

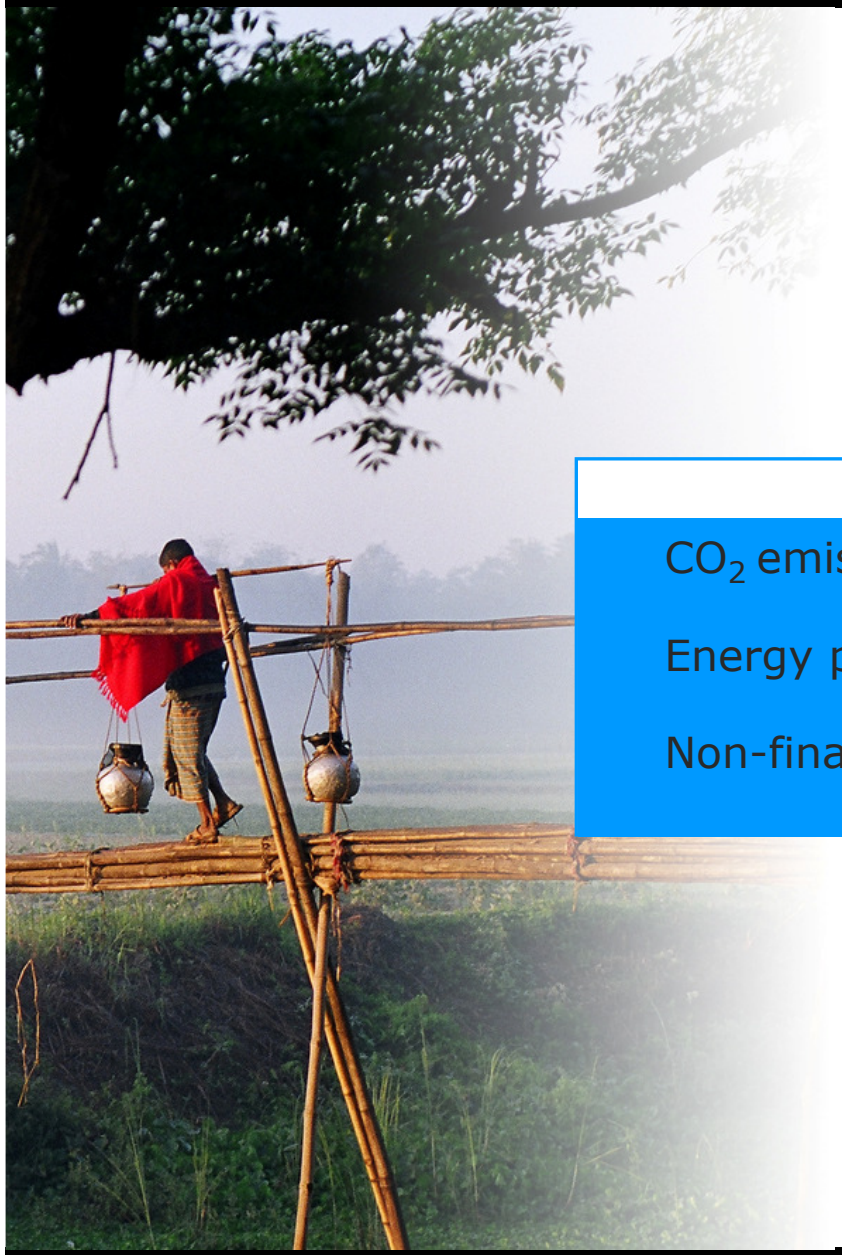
CLIMATE change initiative

Telenor Group - CO2 emission reduction activities

Harald Birkeland, International energy Adviser

March 23rd 2010

telenor group



Content

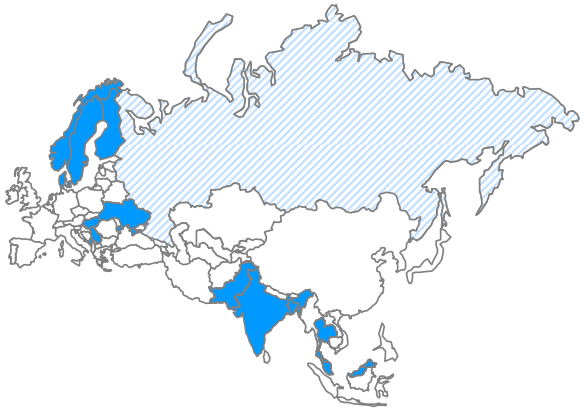
- CO_2 emission reduction strategy and activities
- Energy projects
- Non-financial reporting

CLIMATE change initiative

telenor group

A global provider of telecommunications services

14 countries
174 million mobile subscribers
More than 40 000 employees

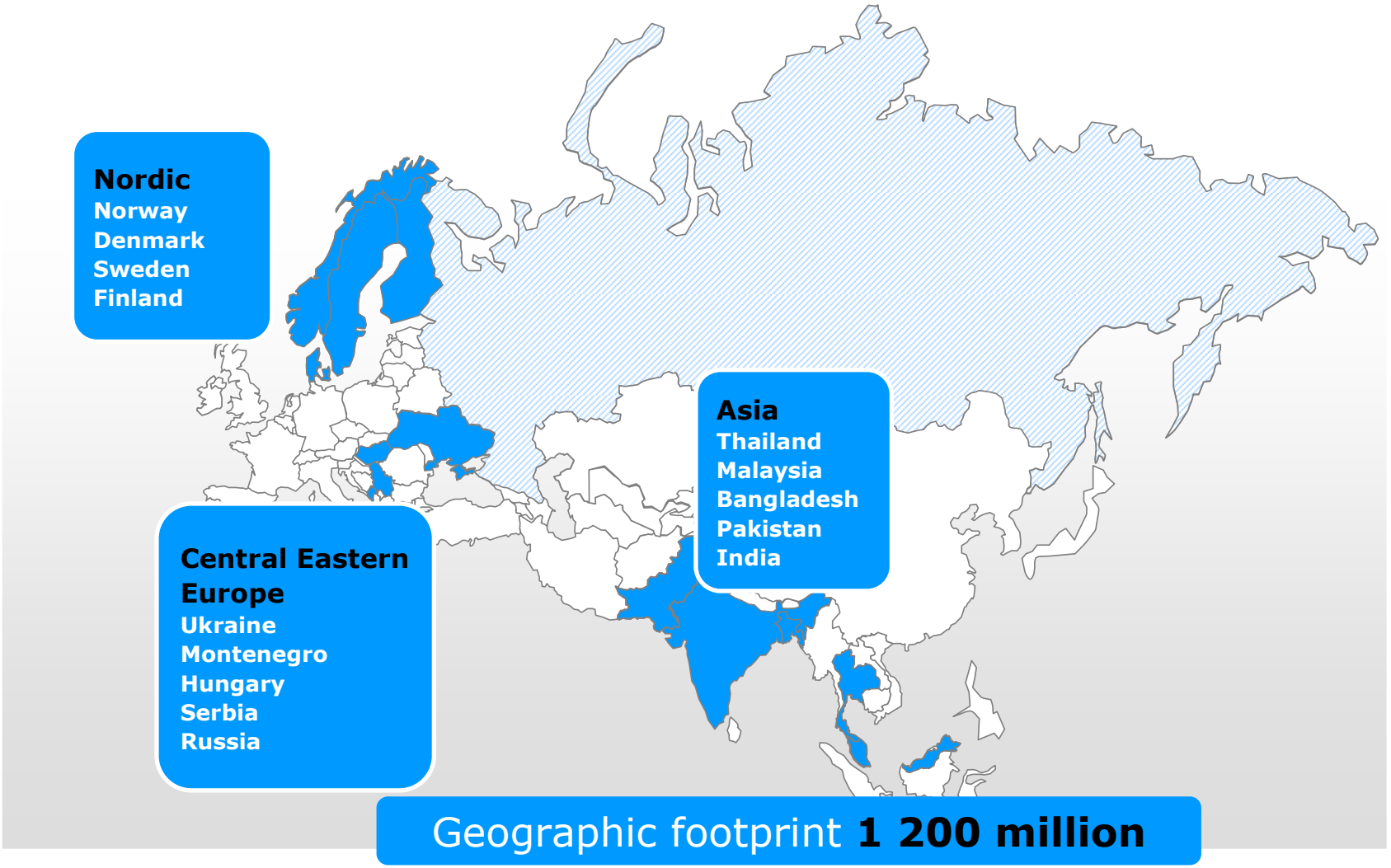


- Mobile operations in 13 markets across the Nordic region, Central Eastern Europe and in Asia
- One of the world's largest mobile operators with 174 mill. mobile subscribers *
- A leading Nordic position in mobile, broadband and TV services

- Total workforce of more than 40 000
- Headquartered in Norway
- Listed on the Oslo Stock Exchange
- Revenues 2009: NOK 107 billion*

* all companies Kyivstar included as per Q4 2009

Operating in three regions



Geographic footprint **1 200 million**

In 2008, Telenor`s long term strategic climate ambitions and KPI have been defined

Goal

*By 2017, Telenor will **reduce the CO2 emission intensity** of its global operations **by 40%** compared with 2008 levels.**

Measures

- Internal cuts – NW, IT, transport
- Green base stations
- Green power purchase
- All measures are NPV positive

Management controls

- Business Review
- Group monitoring of Climate KPI (CO2/value added)
- Incentives

***measured in: CO2 / Value Added (tonns / millions of USD)**
(Value added = EBITDA + Personnel cost)

CLIMATE change initiative

telenor group

Menu of Climate Change initiatives, ongoing or planned…

Investigate renewable energy sources, and run pilots	Improve energy efficiency of networks	More efficient IT-systems	Identify Business Opportunities
Improve energy metering	Reduce travel and transport	Collaborate with the WoW project	Mobile Recycling Programme
Internal competitions / campaigns	Internal e-learning programme	Machine-to-Machine communication	Increase understanding of CO2 impact of our products for customers
Develop & implement green procurement guidelines	Implement Environmental Management System (ISO 14001)		

