Electra Report Annex 3:

Generating more growth from innovation and investment in key European electrical engineering markets

1 Introduction

Among the largest growth drivers for Europe are European infrastructures. The electrical engineering and electronics industries provide innovative technologies for future high-tech infrastructures and can help to develop lead customer markets based on the idea of "future technology made in Europe, applied first in Europe, and showcased to the rest of the world", which has the potential of providing growth.

In this annex, we focus on the future vectors for growth – what we also term as lead customer markets – on the drivers to ensure their deployment first in the European Union and on the barriers that hamper growth and the adoption of new technologies. Finally, we recommend public policy options for facilitating the development of these lead customer markets. We believe that sufficient new innovative technologies will be available, but their deployment and diffusion in the EU is likely to be to slow, in a "business as usual" mode.

A typical best practice for the successful application of high technology is the GSM story. The European satellite programme Galileo could become another success story. However, in order to be competitive in the global environment and in heavy competition with other market places, Europe needs more success stories. Key technologies that demonstrate the strength of Europe, its innovation force, its brain pool, its knowledge of trends and developments, often need a "market pull" orchestrated by the relevant players including political decision makers, with the objective to create "lead customer markets" for future technologies in Europe. The European Commission's Lead Market Initiative is a very good first step to securing the early application of best technologies made in Europe.

2 Lead customer markets for innovation

2.1 Definition of "Lead customer markets"

In the light of globalisation and our intensifying competition with emerging economies, Europe has to make more efforts to stay ahead of its competitors so as to secure its economic and social prosperity. Since Europe is not able to compete globally on costs, an innovation agenda is needed. Innovation is the successful marketing of new technologies or processes, not just their invention. Innovators are entrepreneurs heading for "creative destruction" (Schumpeter), replacing old doings with new. Developing an innovation-driven economy is at the core of the Lisbon agenda for growth and jobs.

Key drivers for innovation are:

- Intense competition in customer and supplier markets.
- Attractive framework conditions that encourage investment.
- Access to financial capital (e.g. Venture Capital) and long-term financing.
- Know-how and skills.
- High R&D rates.
- Co-operation with science.
- High demand for new products and services, hence strong customer demand.

Lead customer markets from the industry point of view

Lead customer markets in the EU are market situations that demand the most innovative and best technologies, systems, products or services in order to satisfy customers' needs. Lead markets are where the customers and the fast application of new technology are. This applies in particular to new technology-based products or to complex combinations of products and services, which are increasingly required to develop innovative goods that can meet consumers' interest worldwide.

Lead customer markets in the EU are market situations

- Where competition is driving innovation (e.g. through single European market, creating "Global Champions from Europe" by market forces).
- Where the EU has (or creates) strong know-how and skills.
- Where the EU can showcase its "best" products or services.
- Where EU entrepreneurs can develop a competitive advantage to lead global markets.
- Where the EU attracts finance and investment.
- With a high growth potential based on high market demand in Europe (e.g. through a large single market) and globally.
- That provide new solutions to economic or societal challenges.
- For innovative goods and services.
- Where action by the public sector (as regulator of competition, customer or facilitator) can significantly impact market development.

Lead customer markets can help to meet public and political goals such as energy efficiency, the sustainable use of resources, healthy living, security and the mobility and information needs of the EU's population.

Lead customer markets for the electrical engineering and electronics industry potentially include:

- Trans-European networks, transportation infrastructure, telematics.
- E-health infrastructures and nano-diagnostics.
- Energy generation, transmission and distribution infrastructures, including critical power and carbon capture and storage (CCS).
- Civil protection, homeland security and defence.
- Buildings, intelligent living, ambient assisted living.
- Automation, industrial IT.
- Digital radio and TV, high definition television (HDTV).

Key drivers include regulation, economic and fiscal incentives, and attractive investment conditions in lively capital markets, a strengthened and deeper EU single market, harmonisation, standardisation, individual demand and, just as important, public acceptance.

Lead customer markets from the EU-Commission's point of view

The European Commission has taken up the issue of lead markets through its Lead Markets Initiative (LMI). The Council requested a follow-up of the Communication "Putting knowledge into practice" COM(2006) 502 final of 13.09.2006 and invited the Commission to present an initiative on lead markets, "defining a valid approach for fostering the emergence of markets with high economic and societal value".

Furthermore, the relevant Council group asked to:

- Identify a certain number of areas with significant innovative potential of high economic and societal value, based on an agreed set of criteria, which includes inter alia the potential and commitment of European industry to effectively contribute to the emergence of such markets.
- Indicate the public policy rationale and instruments that can alleviate obstacles and reinforce drivers of the emergence of these areas and propose a detailed set of actions for the implementation of the instruments.
- Base the elaboration of the approach on a broad stakeholder consultation and wider public policy considerations.

The Commission has responded to this request through its Communication COM(2007)860 of 21 December 2007, which proposed that:

- The application area must be relevant to citizens.
- The application must be driven by "need", not "technology".
- There must be an existing strength in the application area in Europe.
- Industry must show some basic commitment to the application area.
- There must be identifiable and removable barriers.

As lead markets, which are relevant to the EU's electrical and electronics industry, we can, in particular cite:

Market area	Volume in products and services in the EU in 2006 [million Euro]	Volume in products and services in the EU in 2020 [million Euro]	Growth in volume resulting from market development and policy initiatives 2006-2020 [million Euro]	Cumulated growth share attributed to LMI and related policies 2006-2020 [million Euro]
eHealth	21000	30000	9000	12600
Protective Textiles	8800	15200	6400	8960
Sustainable Construction	24000	87000	12600	88200
Renewable Energy	25000	79000	54000	266000

The LMI aims to design a process to better streamline the necessary legal and regulatory environments and accelerate the growth of demand through a consistent and coordinated set of policy actions.

To be successful, the proposed measures will have to be developed in a way that:

- Stimulates market forces to generate a lively EU industry and investments in electrical and electronics industry.
- Incorporates global market needs and customer preferences, so as to maximise market potential.
- Facilitates the acceptance of EU standards and approaches by third markets, notably in domains affected by global trends (e.g. environmental issues).
- Aims at reducing the cost of bringing new products or services into the market, through facilitation of market access and measures to facilitate the aggregation of demand. It is also important to ensure competition among different innovation designs, which will encourage constant adaptation to evolving market requirements.

Finally, the active participation of Member States and of the private sector, in full respect of the principle of subsidiarity, as well as the existing EU legal framework, notably for competition, state aid, and public procurement is essential.

2.2 Growth potentials of key EU lead customer markets

Today the largest customer markets for the electrical engineering and electronics industry in Europe are automation (including electrical drives, measuring techniques and process automation, switchgear and their components, control gear, digital infrastructure markets (including consumer electronics, HDTV devices, TVs media equipment) and the energy infrastructure and industry markets.

