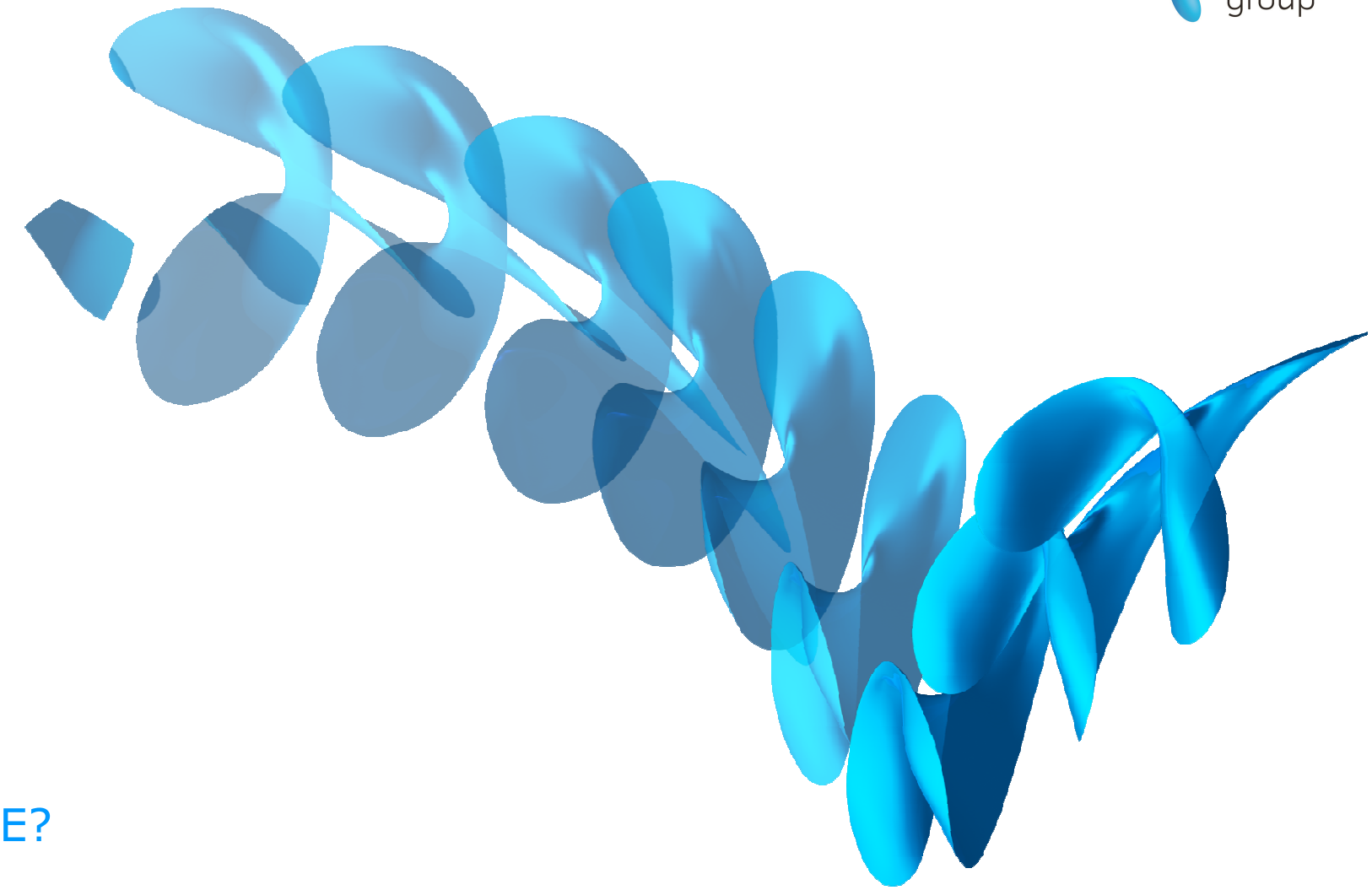


Why LTE?

