

**Sähkötekniikan tutkijakoulun kesäseminaari
Eerikkilän urheiluopisto, Tammela, 12-13.8.2008**

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Fortum Distribution
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Fortum - A leading Nordic energy company

- **The Nordic and Baltic countries, Poland and Russia in focus**
- **Operations in 12 countries**



- **Approx. 15 700 employees in the Fortum Group**



- **1.3 million electricity retail customers**
- **1.6 million electricity distribution customers**
- **District heating for 80 cities, in seven countries**
- **Second largest in power generation**



Fortum at a glance

Nr 1



Nordic countries

Generation	51.1 TWh
Electricity sales	58.5 TWh
Heat sales	20.4 TWh
Distribution cust.	1.6 million
Electricity cust.	1.3 million

Key figures Q1/2008, last 12 months

Sales	4,579 MEUR
Operating profit	1,966 MEUR
Employees	15,689

Nr 2

Poland

Heat sales	3.5 TWh
Electricity sales	7 GWh

Baltic countries

Heat sales	1.2 TWh
Distribution cust.	24,000

Russia – existing

TGC-1 (~25% minority stake)*	
Power generation	~6 TWh
Heat production	~8 TWh

*Fortum's share

Russia – acquisition

TGC-10 (100%)

Power generation	18 TWh
Heat sales	27 TWh

Fortum in Russia: TGC-10 acquisition

- Fortum has acquired a majority stake of 76% in Territorial Generating Company 10 (TGC-10) in West Siberia, Russia
 - 100% ownership targeted through a mandatory offer to remaining minority shareholders
- Total consideration EUR 1.7-2.7 billion (737 USD/kW)
 - of which the capital increase EUR 1.3 billion to finance the committed investment program
- Significant increase to Fortum's power generation: TGC-10's volume 18 TWh/a – Fortum 52 TWh/a in 2007
- Doubles Fortum's heat sales: TGC-10 27 TWh/a – Fortum 27 TWh/a
- ~7000 new employees
- Earnings dilutive for two years
- Value creation based on power price development, volume growth and annual efficiency improvement of at least EUR 30 million
- Fully debt financed, financing fully committed



The challenges for Fortum R&D

- **Global growth, strongly increasing global energy demand**



IEA World Energy Outlook 2007

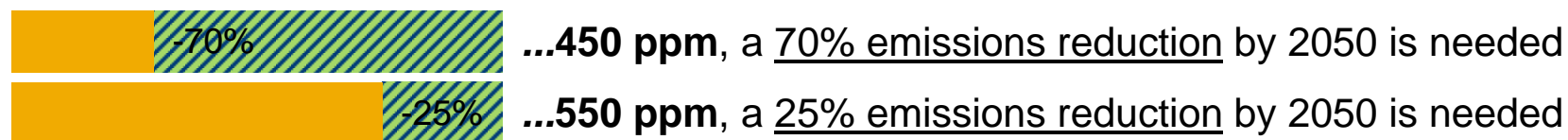


IEA Energy Technology Perspectives 2006

- **Climate change triggered by greenhouse gas emissions**



To stabilize CO₂ concentrations in the atmosphere to...



- **Energy security, dependence on fossil fuels**

- On current trends, fossil fuel dependence increases from a share of 80% today to 85% in 2050

* Estimated based on current trends

The solutions palette

Clean energy production and efficient end-use are key!

