



APSE Distributed Energy workshop Thursday 27th November 2014

Ambitious Cities



www.stepupsmartcities.eu



Co-funded by the European Union





Content



Co-funded by the
European Union



- **The energy challenge and role of cities**
- **STEP UP cities**
- **Glasgow's vision and SEAP**
- **Distributed Generation**
- **The Glasgow ESCo**
- **Conclusions**



- EU FP7 funded energy planning project running until Spring 2015
- 4 European cities: Ghent, Glasgow, Gothenburg and Riga
- 12 Partners: each city council works with commercial and research partner



STEP UP Website:
www.stepupsmartcities.eu

STEP UP Twitter:
<https://twitter.com/StepUpEU>

Targets set by STEP UP cities

Riga

- CO2 emissions
- 55-60% CO2 reduction by 2020
- Riga Smart City SEAP now published

Ghent

- CO2 emissions
- Climate neutral by 2050
- Climate Action Plan (SEAP 2014)

Gothenburg

- CO2e emissions
- 75% per capita reduction by 2050
- Climate Strategy (SEAP 2014)

Glasgow

- CO2 emissions
- 30% reduction by 2020
- Energy and Carbon Masterplan (SEAP 2014)



Sign In



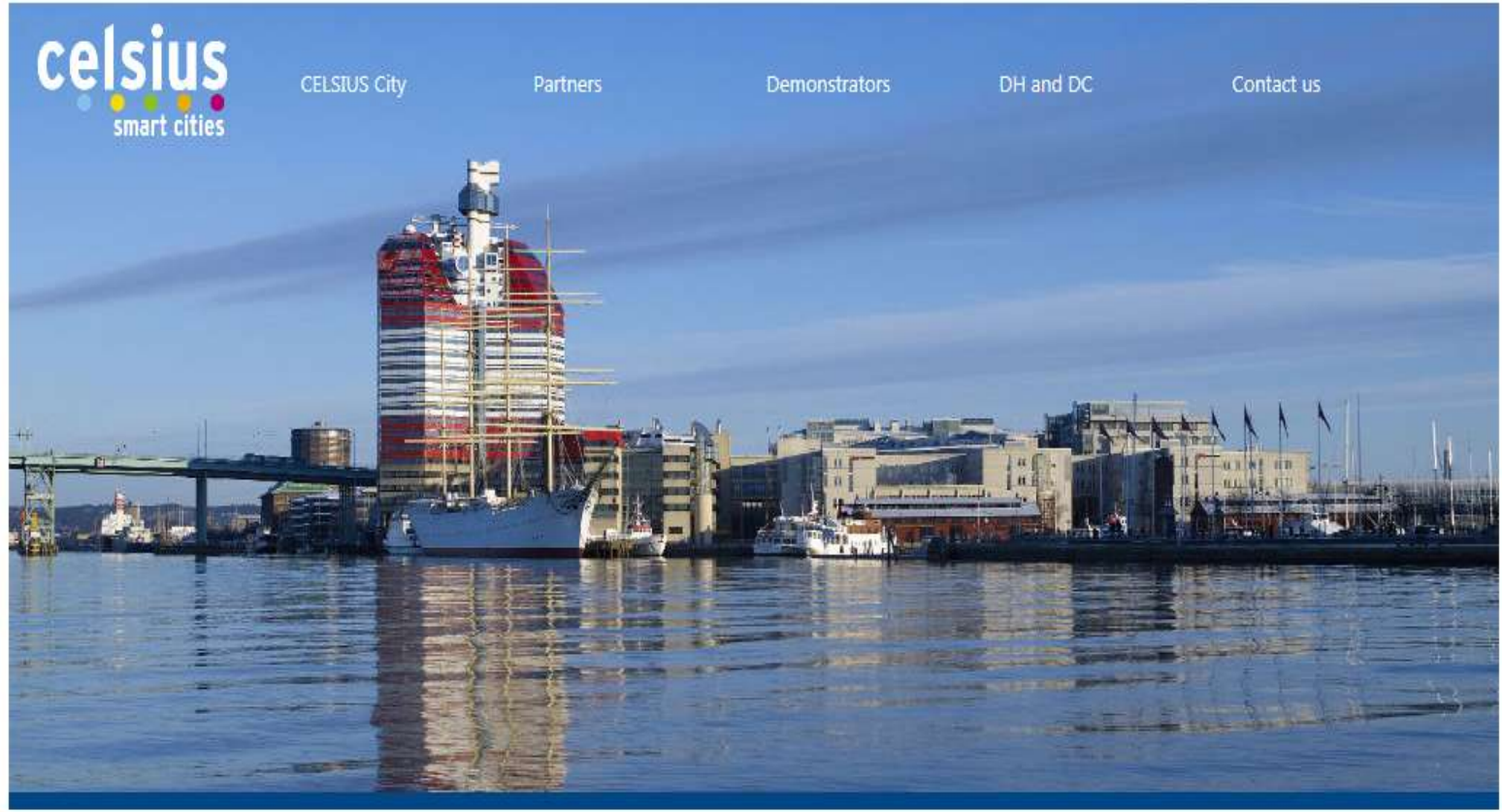
CELSIUS City

Partners

Demonstrators

DH and DC

Contact us



Gothenburg, Sweden

City of Gothenburg

Göteborg energi

IMCG AB

SP Sveriges Tekniska
Forskningsinstitut AB

Göteborg Energi

Göteborg Energi, founded in 1846 and owned by the City of Gothenburg, is Sweden's largest company owned by a municipality. Göteborg Energi employs 1,200 people. Its vision: "A Sustainable Gothenburg Society", describes all activities within the company. Göteborg Energi today offers a complete palette of energy products and services to the citizens of Gothenburg and a couple of surrounding municipalities. This includes electricity and gas networks, electricity and gas trade, district heating and cooling, natural gas and biogas to vehicles, and a range of energy services such as energy saving assistance and climate agreements.

The company has a world-class district heating system, established in 1953. Today, it covers 90% of the city's apartment



