

Green ICT in China - an emerging opportunity

by Marcus Elwin

Many environmental problems in China are rooted in political, economic and social problems. In 2007 China overtook the place from the U.S. as the world's leading emitter of CO₂. During the 11th Fifth Year Plan (FYP)(2006-2010) China consumed 40 percent of the coal, 50 percent of the cement, 60 percent of the iron and steel and 9 percent of the oil produced in the world. With this massive consumption of commodities, China only stood for 5 percent of world GDP during the same period. China has been in great demand of energy in recent years as the energy supply can't keep up with that of energy consumption. Therefore, new environmental policies, regulations, renewable energy, clean technologies, green ICT (information and Communications technology), green economy, smart grids and smart-cities have become imperative for further economic development of the roaring Chinese tiger.

Coal is still the dominant part of China's total energy consumption. From 1978 to 2012 the average ratio of coal to total energy consumption was more than 70 percent. Energy intensity (energy consumption per unit of GDP) is another common metric used which recent studies have showed to be five times the world average. In 2014 China announced that its carbon emission peak will be reached in 2030. According to the World bank, 750 000 people die prematurely every year in China from diseases caused by air pollution. This is outrageous. Has it always been like this? What do the Chinese government do to prevent this? What role can Information and Communication Technology and other emerging technologies take in this?

For over a decade prior to 2000, China reduced its energy intensity by an annual average of 5 percent. Those gains were destroyed between 2002-2005 by drastic rises in energy consumption, with an average 2 percent increase during these years. To curb this excessive use of coal and decrease the energy consumption China invested huge amounts of money, approximately 2.6 trillion yuan (US\$ 411 billion) in clean energy and to support other energy conservation projects. This bore fruit and by the end of the 11th FYP (2006-2010) China reduced 19,1 percent of its energy intensity compared to the 2005 levels. Nevertheless according to statistics the volume of China's energy consumption still had increased from 54 million tons in 1953 to 3.6 billion tons of standard coal in 2012, which shows that they still have a long way to go.

Since 2009 energy efficiency and emission reduction have become keywords in China's policies. Chinese policymakers see the development of the clean energy sector as not only as a mean to fuel its next phase of growth but more importantly, they see it as a strategic opportunity to become leader's in a vital emerging sector. A sector where developed countries are not yet predominant. China wants to reduce its energy intensity with 40-45 percent by 2020. That is astonishing, but what do the Chinese government really want to do? The Chinese government has enacted various laws, rules, regulations and also implemented numerous energy efficiency and renewable energy programs to achieve these goals and other related energy efficiency targets. Speaking of laws, an apparent example with focus on energy conservation is "The Renewable Energy Law" that came into force 2006 to identify the strategic role of renewable energy and also to work as a framework.

More programs that exist for new ways to be energy efficient are e.g. the Top-1000 program that targets the largest industrial energy users and helps them reduce their energy impact. Other examples are the Ten Key Projects and seven strategic emerging industries (SEI) which is mentioned in the 12th FYP (2010-2015), with key areas such as ICT, clean technology and others. Both clean technology and information and communication technology are getting a lot of attention these days from the Chinese government, because of the expected environmental gains. China is for instance building CleanTech industrial parks, mainly to appeal investments from external actors to solve environmental problems.

The CleanTech market is growing more than 50 percent per year globally, and it impacts all industries and is being funded across all investment asset classes. In 2013 the government created "Green Energy County Demonstration Programs" in 108 rural counties to build experiences and to create best practices in developing and deploying clean energy in rural China. Where the Chinese government has invested roughly 4.6 billion yuan (US\$ 730 million) in order for this to happen. There also exist a large long-term plan to invest in water systems, rural infrastructure and power grids in order to facilitate the transition to a more eco-friendly and environmental China.

What about the future and the role of Information and Communication(ICT) systems in all of this? Many of the worlds countries nowadays including China try to adopt the model of "Green economy". One might say that it's a paradigm shift, where this model tries to coordinate relationship in resources, environmental protection, economic growth and implement environmental and resource saving policies. In the case of China, the green economy also gives opportunities for growth in wealth and jobs. This is where ICT and other emerging technologies are vital. In 2010 China's Information and Communication industry generated an added value of 2.6 trillion yuan in revenues for China, accounting for 10 % of the total GDP. The ICT industry has been proven in some studies to have a negative impact on CO₂ emissions in China, as it provides technologies for enhancing energy efficiency and it can also optimize the design and production and the use to end-to-life treatment of other products. Information and Communication used in this way is mainly refereed to as Green ICT.

Green ICT is a key enabler for a green economy which many of the worlds economies and businesses have recognized and launched a wide range of initiatives and programs to implement green ICT. China who now is in a historic period of transforming its economic structure is among these countries that want to implement green ICT. Green ICT is seen by many of the main industrial players in the ICT industry as a large and potential market in the future. With the help of sustainability thinking and technology green IT can reduce IT's environmental footprint and contribute to enhanced economic and environmental performance of existing industries. Information and Communication technology is one of the seven SEIs mentioned in the 12th FYP which indicate that growth in ICT is important to China's restructuring. IT is a powerful tool in upgrading traditional industries, buildings and transportation, but also provide good means for environmental monitoring.

One mustn't forget that ICT also have negative impacts, as higher energy consumption and e-waste as old computers and so forth. It might also increase demand for other products and have degradation and rebound effects, for instants global communication stimulates more traveling etc. China can gain a lot from using green ICT but there are still some hindrances for it in China such as problems with finding a clear policy for green ICT and infrastructural problems with e.g. fixed and mobile broadband that only reached in 2011, 11.2 for mobile and 9.5 for fixed broadband per 100 subscribers compared to the world average of 8.4 and 17.0.

A recent study in 2012 by Tsinghua University on behalf of Alcatel-Lucent found that most Chinese ICT firms are aware of green ICT and 59% of them have plans to go green, but the biggest problem for the companies is the poor understanding of green ICT. The Chinese major telecom operators China Mobile, China Telecom and China Unicorn have all launched a series of green ICT programs since 2007 with focus on more green process innovations as green base station and power-saving technologies.

The telecom operators act as a hub to connect equipment manufactures, application and content providers and their customers in order to mobilize, create networks and to promote green ICT. Good things with this is if a major player takes the lead, this can stimulate other members in the business ecosystem. Greater collaboration between the IT companies and companies from other sectors is still needed in order for China to take more of advantage of emerging technologies as green ICT.

Green ICT and other smart technologies can all help to reduce the energy consumption, increase efficiency, work opportunities, improving the innovation capabilities and international competitiveness of the Chinese ICT industry and promoting green growth. All mentioned are essential to accelerate and facilitate the economic transformation of China. The business landscape of China as in many other countries are progressing in to more service then production oriented. Nonetheless there are still need to formulate systematic green ICT policies at national level and improvement of already existing policies to remove some of the system failures as poor infrastructure, to further benefit from the green growth of green ICT, smart houses and smart grids.