Knut Erik Walter, Head of Network Technology Strategies,
Group Business Development and Research

WBC 08 September 2009, Paris France



Outline

- Who is the Telenor Group
- Mobile Broadband, the product and business case
- Selecting the optimum technology
- The role of LTE
- Summary/conclusion

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Telenor Group
Basic facts

- Our business is telecommunications
- Among the world's largest mobile operators with 164 million mobile subscriptions
- Strong footprint in Central Eastern Europe and Asia
- Leading Nordic position in mobile, broadband and TV services.
- Total workforce: 40 000 man-years (30 000 outside Norway)*
- Listed on Oslo Stock Exchange

*Figures including Kyivstar

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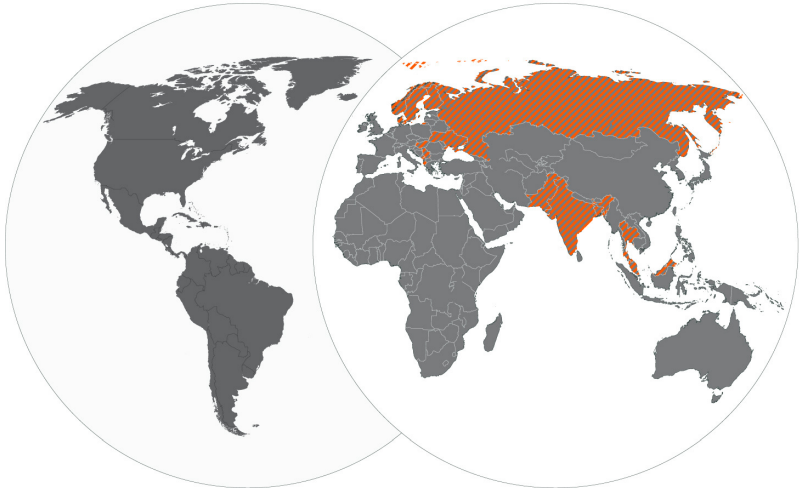
Telenor Group Mobile world