Group targets are defined in different levels

Group Target
Climate KPI*

For internal and external communication

OpCo Target
tonnes of CO_2

For regional assessment, business review and BU-level communication

Manageable Indicators

kWh / MB	Kg CO2/FTE	kWh / FTE
Network	transport	buildings

Supporting benchmark indicators, internal and external



CLIMATE change initiative

*the Climate KPI on group level is the indexed CSI (relative to 2008)

where CSI = CO_2 / EBITDA + personnel cost

telenor group

Climate KPI on Group level is Carbon Stabilisation Intensity

$$CSI = \frac{CO_2}{VALUE\ ADDED}$$

where VALUE ADDED* = EBITDA + personnel cost

Advantages

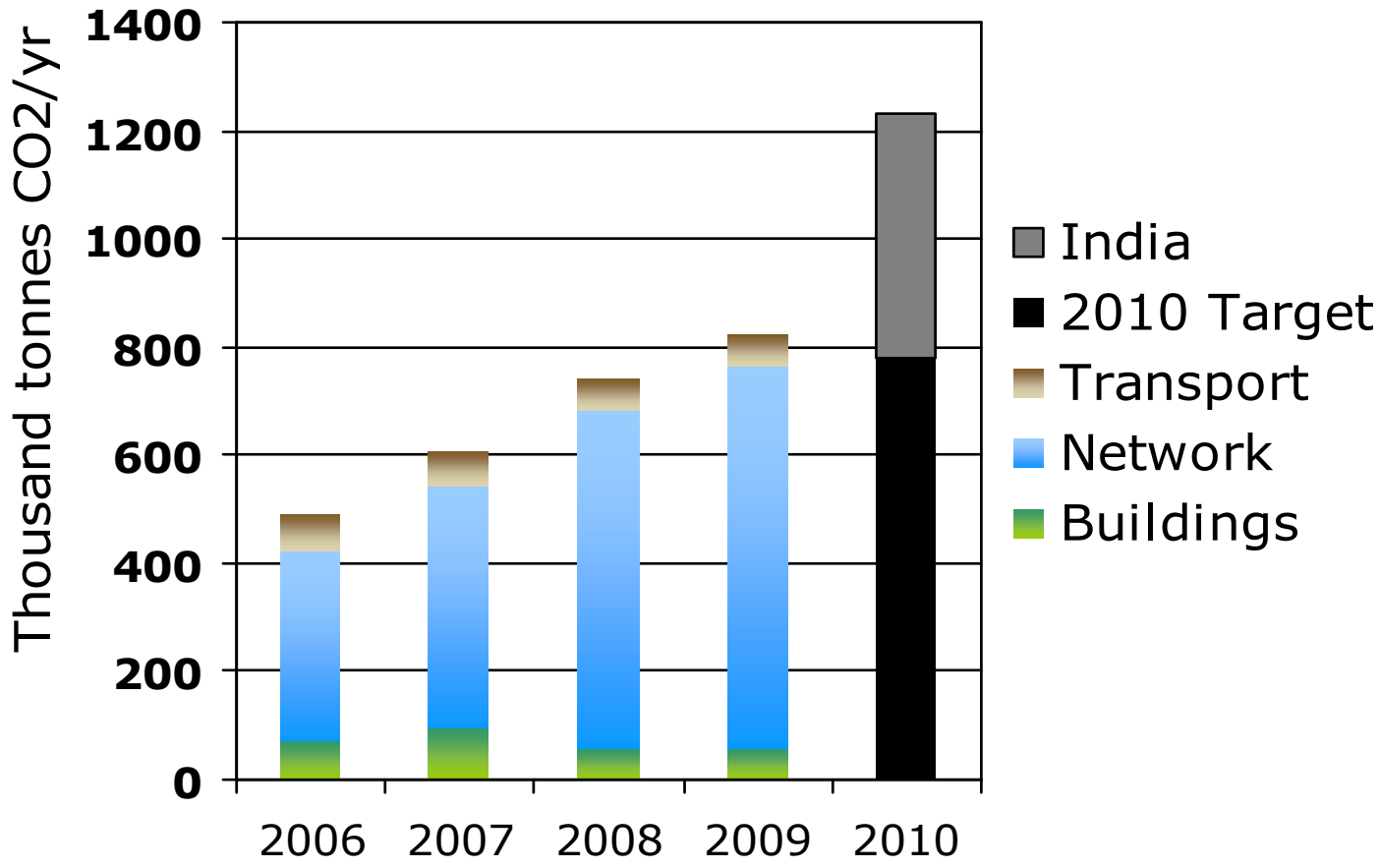
- Links environmental, operational and financial performance
- Accommodates growth
- Framework for modelling future strategy
- Facilitates competitor benchmarking

Disadvantages

- Can mask absolute increases in CO_2 emissions
- Affected by exchange rates fluctuations

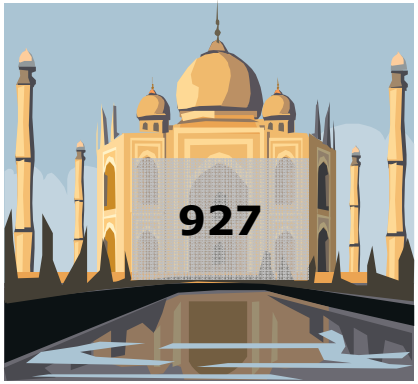
*set by Group Finance per each year

Total CO_2 emissions are likely to continue to rise – network infrastructure is approx **86 %** of total emissions (2009)