The following palette is central to meeting the challenges and at the same time relevant to Fortum:

Solutions	Efficiency with regard to sustainability challenges	Relevance to Fortum
Improved energy efficiency	<ul style="list-style-type: none"> • end-use efficiency single largest contributor to CO₂ emission reductions (e.g. 45% of reduction in 2050) 	<ul style="list-style-type: none"> • considerable customer base! • efficiency services already today • directives and requirements
Extended use & development of renewable energy sources	<ul style="list-style-type: none"> • key from energy security perspective • CO₂-free or -neutral 	<ul style="list-style-type: none"> • appr. 40% of power & heat generation based on renewables today • organic growth opportunity!
Extended use & development of nuclear technologies	<ul style="list-style-type: none"> • profitable large-scale CO₂-free already today • significant for reducing emissions coming decades 	<ul style="list-style-type: none"> • 50% of our power generation portfolio today is nuclear • organic growth opportunity!
Development of clean coal/ gas technologies	<ul style="list-style-type: none"> • largest CO₂ emission reductions potential within power generation 	<ul style="list-style-type: none"> • clean coal/gas needed in order to maintain the possibility to invest in fossil fuel-fired plants in future

Energy services:

- Company provides services to customers, which enable to reach the target of 9 % decrease according to ESD.

Increase of grid company's own efficiency

- The branch has a guiding target to realise activities which enable [150 GWh] savings in usage of electricity and [150 GWh] savings in fuel consumption
- Actions are targeted into stand-alone heat production and into heat and electricity transmission and distribution
- The company will present the own guiding efficiency target (xxx MWh) in a separate accession document
 - In order to reach the target set by the branch all companies have to set their own target in a level of 5 %

Fortum's R&D vision and strategy

R&D VISION

Enable a CO₂ free and sustainable future for Fortum

FOCUS AREAS

Performance excellence in current operations

~ Today

Enable growth

0-10 years (near-term)
10-20 years (mid-term)

Contribute to climate change mitigation

30 years

Contribute to the long-term non-emitting energy system

50+ years

METHODS

- R&D co-operation and networking with leading external partners
- Internal R&D efforts in selected key areas

Increasing R&D activity

- New R&D strategies both on Corporate level and in Business Units, better planning
- Our role in R&D is emphasized: demonstration projects, co-operation with leading equipment & plant manufacturers, and research institutes
- Numerous technologies can be utilized – the entire "solution palette" is needed!
- New Fortum R&D programs:
 - Zero Emission Fossil Production
 - Biogrowth
 - Sustainable Energy System
- The "new renewables" in power production
- Investments in start-up companies – either directly or through Cleantech funds

Examples of important R&D topics to Fortum (Corp.)