The vision for Glasgow



Co-funded by the
European Union



Sustainable, Smart and Resilient City

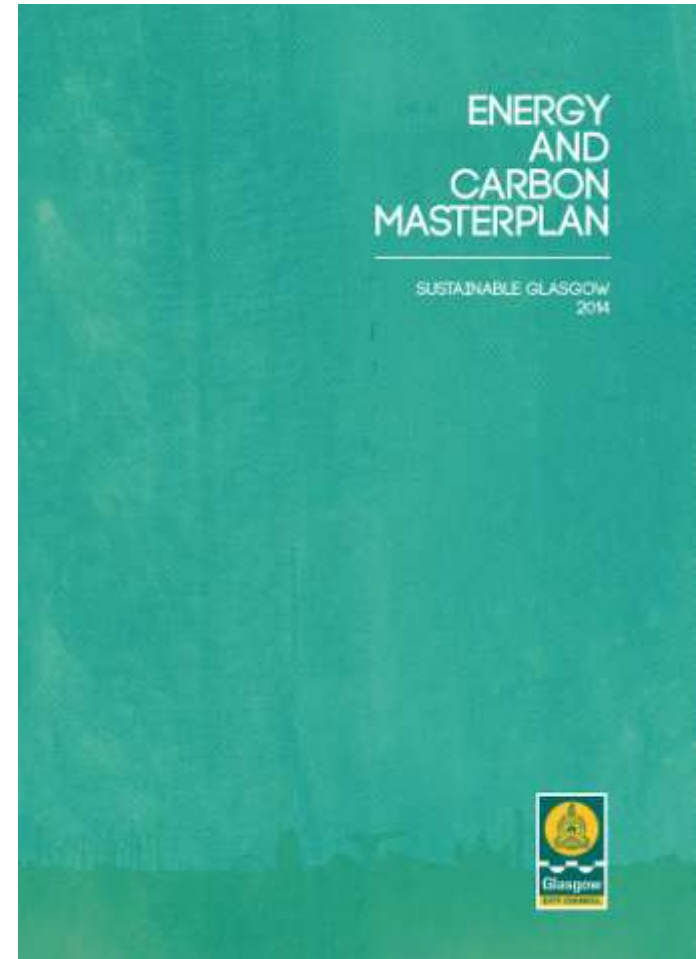
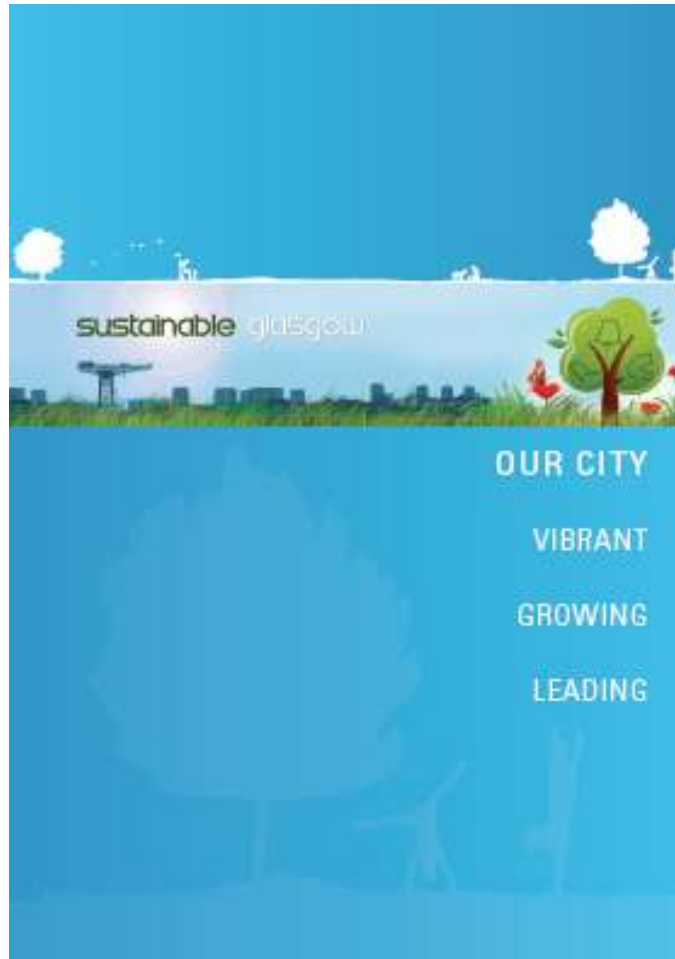




The Energy and Carbon Masterplan



Co-funded by the
European Union





Energy and Carbon Masterplan



Co-funded by the
European Union



Overall Strategy (ECMP)

30% CO2 target

Vision

Staff capacity

Budget

Financing

Baseline Emissions Inventory

- Inventory year 2006
- Emissions factor (IPCC or LCA)
- Emissions reporting units (CO2 or CO2e)
- Energy consumption
- Energy supply
- CO2 emissions

Action Plan

- Key actions by sector
- Energy savings/sector
- CO2 savings/sector
- Stakeholders
- Costs / timeframe

Monitoring Plan

- Review of strategy
- Monitoring emissions inventory
- Results of emissions inventory
- Review of Key Actions
- Annual monitoring