CLIMATE change initiative

telenor group





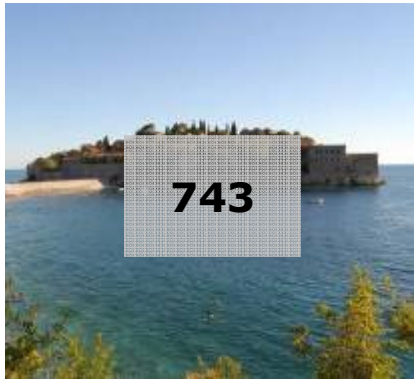




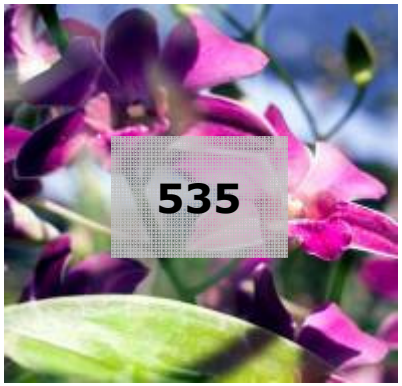














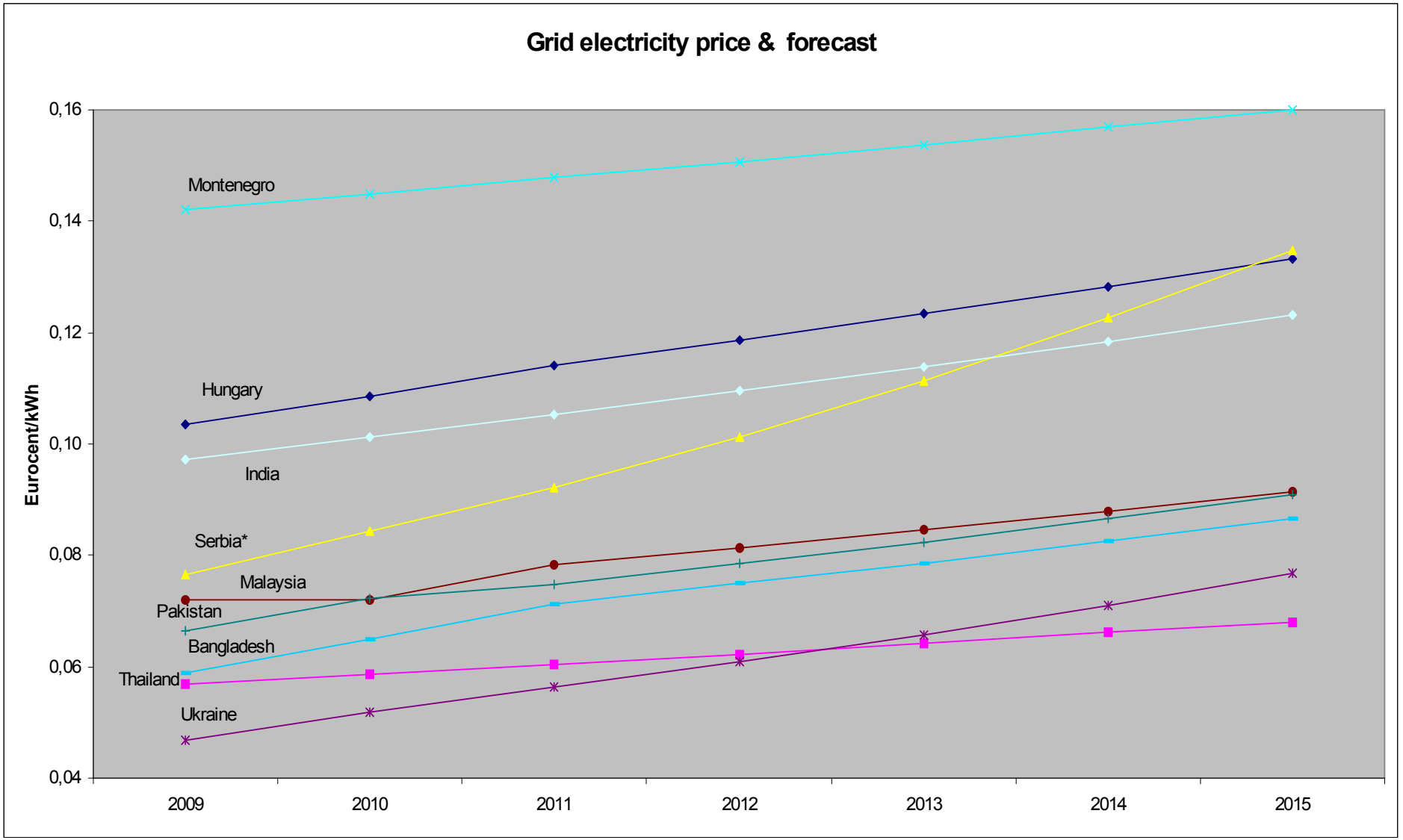


CLIMATE change initiative

Source: IEA

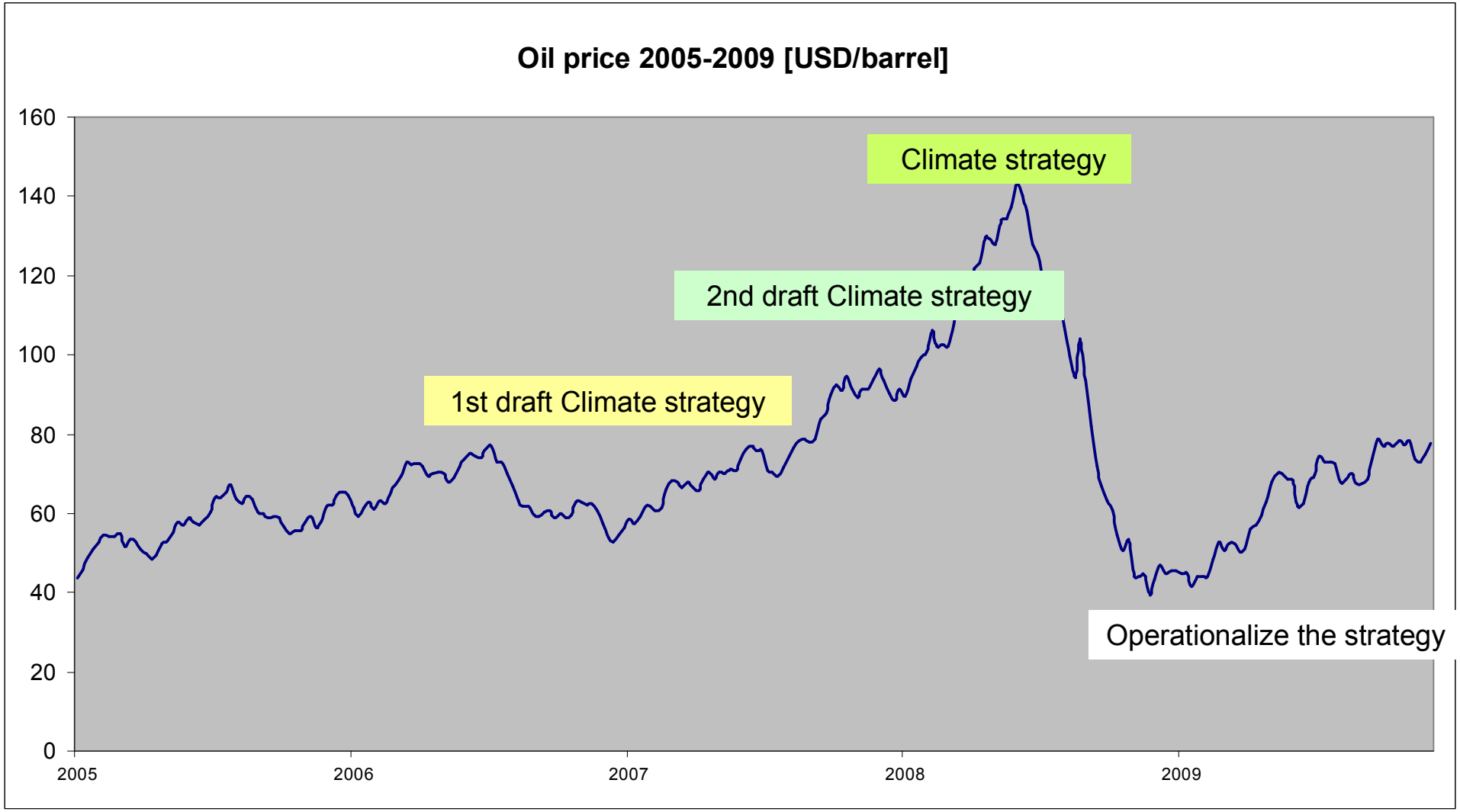
CO_2 tonnes per GWh (g/kWh)
(electricity from national grid)

telenor group

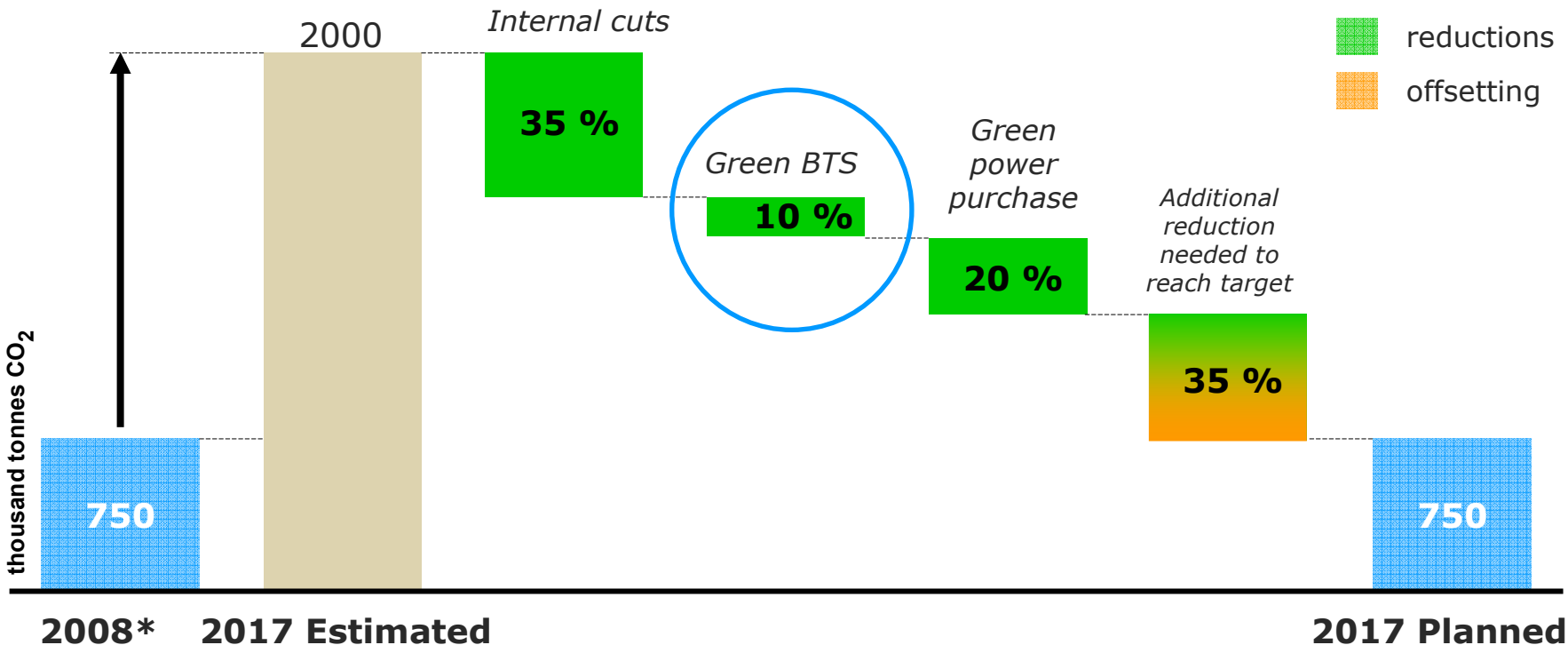


CLIMATE change initiative

telenor group


Oil price 2005-2009 [USD/barrel]
160
140
120
100
80
60
40
20
0
2005
2006
2007
2008
2009
Climate strategy
2nd draft Climate strategy
1st draft Climate strategy
Operationalize the strategy

By 2017, Telenor Group will reduce the CO2 emission intensity of its global operations by 40% compared with 2008 levels…



…and Renewable energy to BTSs will play a part in reaching this goal…

CLIMATE change initiative

telenor group

*2007 figures are based on OpCo estimates

…up until 2009 Telenor has been piloting several renewable solutions…

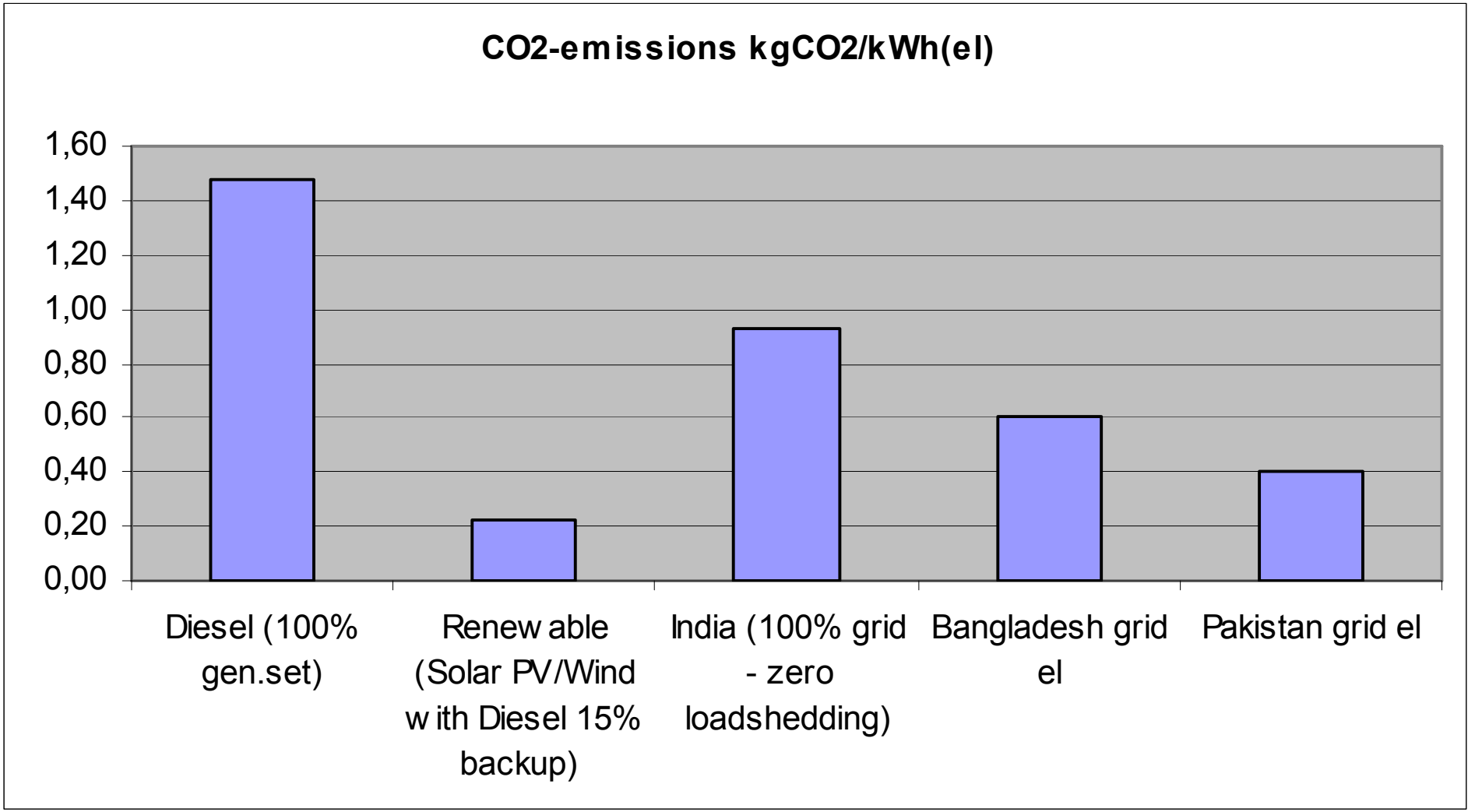


…to gain competence on field of renewable energy

…to identify the best design for green BTS

CLIMATE change initiative

telenor group


CO2-emissions kgCO2/kWh(el)
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
Diesel (100% gen.set)
Renew able (Solar PV/Wind w ith Diesel 15% backup)
India (100% grid - zero loadshedding)
Bangladesh grid el
Pakistan grid el

