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Economic recovery to a greener economy: mobilising ICT-based innovations

By Peter Johnston

Background

Europe is facing challenging times. In addition to a financial crisis and the worst economic slowdown since the 1930s, it also needs to deal with climate and energy security, and the modernisation of Europe's economy for global competition in knowledge-based societies.

European Commission President José Manuel Barroso's vision of "smarter, greener and more sustainable growth" is the way forward. But success will depend on mobilising commitment and investment in all Member States, and realising synergies between their economic recovery plans: building on the Lisbon Strategy and focusing on the knowledge society not only as the source of new employment and competitiveness, but also as the enabler of the transition to a more energy-efficient, low-carbon society with sustainable prosperity for all.

No Member State can succeed alone. Not only is no Member State big enough to address these challenges alone, but inconsistencies between their initiatives can compromise the effectiveness of their measures. Only the EU acting together can assure synergies and global competitiveness by leading the global transformations now required.

Europe has been a world leader in dealing with aspects of these challenges, but now risks lagging behind other regions in the next phases of economic transformation. Europe has led in the stabilisation of financial and banking systems, but now risks lagging behind in the investment of recovery packages towards achieving a greener economy. Europe has led on addressing climate change through its emissions trading trials, but now risks lagging behind in innovation and investment in energy efficiency and the development of low-carbon business models and life-styles. Europe has led the world in developing mobile telephony and digital TV, but now risks lagging behind in the exploitation of web 2.0 services and realising the potential of ICT-based innovations for a greener economy.

The current economic slowdown is structural, not cyclical, and recovery cannot simply involve re-stimulation of unsustainable consumption. Yet in most of the economic stimulus packages, the 'green rhetoric' has been stronger than the substance. Most Member State investments focus on re-building consumption in established products and services, and lack the transformational ambition of some countries in Asia, and the headline "smart, green" initiatives like that for Smart Grids in the United States. A stronger European lead is needed to mobilise all Member States and ensure coherence in their efforts.

New action on climate change is needed urgently. New scientific research since the Intergovernmental Panel on Climate Change's Fourth Report indicates that changes in greenhouse-gas concentrations and sea-levels are occuring faster than expected, and the risks of major regional climate disruptions are greater than thought even a few years ago. Within a few years, we may be

coming close to the limit of greenhouse-gas concentrations consistent with a stable climate.

The ICT revolution

Unfortunately, Europe is not yet on track to meet its 20% emission-reduction target for 2020, and it may increase its ambition to nearer 30% if an international framework is agreed in late 2009. The emissions trading system has not yet succeeded in establishing a stable carbon price at a level sufficient to mobilise substantial shifts in investment, business models and lifestyles. In this situation, the geopolitical lead is shifting to the US and China, driven by the new US Administration and by a much stronger focus on technology innovations and investments which China and other Asian countries are likely to share.

Yet a rapid shift to smart, green growth is possible. In the past 15 years, our economies and social lives have been revolutionised by personal computers, mobile phones and the Internet. The ICT sector is the motor of this innovation: according to the Commission, it employs nearly 7% of the workforce, generates over 6% of GDP and has contributed over 40% to productivity growth in the last decade. It contributes over 30% of all investment in research and development (R&D), and attracts over 50% of venture-capital investment. More than 2 billion people worldwide now use the Internet and web-services, and the mobile telephone networks have over 4 billion customers. ICT is fast becoming ubiquitous in our daily lives: for example, most office equipment and home appliances have embedded microchips and software to improve their effectiveness and energy-efficiency.

The potential of ICT-based innovations goes beyond incremental improvements in the efficiency of existing products and services. The ICT revolution is making the tools and services we depend upon smarter. IT and electronic communications offer radical change in the way we live and work. They will drastically transform how services are provided, requiring new business models to replace traditional ways of doing things. Homes, offices and cities can make different and smarter use of energy. ICT developments have also spun-off more efficient lighting systems, solar photo-voltaic energy generators, more efficient batteries and smart-grid technologies that can help meet our needs more efficiently.

Yet most media attention has focused on the growing use of electrical power by ICT equipment and services. In the EU, ICT use accounts for about 8% of electrical power use, and about 2% of greenhouse gas emissions. Power use is still growing, largely in the data centres used to manage online services, and will continue to grow as the ICT sector and related online services grow in line with the knowledge economy.