The highest growth rates today are in the area of health (+7% p.a.), digital technologies (+6% p.a.) and security (+4% p.a.). Based on existing studies and forecasts of ZVEI – the German Electrical and Electronic Manufacturers' Association, the growth potential of these lead customer markets is estimated to an amount of potentially more than €100 billion per year by 2020 (partly including investments mentioned in the chapter relating to Energy Efficiency and CO_2 reduction).

Estimates of growth potentials

Lead Markets	Market Value in 2005	Annual Growth Potential
Energy [1]	22 bn €	3%*
Automation	58 bn €	2.5%*
• Electrical Drives	14 bn €	3%*
• Switch components, switchgear and controlgear, industrial steerages	19 bn €	3%*
• Measurement technique and process automation	25 bn €	2%*
Transportation	n.a.	n.a.
Health	13 bn €	7%*
Security	14 bn € [2]	4%
Digital Radio + TV / HDTV	25 bn € [2]	6%[3]
Total	132 bn €	

*Average annual growth rate of EU 27 market during 1997 and 2005

1) Infrastructure and industry; 2) Estimate (FV); 3) Average annual growth rate of EU 27 total consumer electronics market during 1997 and 2005

Source: ZVEI – German Electrical and Electronic Manufacturers' Association

Lead Markets growth potential from 2005 until 2020
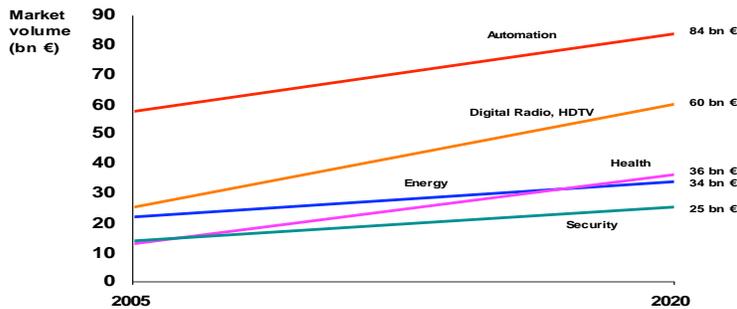
Source: ZVEI – German Electrical and Electronic Manufacturers´ Association

In the following annex, for each lead customer market of the electrical engineering and electronics industries, we analyse global and societal trends, the current situation in Europe, predicted future development, barriers to the adoption of technology solutions and technologies already available or under development and major drivers. These are all listed succinctly. We conclude with specific recommendations.

3 Trends, challenges and potential technology solutions in the identified lead customer markets

3.1 Mobility, moving and transporting people and goods across Europe: Trans-European networks, transportation infrastructures, telematics

Mobility and transportation trends

- High demand for new, intelligent and flexible transport solutions and services due to growing urbanisation, economic growth and globalisation.
- Constant increase in freight and passenger flows and more complex mobility requirements.
- Growing demand for personalised transportation and for mobile access to information.
- Higher requirements in the area of safety and environmental protection.

Current situation

- Lack of private investment incentives for transportation infrastructures.
- National solutions, national traffic data provider.
- Lack of interoperability of systems.
- Lack of competition in infrastructure markets and services in most sectors (rail, traffic control, tolling).

Future development

Technologies available or under development will lead to:
- New infrastructures providing network-wide reductions in journey times and higher frequencies.
- Trans-European Rail Networks and rail management systems.
- Optimisation of the transport management (more security and more efficiency) based on a concept of "intelligent roads".
- Road tolling across the EU.
- Advanced navigation, Traffic Message Channel (TMC).
- Networked vehicles.
- Multiple broadcasting.
- Traffic routing and mobility management.
- Software-based drives control and safety enhancement.
- Automatic train supervision, automatic train operation.
- Passenger transport leading to a full service provider for encompassing mobility solutions.
- Shift from public to private infrastructure operators and service providers.
- Lively financial markets for infrastructure investments.

Barriers to investment

- National solutions, small national markets with domestic population.
- Costly infrastructure investments required.

Technology solutions

- Car-to-car communication.
- Car-to-infrastructure communication.
- "Intelligent road".
- eCall.
- Galileo / GNSS.
- European Train Control System (ETCS).
- Ecological metro-trains.
- Coasting & cruising.
- Improved ticketing and information (eTicketing and billing systems, online ticketing).
- Interchange with local public transport.
- Door-to-door journey planners.

Recommendations

- Internalisation of external costs as incentive for infrastructure investments.
- Urban road charging schemes.
- Develop a European-wide approach: "European Telematics Roadmap".
- Active role of EU-Commission to coordinate and to develop a common understanding with the member states, similar to the open-method of coordination.
- Utilise Trans-European Networks and Structural and Cohesion Funds to foster light house projects.
- Foster PPP-models to finance infrastructure investments.
- Promote the Green Paper on Urban Transport of the EU-Commission.
- Encourage towns and cities to implement urban changing schemes, such as those in place in London and Stockholm, for finance.
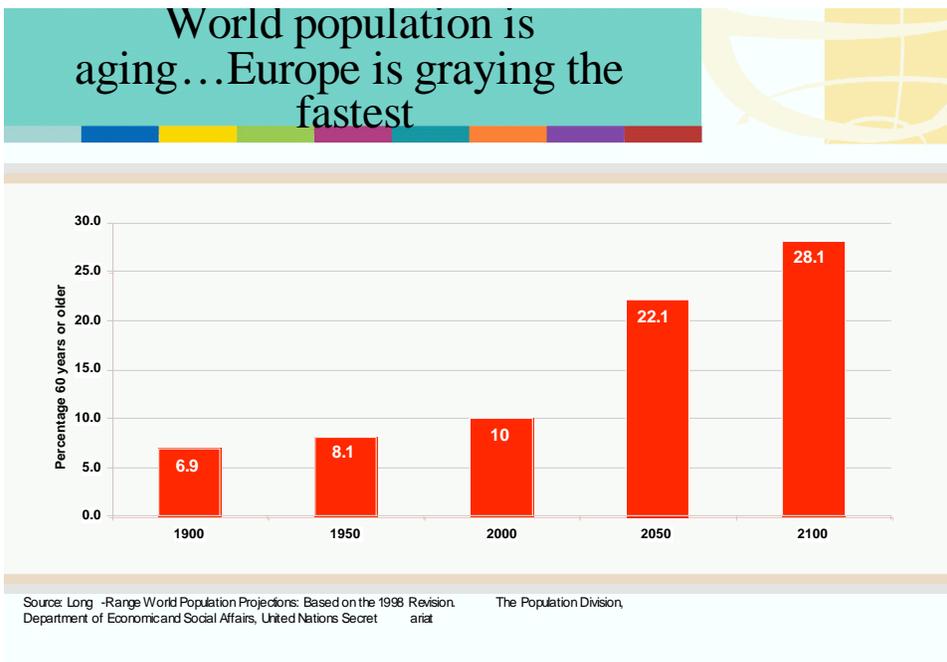
- Improve urban traffic management and traveller information through public procurement.
- Set up a European Observatory on urban mobility to collect and exploit data and identify best practices.