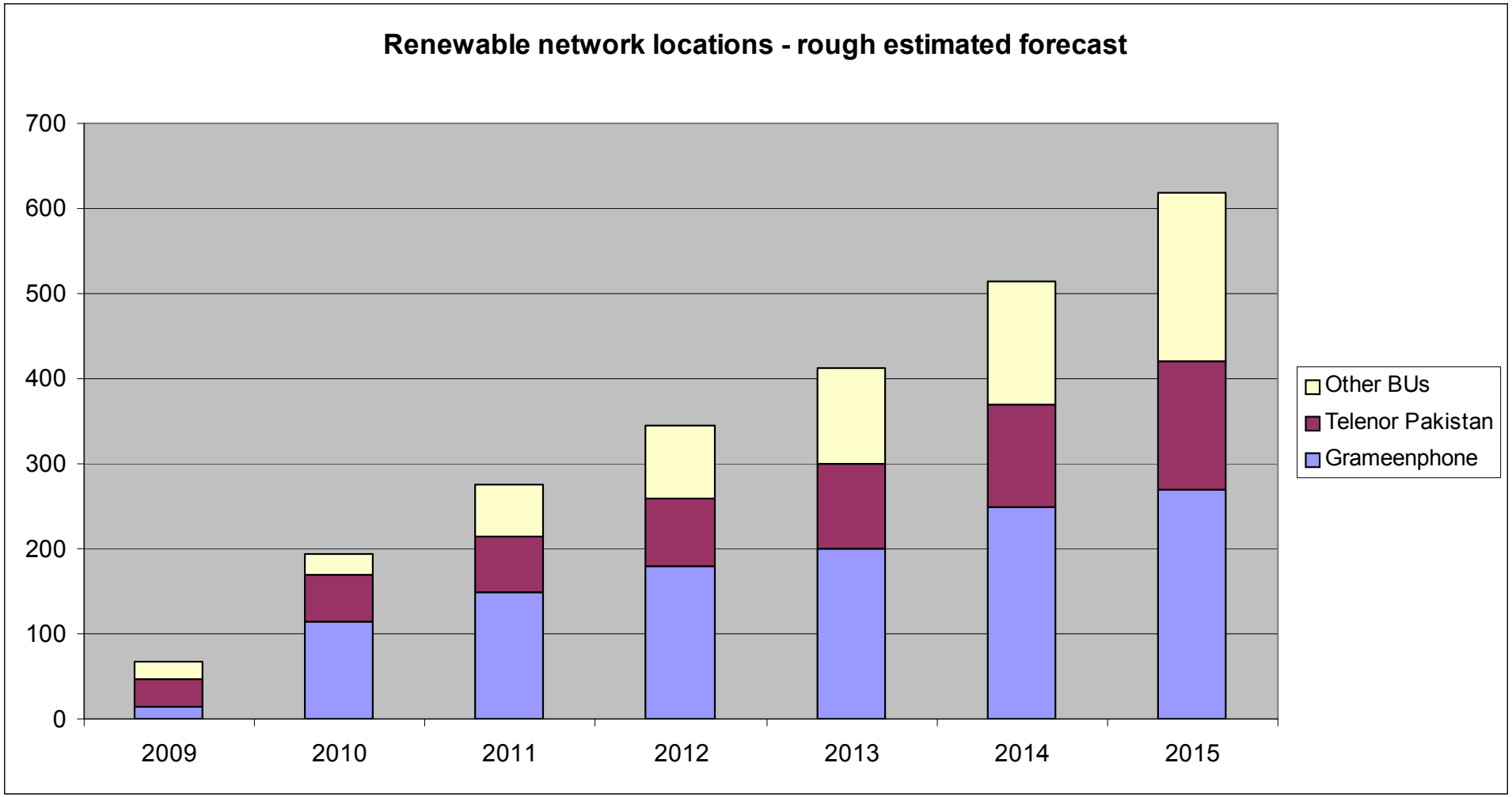
The affordable Green BTS concept focuses on…

1. minimising BTS power consumption

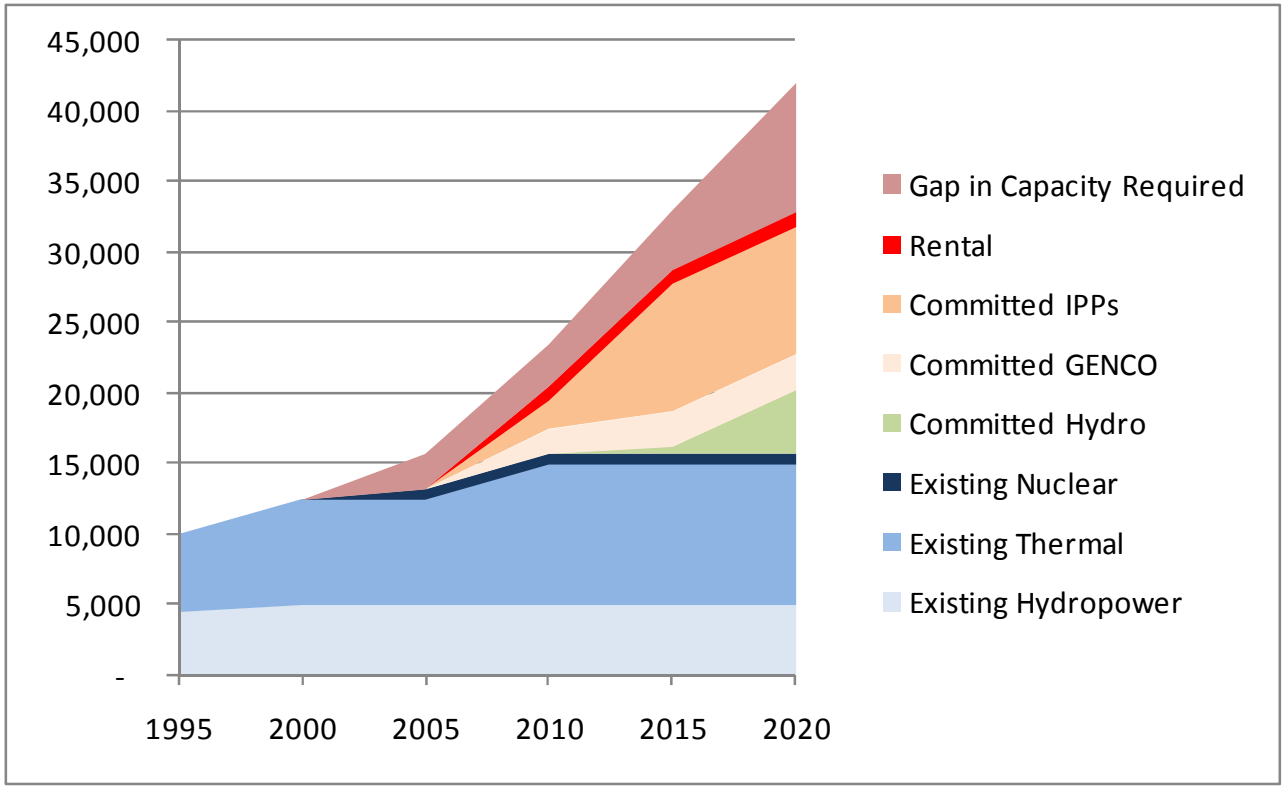


2. minimising site power consumption

3. feeding site with renewable energy


Renewable network locations - rough estimated forecast
700
600
500
400
300
200
100
0
2009
2010
2011
2012
2013
2014
2015
Other BUs
Telenor Pakistan
Grameenphone

Energy Snapshot of Pakistan



Demand expected to outpace increased **supply** over the next 15 years even after 1000 MW of rental power are included in supply:

- 2010 – 3000 MW
- 2015 – 4250 MW
- 2020 – 9150 MW

Renewable Energy Potential in Pakistan



Solar Energy

- 10,000 MW per capita



Biomass

- 2,000 MW



Wind Energy



Hydro

Renewable energy is a focus area of Telenor Pakistan

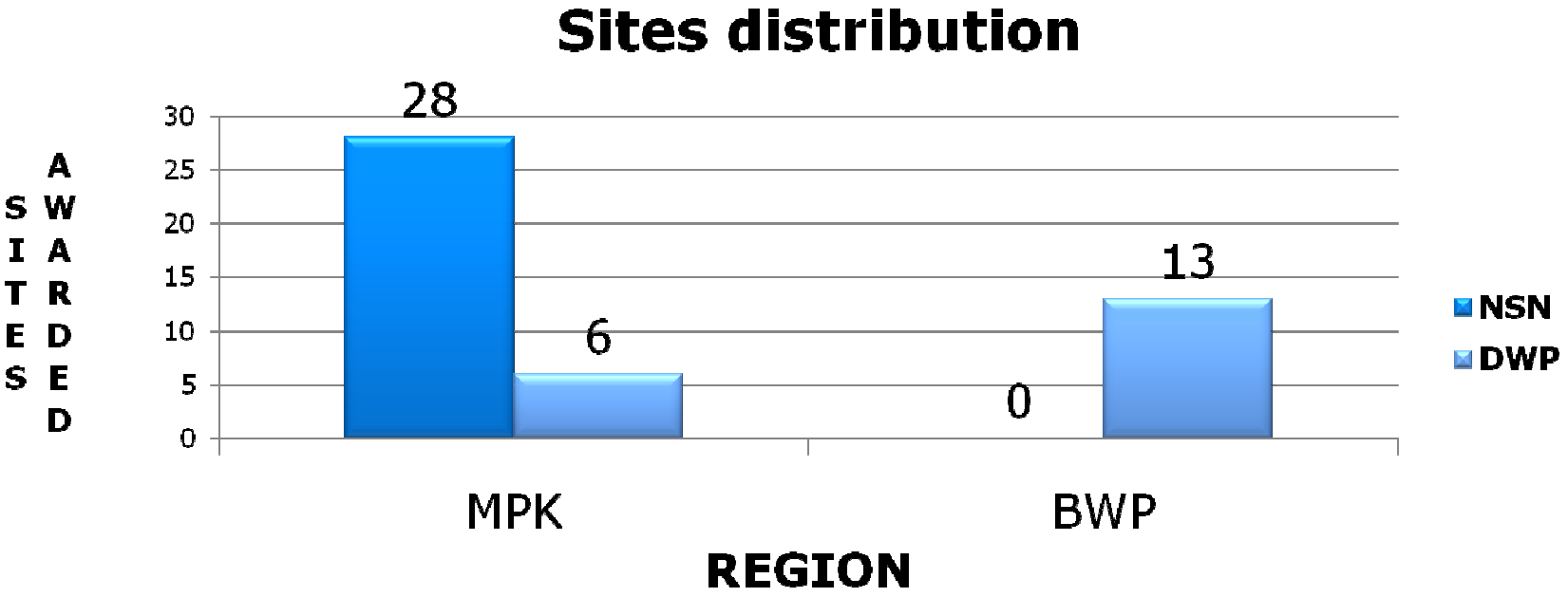
- Unlimited and free supply of input resources
- Pakistan's huge potential in RE by vitrue of its geography and geology
- Carbon credits will help Telenor strengthen its brand as a Green Telco
- Resource variability risk is covered through the Renewable Energy policy
- Tarriff regime allows bonus revenue on production above and beyond the benchmark agreed.
- Wheeling is allowed under RE policy while conventional generation (oil, gas, coal, nuclear, etc.) has no such provision





Solar Power Project in Telenor Pakistan - Description

- The Solar Power Project shall be executed in Mirpurkhas and Bahawalpur Region.
- For the year 2009, the Investment Committee has supported the project from USF project
- A total of 47 sites have been approved by IC so far, which includes 43 BTS and 04 Repeater sites.
- Vendor-wise break up of sites distribution is graphically shown; 28 sites have been awarded to NSN while 19 to DWP for Mirpurkhas and Bahawalpur regions respectively.



Design Specifications

- Battery back-up time on Solar Sites will be 17 hours
- 40% Backup Time will be reduced if site is used for sharing
- Pilot site for the Project shall be chosen within the premises of Islamabad
- Average Power Production from Solar cells on daily basis is 5.2 kWh/ m^2/ day
- Separate test site within the city will also help during on-site training for solar installations in future



Site Model	No. of solar panels/ site	Peak load (KWp)	Proposed Output Power of Solar Panels (KWp)
SM 1	39	1.7	5.1
SM 2	48	2.5	7.5
SM 3	54	2.7	8.2
SM 4 (Repeater)	10	< 1	1.73

DWP Supply

Items	Manufacturer	Origin
Batteries	TROJAN	USA
Solar panels	SHARP	USA

NSN Supply

Items	Manufacturer	Origin
Batteries	EXIDE	Germany
Solar panels	RISEN	China

Onshore Ordering Plan (both NSN/DWP)

Items	Manufacturer	Origin
Cable trays	Build Core/IIC/IKAN	Pakistan
Solar Panel Frame and Pole	Build Core/IIC	Pakistan
Battery Banks racks	Build Core/IIC	Pakistan
DC+AC Cables	FAST	Pakistan
Accessories (Nuts, Bolts)	Build Core/IIC	Pakistan

Rural Electrification:
Project Tatu

- Provided renewable energy to 800+ residents of Tatu Village
- Energy provided in two renewable forms
  - Micro-hydel station (30kW) on a stream flowing next to the village
  - Heating mosque via harnessing hot water from geothermal sulphur springs.
- Successfully running since November 22, 09





Geothermal Potential at TATU



Steam rising out of hot springs at TATU



Channeling HW for heating the Mosque



Village mosque –the locations that was heated by using hot springs and Indoor heating unit

•Large energy potential in the geothermal springs – to be used directly for heating or generation of electricity by use of steam

•Reducing deforestration as wood is largely used for cooking and heating

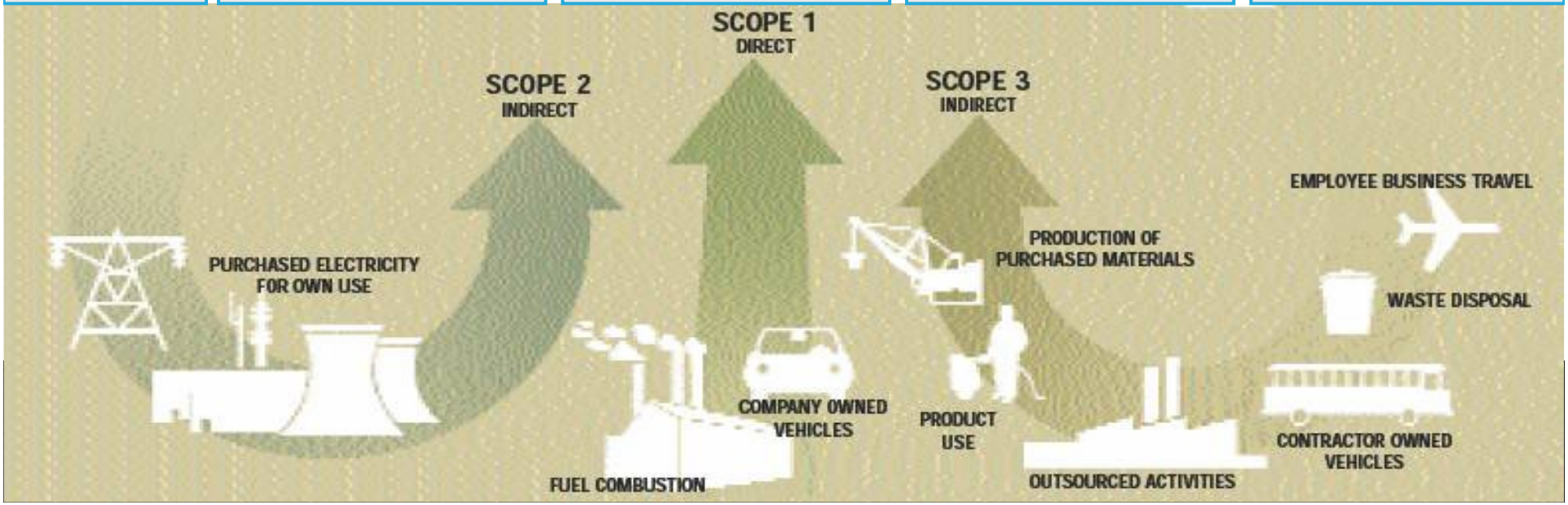
The annual Non-financial Reporting

According to the Greenhouse Gas Protocol

Question categories:

- Staff Key Figures
- Compensation and benefits
- Trade Unions
- Training and development
- Health, safety and working environment
- **Corporate Responsibility and Environment**

	Scope 2 Electricity indirect GHG emissions	Scope 1 Direct GHG emissions	Scope 3 Other indirect GHG emissions	
	• Generation of purchased energy • Generation of purchased district heating and cooling	• Own and employees car fleet in duty • Gas heating purposes • Oil - heating purposes • Own electricity production with gas or diesel	• Flights	Satellite Rocket fuel?
2008:	**567 840 t CO_2**	**159 900 t CO_2**	**17 400 t CO_2**	**745 140 t CO_2**



Group targets are defined in different levels

Group Target
Climate KPI*

For internal and external communication

OpCo Target
tonnes of CO_2

For regional assessment, business review and BU-level communication

Manageable Indicators

kWh / MB	Kg CO2/FTE	kWh / FTE
Network	transport	buildings

Supporting benchmark indicators, internal and external



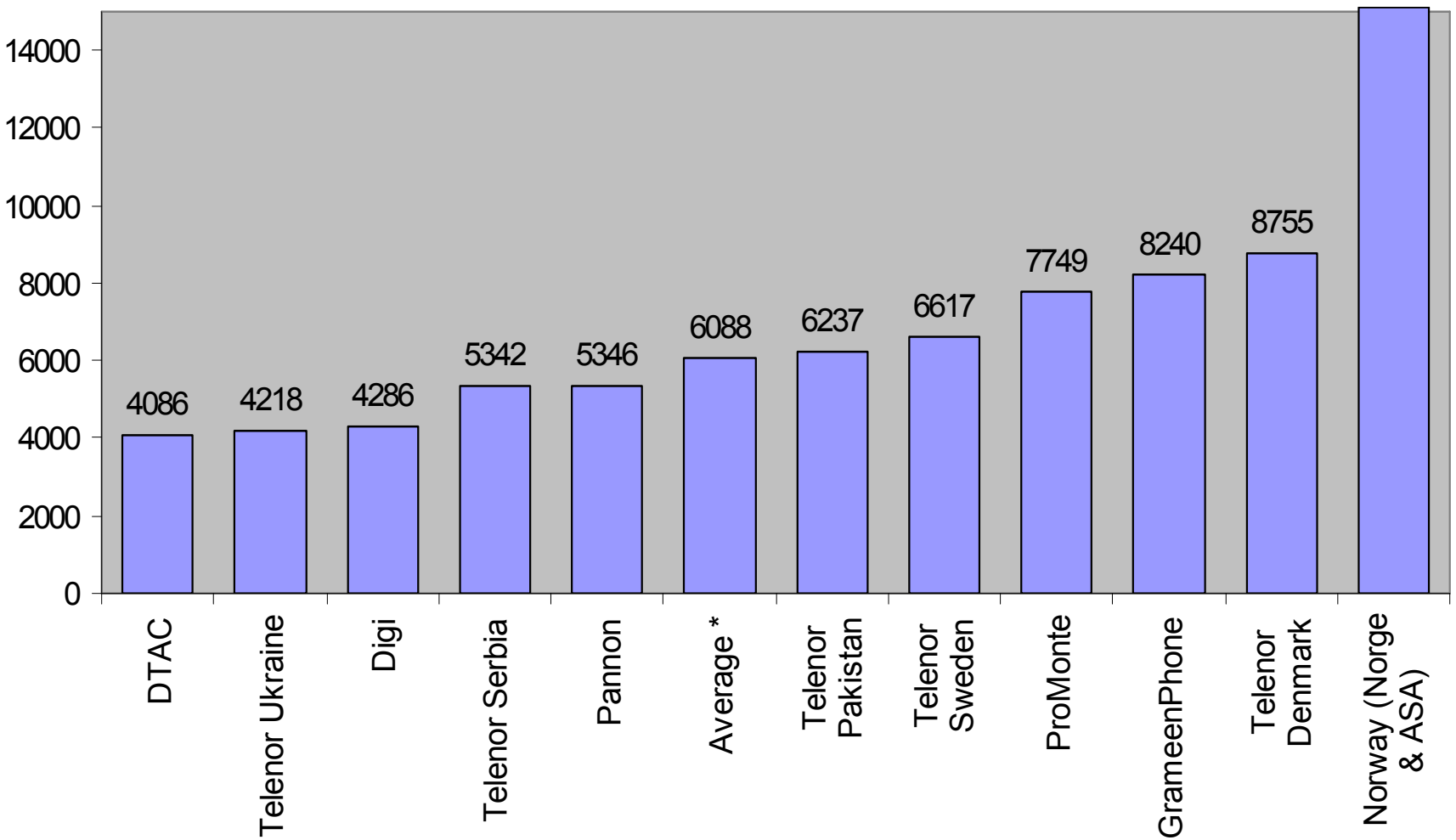
CLIMATE change initiative

*the Climate KPI on group level is the indexed CSI (relative to 2008)