NORDIC REGION
6.7 million subscribers

Telenor, Norway 100%
3 million subscribers

Sonofon, Denmark 100%
1.8 million subscribers

Telenor, Sweden 100%
1.9 million subscribers



CEE REGION without Russia*
30 million subscribers

Pannon, Hungary 100%
3.7 million subscribers

Telenor, Serbia 100%
2.8 million subscribers

Promonte, Montenegro 100%
0.4 million subscribers

Kyivstar, Ukraine 56.5%
23.5 million subscribers

VimpelCom, Russia* 33.6%
61 million subscribers

ASIAN REGION
65.7 million subscribers

Telenor, Pakistan 100%
19 million subscribers

Grameenphone, Bangladesh 62%
21 million subscribers

DiGi, Malaysia 49%
7 million subscribers

dtac, Thailand 65.5%*
18.7 million subscribers

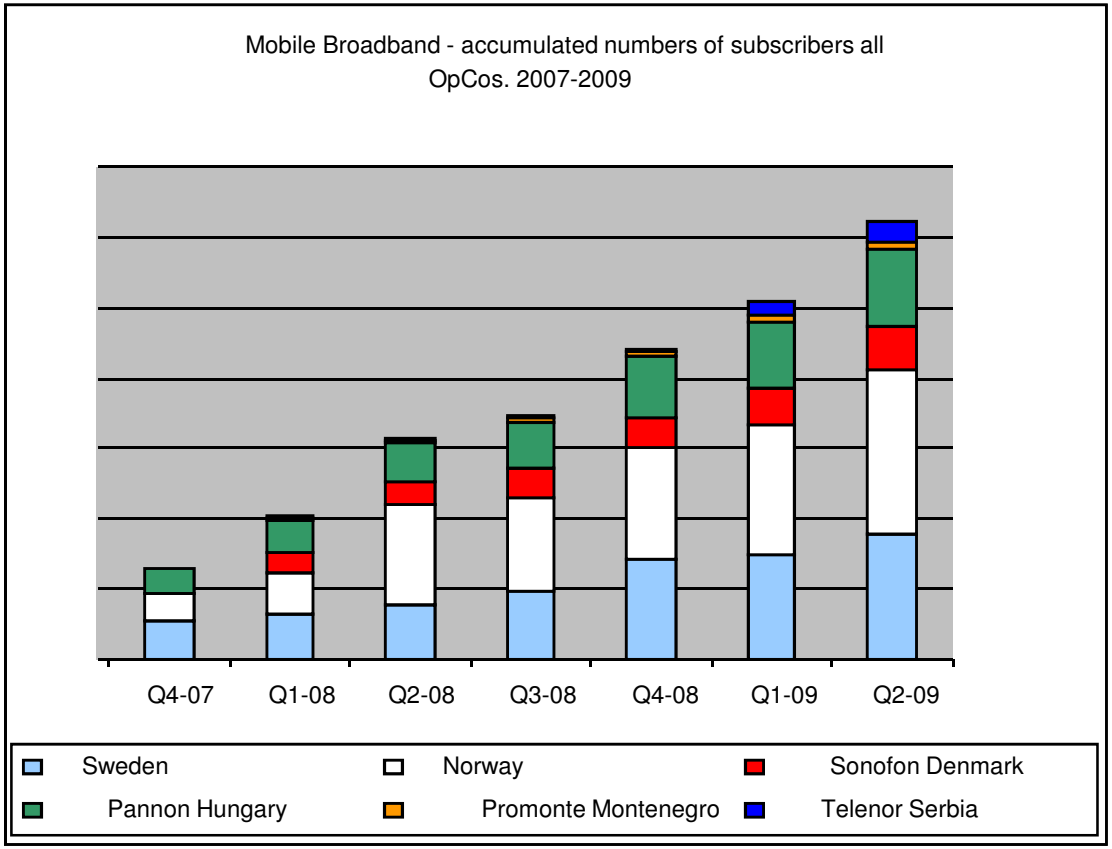
*economic exposure

*Financial statement for VimpleCom as of the Group's balance sheet date is not available.

Figures presented according to telecom analysts

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We experience significant growth in all markets where MBB is launched



Launch of mobile broadband:

- Pannon: April 2007
- Sweden: June 2007
- Norway: Nov. 2007
- Promonte: Dec. 2007 (pilot)
- Sonofon: Jan. 2008
- Serbia: July 2008

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The two flavours of mobile broadband data:

Large screen:

Internet access from PC/laptop:

- Residential (private)
- Nomadic (private and business)

Inbuilt or USB-connected Modem

Advanced mobility features less important

Competition factors:

- Coverage
- Price
- Performance



Small screen:

Smartphone with mobile Internet

- Anywhere, Anytime
- Private and business

All-in-one gadget, but still a phone

Strong requirements on mobility, speech quality in addition to the data connection



Competition factors:

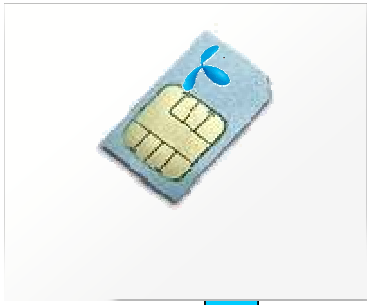
- Coverage
- Price
- Functionality and services
- Performance

