

Topten Europe, USA and China: Reaching a critical mass to face the global appliance market

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Keywords

market transformation, energy efficient products, standards, labelling, Internet, benchmarking, market overview on best available technology (BAT), advice for policy design, multipliers and end-users

Abstract

Topten selects and presents the most energy efficient products on national markets. A milestone for the Topten network was achieved in 2010, when, additionally to 15 European websites, TopTen USA and China were launched. Topten is now present in countries responsible for 55 % of the global energy consumption and CO₂ emissions. Topten needs a critical mass of visitors and international presence in order to successfully contribute to a market transformation towards high efficiency products. Within Europe, a critical mass of national Topten sites has been reached. The European site 'Best of Europe' showcases the best available technology (BAT) across Europe and addresses policy makers, large buyers, researchers and manufacturers rather than consumers. TopTen USA has started with 10 product categories and includes user-friendly features such as a search tool for rebate programmes and direct links to online shops and price comparisons. TopTen USA is building up partnerships with key NGOs, developing pilot projects with utilities and optimising its ranking in search engines in order to attract large numbers of visitors. Topten China displays the most efficient models of 8 product categories as a starting point. First compliance tests by Topten China have shown that most manufacturers declare the efficiency grade of their products correctly and that most products do meet the performance requirements.

The presence of Topten in different markets allows to make differences in BAT products visible and to promote a wide availability of the best products. Topten plans to expand further to allow for more cross-continental research and comparisons.

Introduction

Topten is an online search tool for the most energy efficient products on the market. Topten started in Switzerland in 2000; by the end of 2010 Topten had expanded to 15 European countries plus China and the United States. Topten is neutral, rigorous and transparent in that there is no influence from manufacturers or retailers. The selection methodology is based on international measurement standards and labels and is explained online for each product category.

The purpose of Topten is to provide consumers and energy-management professionals with credible, up-to-date information on the most efficient products available on their local markets. Information on specific product categories is displayed on the national Topten websites in a consumer-oriented way. The best products can be accessed with one click, including pictures and information on electricity consumption and total costs.

Topten aims at increasing consumer and professional demand for high efficiency products and awareness of their benefits, increasing the availability of high efficiency products across the market (more products from more manufacturers), and increasing market transparency so that decision makers can decide on ambitious yet reachable goals for their product policies.

The following pages present Topten's work both at national and global level and the recent developments in Europe, the USA and China.

Topten critical mass: from Europe to USA and China

INTERNATIONAL DIFFERENCES IN PRODUCTS AND MARKETS

It is of little surprise that the European, Chinese and the US markets of energy using products differ strongly. Different use patterns and consumer preferences, climate, building construction, legislation and different power supply voltages lead to quite different products markets. Penetration of certain products varies strongly (e.g. rice cookers are popular in Asia only, air conditioners have only small markets in Northern countries, whereas tumble driers are much more widespread than in the South), or different technologies are applied for obtaining the same function (e.g. heat pump laundry driers do not exist in the US). Accordingly, also the availability of energy efficient products varies strongly across the world's markets. Even within Europe, the appliance and product market is highly fragmented. Even though the market is very internationalized and guided by the same regulatory context, the same labels and only a few major industrial companies produce appliances and distribute them across Europe, high efficiency products are not delivered to European countries evenly (e.g. large offer in Denmark, poor offer in Portugal). National markets are greatly influenced by different climates, use patterns (for instance central heating in Northern versus reversible air conditioners in the South), different tax regimes and energy costs, consumer preferences and purchasing power¹.

In concrete terms, this means that most products, in Europe but even more so across different continents:

- Differ technically between countries or regional country groups, and only few products are uniform (within Europe e.g. cars, office equipment, some consumer electronics),
- Bear different brand names even where they are technically identical, which makes it very difficult for monitoring, verification and enforcement activities,
- Have different prices (due to different marketing strategies, different rates of value-added tax and due to special features of national and regional markets),
- Have significantly different life-cycle costs due to different energy and water prices.

Looking at markets on different continents, products can differ completely regarding technology or construction (e.g. in the USA heat pump driers are not on the market², in the case of air conditioners the US market is dominated by through-the-window models, while in China only split air conditioners are installed³). As a consequence orientation to nationally available products continues to prevail and harmonization is difficult to achieve, even on a European level. Consumers also lose out in

terms of access to the best performing products, as these are not distributed evenly across the markets.