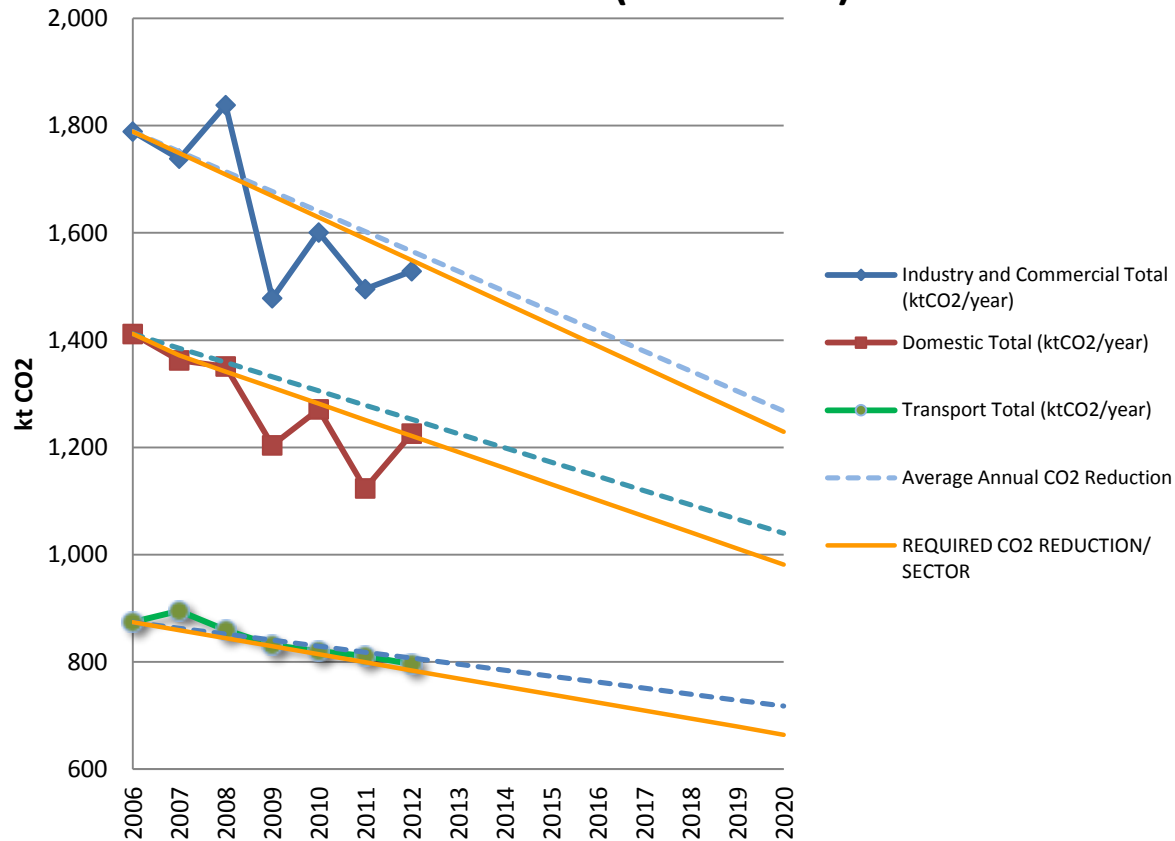
Action Plan – meeting the target



Co-funded by the European Union



Annual Average and Required CO₂ reduction by sector (2006-2020)



- **Maintain same overall Vision as 2010 report**
- **Retain 30% CO₂ savings by 2020 target**
- **Key challenge: reducing electricity consumption for heating**
- **33 actions featuring:**
 - ✓ **Development of ESCo and district heating schemes**
 - ✓ **Phasing out coal, oil and electric heating**
 - ✓ **Improved energy efficiency and building energy management**
 - ✓ **New LED street lighting**
 - ✓ **New Waste to Energy plant by 2016**
 - ✓ **Promotion of electric vehicles and active travel**
 - ✓ **New wind turbines and solar PV**
 - ✓ **Behavioural change and DSM**
 - ✓ **Integrated Energy Planning**
 - ✓ **Building capacity in GCC to deliver the ECMP**



Distributed generation

“Small, modular, decentralised, grid-connected or off-grid energy systems located in or near the place where energy is used.”

- Electricity generation and delivery should be:
 - Reliable
 - Affordable
 - Efficient
 - Environmentally friendly