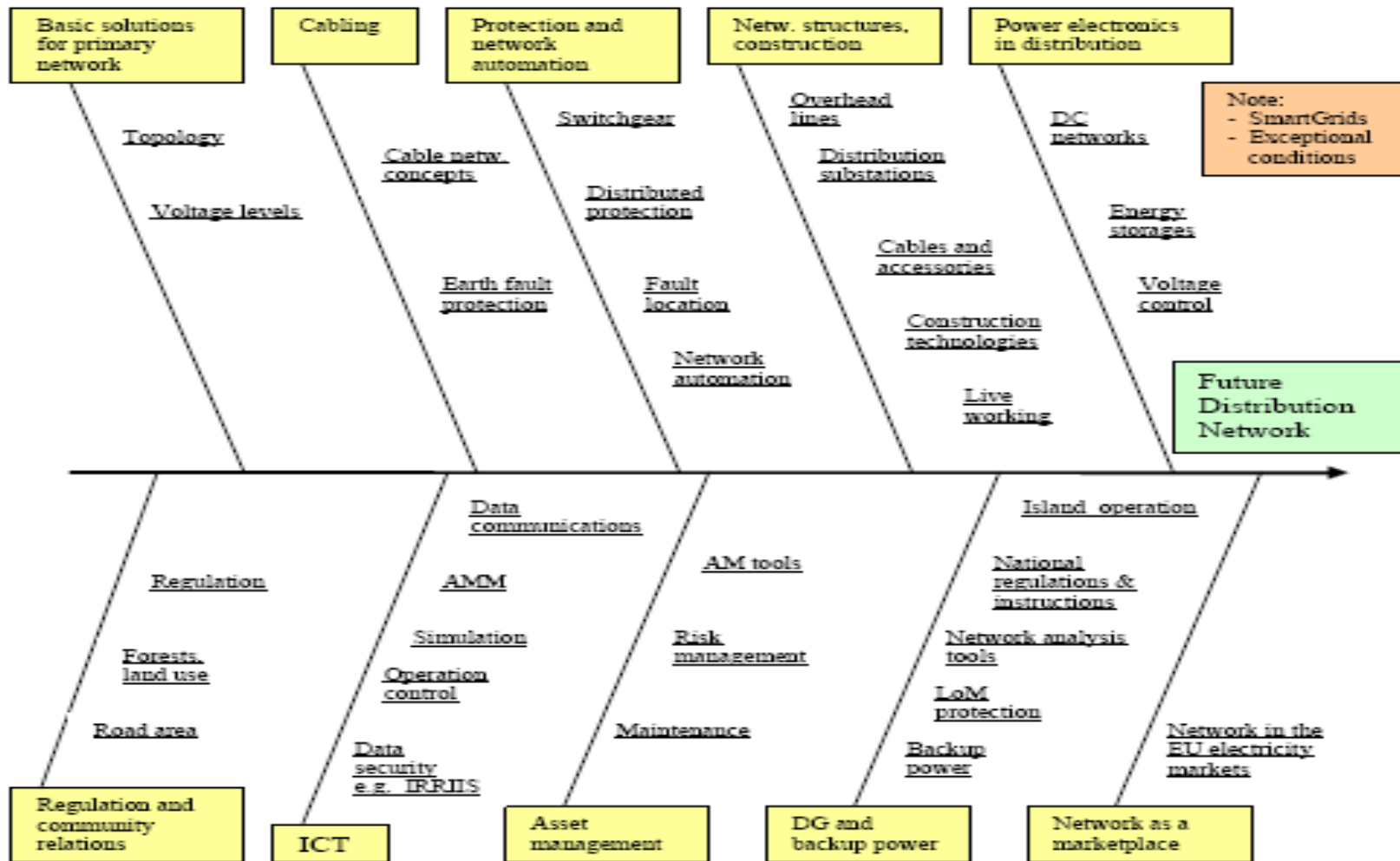
- **Carbon Capture and Storing (CCS):** CCS demonstration project in Meri-Pori power plant
- **New technologies for Bioenergy:** Replacing coal with biomass, Piloting integrated pyrolysis at one of our own plants, Waste energy enlargements
- **New renewables:** wave power, solar, hydrogen + fuel cells, wind power
- **CO₂ free transportation solutions:** PHEV, EV, ships
- **Developing nuclear technologies:** studies and analyses to enable Loviisa 3, participation in EU research activities MICANET, RAPHAEL
- **District cooling**