ANSWERS TO THE GLOBAL APPLIANCE MARKET ARE BOTH LOCAL AND GLOBAL

Topten addresses the barriers to a thorough dissemination of efficient products by providing transparency on the *status quo* of the energy efficient products market on two levels: on national level through the 17 national Topten sites, and on an international level through its global network allowing for cross-country and even more recently cross-continent comparisons.

On the one hand, consumers are addressed by Topten with national, user-friendly product lists which use pictures, describe functions, availability, list prices and compare total life-time costs (purchasing price plus electricity and water costs calculated based on national costs) with that of a typical model. Advice for proper use of appliances and equipment is also accessible on-line. In contrast to labels, political instruments and governmental/public bodies, Topten can react immediately to the development of more efficient technologies by rapidly setting the benchmarks higher.

On the other hand, Topten establishes some pressure on manufacturers to make energy efficiency a key topic: directly through the possibility to have the best products listed on Topten, and indirectly through the market-pull effect by consumers asking for more efficient products. Thanks to its international presence, Topten can make differences between national markets visible and encourage manufacturers (thanks to a continuous dialogue) to shift their production lines towards more energy efficient products and distribute these widely.

To be successful in doing so, it needs to continuously demonstrate a high number of visitors - which shows through the number of participating countries, the development of new partnerships and policy recommendations. Furthermore, it must showcase its several impacts on the market stakeholders (consumers, retailers, manufacturers, professional buyers, energy utilities, policy makers, environmental and consumer NGOs and the media).

Higher presence around the globe increases Topten's credibility and thus its impact - as the Topten network gains weight while facing global players such as governments or international manufacturers. Furthermore, the Topten network allows for cross-country or even cross-continent BAT (best available technology) comparisons, which can stimulate manufacturers but also policy makers to go for higher efficiency.

Building up national Topten sites is a long process: a local team has to be set up, strong partner organisations have to be found, funding has to be secured before contacts with manufacturers and importers are established, data is collected and the website is built up. Contacts with media and partnerships with "multipliers" are also vital. This process usually takes years before the national Topten project begins to be recognised and to "stir things up".

TOPTEN GLOBAL NETWORK

In order to facilitate the achievement of the critical mass and better unify the different national Topten teams, an umbrella association was created: the Topten International Group (TIG) maintains collaboration on the long run, contacts new countries and undertakes a quality control. As each market is differ-

1. Factors influencing the penetration of energy efficient electrical appliances into national markets in Europe. Report for Defra/the Market Transformation Programme by SoWatt (Sophie Attali) and Bush Energie GmbH (Eric Bush, Anette Michel), Paris, June 2009.

2. Energy efficient heat pump driers - European experiences and efforts in the USA and Canada. Rita Werle, Barbara Josephy, Jürg Nipkow, Chris Granda. EEDAL 2011.

3. Energy efficient room air conditioners - best available technology (BAT). Anette Michel, Eric Bush, Jürg Nipkow, Conrad U. Brunner, Hu Bo. EEDAL 2011.

ently structured, it is the responsibility of the national Topten teams to find the best way to exchange with manufacturers and to communicate useful and sound information to consumers and other stakeholders. TIG helps each team to find this way but there is no “one recipe”, provided the Topten Charter (which sets principles concerning the project neutrality and independency) is respected. TIG rather functions as a “loose centre” supporting and advising “strong peripheries” that know better about their national market realities.

Within Europe, a critical mass has been reached: Topten is present in 15 countries consuming 75 % of total European energy; the further expansion towards 90 % energy consumption coverage is planned. With the launch of Topten China and TopTen USA in autumn 2010, a crucial step towards a global level has been made. The USA and China are absolutely critical in terms of energy use, greenhouse gases emissions but also product policies (they host many manufacturers, a lot of which export products world-wide and it is therefore crucial to make these manufacturers sensible to the most efficient technologies and their market value). All in all, Topten International is currently present in countries responsible for some 55 % of global energy consumption and CO₂ emissions.

Before the various regions are briefly introduced in the next sections, it is important to underline that, in order to speak the same language as manufacturers and policy makers, Topten is based on regulations: depending on the region, different measurement standards and labelling regulations are used as a basis before thresholds are set for the Topten selections. These thresholds move with the market performance, and when a standard/regulation is revised in a given region/country, Topten applies the new version, just as manufacturers do. Research projects are now starting between the Topten platforms to compare standards, analyse how different products behave under different test procedures, etc. with the objectives of harmonizing procedures and bringing the best of each region to future revisions – wherever they occur.