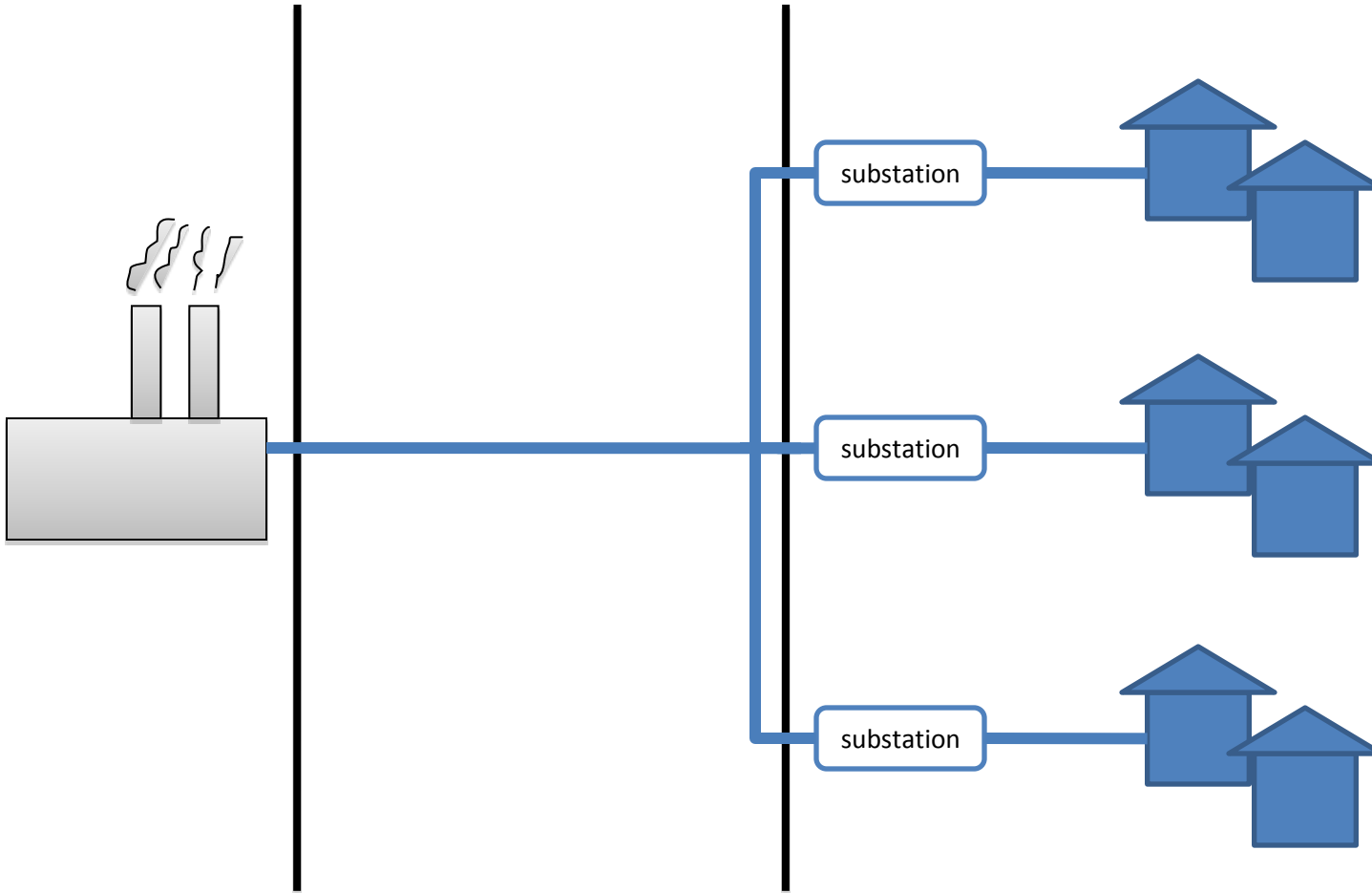


The Power Grid

Generation

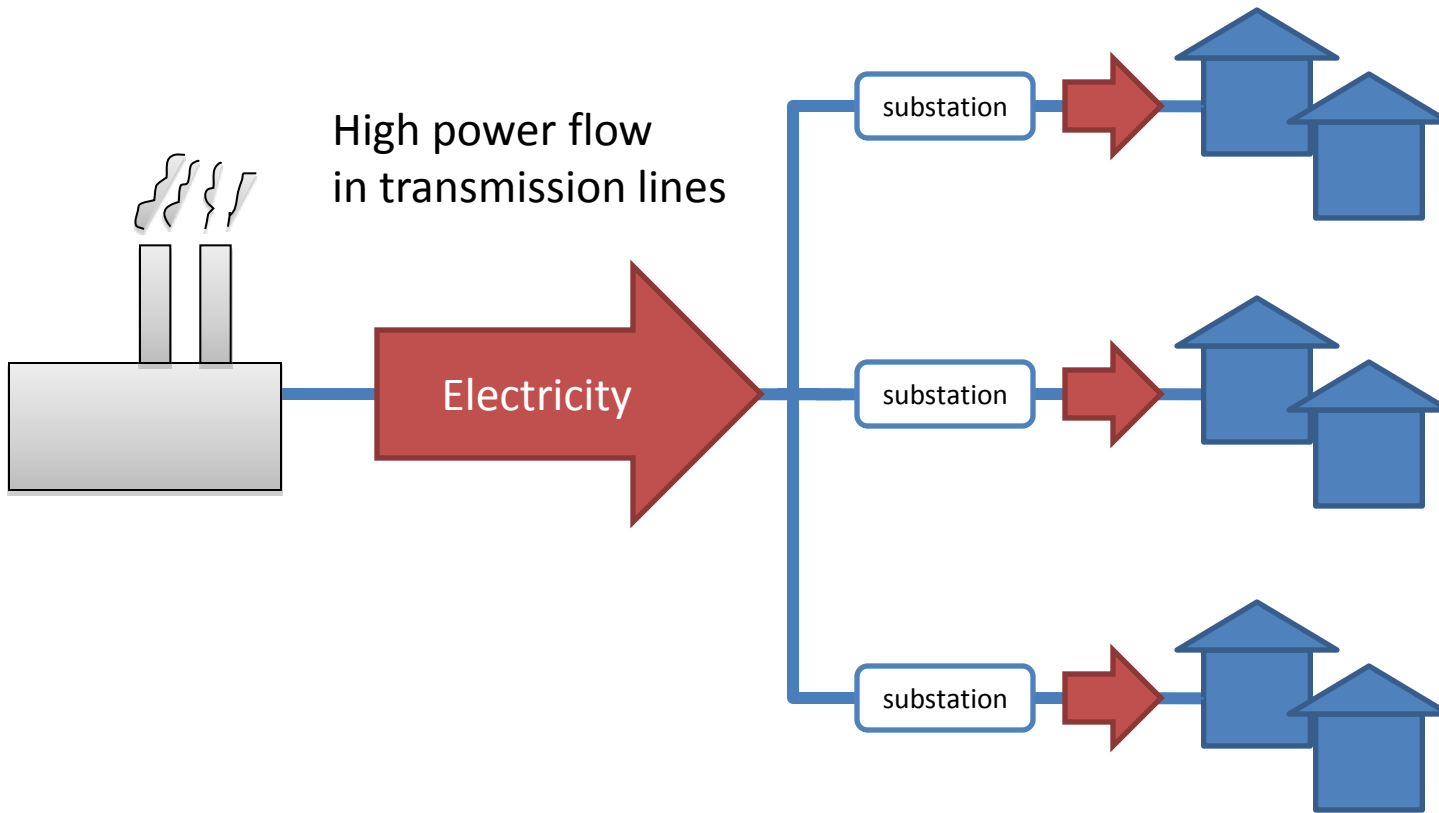