But the sector is already about three times more energy-efficient than the economy as a whole, and the relative growth in ICT-related energy use must be weighed against the efficiencies it can enable across all businesses. Nevertheless, more can be done to contain ICT energy use. Some major ICT companies have made substantial efforts to cut their energy use and offer more energy-efficient equipment and services. But the sector must still do more, setting more consistent goals and pioneering the smart solutions it can offer to all.

State of play

The EU has recognised the transformational potential of ICT-based innovations, most notably in the Lisbon Strategy for a knowledge-based economy and associated i2010 initiatives. However, it has been slow to recognise the importance of ICT-based innovations for the transition to a more energy-efficient, low-carbon economy.

Only last year did the Commission recognise the potential for ICT-based innovations to contribute to energy efficiencies across the economy. In May 2008, a Commission Communication highlighted the potential for smarter homes and offices, smarter manufacturing and logistics, and smarter electrical power grids to contribute to a greener tomorrow. It then launched a stakeholder consultation, on which it reported in a second Communication in March 2009, but deferred any policy recommendations until later this year, after further consultation.Yet it is now urgent to kick-start the transformation to a smarter, greener economy in the economic recovery.

The critical role of ICT-based innovations is now also being recognised in other sectoral initiatives. The recast Directive on the Energy-Performance of Buildings may promote highly-efficient 'solid-state' lighting systems spun off from the telecoms and home electronics applications, as well as intelligent sensors and control systems. In transport, the eFreight initiative and related RTD actions seek to harmonise the use of ICT-based logistics optimisation. In manufacturing, the November 2008 Recovery Action Plan includes €1.2 billion for a "factory of the future". And since none of these initiatives will succeed without the pervasive broadband infrastructures, the Plan also foresees additional investments in these infrastructures. However, these sectoral initiatives do not yet constitute a mainstream strategy for a smart and green economy.

Not only are there as yet only modest European-led initiatives to consistently mobilise ICT-based innovations for energy efficiency, but responsibilities are also compartmentalised (in separate Directorates-General and Executive Agencies for energy, environment, enterprise and innovation, research and the information society). This hinders the establishment of a consistent and effective set of initiatives, and leads to poor linkage between RTD and innovations, notably at regional and city level, slowing the speed with which new knowledge becomes new prosperity.

To realise the ambition of smart, green growth now at the centre of President Barroso's agenda for the new Commission, much more needs to be done.

Prospects

The Swedish EU Presidency offers a unique opportunity to make smart, green growth a central part of a more coherent implementation of the economic stimulus process; as a follow-up to the Lisbon and i2010 strategies, and as the major European initiative on climate and energy security.

Not only is Sweden a leader in the transition to a knowledge-based society, but its Presidency coincides with the transition to a new European Parliament, a new Commission and the conclusion of the United Nations Framework Convention on Climate Change (UNFCCC) negotiations on a global response to climate change.

Greening EU policy

The numerous but dispersed initiatives for smart growth managed by various Commission Directorates-General and in various EU programmes must be brought into a more coherent and synergetic framework, and better articulated with Structural Fund initiatives, the support of the European Investment Bank and Member States' actions. Stronger links are needed between RTD, innovation, regional and city development, and green public procurement, and on getting the market regulations right.

A new determination is needed to integrate European policies for the knowledge society and climate and energy security with the recovery packages. A new prosperity, with energy and climate security at its heart, must be clearly recognised as the way forward in the transformation to a smart, knowledge-based society.

In December 2008, the European Council agreed on the European Economic Recovery Plan to address the financial crisis and deteriorating economy, but also to "jumpstart the economy with investment in infrastructure, green technology, energy-efficiency and innovation to accelerate the transition to a knowledge-based low-carbon society".

The green growth rationale behind the Plan is sound, requiring action at all levels. At the EU level, the €5 billion of spending for clean energy and broadband infrastructures is indicative of a substantial shift towards green investment. But the translation of the Plan on the national level mostly does not match the 'green new deal' rhetoric.

Current short-term priorities are to protect manufacturing industries, where many old jobs are under threat but which will not create the jobs of the future, while businesses that *will* create the new green jobs do not yet have sufficient 'lobbying weight'. Investments in these areas are also often complex and risky, and often require public-private partnerships, including a need for a greater range of skills.

In addition, public investment alone is neither sufficient nor always necessary. The transformation to smarter green growth will come through innovations developed by the private sector, and investments by millions of companies and hundreds of millions of individuals. The market and regulatory frameworks must enable and encourage these investments.