3.2 Living long and in good health: E-health infrastructures and nano-diagnostics

3.2.1. E-Health infrastructures

Health and living trends

- Health is an increasingly important value in the ageing society.
- High demand for new treatment of diseases (cancer, diabetes, Alzheimer, Parkinson etc.) and care for the chronically ill.
- People will be willing to devote a larger proportion of their income and personal wealth to health care ("the patient will become a consumer").
- Paradigm shift from the traditional hospital setting to the home (sub acute care for some illnesses may be provided at home through monitoring devices that can transmit data to health providers in remote locations).
- Better healthcare quality on the basis of eHealth infrastructures that allow access to patient's healthcare records and telemedicine applications.
- Better quality through nano-diagnostics, bio-diagnostics and genetics.

World population is aging…Europe is graying the fastest

Source: Long -Range World Population Projections: Based on the 1998 Revision. The Population Division, Department of Economic and Social Affairs, United Nations Secretariat

Current situation

- Demographic change, ageing society.
- Cost overruns in health care insurance.
- Ample room to improve medical quality and the efficiency of care processes.
- Poor integration and participation of chronic patients.
- Market fragmentation and lack of interoperability.
- Little private investment in health infrastructures.

Future development

Comprehensive information and communication tools in combination with new medical technologies will allow for more quality and efficiency in healthcare, including:

- Disease management – a shift toward preventative care.
- Health management for homogenous patient groups – optimisation by identification.
- Patient identification- integration of various personal data sources.
- Flat panel diagnostics – multimedia from integrated databases.
- Continuous treatment at the point where the predecessor ended (information) - seamless care.
- Ensured quality and conformity through guidelines with supporting IT systems (decision support, computer aided detection and diagnosis).
- Reduced administrative work for doctors and healthcare providers.
- Optimised billing processes.
- Collection of reliable data to improve care process continuously.
- Increased efficiency and quality of health service.
- Privatisation of health infrastructures and corresponding competition on quality of care, quality regulation of health services.

Drivers for investment

- Increasing demand for intelligent health care technologies and services.
- Need to improve the cost efficiency of care.
- Reform of social security systems.
- More competition in health markets.
- Early prevention (instead of late intervention) as an emerging market.

Develop patient-centric services
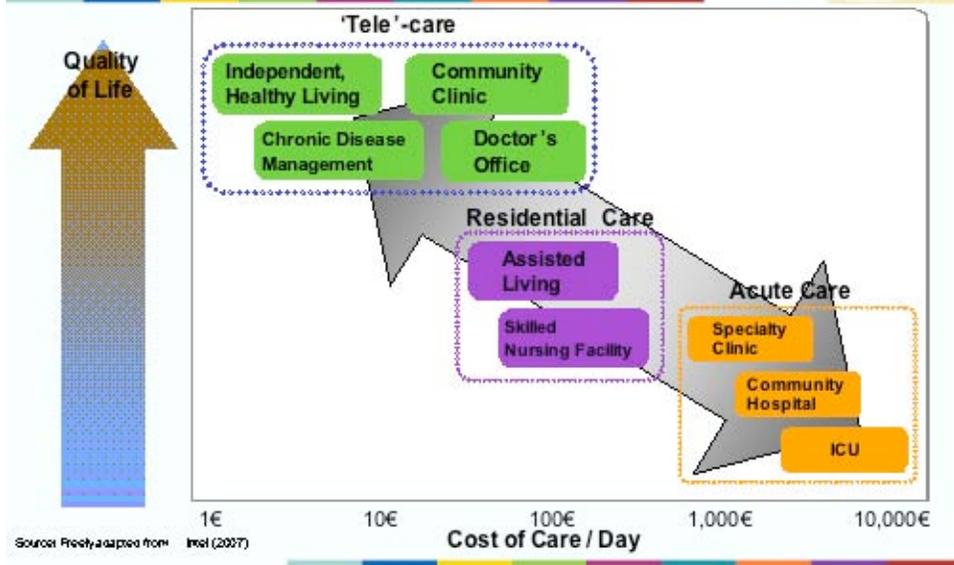
Technology solutions

- Telematics infrastructure and interoperability (standards and integration profiles).
- ICT database: Electronic Patient Record (EPR) or Electronic Health Care Record (EHR).
- RFID and mobile computing used for healthcare identification and processes.
- Smart-card (authentication, authorisation, digital signature, data storage, data security).
- Integrated Process Communication.
- Processes / Services: continuous improvement of care through data analysis.

ICT as a tool to define the future of Healthcare

	Today		Tomorrow
Technology	Disparate Information Systems	→	Connected Information Systems
Data Access	Limited, Difficult to Access	→	Ready Real Time Access
Data Accuracy / Completeness	Manual	→	Systematic Controls / Checks
Decision Support	Personal Preference	→	Rules / Evidence Based
Ordering Process	Manual, Multiple Hand -Offs	→	Automated, Minimal Hand -Offs
Care Delivery	Individual Experience	→	Adoption of Clinical Best Practices
Patient Record	Multiple Sources, Incomplete	→	Single Integrated / Complete Source
Outcome Measurement	No Linkage to Care Delivered	→	Structured Data Repository Linking Outcomes to Care Delivered

(Information kindly provided by COCIR, the European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry).

Recommendations

- Since healthcare goals are comparable among Member States, they and the European Commission should agree on a joint vision for the use of eHealth to improve the quality of care within, as well as across, Member States. Coordinated activities to realise this vision will strengthen Europe's international competitive position in the eHealth market. To do so, input from health care providers, patients and industry should prevail over perceived needs.

  Actions proposed:
  - Establish a joint platform of Member States, the European Commission, health care providers, patients and industry representatives, with the task to select "use cases" for eHealth with sufficient benefit to stakeholders. This task may be given to an existing platform, if the task is clearly defined and all stakeholders are granted equal access.
  - The joint platform should develop a "European eHealth Roadmap 2015" with a clear commitment to realise the agreed "use cases" by 2015.
  - Ensure coordination between the European Commission's DG INFSO, DG ENTR (internal market and standardisation) and DG SANCO with regard to eHealth. All 3 DGs should strongly support the proposed "European eHealth Roadmap 2015".

- Open health care markets for competition and private investment in health care infrastructures.

  Actions proposed:
  - Develop a Communication by the European Commission on the applicability of EU rules on competition and public procurement in the health care sector. This will encourage more competition at the level of investment in health care infrastructures.
  - Promote the use of Public Private Partnership ("PPP") models for investment in health care infrastructures through best practice sharing among Member States. Such an exercise has to

include representatives from the Ministries of Finance, in addition to representatives from the Ministries of Health.

- Support interoperability between solutions and applications, rather than defining integrated systems, which are proprietary to Europe.

  Actions proposed:
  - Leverage the experience of IHE ("Integrating the Healthcare Enterprise") as a technology platform between healthcare providers and industry. To this extent IHE should be involved in the activities under recommendation 1.
  - Ensure that the eHealth Standardisation Mandate issued by DG ENTR is being implemented with a focus towards interoperability and application of standards rather than the development of proprietary European eHealth standards. Such standards are not required.