Transmission

Distribution



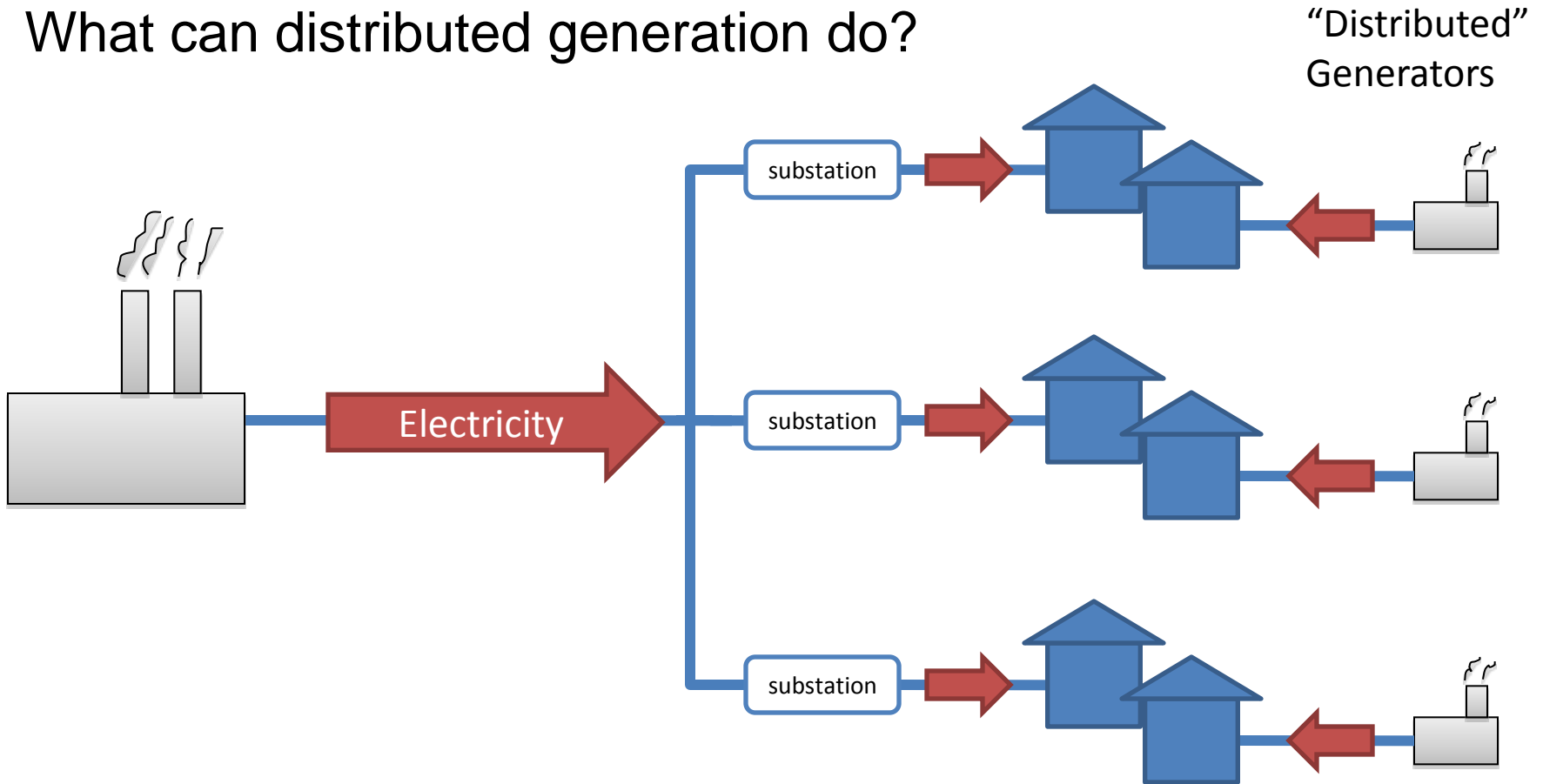
The Power Grid

The classic model



