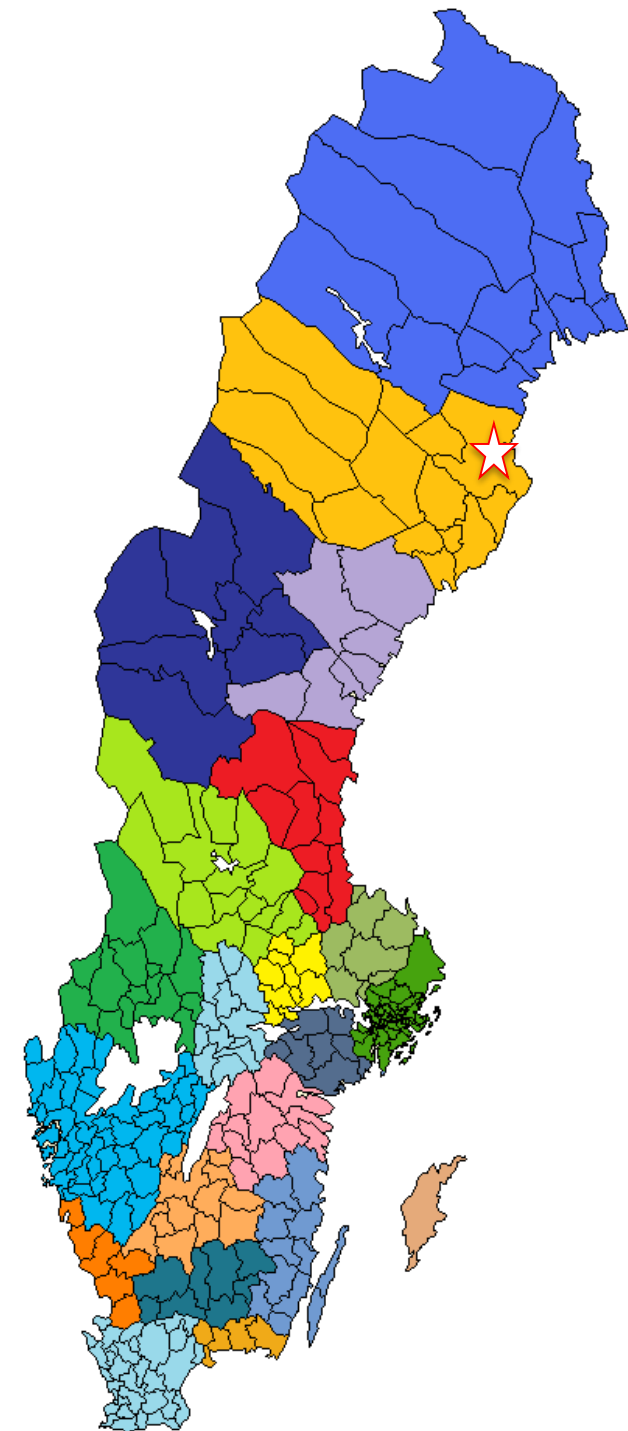## in the countryside of northern Sweden

Skellefteå kommun

Skellefteå

- A large municipality in the north of Sweden (almost the size of Skåne)

- 72.723 inhabitants (36.414 live in the town of Skellefteå)

- 13.350 are living in the countryside (as defined by SCB).

The autonomous 100 % electric shuttles

Driverless 100% electric shuttles who navigate using odometry, IMU, LIDAR, GPS and cameras.

- Main use: First and last mile coverage

- Type of service: Non-stop, scheduled or on-demand

- Cost: The driver costs are about 50 % of the total public transport cost so a lot of money can be saved

- Test areas: Cities

Next year: Test in Finnish Lapland (Muji + Sensible 4)

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Our vision

With the press of a button people living in the countryside can order the autonomous electrical shuttle where and when they need it.

The autonomous electrical shuttle transports the passenger to the nearest service location, or to the bus stop where it let him/her wait in the warm and lit vehicle until the regional bus arrives.

Rullande busskur
– framtidens kollektivtrafik på landsbygden?

www.skelleftea.se/projektrullandebusskur

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Pilot study in Skellefteå: *the Rolling bus shelter*

A six month pilot study "the Rolling bus shelter" has just been completed.

- Funded by the strategic innovation program InfraSweden 2030
- A partnership between Ramboll, the municipality of Skellefteå, Skellefteå buss, Region Västerbotten, K2 and RISE.

Main objective: To prepare the ground for a real test project with autonomous electric vehicles in the countryside of Skellefteå

Why in Skellefteå?

