INSMART
Integrative Smart City Planning

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Edition Four

Transport Systems – Better planning to bring about a sustainable energy future

In this fourth Newsletter from the INSMART project we focus on how the project has developed a better understanding of the four cities' transport systems. Due to our innovative modelling method we can now better measure energy consumption and carbon emissions from the different modes of transport and better forecast the effects of introducing new measures.

Why are transport systems important to Sustainable Energy Action Plans?

Transport is responsible for more than a third of a city's energy consumption, so is it very important to calculate and evaluate its impact on the energy demand and CO_2 level for cities. Understanding the environmental impact of a city's transport system is a fundamental factor when developing a SEAP.

Overview on Transport Model

Project partners SYSTRA were tasked with delivering the transport 'package' of the overall project. This required an analysis of transport flows, energy use and emissions for each of the transport modes in the participating cities, along with the definition of scenarios to reduce energy use and carbon emissions without reducing convenience to travellers.

To test the defined scenarios, an innovative modelling platform was created which represents a new approach in transport forecasting in terms of environmental impact.

At a local level data has been collected on the travel behaviour and characteristics of the people living in each city, in particular:

- Why people travel
- How often they travel
- When they travel
- How far they travel
- By which mode they travel.

The INSMART transport model can then use this data to give insights such as journey purpose proportions, modal splits and trip lengths.

How is the model different to other transport models?

We have developed a small scale transport and emissions model with the ability to model cities on a simpler, low cost scale, requiring less input data, reduced run times but still producing useful outputs. It provides the ability to test a wide range of transport, land use and behavioural change scenarios and produce demand, fuel consumption and emissions figures on an area-by-area basis, split by vehicle type and journey purpose.

Project legacy for the cities

Through the big data and open source movements a vast amount of data is now becoming available to cities, particularly with so much data being collected via councils, governments, mobile phones, self-collection etc. The INSMART transport model offers a perfect platform to make use of this data for better transport planning.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 314164

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The INSMART Cities: Current Overview

Cesena

Population	96,875
Energy Per Person (MJ/day)	55.4
Energy Per Vehicle (MJ/day)	64.7
Energy Used Per Trip (MJ/day)	19.2
% Trips on Public transport (MJ/day)	7%

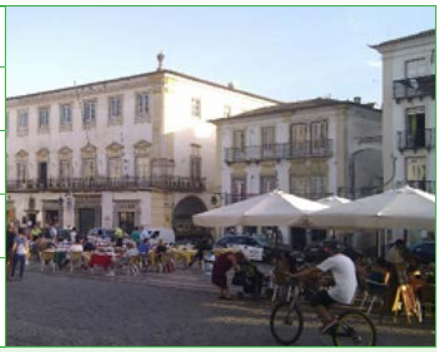
Cesena is a fairly compact, largely flat city and lends itself well to a high proportion of trips by cycling. The existence of a cycle hire scheme further encourages this. A high car mode share of 93% hides the large amount of cycling as it is not included in the calculation.

The two proposed improvements from the INSMART transport model that will have the biggest impact on energy consumption are the addition of two new tram routes and a number of improvements to the cycle infrastructure around the city. Both lead to around a 4% reduction in consumption as people shift away from cars to public transport and active modes.

The provision of 500 electric vehicles throughout the city has the potential to both reduce the number of vehicles, and increase the average efficiency as more vehicles are electric.

Evora

Population	56,594
Energy Per Person (MJ/day)	43.1
Energy Per Vehicle (MJ/day)	58.8
Energy Used Per Trip (MJ/day)	15.5
% Trips on Public transport (MJ/day)	6%



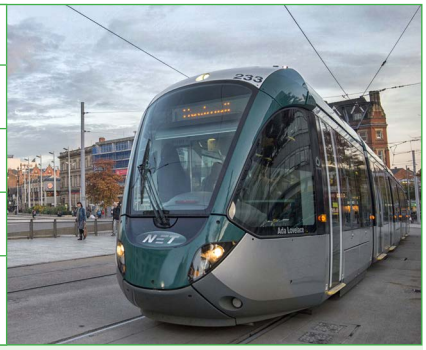
Compared to the other cities the modelled area of Evora includes a large rural area outside of the main historic centre of the city. In these rural areas public transport is limited and so car use is high. Within the historic city driving is difficult due to the narrow streets and the environment is better suited to walking and cycling.

The INSMART transport model proposes improvements to the cycling infrastructure, traffic restriction in the city centre and the building of new roads around the city. These will help reduce energy consumption.

The improved infrastructure will remove cars from the road as people switch to cycling whilst the new roads will reduce the average distance travelled, therefore reducing consumption.

Nottingham

Population	961,461
Energy Per Person (MJ/day)	113.9
Energy Per Vehicle (MJ/day)	124.0
Energy Used Per Trip (MJ/day)	26.5
% Trips on Public transport (MJ/day)	15%



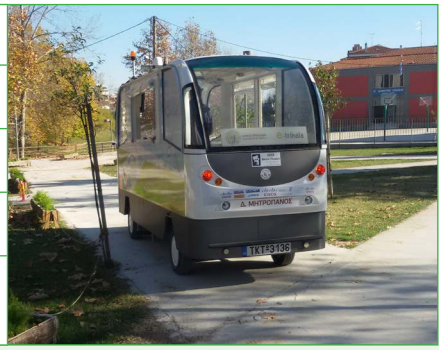
Nottingham's data includes those who live in the county and work in the city generating a large number of trips in and out of the city each day.

Nottingham also has the highest public transport provision with two large bus operators; two tram routes and a number of suburban rail stations. This is reflected in the data; public transport mode share of 15%, more than double that of the other three cities.

Nottingham already has sustainable transport infrastructure in place to build upon and the INSMART transport model has come up with a 'Local Leadership' package of improvements, this includes a large number of changes including improvements to cycling infrastructure, additional electric buses replacing the least efficient in the current fleet, an increase in the number of people working from home and bus priority improvements.

Trikala

Population	62,154
Energy Per Person (MJ/day)	18.4
Energy Per Vehicle (MJ/day)	15.0
Energy Used Per Trip (MJ/day)	5.6
% Trips on Public transport (MJ/day)	6%



Trikala's consumption figures are smaller than all the other three cites on all measures. This is related to two factors. Firstly, 98% of trips are internal to the relatively small modelled area leading to an average trip length of 2.5km. Secondly, there are far fewer goods vehicles within the city potentially due to the small amount of industrial and retail floorspace.

For Trikala the INSMART transport model finds that the cycling improvements to the north of the city have the largest impact. The completion of the ring road to the south of the city will only slighting reduce energy consumption, but reroutes through traffic away from the city centre, reducing local emissions and increasing air quality there.

The city is currently involved with an innovative pilot to trial driver less bus trials.

Project Channels

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