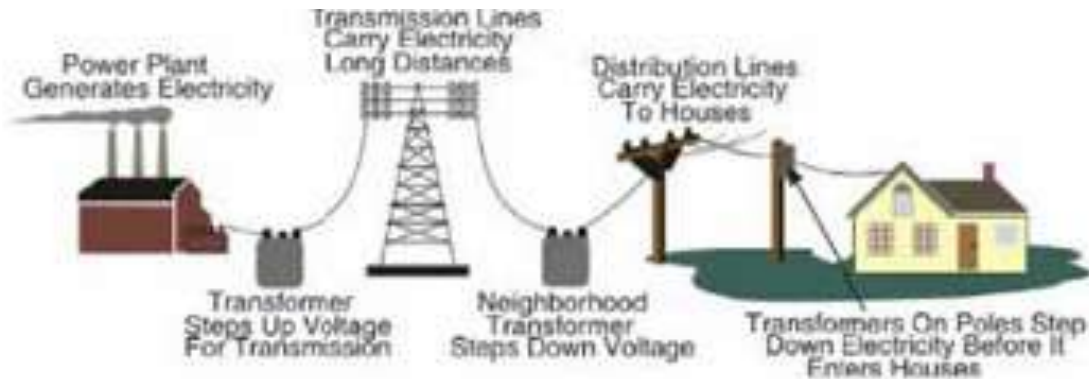
The Power Grid

What can distributed generation do?



