## Nordic Green to Scale for Cities and Communities

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#GreenToScale #NordicSolutions #TheFutureWeWant

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## Who is behind Nordic Green to Scale

- Project run by the Finnish Innovation Fund Sitra
- Partners include CICERO (NO), CONCITO (DK),
   Stockholm Environment Institute (SE), University of Iceland (IS) and C40
- Funding kindly provided by the Nordic Council of Ministers (NCM)
- Nordic Green to Scale included in the Nordic
   Prime Ministers' Initiative Nordic Solutions to
   Global Challenges





## Green to Scale: how far can we go with what we already have?

## How does scaling up work?

### Benchmark implementation level

(e.g. Oslo's 12% EVs)

Baseline implementation level (e.g. Finnish average 0.1% EVs)

Scaling the implementation to benchmark level replaces incumbents (e.g. gasoline cars) and causes an **emissions effect** and a **cost effect**, which determine unit abatement cost. Perceived costs include taxes.

Total possible implementation pool (e.g. Finnish car fleet)

## Exciting results in three studies



- Global Green to Scale in 2015 in the run-up to the Paris conference
- International partners, Ecofys providing the analysis
- Covered 17 solutions from both the global North and the South
- Nordic Green to Scale in 2016
- Nordic partners, CICERO in charge of the analysis
- Analysed the potential of scaling up 15 Nordic climate solutions



- Nordic Green to Scale for Countries in 2018
- Nordic partners, SEI producing the analysis
- Looked again at Nordic solutions, focusing on scalability in five European and two African countries



## Nordic Green to Scale for Cities and Communities

### NORDIC GREEN TO SCALE FOR CITIES AND COMMUNITIES

How far could we go simply by scaling up already proven climate solutions?

SITRA



Cities can be game changers and drivers of ambitious climate action. They are in a prime position to enable sustainable life for their inhabitants and they can implement new policies and solutions quickly.



## Key results: large potential in scaling up existing climate solutions

## 14 solutions analysed

### Energy

- 1. Onshore wind Rinkøbing, DK
- 2. Offshore wind Copenhagen, DK
- 3. District heating from waste water Turku, Fl
- 4. District heating from sea water Drammen, NO
- 5. Solar district heating Marstal, DK
- 6. District heating from data centre waste heat Mäntsälä, Fl
- 7. Geothermal district heating Reykjavík, IS

### Buildings

8. Ground source heat pumps – Stockholm, SE

### Transport

- 9. Public transport in urban areas Helsinki, Fl
- 10. Electric vehicles Oslo, NO
- 11. Cycling in urban areas Copenhagen, DK
- 12. Electric ferries Sognefjord, NO

### Food and waste

- 13. Biogas from food waste Oslo, NO
- 14. Reduction of retail food waste Vantaa, FI



## But there is more

#### Energy

- Two-way district heating Turku, FI
- System integration in EnergyLab Nordhavn Copenhagen, DK
- Carbon capture and storage in rock Reykjavík, IS

### **Buildings**

- Renovations of old buildings to plus-energy houses Sandvika, NO
- Wood construction Växjö, SE
- Semi-deep geothermal heat for buildings Espoo, FI

### Transport

- Renewable methanol Grindavík, IS
- Mobility as a service Helsinki, Fl
- Shared electric cars Aarhus, DK
- Electric buses Reykjavík, IS

### Food and waste

- Reduction of city meat and dairy consumption by 50% Helsinki, FI
- Biochar Stockholm, SE
- Increased reuse and efficient waste sorting for recycling Eskilstuna, SE



## Significant emissions reduction if other Nordic communities adopt the 14 solutions



#nordicsolutions
to global challenges

Annual emission reduction in Nordic cities and communities when overlap of solutions is accounted for, but synergies are not.

Standalone emission reduction by solution in Nordic cities and communities, MtCO<sub>2</sub>e

Many solutions have a large climate impact



## Solutions bring net savings to communities



Annual net costs in Nordic cities and communities when overlap of solutions is accounted for.

# Results for different solutions and countries: some examples

# **Electric vehicles** – Oslo, NO 12% of car fleet

EVs are still expensive, and purchase incentives and sufficient charging infra are key drivers. Oslo has set up a city-owned charging network, subsidizes charging points in housing cooperatives and has given EVs free parking.

### Analysis:

- Replaces new ICE vehicles
- TCO (total cost of ownership) comparison made for Volkswagen Golf and e-Golf
- Emission reduction includes tailpipe emissions and grid emission factor. In lifecycle analysis the manufacturing emissions and fuel well-to-tank would balance each other out



### **District heating from waste water -** Turku, FI 8% of district heating demand

Waste water is stable and free source of heat. Heat pump solutions require affordable electricity and location near the heat load. In Turku treatment plant underground in the city also provides cooling and balancing national power demand.

Analysis:

- Scaling done by network<sup>1</sup>
- Heat pump system not assumed to fully replace incumbent – levelized cost of solution compared to variable cost of incumbent
- Solution and existing ambient heat in network capped at 63%



# **Onshore wind -** Ringkøbing, DK 27% of Danish electricity demand

Local public acceptance a key enabler for wind. Ringkøbing is Denmark's largest onshore wind farm, owned by local investors and wind farm neighbors, and creates local jobs.

### <u>Analysis</u>:

- LCOE comparison
- Assumed wind to replace production with highest marginal cost in seamless joint market between Finland, Sweden, Norway and Denmark
- Based on monthly production data
- Emission reduction allocated where capacity is built



On average, solutions are affordable compared to incumbents



# Reductions in Finland equal to 12% of current emissions



# Reductions in Sweden equal to 13% of current emissions



# Reductions in Norway equal to 13% of current emissions



# Reductions in Denmark equal to 10% of current emissions



# Reductions in Iceland equal to 2% of current emissions



## What to make of the results?

- The study helps to identify effective existing solutions and successful tools to deploy them
- Emission reduction potential and cost estimates should be seen as indicative rather than accurate
- All countries, cities and communities have areas where they can learn from the experiences of others – and also where their experiences can be valuable for others
- By learning from each other and sharing lessons learnt, all can move further and faster





## Policy recommendations for local level

### <u>1. Set a good framework</u>

- set emission **targets** and budgets in line with the Paris Agreement
- introduce sector-specific **strategies** with concrete measures and mechanisms to **monitor progress**
- involve stakeholders and citizens in **dialogue** and decision making about climate action
- collect and publish data on emissions and measures to reduce them

### 2. Harness your tools

- use land planning to reduce transport emissions and enable sustainable energy production
- develop electricity distribution grid in a forward-looking way to enable electrification
- incentivise climate action through congestion charges, parking prices and waste fees
- harness **public procurement** and use the municipality as a testbed for climate solutions
- require **municipality-owned companies** to implement climate solutions
- **cooperate** with neighbouring municipalities in e.g. traffic planning and waste treatment
- 3. Ensure future success
- recognize and build capabilities necessary for decarbonization
- raise awareness of climate solutions
- **share experiences** with peers and learn from the experiences of others

## Conclusions: solutions exist, leadership needed

- Scaling up existing low carbon solutions is feasible, affordable and attractive
- Learning from the communities that have already deployed these solutions helps in removing barriers
- Governments have a major role to play in terms of policies to enable deployment of these solutions
- Local action can make a big difference: cities and communities are key in concretely enabling sustainable life for their inhabitants and testing and spreading new solutions





## What next?

- Release events in Nordic countries in November 2019
- Event at the UN Climate Conference COP25 in Chile in December
- Interested? We are open for co-operation!





## Thank you greentoscale.net