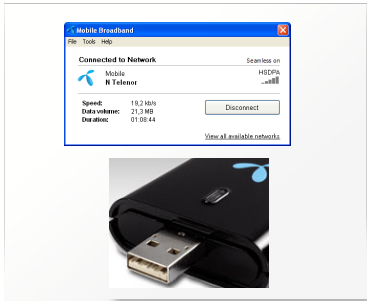
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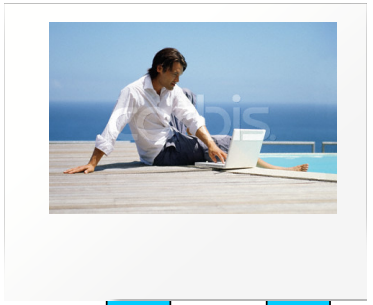
MBB is a success for the users…

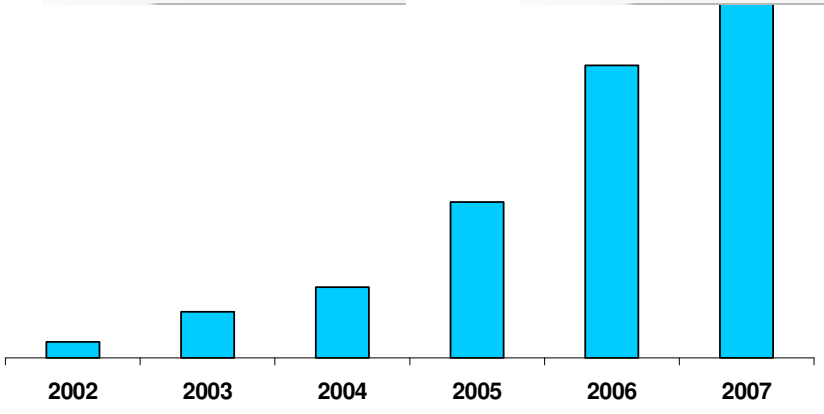
- Accelerating uptake and usage show that the customers wants the service
- "Hunger for speed and capacity" follow a similar path as for fixed broadband



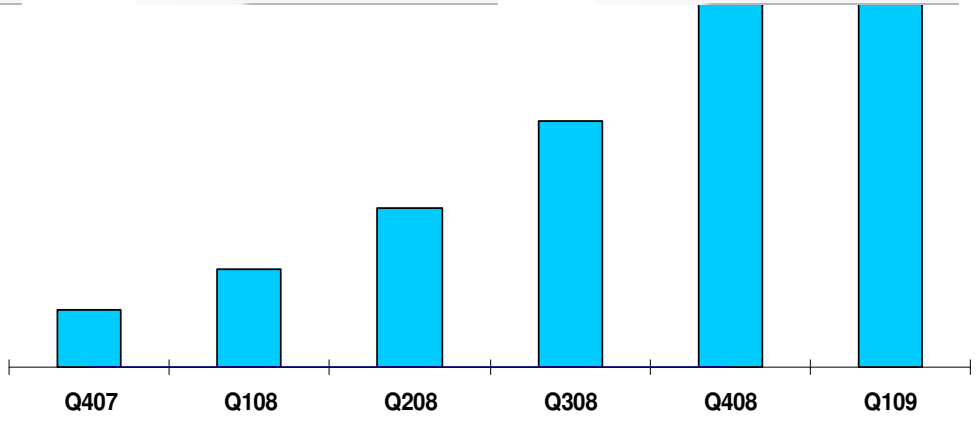








Evolution of ADSL volume in Norway



Evolution of Mobile data volume in Norway

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- But the business case is a challenge for the operators

- Average large screen users creates 10x more traffic than a small screen user
- Majority of usage is residential or nomadic, direct competition with fixed broadband and open WiFi zones
- Users are very conscious on data speed
- Price is the main competition parameter
- Acceptable market prices are decoupled from traffic volume

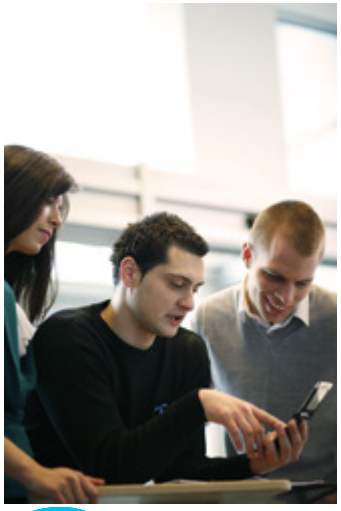
- Revenues must be secured!