3.2.2 Nano Diagnostics

Current situation

- Greater insight is being gained into how genetic differences between individuals can affect treatment.
- The development of nanotechnologies is facilitating faster, more accurate and cheaper diagnostics and treatment.
- Diagnostics is a cornerstone of all healthcare delivery.

Future development

- Convergence of nanotechnology and medical imaging towards molecular imaging.
- Early diagnosis and screening of diseases before they have a significant and serious effect on the body.
- Increase of sensitivity of imaging procedures by a factor of 100 to 100000.

Technology solutions

- Advanced in-vitro diagnostics (biosensors and integrated devices, novel optical microscopy, scanning probe microscopy, electron microscopy, imaging mass-spectrometry).
- Advanced in-vivo diagnostics (implantable devices, medical imaging).
- Improved detection (clinical cameras capable of acquiring whole-body images, combination of different imaging modalities).
- Nano Probes (able to penetrate the cell).
- 2010: multifunctional nano particles for drug release and imaging, clinical cameras for whole-body images, biometric sensors, encapsulating contrast agents.
- 2015: implantable device for continuous measurement of blood markers, minimodal cameras for medical imaging.
- Molecular imaging.
- Minimal invasive implantable devices.

Recommendations

- European Commission and Member States should accompany the R&D activities in the area of nano technologies in healthcare with an effort to establish a joint impact assessment of these new technologies. This should include the impact on health care services as well as the impact on public safety and security. It is essential that society has established a Europe-wide consensus on the use of these technologies in health care before products and solutions are reaching the market.

  Actions proposed:
  - Establish a panel of experts from industry, research, healthcare and patients in order to determine relevant issues to be assessed. Further action should only be considered on the basis of the opinion of this expert panel.
  - Based on the result of the assessment, the European Commission should start a public consultation on the issue and outline legislative and other measures, which are deemed necessary in a communication.

- Incorporate adequate risk management procedures into existing regulatory standards in order to enable the putting on the market of related products.

  Actions proposed:
  - o DG ENTR should ask a working group within the Medical Devices Experts Group (MDEG) to analyse the need for additional risk management procedures in a systematic way.
  - o Coordination between DG ENTR, DG Research and DG SANCO needs to be established for the evaluation of this issue.

- Review and revise, if necessary, existing harmonised standards relating to biological safety to take into account nanotechnology products. This is essential, since the technology is not restricted to health care. However, general requirements may negatively affect the use of nano technology in health care.

  Actions proposed:
  - o Mandate a joint working group of CEN and CENELEC to perform such a review. This review should involve an appropriate number of industry experts.
  - o Establish a panel of experts from research, healthcare and industry to advise the European Commission and Member States on issues that may affect the use of nanotechnology in health care.

- Incorporate new risk management procedures into existing regulatory standards.

- Review and revise existing harmonised standards relating to biological safety to take into account nanotechnology products.

3.3 Light, heat and power for our daily life: energy generation, transmission and distribution infrastructures

3.3.1 Energy generation, transmission and distribution

Rising energy demand as a trend

- Energy is an indispensable basis of every infrastructure and industrial production process, as well as an increasingly critical cost factor.
- High demand for new products and services due to the EU energy efficiency goals, 20% by 2020 and the strong need for security of energy supply in Europe.
- Energy requirements will grow due to further economic growth and increase in global population.
- Global energy demand can only partially be offset by improvements in energy efficiency.
- Rising energy prices and emission control regulations are focusing attention on new issues, such as what constitutes the best energy mix and how to prevent costly perturbations in the public supply network.
- The importance of the use of energy with a view to improving environmental quality and climatic protection has been recognised by governments and industry.
- A high level of reliability and continuity of service is more and more crucial for an increasing number of mission critical installations.

Current situation

- Power generation: public opinion in some European countries does not accept a substantial increase of nuclear energy to offset rising energy demand and costs.
- Hydro-power and renewable energy sources (wind and solar), as available today, leave only a limited room for further substantial increase in energy access.
- Short- to mid-term focus is on the increase of energy efficiency and security of supply all along the value chain.
- Electricity markets reflect short term costs not providing timely signals for investment.
- Availability of electric power is not at the necessary level and blackouts (local or global) are common (50% of data centres encounter problems, the annual cost of electrical shut down in industry and commercial in the EU or the US is estimated at some €10 Billion.

Future development

- Following the policy debate on energy efficiency and CO2-reduction, analysis of energy infrastructure in Europe.
- Long-distance transmission technologies: access renewable energy sources (wind and solar).
- Grid reliability and flexibility:
  o Collection from different decentralised energy sources.
  o Coordination of grid planning in Europe.
  o Investments and innovation.
- Transmission and distribution losses (power line designs).
- Power plant efficiency optimisation.
- Critical power solutions for mission critical installations (consisting in an uninterruptible power supply that guarantees continuity of electrical power when grid power is either inadequate or fails).
- More (public and private) investments mobilised for EU grid development.

- More competition and liberalisation in services and power generation and distribution.
- Efficient process automation.
- Development of decentralised micro generation.

Barriers to investments

- Long-term planning: this is necessary, but is today practically impossible to realise due to changing political framework conditions.

Technology solutions

- Low-carbon technologies.
- Renewables.
- Heat-power combination.
- Carbon capture and storage (CCS).
- HVDC.
- Smart Grid.
- Super Grid.
- Uninterruptible power supply.

Recommendations

- Set a stable and predictable regulatory framework: adequate regulation is a key when it comes to the development of efficient energy infrastructures. Therefore it is necessary to:

    o   Make sure that regulation does not create barriers for investments into innovative technologies.

    o   Enhance coordination of regulation on a European level, in order to allow investment in systems which are technical prerequisites for a common energy / power market.

    o   Provide clear and encouraging market conditions for the energy supply industries, with a view to achieving a greater level of investment and thereby a more secure and efficient energy supply.

- Strengthening regulatory authorities to establish pro-forma competition on a European level: the principal requirement is that regulatory authorities are empowered to create a balance between competitive price levels for consumers and the necessary expenditures for future investment, in order to strengthen power networks and infrastructures in the face of increasing performance requirements.

- Support for the EU Commission's initiative to establish a European Regulatory Agency (based on ERGEG experience). Formalisation of cooperation between transmission network operators. Establishment of a European Network Transmission System Operator.

- Promote renewables, CCS, Smart Grids, HVDC and critical power solutions.

- Maintain and develop know-how for nuclear technologies 3rd generation.

- Foster R&D programmes (e.g. nano-materials), focusing on the most-promising technologies.

- Develop market and technical codes: for the integration of the electricity and gas markets, a coherent set of technical and market codes are required.