SmartGrids vision

Future Network Vision



Gridvision 2030



Examples of important R&D topics to Fortum Distribution

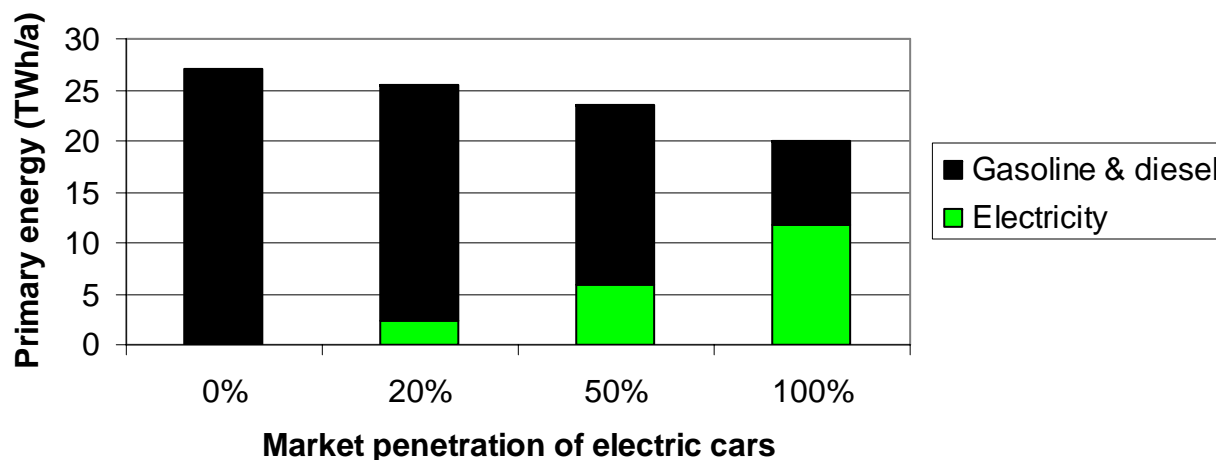
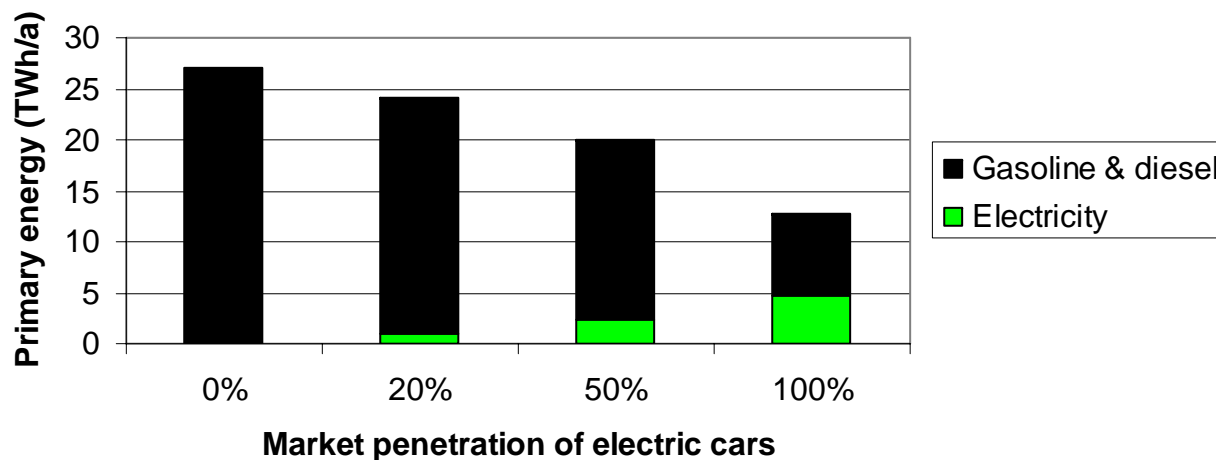
- Network automation and ICT-technology
- New network concept development
- Rural area new network layout
- City-net development for future demands eg. PHEV
- Regulation models and steering impacts of those
- Small scale distributed power production and networks
- Energy efficiency products for market place
- New network related products for customers
- New protection systems for distribution networks
- AMM usage in improving net company processes
- New information solutions eg. Simulation tools for net planning sw
- Power electronics and DC supply