Topten Europe

In Europe, the use of electrical appliances has a major impact as household electricity consumption represents approximately 30 % of total electricity consumption⁴. The potential to reduce energy consumption and associated carbon emissions through the use of highly energy efficient appliances is significant.

15 PARTNERS GATHERED IN A EUROPEAN PROJECT

- The operation and further expansion of the European Topten network is supported by Intelligent Energy Europe (IEE) funds. Thanks to the projects called Euro-Topten (2006–2008) and Euro Topten Plus (2009–2011)⁵, the Topten concept could be carried out in 15 European countries to reach a critical mass. Each of the national sites guides consumers to the most efficient products available on their market, providing market-specific total cost informa-

tion. The European Topten network is expected to grow to 19 national sites by 2012, still with the support of IEE funds.

- Several papers have explained in the details the objectives and the work undertaken by Topten in Europe⁶. Orders of magnitude for the 15 websites on line in Europe are:
- nearly 188 product categories broken down into 409 sub-categories (presenting the most appropriate market segmentation from the consumer point of view) displayed on-line and more than 11,100 products listed mid 2010 (i.e. only a small share of the most energy efficient products available in the corresponding countries, products which were identified and for which the Topten teams have led a paper check in collaboration with manufacturers);
- More than 1 million visitors between January and May 2010 (generating 13 million hits);
- More than 28,000 articles in the printed media generating 95 Million readers, more than 2,000 Internet articles generating more than 20 million hits, more than 100 television reports with 74 million viewers and more than 200 radio reports with 31 million listeners (from January 2009 to June 2010);
- More than 40 partnerships with organisations relaying the Topten message in their daily activities (e.g. cities, utilities, NGOs, retailers).

These good results require a significant and continuous amount of work, resources and time, and are the out-come of dedicated teams – i.e. if the objective is not to set up a long-term Topten project (but “just” to participate in a European project as long as funding is provided, without national fund-raising or partnership building activities), there is little chance that a Topten website can really develop. So far only one team has renounced before actually starting. With 6 years of experience, one can see whether a national organisation carrying-out a Topten project will be able to continue with good conditions. If this is not the case (because of changes in staff, in priorities, or when it was agreed that the starting organisation was to launch the project before it could stand alone), Topten looks for a more suitable partner to take over (this is now happening in Belgium and France).

THE “BEST OF EUROPE” PROJECT

Additionally to the 15 national, consumer-oriented sites, Topten.eu was built up in the framework of the ‘Best of Europe’ project, recently supported by the European Climate Foundation. Topten.eu applies the strictest selection criteria of all European Topten sites and showcases the most efficient products and information on their availability in Europe – Topten.eu allows to find the best available technology (BAT) across Europe with one click. ‘Topten – Best of Europe’ is addressing large buyers and procurers, researchers, manufacturers and policy makers rather than consumers. The market overview on the

4. Energy efficient products, Consume Green, 22 project funded by the Intelligent Energy Europe programme, Report n°3, July 2008.

5. Intelligent Energy Europe projects Euro-Topten (2006–2008) and Euro-Topten Plus (2009–2011).

6. Source: see for example the eceee 2007 summer study paper “Topten – Best of Europe. How do best products perform and why aren't they sold across Europe?”; the EEDAL 2009 conference “Topten.info: Market Pull for High Efficiency Products”; the 2008 Euro-Topten final report “Click your way to energy savings: Find out the most efficient products with a simple click on Euro-Topten websites”).