3.3.2. Critical power

A high level of reliability and continuity of electric power is becoming more and more vital. Data centres, financial institutions, hospitals, airports, telecommunications facilities, emergency response centres or general homeland security are only a few examples of applications where ultra reliable power is of key importance. Electrical and electronic infrastructures extend across many sectors of the economy, including banking and finance, transport and distribution, energy utilities, health, oil and gas, food supply and communications, as well as key government services. Their disruption or damage would have a serious impact on the health, safety, security or economic well-being of citizens or the effective functioning of the economy and governments in the Member States. Precautionary measures aimed to reduce the risk that these infrastructures fail are needed. Investment in critical power facilities creates public benefits and policy makers should explore alternative means to remove obstacles that impede investment in these facilities.

3.3.3 Carbon capture and storage (CCS)

Global energy demand can only partially be offset by improvements in energy efficiency. Efficient use of energy resources alone will not solve the problem of long-term energy shortage. The solution is a better energy mix including nuclear and renewable energy sources, more flexible and reliable grids, a decrease of energy losses during its transport and distribution and incentives to invest in European energy infrastructures. At the same time, given that energy is clearly a determinant of economic growth, the trend towards green low carbon technology to arrive at zero emission power plants will accelerate. With coal set to remain a central part of the EU's energy mix, the development of carbon capture and storage must be brought forward as part of wider EU efforts to tackle climate change and to reduce the bloc's CO_2 emissions by 20% by 2020. CCS will need the appropriate regulatory and financial framework to ensure a speedy ramp-up of the technology and large scale commercial use. Using the EU's Emissions Trading Scheme as a driver for CCS deployment would enable investment decisions on CCS to be made as early as 2009.

3.4 Living and moving safely across Europe: civil protection, homeland security and defence

Trends

- People in Europe feel less safe and secure due to an increasing number of incidents and attacks.
- The threat of terrorism leads to an atmosphere of "perceived insecurity".

Rising demand for security solutions due to:
- New security threats to EU from terrorist attacks, illegal migration, etc.
- Increasing number of major events: sports, culture, summits and conferences,
- Critical infrastructure: water, food, public transport (road, rail, air, ports), oil and gas and electricity transport, communication networks, nuclear, chemical industry, health, finance, space, research facilities,
- Public sector: defence and intelligence, public security, social security, public administration (passports, ID cards, e-Government, eHealth).
- IT / electronic security (hacking, viruses, encryption, digital signature).
- Building security (protection against intrusion, robbery, attack, sabotage).
- Tracking and Tracing (containers security, vehicles, patients, assets).
- Scanning and detection (metals, explosives, nuclear, chemicals, biological material e.g. Weapons, drugs).

Technology solutions

New technologies include:
- Detection technologies.
- Passenger protection technologies (x-ray machines, vapour machines, identification technologies incl. Biometrics).
- Cargo identification and protection technologies (scanners, seals, electronic tags and sensor arrays).
- Protection of critical infrastructures.
- Video surveillance.

Recommendations

- Develop a common European market by setting common standards.
- Provide EU support for one stop testing – one stop certification procedures at the level of quality labels.

3.5 Buildings for an intelligent living and ambient assisted living

Trends

- People will make more intensive use of their living environment and create tailor-made technical infrastructures based on their living needs.
- The networked, automated and remote-controlled home will become one of the main fields of innovation in the coming years.
- Available technologies allow interoperable systems, including door locks, alarm, room temperature, lighting and communication facilities, to be controlled from a single console.
- Heating, lighting, hot water and air conditioning systems will fulfil the inhabitants' needs with much increased energy performance.
- Energy will no longer be wasted when nobody is at home or not in a room.
- Overheating will be avoided and in addition remote control will increase both energy efficiency and comfort. Associated remote services should develop fast.

Current situation

- Strong increase in energy prices.
- Demographic change, ageing society, leading to shrinking number of house, at the same time the number of single person households is expected to grow.
- More people deliberately live alone.
- Spreading access to high speed internet.
- Flexible and up-to-date multimedia cabling.
- Security needs: safety checks when abroad.
- Intelligent home appliances.
- Higher technical expectations, higher competence in using technical goods.
- Multimedia convergence.
- Increase of teleworking at home.
- The KNX communication standard is set for control purpose and has the highest market penetration of all available systems.

Future developments

- Future extension of the KNX communication standard to control of multimedia, etc.
- High-speed backbone IP-based.
- Alerts, alarms.
- Flexibility: wireless devices, plug-and-play.
- Comfort: automated and highly efficient control of heating, lighting, etc. according to the inhabitants' needs.
- Security: simulated occupancy (lights, blinds, etc), smoke detectors, window contacts, presence detectors, sensors.
- Safety checks when leaving home.
- Energy efficiency: temperature reduction when leaving home.
- Access to multimedia content (home cinema) and eServices / e-Government facilities.

Technology solutions

- Intelligent lighting and heating.
- Remote access and control.
- Distributed Audio / Video.
- Media Centre servers and extenders.
- Burglar and fire alarm systems.
- Camera with Internet access.
- Remote control and notification.
- Green buildings.
- IT & Control convergence.

- Further standardisation of all infrastructure related systems. Basic standardisation of human-machine interfaces. Standardisation of system aspects to enable services to buildings.
- Smart metering to be promoted as starting point for "home automation".
- Tax incentives for individuals and housing providers in order to support investment in "intelligent living", with the long-term goal to encourage "independent living".
- Procurement rules for networks (bus systems) to control energy consumption.
- Foster innovative consumer electronics and intelligent home appliances.

3.6 Higher productivity and efficiency in industrial processes: automation, industrial IT, RFID

Trends

- Productivity and flexibility in the process and manufacturing industry continue to steadily increase.
- Global presence, due to strong global competition and ever shorter innovation cycles, requires networked cooperation.
- Production systems are easier to integrate and operate.
- Availability of all relevant information at all times and places ensure and optimal integration of separate tasks along the entire production chain.
- Services for production tend to be oriented on the total lifecycle of product and processes.

Current situation

- The EU's automation industry is mainly driven by the mechanical engineering, automotive and chemical industries.
- Growing need for information processing.
- Large diversity of communication methods.
- Increasing complexity in production.
- Wider use of Internet technologies.

Future developments

- More decentralised automation.
- Growing pressure on productivity gains and cost savings.
- Decentralisation of production.
- Introduction of wireless technologies.
- Need for clear and comprehensible information.
- Straightforward and distinct communication structures.
- Standardised databases.
- Safety and security of information.
- Advanced maintenance and diagnosis.

Barriers to investment

- Scarcity of skilled personnel.
- Lack of standards.

Technology solutions

- IT-standard / Industrial Ethernet.
- Internet technologies.
- RFID.

Recommendations

- Standardisation of technologies, in particular transmission standards.
- Define open IT-standards.
- Technology roadmaps.
- Use of frequencies for industrial wireless data transmission.
- Support R&D for Industrial Production IT: virtual networks, scalable real time for heterogeneous networks, safety and security.
- Support R&D in new sensor technologies.
- RFID: foster international technical standards, voluntary but consensus-based and specific for different technologies; allocate spectrum and frequency for RFID (Tetra band; support R&D of pilot projects within FP7..
- Data privacy RFID: establish strict compliance with existing privacy legal framework, transparent and acceptable schemes, codes of conduct, deactivation or disablement.