Setting priorities

The transformation to a smart, green economy will touch all aspects of our lives and all businesses. To work efficiently and effectively, some key infrastructures must be rapidly put in place for these broader benefits to emerge.

Firstly, pervasive broadband networks are a prerequisite for everybody to be able to access information and services anywhere. Europe is well-placed in the current generation of access technologies, but new initiatives are needed to accelerate the next generations of fibre and wireless access. The regulatory framework must enable substantial new investments in the next decade.

Secondly, smart electrical power grids are needed not only to integrate renewable energies into supply, but also to allow more effective demand management, both across the network and by users.

Buildings can only become "smart" when they can feed in surplus energy to the network, display energy-use in real-time to users, and respond to price signals in their energy consumption. The electrical power industry must make the same transformation as the telecoms sector has undergone

in the last decades: from centrally-generated distribution of power to management of a Smart Grid which enables millions of smaller local and regional generators of renewable power to trade with users, and user-demand to respond to the availability of supply. Investments in Smart Grids will flow when the regulatory framework is right, and there is a sound business case for investment in smart meters and energy-management systems by grid operators and by all users, including householders.

Thirdly, energy-use and carbon-emission monitoring, accounting, reporting and labelling must become a common requirement. Nobody can manage what they do not measure. Businesses need energy-use and carbon accounting to improve their efficiency; investors need carbon reporting to assess risks in investment decisions; individuals need energy and carbon labelling to 'buy green'; and governments need coherent carbon reporting and labelling to monitor progress towards the 2020 goal.

The ICT sector can provide the software tools and communication facilities to make such accounting and reporting a reality within a few years. However, common standards will be needed to safeguard the European Single Market, and an infrastructure of standards, certification, monitoring tools and regulations will need to be put into place rapidly. Carbon accounting and reporting requirements should also be integrated into the green public procurement guidelines.

Once the legal and regulatory frameworks and the investments are in place to deliver this green infrastructure, there are a number of key opportunities which can be realised. In the short term, two priorities offer significant potential.

Greener and more efficient logistics for transport are a key to Europe's climate goals, as transport represents about 26% of energy end-use in the EU. Recent estimates from the Commission and others put the ICT-enabling potential at €280 billion in energy savings and possible carbon emissions reductions at 27%. Europe's transport systems must be upgraded to track the location of freight containers in real-time and facilitate intermodality. ICT software can rationalise routes and modes of transport. However, faster deployment of innovations, wider use of open standards and regulatory changes to allow SMEs to better optimise loads are essential.

Smart buildings are also key. Buildings use 40% of energy supplies, but the building stock evolves slowly. Recasting the Directive on Energy-Performance of Buildings is necessary but not sufficient. It will raise the energy-efficiency of the worst buildings, but the 2020 targets will only be met if there are complementary incentives to shift 10-20% of the building stock to near-zero carbon emissions by 2020 as a step on the way to making most buildings carbon neutral by 2050.

Only by pioneering this can Europe ensure the development of the skills, and the technology and business basis for the transformation of the whole building stock in the following three decades. This will require the full panoply of 'smart building technologies': active energy-management, smart meters, very efficient lighting and climate controls.

Some Member States are starting down this track, but more needs to be done at the EU level to realise the economies of scale in technologies for carbon-neutral buildings and provide world leadership in their deployment.

The way ahead

Policy-makers need to be provided with concrete recommendations to achieve the goal of a smarter and greener EU economy. At EU level, the European Policy Centre's Task Force on ICT-based innovation for a smarter, greener economy is facilitating discussions between major companies, regions and non-governmental organisations together with senior officials from right across the Commission.

The Task Force has already identified opportunities for policy- and business-led initiatives for software tools for carbon accounting and wider deployment of Smart Grids and buildings. Further discussions will focus on integrating innovations at the city and regional levels, and in stimulating the structural shift to a smarter, greener economy.

Europe's economic recovery depends on a stronger lead towards a smart, green economy, with public investment and regulatory changes enabling much more substantial and coherent investment by the private sector – both companies and individuals. This investment will anyway be essential to Europe's continued lead in addressing the challenges of energy and climate security, without which jobs and prosperity cannot be assured.

The Swedish Presidency has a unique opportunity to set the agenda for integrating policies for economic recovery, the knowledge society, and energy and climate security into a single framework for smart, green growth.

Peter Johnston is Chair of the EPC's Task Force on ICT for a Green Economy, which is drawing up a detailed set of policy recommendations to be published in January 2010.

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