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An integrated tool to assess the climate and health benefits of urban We have developed an operational Impact Assessment Tool for Climate Measures in Cities

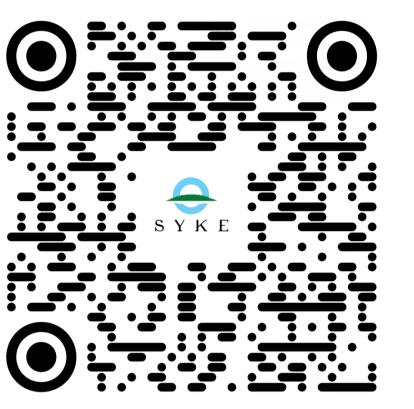
The tool enables the assessment of climate measures' effect on **GHG emissions**

strategies and measures

and PM_{2.5} induced health impacts and costs in an

integrated manner





User interface of the ALasSken-ihQ tool:

		SELECT MUNICIPALITY		
Short instructions	Municipal GHG Emission Scenario Tool Welcome to shaping the future pathways for municipal greenhouse gas emissions. With the Municipal Greenhouse Gas Emissions Scenario Tool, you can assess what			
	changes are needed to reduce emissions and meet emission reduction targets. The starting point for the scenario work is a so-called baseline scenario for each	Haapajärvi	Haapavesi	
	municipality, in addition to which the municipality can define additional measures	Hailuoto	Halsua	
	leading to higher emission reductions. A key starting point for the design of the tool has been that its use supports the impact assessment of regional climate	Hamina	Hankasalmi	
	roadmaps.	Hanko	Harjavalta	
	The calculation is based on the Finnish Environment Institute's ALas-model and the Hinku calculation rules. The detailed methodological description of the scenario	Hartola	Hattula	
	tool presents the baseline criteria and the calculation assumptions for the impact assessments.	Hausjärvi	Heinola	
Select a City	Oser reedback is requested from the tool to santtu-karninen@syke.il (calculation)		Helsinki	
	and teemu.helonheimo@syke.fi (usage).	Hirvensalmi	Hollola	
		Huittinen	Humppila	
The teel energy Deceling		Hyrynsalmi	Hyvinkää	
The tool opens a Baseline		Hämeenkyrö	Hämeenlinna	

Methodologies

Modelling setup

Emission reductions > health improvement

• Studied emissions: primary $PM_{2.5}$ road traffic exhaust and non-exhaust

• Impacts and costs calculated using impact pathway approach

Simulated change in emissions	Modelled change in concentrations		Modelled population exposure		Estimated health impacts and costs
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Emissions at 250 m spatial resolution

Dispersion modelling

• Source-receptor matrices based on UDM-FMI (250 m x 250 m)

Population data 250 m resolution

Health impacts

• Premature mortality

city scenario 2030

You can study various additional measures on top of the Baseline

helsinki 2007 - 2030	Baseline scenario -55.1%		Emissions to be reduced (gap) 876.3 kt CO ₂ e
	n the scenario describes the emission reduction be		HELSINKI
implemented by various measures aft the set target year. You can find the ca The tool examines emissions in accor include emissions directly or indirect emissions from heavy-duty road traffi	al emission development by 2018 and the emission er 2018. The measures set in the tool will be imple alculation principles of the scenario tool here: met rdance with the Hinku calculation rules of the ALa ly under the influence of the municipality. For this c and the use of fuels from industrial plants include th the emission calculation system and the scenari	emented after 2018, but by hod description. s calculation system which reason, for example, ed in emissions trading are	4000 3500 2500 2500 1500
Selected municipality	HELSINKI		500
Scenario name (optional)			0-2007 2018
Reference Year	2007 Target Year	2030	vuosi
Emission reduction target (%) (%)		80	2030
			Detached houses Terraced houses
Population change			Block of flats Other buildings
Change in the floor area of th	e building stock.		Sum
Save the scenario as a file to continue		allenna	
Import a scenario from a file you pre	viously saved	Tuo	
Buildings: Energy u	se	-61.09	~
🖨 Road Traffic		-41.15	% _
Other sectors		-44.09	%
♥ Emission factor for	electricity		_
Carbon offsets		0.0 kt CO ₂	e
Scenario summary			_
HELSINKI	Custom scenario		Emissions to be reduced (gap)

Select Road traffic

There are sub-topics where you can find the measures

E.g. to study effect of electric cars, go to **Fuel types of passenger cars** and use the slider on fully electric

	2007 - 2030	-56.1%		841.3 kt CO ₂ e		
	🛱 🛛 Road Traffic		-46.0%			
	Vehicle mileage			2030	Mileage (Mkm)	Emissions (kt CO ₂ e)
				Passenger cars	3254.4	266.6
	Fuel types of passenger cars			Buses	52.1	26.5
				Vans	262.8	20.1
				Trucks	95.9	57.3