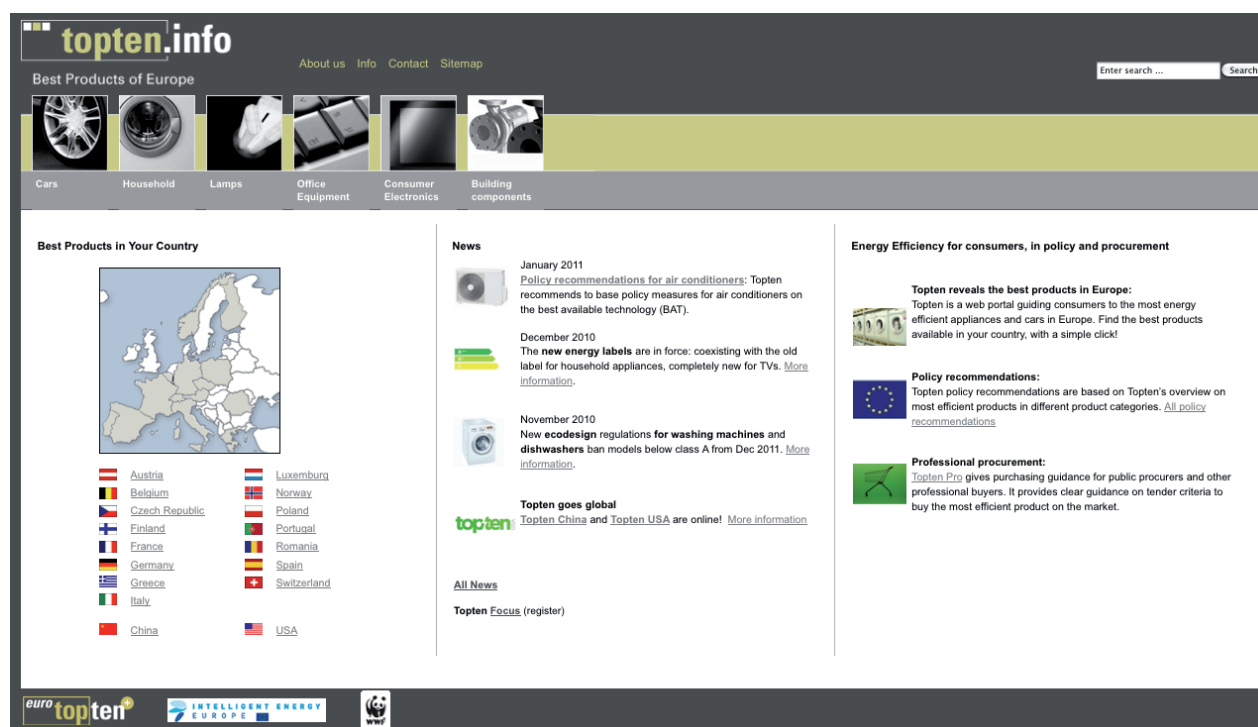


Figure 1: The Topten.eu portal (currently changing URL address from www.topten.info) showing on the left: access to the national European Topten websites; at the top: the selection of best products in Europe; on the middle: a news section; on the right: a section with a project presentation and public procurement guidelines.

European high efficiency product market is used to deduce detailed policy recommendations – Eco-design requirements or energy labelling schemes for instance, guided by the BAT. So far, policy recommendations have been put online for room air conditioners, TVs, driers, cold appliances, coffee machines and circulation pumps. In addition to these product groups, stakeholders can also find quick information on BAT levels in product lists on vacuum cleaners, lighting, computer monitors and imaging equipment.

The information available on Topten.eu stimulates the diffusion of the most innovative products and supports decision makers to launch new initiatives promoting products efficiency and energy conservation. It is being used in the framework of awareness and dissemination programmes, as a basis for specifications for large-scale buyers, and most importantly as a reference and benchmark for policy design, especially Eco-design and labelling regulations. For example, the Topten market study and policy recommendations allowed to see, before the new label for TVs was adopted that the planned thresholds for the most energy efficient classes were set too low (A, A+, A++) because these classes were already populated. It was possible to strengthen the label's scale before it was adopted.

TopTen USA

The energy savings potential by high efficiency products in the USA is substantial. As shown in Table 1, TopTen USA estimates that by replacing old appliances with efficient ones, more than 270 millions of tonnes of CO₂ and \$47 billion (equivalent to 34 billion Euro) could be saved over the lifetime of the products.

TopTen USA was formed as a non-profit organization in early 2009 by a group of U.S. environmental organizations, na-

tional and regional energy efficiency groups and utilities. The organization's start up was funded by charitable contributions and significant in-kind donations of time by the staff of the founding groups. TopTen hired its Executive Director in August 2009 and, working through a team of expert consultants, developed its initial product lists and built a state-of-the-art web site. The web site was beta tested through the summer of 2010 and opened to the public on November 9, 2010.

TopTen USA launched with lists of 10 product categories, some of which have been subcategorized: refrigerators, freezers, televisions, laptop computers, desktop computers, cars, light trucks and SUVs, dishwashers, clothes washers, computer monitors and water heaters.