3.7 Access to new, tailor-made information and content at better quality: digital radio and TV, high definition television (HDTV)
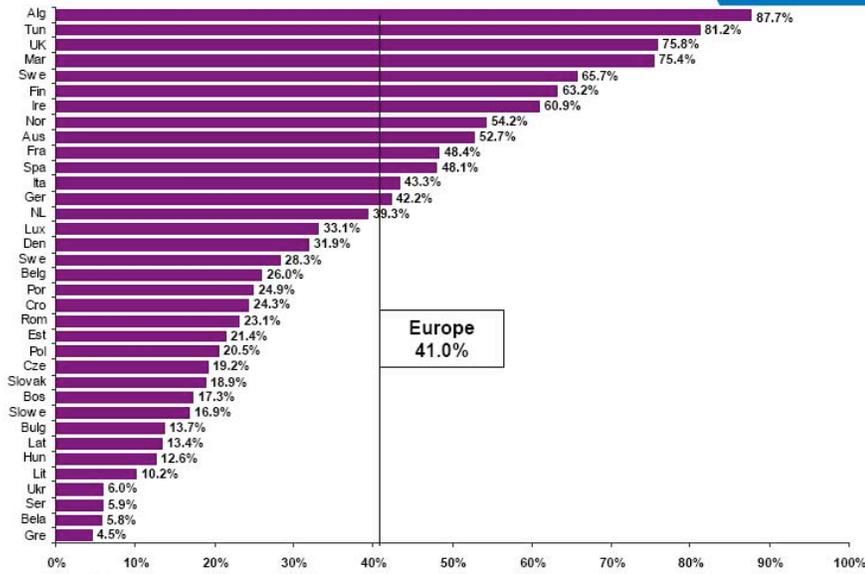
Trends

- Demand for new content, broader diversity, more interactive media, better quality and flexible viewing.

Current situation

- Uneven transition from analogue to digital infrastructure.
- Different standards.
- No successful business models.
- Lack of content, due to the reluctance of content providers to invest in digital programmes.
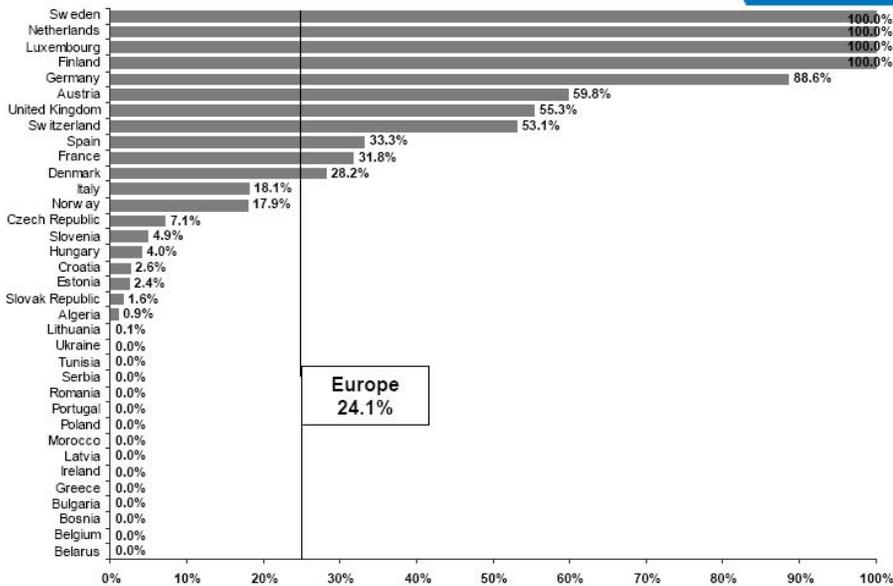
Level of digitalization in Europe
in % of TV HHs - Year End 2007

Country	%
Alg	87.7%
Tun	81.2%
UK	75.8%
Mar	75.4%
Swe	65.7%
Fin	63.2%
Ire	60.9%
Nor	54.2%
Aus	52.7%
Fra	48.4%
Spa	48.1%
Ita	43.3%
Ger	42.2%
NL	39.3%
Lux	33.1%
Den	31.9%
Swe	28.3%
Belg	26.0%
Por	24.9%
Cro	24.3%
Rom	23.1%
Est	21.4%
Pol	20.5%
Cze	19.2%
Slovak	18.9%
Bos	17.3%
Slowe	16.9%
Bulg	13.7%
Lat	13.4%
Hun	12.6%
Lit	10.2%
Ukr	6.0%
Ser	5.9%
Bela	5.8%
Gre	4.5%

Europe 41.0%

Reading example: 87.7% of TV homes in Algeria are digital
Source: SES ASTRA, Satellite Monitors
Market Development Department, May 2008

The Quality Link 2

Level of Terrestrial digitalization in Europe
Year End 2007

Country	%
Sweden	100.0%
Netherlands	100.0%
Luxembourg	100.0%
Finland	100.0%
Germany	88.6%
Austria	59.8%
United Kingdom	55.3%
Switzerland	53.1%
Spain	33.3%
France	31.8%
Denmark	28.2%
Italy	18.1%
Norway	17.9%
Czech Republic	7.1%
Slovenia	4.9%
Hungary	4.0%
Croatia	2.6%
Estonia	2.4%
Slovak Republic	1.6%
Algeria	0.9%
Lithuania	0.1%
Ukraine	0.0%
Tunisia	0.0%
Serbia	0.0%
Romania	0.0%
Portugal	0.0%
Poland	0.0%
Morocco	0.0%
Latvia	0.0%
Ireland	0.0%
Greece	0.0%
Bulgaria	0.0%
Bosnia	0.0%
Belgium	0.0%
Belarus	0.0%