Before Smart Grid:

One-way power flow, simple interactions



After Smart Grid:

Two-way power flow, multi-stakeholder interactions



Adapted from EPRI Presentation by Joe Hughes
NIST Standards Workshop
April 25, 2008



Supporting community energy generation



Co-funded by the
European Union

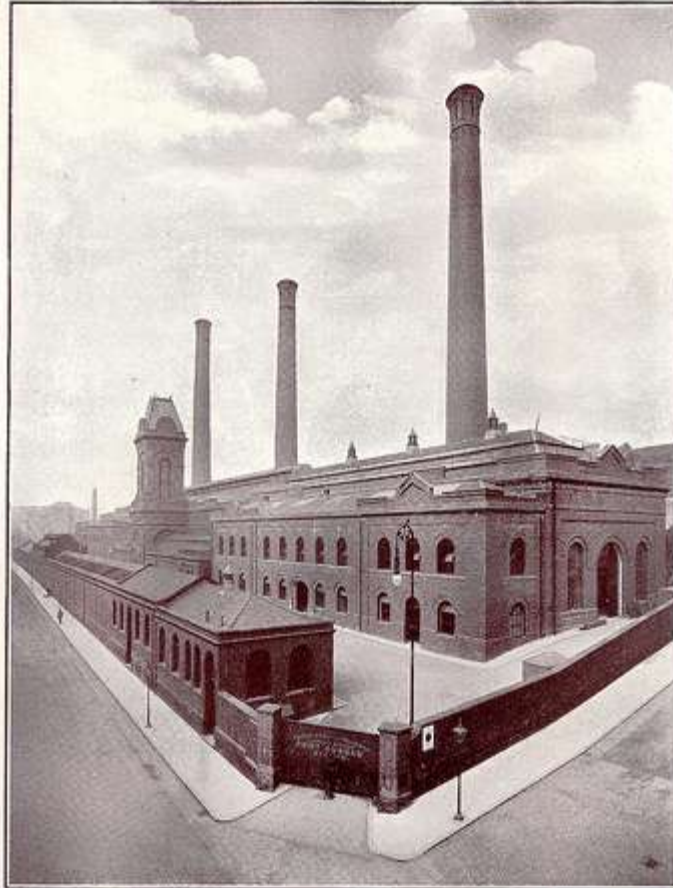




Energy Company - Back to the Future?



Co-funded by the
European Union



PORT-DUNDAS STATION.—EXTERIOR.



PORT-DUNDAS STATION.—INTERIOR.

Glasgow Energy Services Company

Developing the ESCo

- Strategic Business Case agreed
- ITT for legal, financial, and technical support issued
- Appointment of Consultants in Jan 15
- Completion of final business case June 15
- ESCo begins operating July 15 with 'The Village'



The Village District Heating



- **The Energy Centre:**
 - Provides heating and hot water for 700 houses, 120 bed care centre and Emirates Arena.
 - Combined Heat and Power (CHP) gas engine, 3 boilers and thermal store
 - Efficient system lowers carbon emissions
- **The Athletes' Village regenerates the area, creates opportunities for employment and training, local business and social enterprise.**
- **Potential to extend to other social housing nearby**



Conclusions

- **Distributed energy is a huge opportunity for Councils**
 - Creating a smarter, more resilient grid
 - Generating revenue for communities and Councils
 - Tackling fuel poverty
 - Creating jobs
- **Glasgow vision and strategy is in Energy and Carbon Masterplan and LDP**
 - Wind turbines
 - Solar PV
 - Geothermal, HEP
- **Establishing the Glasgow ESCo in 2015**