The TopTen USA website shows up-to date information on financial rebates available and direct links to instructions on how to claim the rebates in the various States (linking to local policies). It also contains educational material for consumers on how to buy, use and properly dispose of or recycle products. Furthermore consumers find direct links from the products to different online shops, including a price comparison. These features make it easy for consumers to choose and buy efficient products.

In order to attract large numbers of visitors, TopTen USA is focusing on three strategies. First, TopTen is building "partnerships" with non-governmental organizations having large memberships. Those organizations are linking to our web site and encouraging their members to visit our site and buy listed products. As of mid-December 2010, TopTen USA had partnerships with organizations having over 3.5 million members. Second, TopTen is developing pilot projects with utilities and retailers to reward those that sell TopTen USA listed products.

Table 1 – CO₂ and money saving estimates if appliance stocks were replaced by BAT (Topten) models.

PRODUCTS	Energy Use of Typical Old Appliance (kWh/year)	Cost to Run Typical Old Appliance (\$/year)*	Energy Use of an Energy Star-Qualified Appliance (kWh/year)	Cost to Run Energy Star-Qualified Appliance (\$/year)*	Energy Use of Leading Same-Sized TopTen Appliance (kWh/year)	Cost to Run Leading Same-Sized TopTen Appliance (\$/year)*	CO2 Savings Over Life of Product if All Products Were TopTen instead of Old (Metric Tons)	Electricity Cost Savings Over Product Life if all Products Were TopTen instead of Old (\$/lifetime)
Large LCD Televisions	455	\$54.60	243	\$29.16	81	\$9.72	88,825,361	\$ 15,259,200,000
Computers	231	\$27.72	55	\$6.60	22	\$2.62	61,375,838	\$ 10,543,680,000
Clothes Washers	790	\$94.80	381	\$45.72	118	\$14.16	45,136,659	\$ 7,753,971,456
Refrigerators	1,065	\$127.80	590	\$70.80	356	\$42.72	59,812,672	\$ 10,275,145,632
Freezers	674	\$80.88	704	\$84.48	460	\$55.20	3,451,414	\$ 592,914,221
Dishwashers	451	\$54.12	324	\$38.88	180	\$21.60	14,771,299	\$ 2,537,543,405
TOTALS	3,666	\$439.92	2,297	\$275.64	1,217	\$146.02	273,373,243	\$ 46,962,454,714

This program is in its infancy and is beginning with the development of the “business” case for utilities to use TopTen to promote more efficient products. Third, TopTen is working to increase the ranking on search engines, encouraging companies, bloggers, news media and others to link to the site, employing the various tools such as keyword placement that helps with search engine optimization, Google Analytics, Alexa and other tools to monitor closely how visitors are using the site and what such data tells about how to improve the site and site traffic.

In 2011, among other things, TopTen USA will add an additional four new product categories, improve the functionality of the website-- including adding several new features, create the ability to feed content out to utility partners and other websites through either a widget or API, and build a Smartphone application that allows consumers to see TopTen lists on their phones.

Topten China

China is in a rapid phase of economic development not only in urban areas. Millions of households have now access to refrigerators, TVs, motor vehicles, etc. The rural market keeps expanding, in part due to incentive policies such as “Home Appliances Going to the Countryside”, which is an incentive programme encouraging farmers in rural areas to get equipped. Energy consumption and greenhouse gas emissions due to the use of consumer goods are growing rapidly. Improved energy efficiency for consumer goods in China is a key element in Chinese energy policy in order to slow down the need for additional electricity generation capacity and to reduce greenhouse gas emissions.

On 26 October 2010, Topten China (www.top10.cn) was publicly launched in Chinese (simplified Mandarin) and English with 8 product categories listing 332 products: refrigerators, washing machines, electrical water heaters, air condition-

BETA
top10
The latest energy efficient products

Search Top Ten USA

Home How We Evaluate About Us

Refrigerators Freezers Televisions Computers Vehicles Dishwashers Clothes Washers Monitors

**Better climate.
Lower bills.
The most efficient
products you can buy.**

Supported By
ENVIRONMENT AMERICA
Green America
MEEA

Medium televisions Large Refrigerators Laptop Computers
Large Televisions Dishwashers Freezers
Cars Small Televisions Small Clothes Washers

Top 10 Reasons to Go Energy Efficient
#2 Using energy efficiency measures alone, the U.S. can go a long way toward rolling its contribution to global climate change back to safe levels. [See All >](#)

All about Energy New Ways to Save
Why your electricity provider wants you to use less energy. [Read More](#) [See All >](#)

Figure 2: Topten USA's Home page.