Europe 24.1%

Reading example: 100% of terrestrial homes in Sweden are digital
Source: SES ASTRA, Satellite Monitors
Market Development Department, May 2008
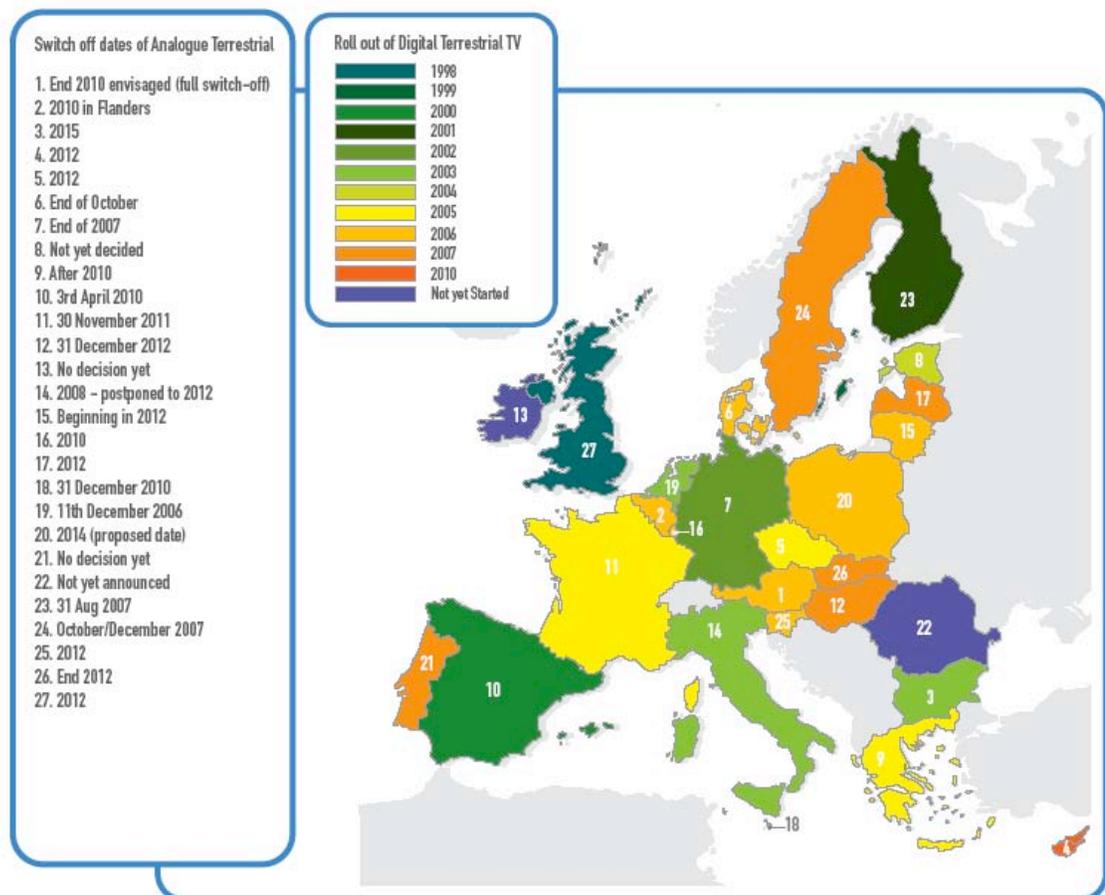
The Quality Link 5

Future development

- Digital infrastructure allowing for a wide variety of content and services.
- Switch from analogue to digital signals.

Technology solutions

- HDTV, conditional access and common interface technologies.
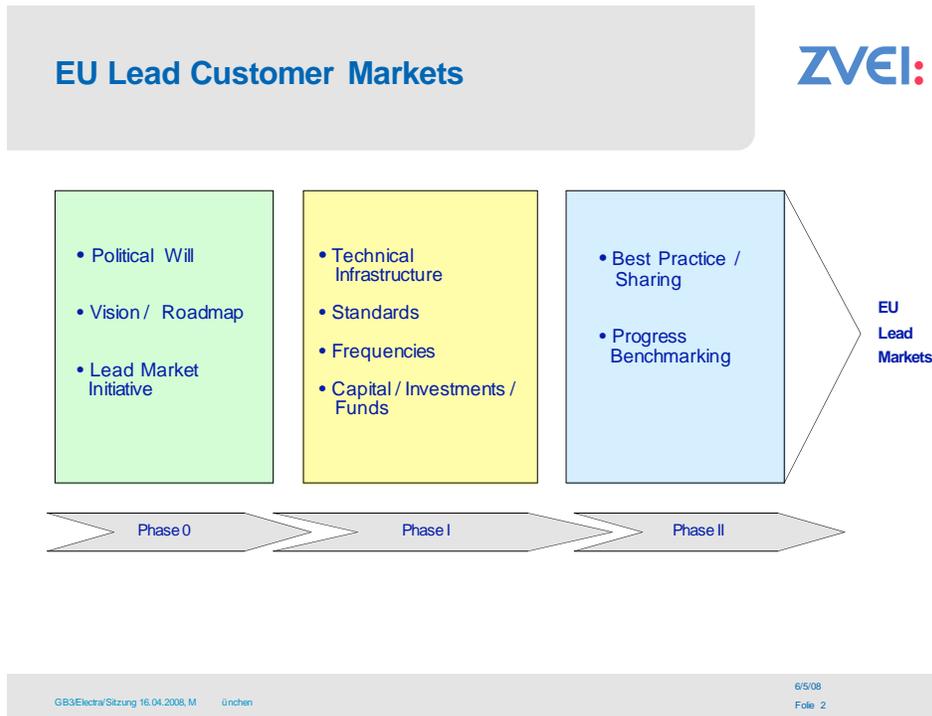
Recommendations

- Ensure Europe-wide switch over from analogue to digital broadcasting in 2012.
- Define business models for new or additional digital content and services.
- Set up a regulatory framework for new digital media (Digital Rights Management Systems DRM, copy protection).
- Allocate frequencies for mobile broadcasting and HDTV in Europe.

Switch off dates of Analogue Terrestrial

1. End 2010 envisaged (full switch-off)
2. 2010 in Flanders
3. 2015
4. 2012
5. 2012
6. End of October
7. End of 2007
8. Not yet decided
9. After 2010
10. 3rd April 2010
11. 30 November 2011
12. 31 December 2012
13. No decision yet
14. 2008 – postponed to 2012
15. Beginning in 2012
16. 2010
17. 2012
18. 31 December 2010
19. 11th December 2006
20. 2014 (proposed date)
21. No decision yet
22. Not yet announced
23. 31 Aug 2007
24. October/December 2007
25. 2012
26. End 2012
27. 2012

Roll out of Digital Terrestrial TV

1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2010
Not yet Started

(Information kindly provided by EICTA, the European Information, Communication and Consumer Electronics Technology Industry Association)

4. Lead customer market recommendations

Lead customer markets in the EU are expected to develop in three main phases:

EU Lead Customer Markets

ZVEI:

Phase 0 (green box):
- Political Will
- Vision / Roadmap
- Lead Market Initiative

Phase I (yellow box):
- Technical Infrastructure
- Standards
- Frequencies
- Capital / Investments / Funds

Phase II (blue box):
- Best Practice / Sharing
- Progress Benchmarking

→ EU Lead Markets

Phase 0 | Phase I | Phase II

GB3/Electra/Sitzung 16.04.2008, München

6/5/08
Folie 2

Crucial for the development of lead customer markets are reliable long-term framework conditions that foster necessary investment in European infrastructures, especially at the levels of regulatory certainty and consistency for incentives and return on investment.

In order to mobilise EU technology markets there needs to be a drive to introduce new technologies through smart regulation of lead customer markets: mobilise competition, create demand by combining privatisation with investment obligations and allow many competing technologies to enter the market. In order to respond to societal challenges analysed above, an interdisciplinary approach is required. Europe has no lack of excellent ideas, but does suffer from an insufficient transfer of knowledge into the market. EU research programmes have to focus more on a problem solving approach in order to tackle societal needs.

