### Systematic Climate & Energy Action Work in Stockholm

Winner 2010

EUROPEA

Jonas Tolf City of Stockholm

# Systematic work since 1995

Cities for Climate Protection Systematic work (ICLEI) since 1996

Covenant of Mayors since 2008, EU

Compact of Mayors since 2015, UN

Strategy for a Fossil Fuel Free Stockholm 2040





a fossil-fuel free

Stockholm by 2040

Stockholm action plan for climate and energy

2012-2015

#### Action programmes 1996-2020

# **Goals and achievements**

CO<sub>2</sub> eqv t/capita





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### Cities with fossil fuel free- and carbon neutrality targets

<u>City</u>	<u>Target</u>	<u>Year</u>	
Stockholm	Fossil fuel free	<del>2050-</del> 2040 2025	
London	60% v.s. 1990	2025	
Oslo	Fossil fuel free	2050	
Hamburg	80% v.s. 1990	2050	
Berlin	85% v.s. 1990	2040	
Yokohama	80% v.s. 1990	2050	



THE CITY OF STOCKHOLM

# **Fossil Fuel Free Stockholm 2040**

• Decision in City Council 28 November 2016





# Climate Strategy 2040





# Studies during 2017 on how to become fossil fuel free 2040

Plan for phasing out last coal fired plant.	Fossil fuel free road transports, including prohibition of fossil fuel sales.
Phasing out fossil oils for peakloads.	Fossil fuel free shipping.
Increased use of waste heat.	Fossil fuel free off road vehicles.
Increased renewable power production.	Increased production of biogas
Reduction of fossil plastics in waste incineration.	Carbon sinks, CCS etc.
	Action plan for fossil fuel free city organisation 2030.

## Actions to 2020

Action	Planned reduction ton CO2e	Estimated reduction 2018 ton CO2e
District heating	240 000	287 000
Energy efficiency in city owned buildings	20 000	10 000 – 15 000
Energy standards for new buildings	25 000	12 500 – 15 000
Reduced traffic work	80 000	15 000 – 20 000
Less fossil fuels in transport sector	140 000	188 000
City transport procurement	8 000	8 000
Increased biogas production	20 000	15 000
Total	533 000	520 500 - 533 000
Expected development beyond the city's possibilities of influence	134 000	155 500
Grand total	667 000	676 000 – 688 500



# **HEATING AND COOLING**



THE CITY OF STOCKHOLM



#### **Emission factors**

2015	83 g CO <sub>2</sub> /kWh			
2016	64 g CO <sub>2</sub> /kWh			
2022	40 g CO <sub>2</sub> /kWh			
Source. Fortum Heat				



# FROM HÄSSELBY COAL FIRED CHP 1958 TO VÄRTAN BIO FUELED CHP 2016 (280 $\rm MW_h$ 130 $\rm MW_e)$



#### Production 2016

 $\begin{array}{ll} 8 \ \text{TWh}_{\text{h}} \ 1,1 \ \text{TWh}_{\text{e}} & 0,4 \ \text{TWh}_{\text{c}} \\ \text{Approx. 10 \% fossil fuels} \\ \text{Approx. 80\% of heat demand} \end{array}$ 



### District heating/cooling with co-generation 8 TWh<sub>h</sub> 1,1 TWh<sub>e</sub> 0,4 TWh<sub>c</sub>





THE CITY OF STOCKHOLM

# GREEN COMPUTINC REDEFINED

1911



**€**Fortum <sup>►</sup><sub>™</sub>

Me Capital of Scandinavia







"The fact that we are based in Stockholm with its vast district heating and district cooling networks has opened for a new way of thinking about cooling, sustainability and solutions that are unbeatable financially, which translates to significant benefits for our data center customers."

Gustaf Bergquist CTO Bahnhof









THE CITY OF STOCKHOLM

### **Clean vehicles development – County of Stockholm**





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## **Bio fuels in road traffic**





## **Electric vehicles Stockholm County**





# Public transports on renewable fuels

#### Today

- The worlds largest ethanol/biogas bus fleet is rolling on the streets of Stockholm.
- All fixed-track services are driven with electricity produced by hydropower and wind power.
- 100 % of all buses powered by renewable fuel.

#### 2020

 100 % of all buses will be powered by renewable fuel.









### EXPERIENCES OF CONSTRUCTING A SMART SUSTAINABLE CITY

#### Mika Hakosalo, Project Manager, Site Stockholm





## **GrowSmarter project goals**





# The integrated project approach

Energy & Mobility & Integrated Infrastructures

12 smart solutions



#### WP3: Integrated Infrastructures

Smart street lighting
 Waste heat recovery
 Smart waste collection
 Big data management



#### WP2: Low energy districts

- 1. Smart building shell refurbishment
- 2. Smart building logistics
- 3. Smart energy-saving tenants
- 4. Smart local electricity management



#### WP4: Sustainable urban mobility

- 9. Sustainable delivery
- 10. Smart traffic management
- 11. Alternative fuel driven vehicles
- 12. Smart mobility solutions



#### Så ska Stockholm bli världens smartaste stad till år 2040

Stockholm ska bli världens smartaste stad till år 2040. 100 miljoner kronor satsas på att möjliggöra utveckling av nya appar och andra digitala tjänster för att underlätta livet för stadens medborgare. Men hur vet vi vad medborgarna vill ha och vilka hinder finns för den digitala transformationer

#### Strategy for a smart and connected city



On April 3, 2017 the City Council adopted a strategy to further develop the smart city through coordination of the City's work on digitalization. The strategy has been developed together with the Stockholmers.

#### Project GrowSmarter - Lighthouse Smart Sustainable City Project

Preparing	Planning	Implementing	Evalu	ating
2014	2015	2016	2017	2018
Stockholms stad				

#### **GrowSmarter Site Stockholm**

#### Slakthus area

- Energy efficient refurbishment
- Energysaving tenants
- Renewable local energy
- City wifi with Internet of Everything
- Big data platform
- Construction logistic center
- Smart Traffic Management

#### Valla Torg

- Energy efficient
  refurbishment
- Energysaving tenants
- Renewable local energy
- Smart lighting
- Smart wastehandling
- Sustainable delivery

<u>Cilinii</u>

• Smart mobility solutions

#### <u>Västberga</u>

- Open District Heating
- Alternatively
  fueldriven vehicles

stad

# THE SMART CONNECTED CITY



# The technical solution







# End-user communication via digital channels





#### Mika Hakosalo City of Stockholm mika.hakosalo@stockholm.se

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Wasseller .

**THANK YOU !** 

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