Electric vehicles reduce primary energy consumption

Primary energy consumption if electricity is produced with RENEWABLES

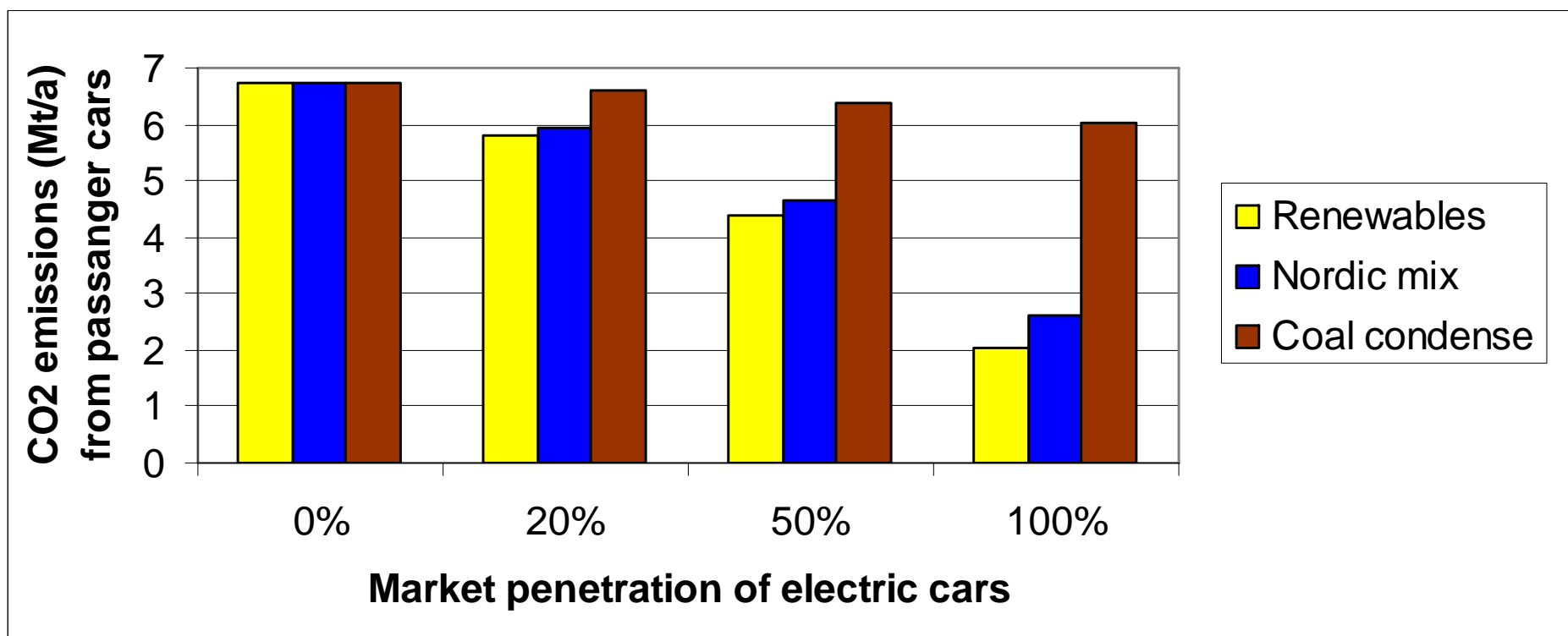
Business case: electric passenger cars in Finland (70% of km's on electricity)

Primary energy consumption if electricity is produced with CONDENSE COAL



Electric vehicles reduce CO₂ emissions significantly

**Business case: electric passenger cars in Finland
(assuming different electricity production sources)**



Global trends, response on those from companies and arising R&D needs

1. Increasing investment costs

Based on increasing needs of reliability of supply and rebuild of old networks. Strategy for investments and maintenance allocation and optimization. This will create new research needs for component analysis (material technology) and use of network data information (ICT).

2. Increasing energy price

Due to high consumption growth in developing countries and rebuild of old power plants in developed countries. Means to challenge this are energy efficiency, distributed power production and RES. R&D topics are through energy efficiency; automation, AMM, storages, RES etc.

3. Energy companies will specialize and service providing markets will grow

In Europe unbundling and tightening regulation will lead to separation of asset owning and network operation. Developing countries will need services of consultation, planning and construction. Creates bodies both for purchasing and providing. R&D needs in business administration, business models, service product development and value chain management.

Situation within 5 years

- We have infrastructure and business concepts for plug-in-cars solutions on the market
- We have energy efficiency products (partners and cross-BU) and metering services, contributing to energy efficiency on the market
- We have development and demo sites for energy efficiency concepts, where we together with partners and customers can show state-of-the-art and create visions for the future.
- We have demo-sites and partnerships within distributed-energy-systems and Smartgrid concepts.