In addition, more tailor-made measures are needed to improve Europe's innovation capacity. We list hereunder our main recommendations for the development of lead customer markets.

4.1 Foster high-tech infrastructure modernisation

The early adoption of new technologies in this area can be facilitated in Europe by implementing a policy framework which promotes competition, investment and innovation in infrastructure markets through:

- Using TEN projects, regional funds, cluster policies and other levers to promote the application of new technologies, thus making the EU lead market for these technologies.
- Providing EU coordination and accelerate investment for TEN projects and standardise technologies to be introduced, for example for railway infrastructures, communication networks, traffic control systems, etc.
- Fostering the application of ICT in all fields of government, industry, education, health.

4.2 Mobilise EU technology markets

- Drive faster introduction of energy efficiency and alternative energy technologies in the context of the EU climate change initiative.

- Introduce an EU benchmarking approach for power station technologies, as well as for household equipment.

Cutting off the least performing technologies should be incentivised.

Unbundling is one way to accelerate investment in the energy sector, but another easier and quicker solution might lie in targeting directly the creation of cross border grids and high voltage flexible grids. Crucial in this area will be the connecting of investment obligations to the new ownership of the (overlay) network.

In the area of transport of electricity, the auction of cross border European lines to new owners and operators should be considered, as this will accelerate investment.

4.3 Attract more private funding and EU regional funds to build EU high-tech infrastructures

- Initiate public-private partnerships (PPP) in cross-border infrastructures in the TEN contexts for railway, power grids, air traffic control, road traffic control, etc.

- Start an EU fund for energy efficiency and all other CO_2 reduction investments to be repaid from the energy savings of investors and operators.

The volume of funding in structural funds foreseen from 2007 until 2013 is some €350 billion. The declared investment goals include: R&D, innovations, infrastructure, renewable energy, energy efficiency, competitive position, mobility, renovation of rural areas. Our recommendations include:

- Provide means from regional funds for the promotion of lead markets.
- Amend the European Development Fund Regulation to include countries that are not included today for energy efficiency measures in housing and buildings.
- Start at a national level, lead market funds on the paradigm of regional fund.

4.4 Initiate EU lighthouse projects for lead customer markets

We propose hereafter, a few potential lighthouse projects for further consideration:

- Focus on Galileo, Digital EU Patient Card, Digital EU Identity Card, a high voltage direct current (HVDC)-grid, radio frequency identification (RFID).
- Set up technology roadmaps for EU driven eHealth, e-Government, security and mobility solutions, for example for the future "megacities".

4.5 Mobilise EU-lead market investments by smart regulation

Make investment in the EU more attractive by fostering venture capital and private equity in lively financial markets:

- Improve conditions for small business financing by fostering entrepreneurship in the EU.
- Attract investment by promoting more public-private partnerships (PPP) and private financing of infrastructure modernisation.
- Enhance cross-border investment and ease access of foreign direct investment in the EU.
- Channel EU Regional Funds into tech based infrastructure to stimulate introduction of new technologies across Europe.
- Start European "green funds" managed by local banks, in which pension fund money could be collected and invested in energy saving projects. The use of these "green funds" should be tax deductible at the level of the individual investor.

5 Start specific EU lead market initiatives

We propose lead market initiatives in the following sectors:

5.1 Mobility / transportation:

The EU needs more European-wide solutions and best-practice sharing (road, rail, air transport) orchestrated by the European Commission in order to avoid fragmented approaches: the ideal lever will be the utilisation of cohesion funds for lighthouse projects. Infrastructure markets also need to be opened to PPP investments.

There should also be a drive to promote urban road charging schemes and road telematics by internalising of traffic congestion costs: these measures will require a large degree of intervention from national, regional and even local authorities.

5.2 Health

E-Health will become one of the stronger drivers for growth, jobs and innovation in the EU. Growth in the health sector has the double attraction of being locally distributed in the EU and of offering a high local value added. E-Health and nano-diagnostic solutions can help to deliver better care at lower cost.

The European Commission should coordinate and take measures to overcome the fragmentation in the e-Health governance, to develop innovative economic model, to provide the necessary economy of scale by fostering standard and interoperability for the healthcare-IT industry and building trust and legal certainty. This task will require a mix of EU regulation, backed up at national level as well as the active involvement of industry stakeholders in the area of providing standardised solutions, in particular for communication among systems.

5.3 Energy

Driving competition and setting a stable and predictable regulatory framework in the energy infrastructure markets is fundamental. This task will largely accrue to the European Commission.

The efficient use of energy resources alone will not solve the problem of long-term energy shortage. The solution is a better energy mix including keeping and developing know-how in the nuclear industry and promoting renewable energy sources, carbon capture facilities, more flexible and reliable grids, long distance transmission, a decrease of energy losses during its transport/distribution and incentives to invest in European energy infrastructures. This task will require a mix of EU regulation, backed up at national level to reduce investment lead times.

5.4 Security

Security technology can contribute to a more secure Europe for both citizens and institutions. At the level of the legal framework most of the areas concerning security belong to the field of national policy and administration.

At the business level, establishing a common vision in this area, as well as common public procurement approaches would be helpful. Up to now an overextended interpretation and use of Article 296 of the EC Treaty is proving to be a hindrance. Besides, the establishing of a one-stop testing – one stop certification procedure concerning quality labels would open the market in the field of public and private security. The support of the EU institutions in this sensitive area to accomplish this would be highly appreciated.

5.5 Intelligent Living / ambient assisted living

Advanced building technologies provide a high level of convenience and safety and help cut costs by making it possible to network intelligent products and systems in the areas of home automation, heating, climate control, ventilation, fire protection and security for example. There is a need to promote solutions and services based on technology to users in order to stimulate their demand for such products on the market. Further standardisation of all infrastructure related systems is needed, including, in particular, basic standardisation of human-machine interfaces; standardisation of system aspects to enable services to buildings. If the lead in this area should be taken by industry, the support of the EU institutions would be welcome.

5.6 Automation / industrial IT

IT standards and radio frequency identification (RFID) play an important role to foster the productivity of manufacturing industry. Defining open international IT standards, in particular transmission standards are of key importance. For RFID, the spectrum and frequency allocation as well as ensuring data privacy play a vital role: at this level the EU institutions play a significant role, while, in the standards area, it is up to industry to take the lead.

5.7 Digital radio and TV, high definition television

Higher quality and broader diversity of programmes are already requested by many consumers. Access to individualised content and availability of several frequencies are newly arising needs.

In Europe, it will be important to ensure an EU-wide switch-over from analogue to digital signals in 2012. This will all the more stimulate the defining of business models for new or additional digital content and services. This task will largely accrue to the industry.

However this will happen in so far as the EU institutions set up a regulatory framework for new digital media – digital rights management systems (DRM), copy protection – and allocate frequencies for mobile broadcasting and HDTV in Europe. In this context, the conclusions of the High Level Group on ICT should be taken into consideration.