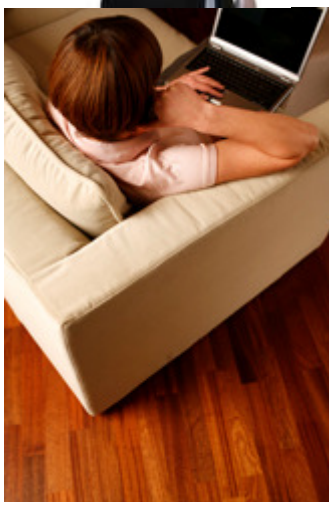
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Main points to improve profitability

- Market attractive products addressed to key segments
  - Attract entry and mass market as well as business market
- Ensure some kind of fair usage policies and enforcement
  - Managing the extreme users, maintaining quality for the business users
- Stimulate off-peak use
- Build coverage based on demand
- Adapt the capacity investment to the real needs

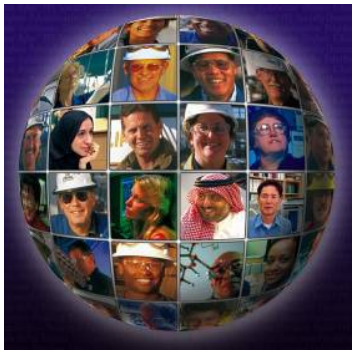






Telenor mobile operations cover a wide range of markets.

Large differences in terms of maturity of mobile broadband:



“Initial”:

Low or lower medium average income

Limited spectrum resources

Low internet penetration (<20%)

No specific MBB offer

Mobile data volume very low

Deployed technologies:

GSM/EDGE

“On the way”:

Medium average income

Medium spectrum resources

Internet penetration 20-60 %

MBB launched

Mobile data volume approaching voice

Deployed technologies:

GSM/EDGE + UMTS/HSPA

“Mature”:

High average income

Large spectrum resources

Internet penetration >60%

MBB in widespread use

Mobile data volume larger than voice

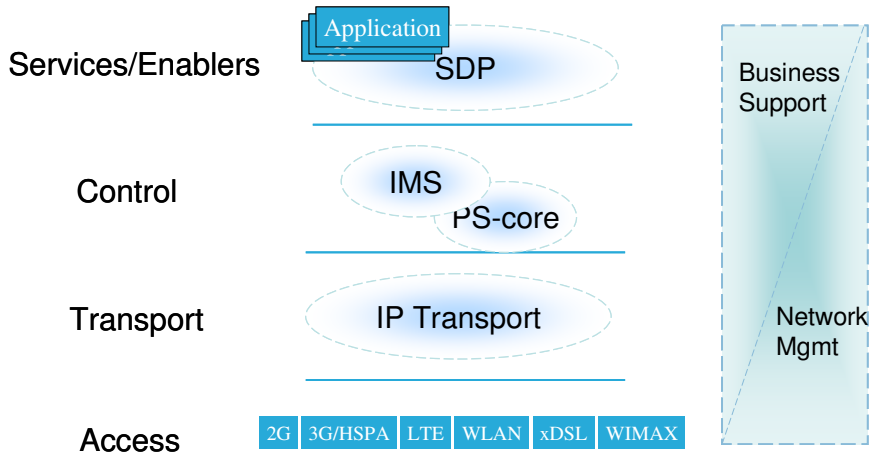
Deployed technologies:

GSM/EDGE + widespread UMTS/HSPA

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The target for network evolution

- Towards a cost-effective network supporting all kind of services
- Access-agnostic core network, various access types
  - Tradeoff: Maximum performance under various conditions and limited number of different technologies
- Any point in time: A mixture of "legacy" and new technologies,
  - Compatibility and multi-standard user equipment are important