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New parameters

- Countryside

- Cold climat

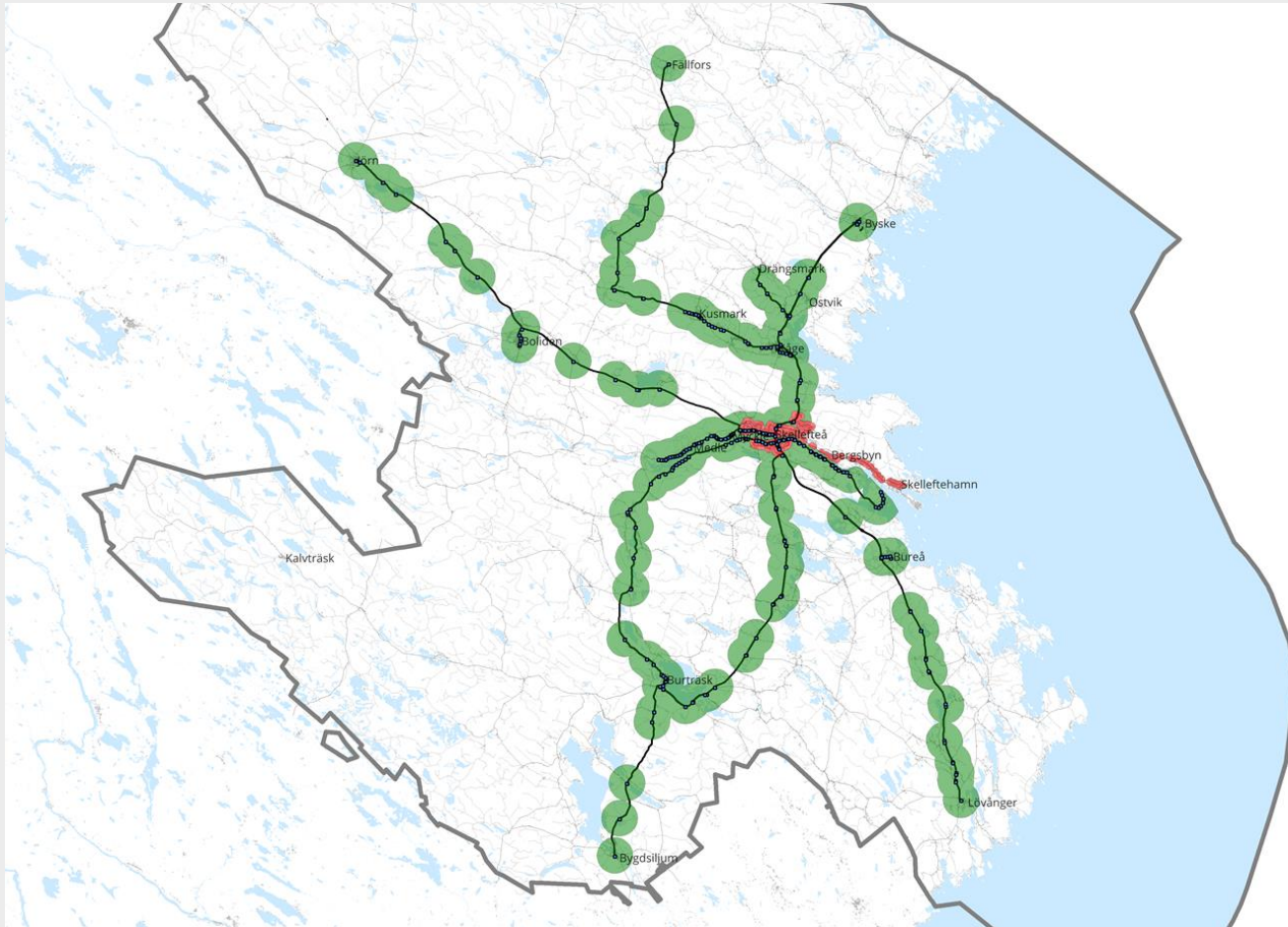- Lots of snow

- Target a different category of people

Other relevant ongoing projects in the region:
- Battery factory (Northvolt)
- Electrical buses in the city bus system
- Renewable energy/charging infrastructure (Skellefteå kraft)

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Why now?

The new public transport system

Starts in August 2019

- Focus on commuters living in the more densly populated areas (gives 85 % of the population 2 km or less to the nearest bus stop)

- Outcome: The countryside is left without public transport

- Solution: On-demand shuttles in the countryside, preferable autonomous to lower the cost

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Aims for the pilot

- Find a suitable test area

Not to long, not to steep (max. 10% inclination), inhabited, relatively close to a regional bus line, with charging possibilities, owned by the municipality

- Identify infrastructural needs

Charging possibilities, what is needed for the shuttle to know where it is (poles where no houses are), turning zones in both ends

- Cooperations with vehicle manufacturers

Is driving in the harsh countryside in the north of Sweden interesting for the manufacturers?

- Cooperation with universities

Both tecnical and behavioral

- Prepare the application for the implementation project

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Benefits

ACCESSIBILITY: People living in the countryside no longer need to relay on others in order to access service (thus prolonging the time elderly or youth can live at home)

ENABLING USE OF PUBLIC TRANSPORT: the last mile(s)

SAFETY: In connection to the regional buses the passengers can wait in a warm and lit vehicle rather than on a cold and dark bus stop

FLEXIBILITY: Where you want it, when you want it

ENVIRONMENTALLY FRIENDLY: As it uses electricity from renewable sources

SERVICE PROVIDER? The shuttles could be used for other social services (transporting for example food, medicines and mail)

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Possible obstacles

THE CLIMATE: Will the shuttles work in -30 or when snow has blown into the road?

MAXIMUM SPEED: The shuttles in service today are slow (up to 20 km/h) which makes them less attractive

SAFETY: Who will the autonomous shuttle hit if a choice has to be made?

ACCEPTANCE: Will it be an accepted mode of transportation or are we not there yet?

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The future of autonomus shuttles in Skellefteå

The plan is to search funding for a three year implementation project

In the meantime ...

- **preparations for the new bus systems are ongoing (region and city buses)**

- **a new on-demand system is developed (based on a zone system rather than bus lines) and should be ready by the time funding for the autonomous shuttle project is secured**.

Thank you!