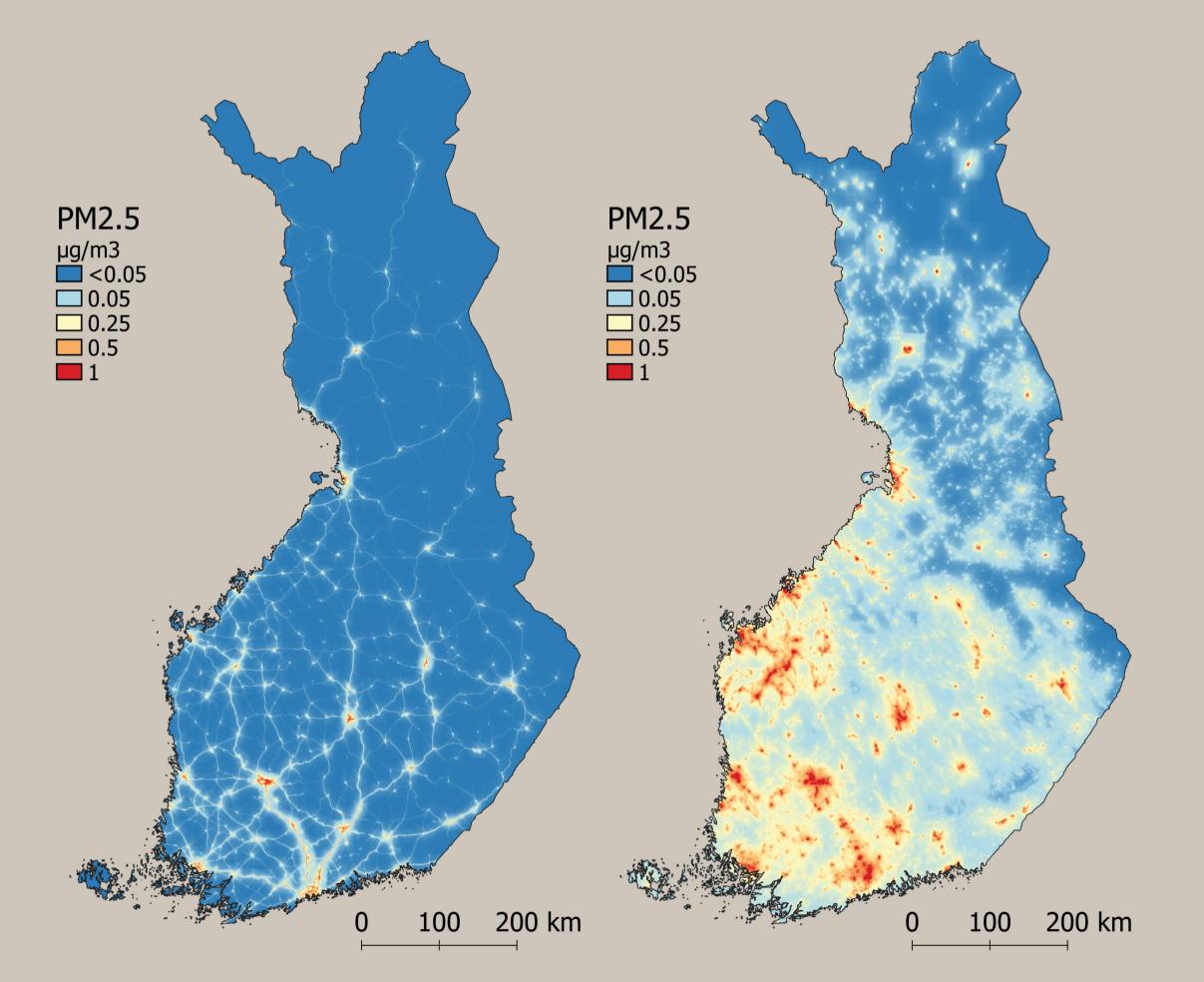
- Chronic bronchitis, asthma
- Hospital treatment (heart/respiratory diseases)
- Missed working days/reduced efficiency

Health valuation

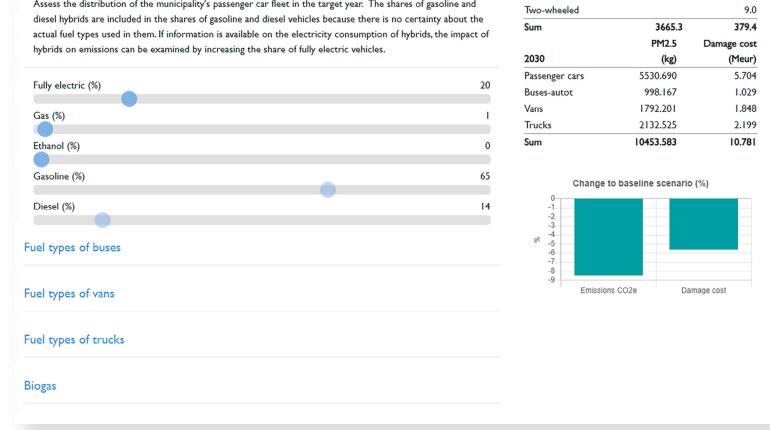
Floor area

4208315

• Nordic VSL (Value of Statistical Life) 3.5 M€



Scroll down on your mobile and you will see the effect on CO_2 emissions, $PM_{2.5}$ emissions and health damage costs due to $PM_{2.5}$



Modelled primary PM_{2.5} concentrations Road traffic (left), Residential wood combustion (right). Source: Finnish Environment Institute SYKE.

More information about methodologies:

Kukkonen, J., Savolahti, M., Palamarchuk, Y., Lanki, T., Nurmi, V., Paunu, V.-V., Kangas, L., Sofiev, M., Karppinen, A., Maragkidou, A., Tiittanen, P., and Karvosenoja, N.:
Modelling of the public health costs of fine particulate matter and results for
Finland in 2015, Atmos. Chem. Phys., 20, 9371–9391, 2020.

syke.fi/emissionmap

syke.fi/projects/fres ihq-demo-harmo.netlify.app