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Selected solution depends on many drivers

- Available spectrum and bandwidth
- Outlook for future spectrum
- Regulation policies
- Existing infrastructure (towers, sites, cables, fibre…)
- Timing
- Competition
- Coverage requirements
- Demography
- Services and data rate to be offered

Long term solution



LTE offers unique flexibility

- Supports different channel bandwidths 1.4 – 20 MHz.
- Easier to put LTE than HSPA into parts of the GSM900 band
- Specified for all relevant bands globally
- User data rate can be directly tuned to current signal conditions and to customer needs.
- Self-organizing functions reduces the planning and deployment cost

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LTE will give superior performance

LTE provides more cost-efficient mobile data than HSPA

- Higher data rates and cell capacity for same cost
- Based on next generation flat, All-IP core network
- Very scalable in terms of investments in radio and core network: Pay as you grow.



LTE will offer superior user experience and capacity

- Improved efficiency (bit/Hz/km2), peak rate and latency
- Further development through “LTE Advanced”

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Mobile WiMAX has no real advantages compared to LTE

Technical specifications are very similar, the minor differences give no clear advantage in any direction.

- No significant difference in expected performance

Trend towards technology-neutral licensing and WiMAX accepted as IMT-technology:

- No unique WiMAX spectrum not accessible through LTE

The head start of WiMAX is not relevant for most 3GPP based operators

- HSPA is sufficient until LTE is available
- Establishing a complementary stand-alone system is not a cost-effective solution

Exception:

- Local licensing regime may still make WiMAX more favourable than 3G/LTE

LTE will have the most vital ecosystem

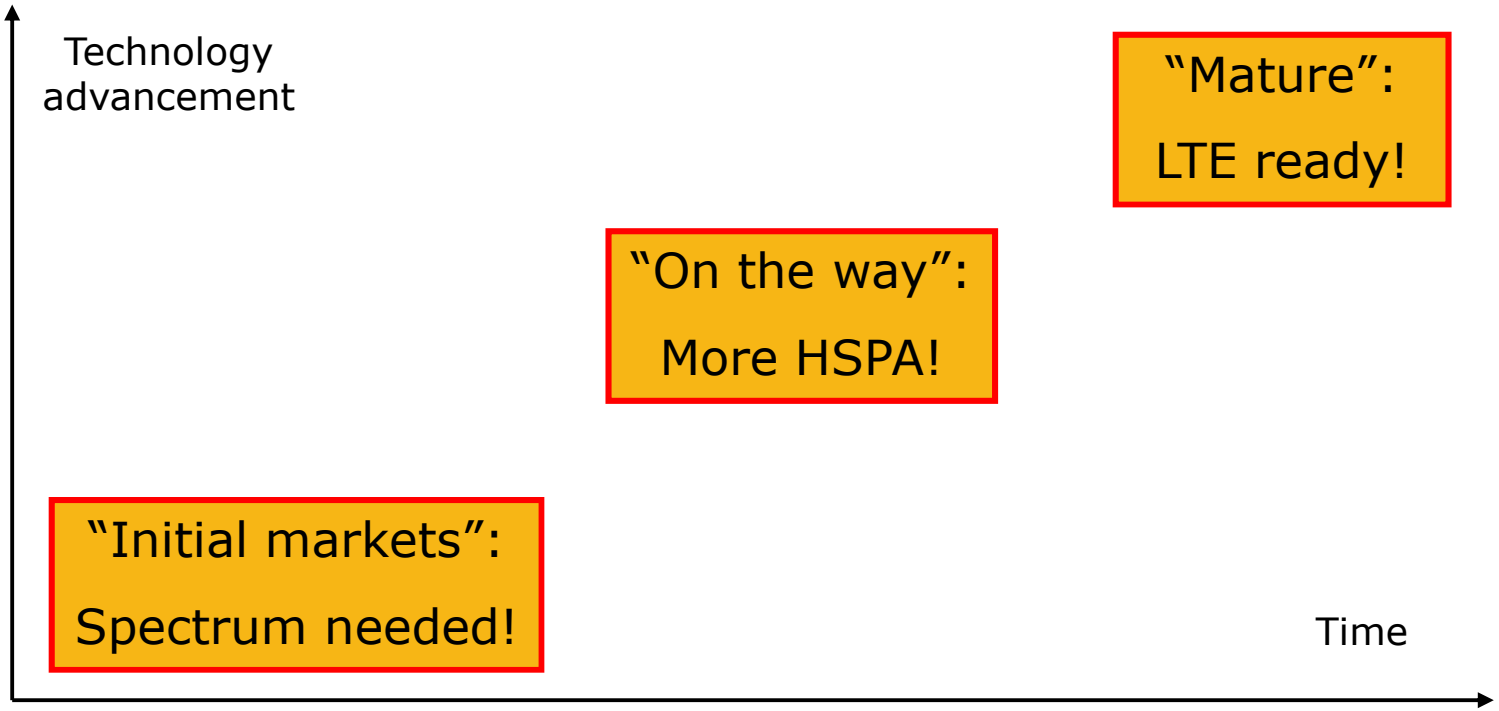


- Supported by all major vendors of infrastructure and terminals/devices
- Clear development path both from 3GPP and 3GPP2, hence providing an unprecedented support of operators
- WiMAX may get sufficient support to survive as an alternative, but more attractive for start-ups than for an existing 3GPP operator

LTE is the solution best prepared to offer the performance and cost levels expected by customers in the future.

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Returning to the three categories of Telenor markets:



All move in the same direction, but definitely not at the same pace!

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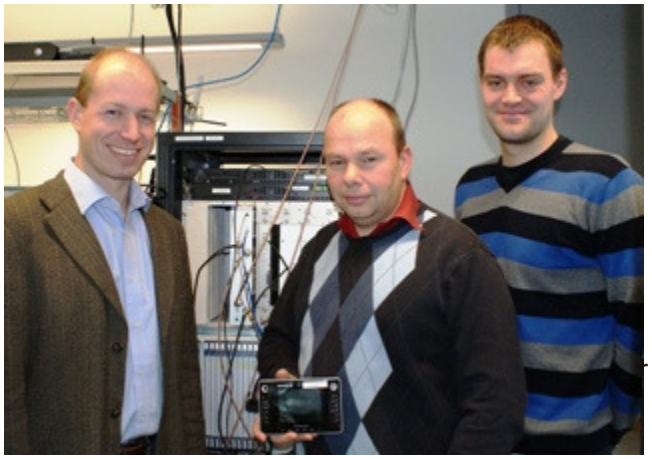
We are preparing for the LTE era

- 2,6 GHz band nation-wide licenses in Norway and Sweden secured in 2008.
- Technical testing of the performance and capabilities together with vendors in 2009
- Rollout and launch starting in 2010

Motivation:

- Having the right competence in the organisation is crucial
- Knowledge and early experience on LTE is urgent, also for further decisions on HSPA investments





Why rolling out LTE that early?

Extreme traffic growth in Sweden, capacity investments needed

- LTE will offload MBB in 3G/HSPA, enables more 3G voice telephony

Market expectations are high:

- Competition on performance, both real and perceived
- LTE will be closer to fixed BB in performance, Telenor has a weak position on fixed in Sweden

Current cost structure is not sustainable

- Expectation on further reductions with LTE

Early uptake will be dominated by large screen MBB (PCs), inherent voice solution is not required from day one.



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Conclusion

LTE is the most important radio technology in the coming decade

Early knowledge and experience is vital for Telenor to ensure:

- Competitive user experience
- Cost-optimal infrastructure

Our challenge: To select the correct set of technologies and functionalities across very different markets