where CSI = CO_2 / EBITDA + personnel cost

telenor group

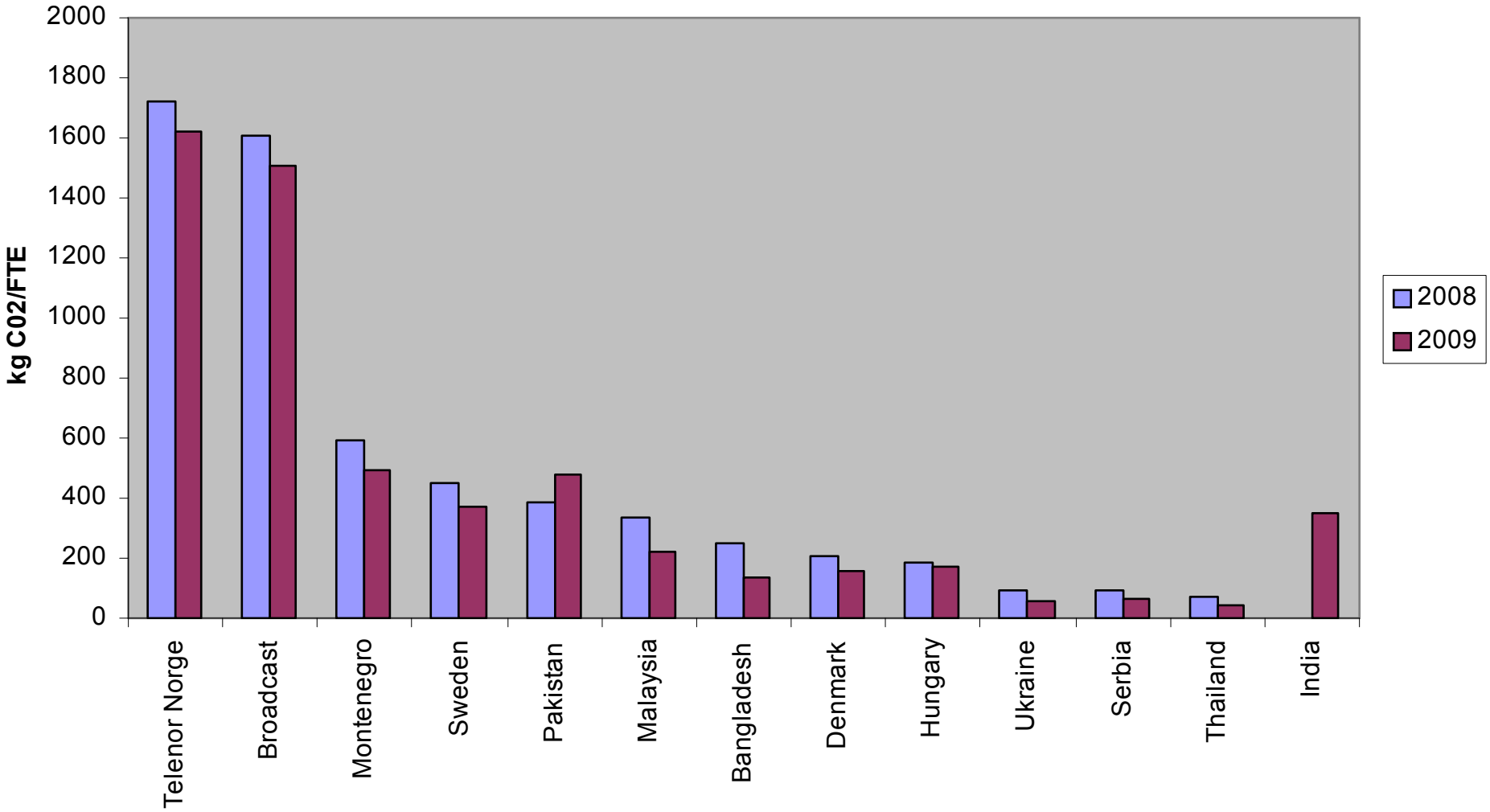
Energy use in Telenor buildings per FTE 2008 [kWh/FTE*yr]

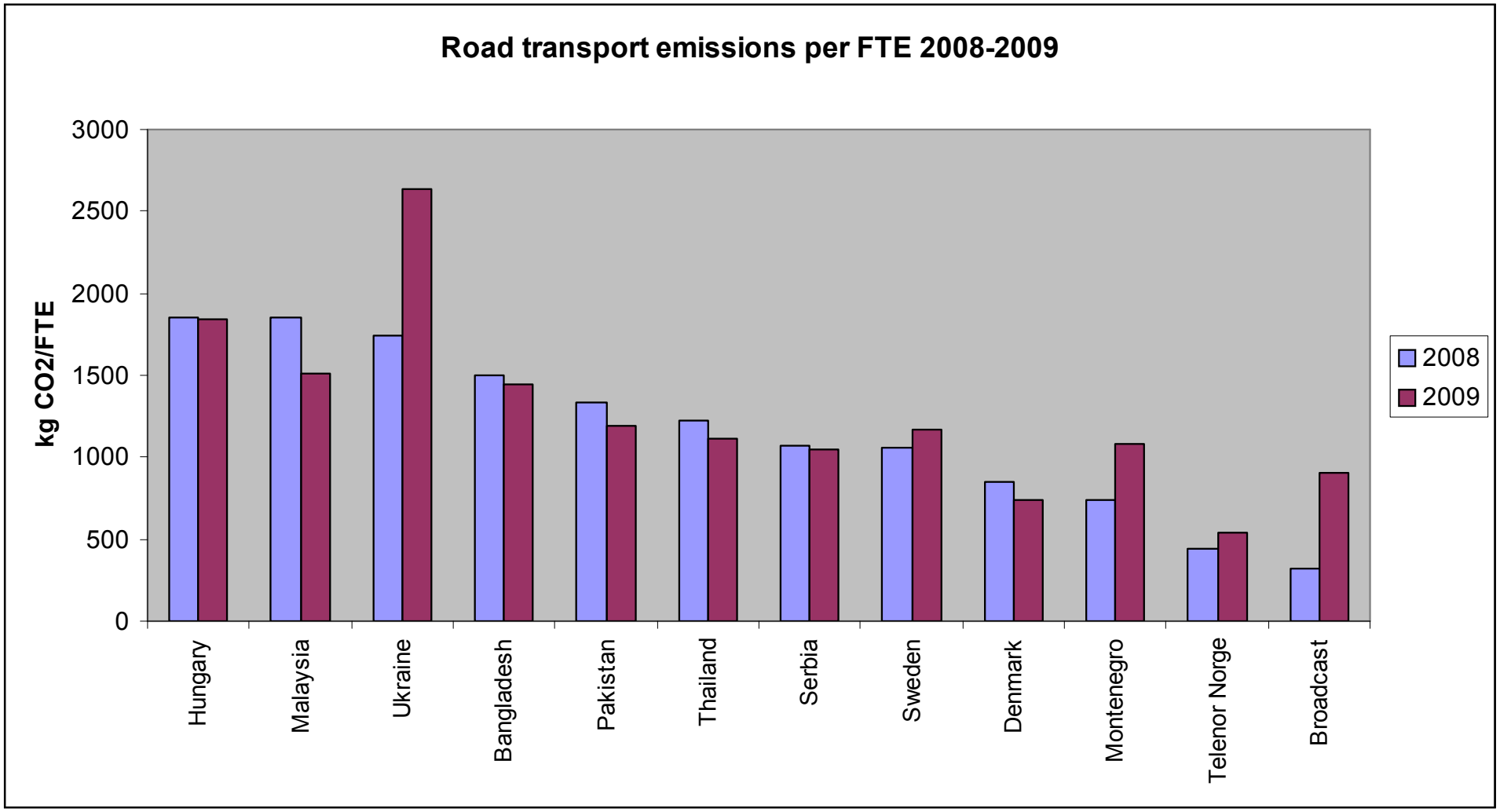


CLIMATE change initiative

telenor group

Specific flight emissions per FTE 2008




Road transport emissions per FTE 2008-2009
kg CO2/FTE
3000
2500
2000
1500
1000
500
0
Hungary
Malaysia
Ukraine
Bangladesh
Pakistan
Thailand
Serbia
Sweden
Denmark
Montenegro
Telenor Norge
Broadcast
2008
2009

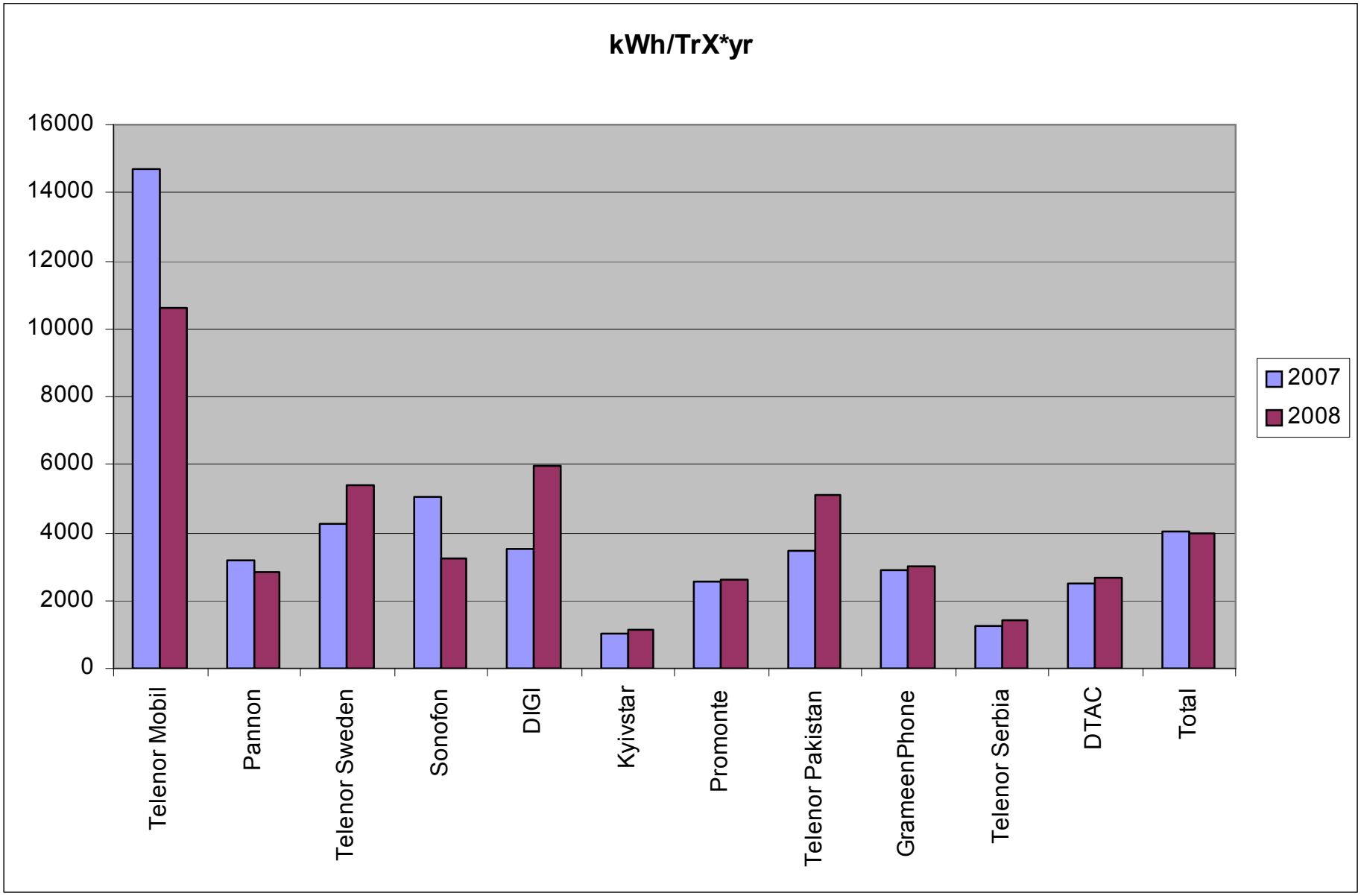
Benchmark indicators on network emissions will be introduced...

- In networks it is challenging to create indicators which can give exact benchmark, because:
  - different characteristics of networks
  - mix of 2G / 3G equipment
  - different traffic characteristics, etc…

- The focus is rather on **benchmarking the year-on-year change** in each OpCo.

Possible benchmark indicators for networks:

- kWh / TRX / year
- kWh / cell site / year
- kWh / traffic unit
- Energy indicators based on selected parameters


kWh/TrX*yr
16000
14000
12000
10000
8000
6000
4000
2000
0
Telenor Mobil
Pannon
Telenor Sweden
Sonofon
DIGI
Kyivstar
Promonte
Telenor Pakistan
GrameenPhone
Telenor Serbia
DTAC
Total
2007
2008

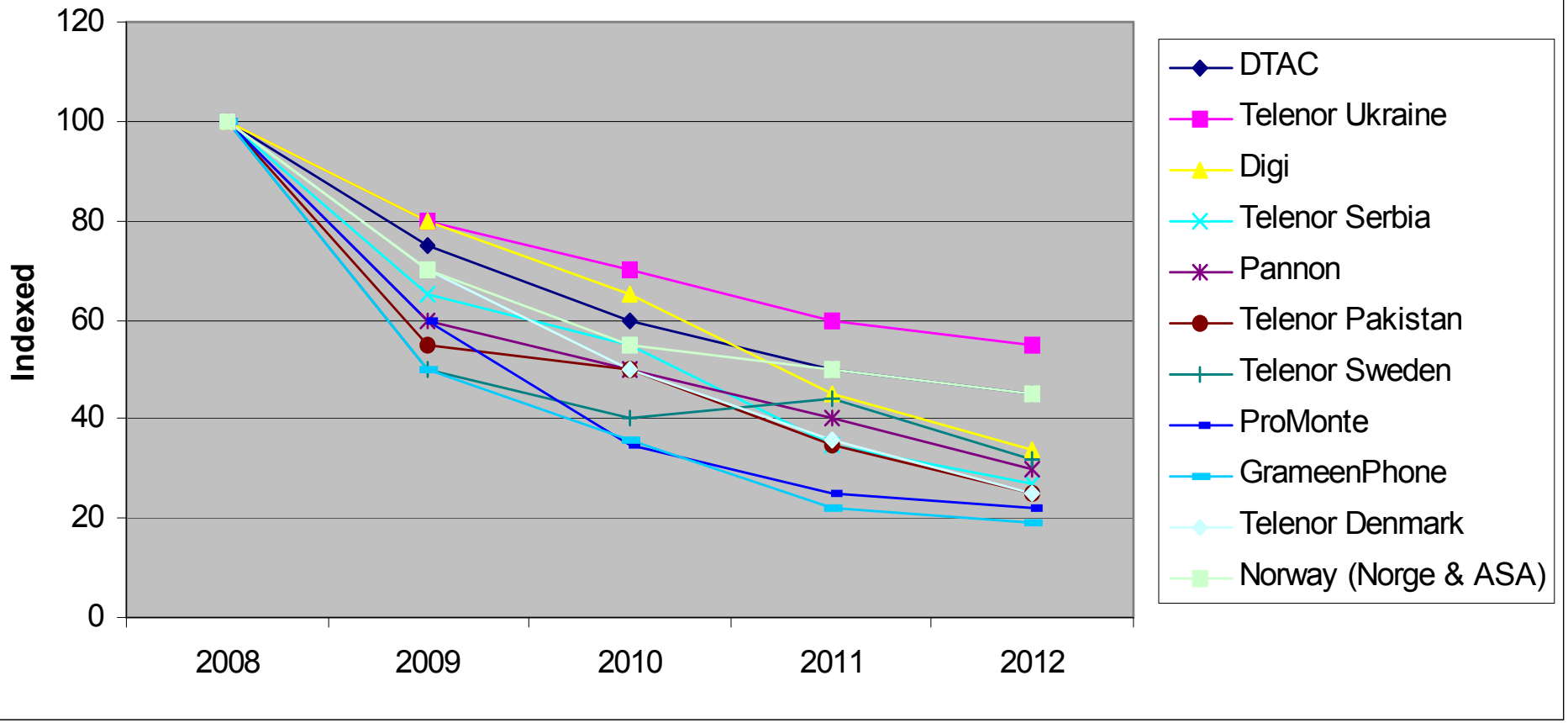
Voice and Data traffic…

Measured voice traffic [Erlang/year]	BW per voice call at the radio interface [kbps]	Measured data traffic [Tbyte/year]
208 000 000	12,20	2 600
Calculated voice traffic [Tbyte/year]		
1 142		
Total 2G/3G traffic [Tbyte]		
3 742		

Input

Calculated

DUMMY Indexed specific energy use per network traffic [kWh/MB*yr]



Recycling is a focus area of the updated Climate Strategy of Telenor Group (approved by GEM on 25.01.2010)

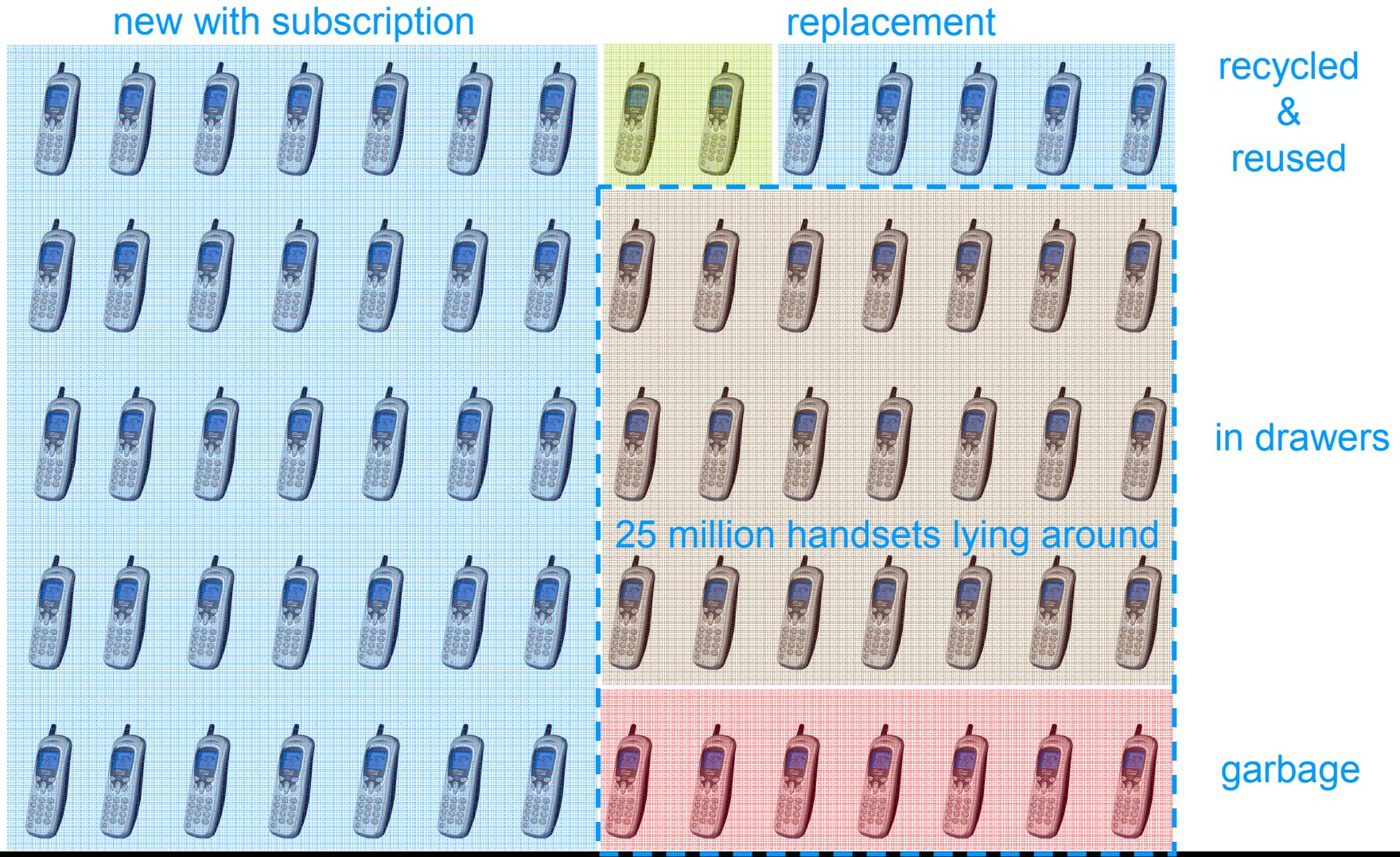
Strategic focus area:

- *Telenor Group will fully implement self-sustaining handset recycling programmes in all Business Units by 2010*
- *A recycling programme for IS / IT, network and customer-premises equipment should be in place in all Business Units by 2012*

Follow up:

- *Number of collected handsets is measured through the monthly HSSE reporting*
- *by Business Assurance and TCCI*

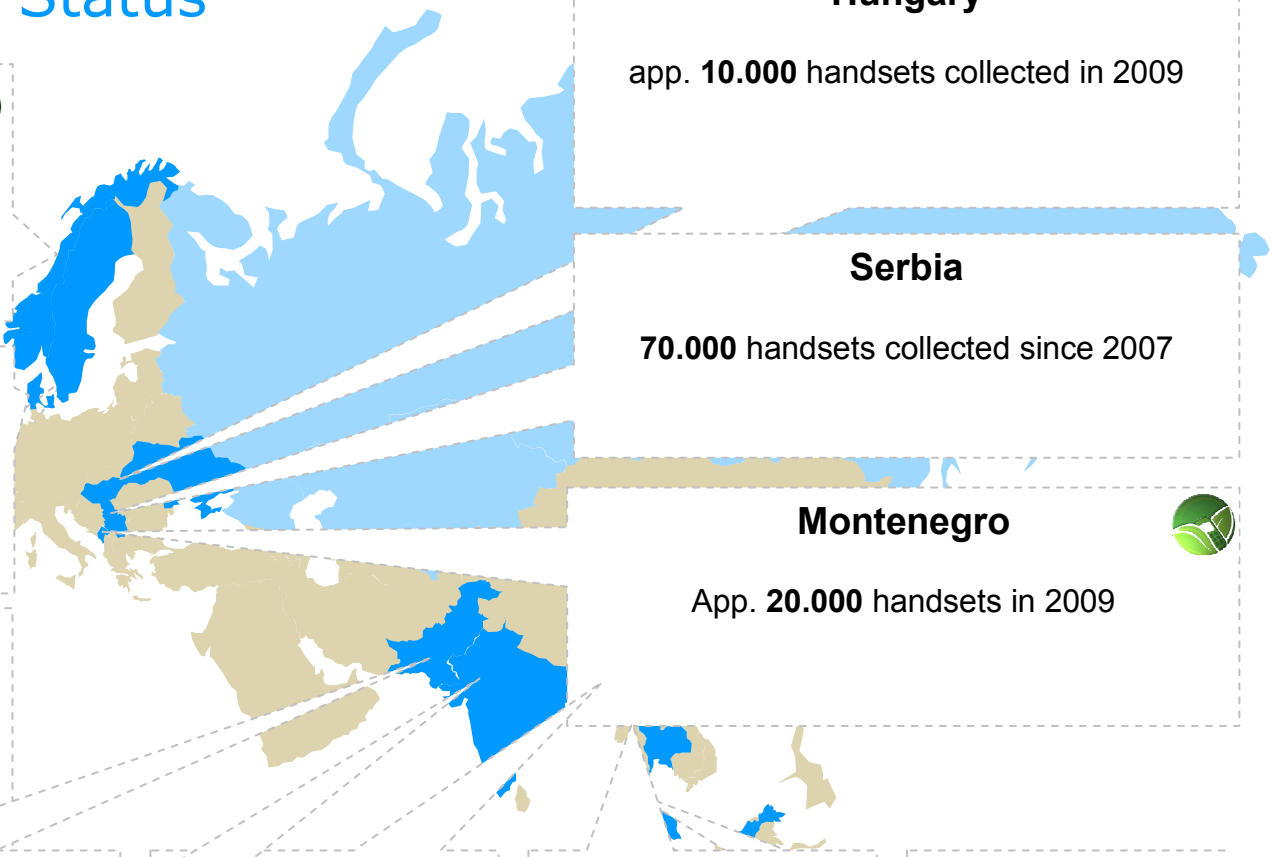
More than 70 million handsets were sold to Telenor customers



CLIMATE change initiative

telenor group

Group Recycling Status



Norway

App. **8.000** handsets in 1st. round
Recycling & re-use
Business program launch in Q4

Denmark

App. **20.000** handsets in 2009
Recycling & re-use (6 brokers)

Sweden

App. **70.000** handsets in 2009
Re-cycling only

Hungary

app. **10.000** handsets collected in 2009

Serbia

70.000 handsets collected since 2007

Montenegro

App. **20.000** handsets in 2009

Pakistan

program to be launched

Uninor

program to be launched

Bangladesh

program to be launched

Thailand

program to be launched

Malaysia

Piloting program

CLIMATE change initiative

telenor group

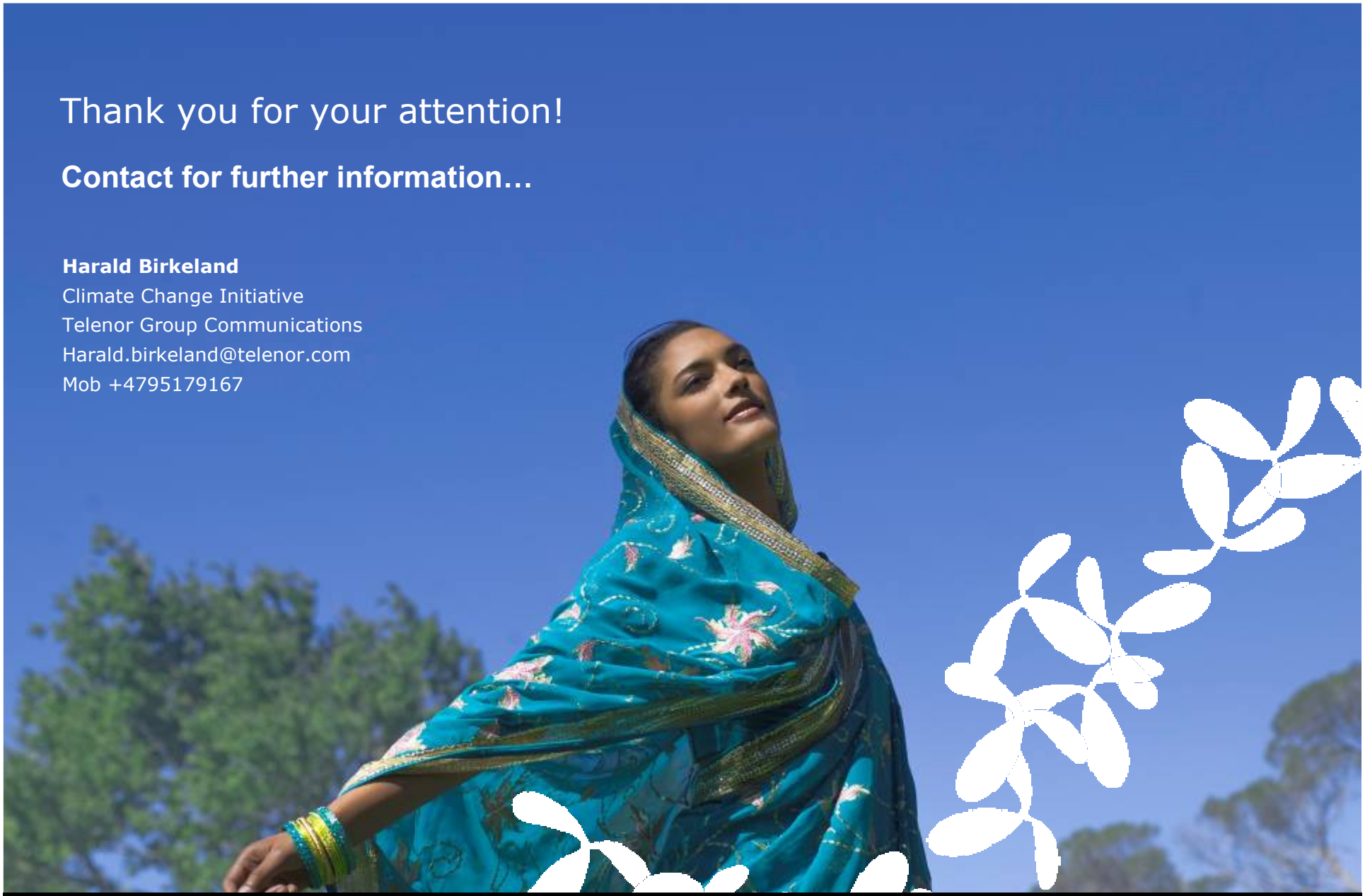
Menu of Climate Change initiatives, ongoing or planned…

Investigate renewable energy sources, and run pilots	Improve energy efficiency of networks	More efficient IT-systems	Identify Business Opportunities
Improve energy metering	Reduce travel and transport	Collaborate with the WoW project	Mobile Recycling Programme
Internal competitions / campaigns	Internal e-learning programme	Machine-to-Machine communication	Increase understanding of CO2 impact of our products for customers
Develop & implement green procurement guidelines	Implement Environmental Management System (ISO 14001)		

Thank you for your attention!

Contact for further information…

Harald Birkeland
Climate Change Initiative
Telenor Group Communications
Harald.birkeland@telenor.com
Mob +4795179167



CLIMATE change initiative

telenor group