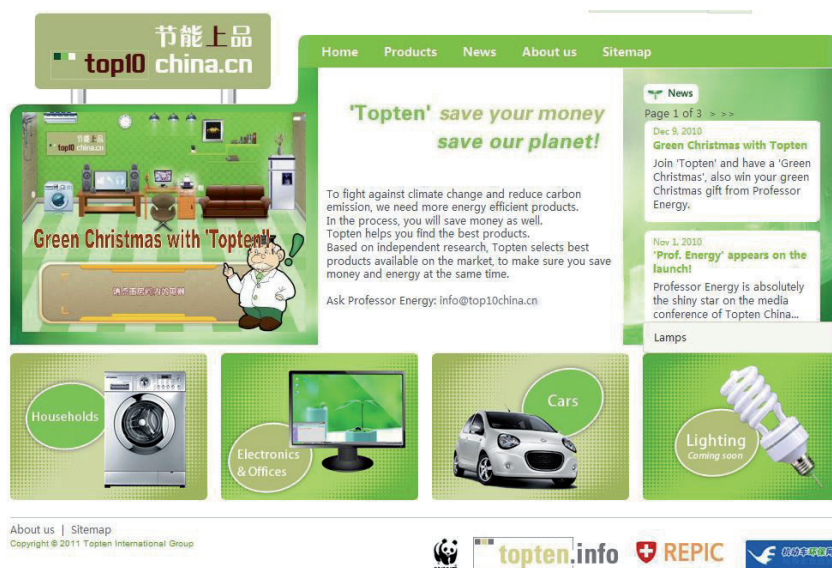


Figure 3: Topten China's home page.

ers, inverter air conditioners, monitors, copiers and passenger cars. The expansion in 2011 will include several additional product categories (e.g. TVs, microwave ovens).

So far Topten China has mainly been funded by WWF Switzerland and REPIC (Renewable Energy & Energy Efficiency Promotion in International Cooperation), a joint initiative of Swiss federal agencies.

The public launch of Topten China was a coordinated international event together with TopTen USA to demonstrate the global reach of the energy efficiency platform. It was a successful test of the media network which had been built up: currently Topten China is in contact with 14 key media partners in China, including Sina (one of the biggest portal websites in China), Autohome (one of the most popular car websites), PC-POP (one of the most popular IT products websites) and the China television CCTV (a WWF media partner).

The Topten products are selected based on governmental databases and market research results in key retail stores in China. Their selection in the Topten lists also depends on the accuracy of the energy performance data. Mostly manufacturers' self-declared data are currently available. Past product testing activities had shown that these data are not always sufficient (in few cases even grossly inaccurate) to rely on for the selection of the very best products according to Chinese testing standards and to the China Energy label criteria.

In order to secure the energy performance data of the selected Topten products, a first round of conformity tests of refrigerators, air conditioners and computer monitors was conducted at the end of 2010 by Topten China at the China Household Electric Appliances Research Institute (CHEARY) which has a testing laboratory and which brought a strong technical support.

Beyond various small deviations of self-declared values, the conformity test of a total of 29 products revealed non-compliance in two cases. Most of the products (93 %) did meet the requirements set by Chinese standards and regulations. Interestingly, the measured energy performance values of air conditioners and refrigerators were usually lower than the declared ones by the manufacturers, while the measured energy

performance of all monitors was higher than declared. As a consequence, Topten China will conduct further conformity tests on these as well as on additional products groups. Topten China is now in the process of raising specific funds to undertake independent product tests in order to increase the reliability of the Topten selections and contribute to the improvement of the testing and energy label standards of China. For example, a grant could come from the Asian Development Bank (ADB). This would also strengthen the acknowledgment and support from the Chinese authorities to Topten China – since the authorities have to agree to the ADB projects considered as priorities.

Topten China relies on crucial government policies, which include:

- Testing standards
- Mandatory energy minimum performance standards (MEPS)
- Financial incentive programs
- Procurement lists

Chinese government agencies (Standardization Administration of China (SAC), General Administration of Quality Supervision, Inspection, and Quarantine of China (AQSIQ), China National Institute of Standardisation (CNIS), Vehicle Emission Control Centre (VECC) of the Ministry of Environmental Protection (MEP), Energy Research Institute (ERI), etc.) are interested and open to international exchange on several energy efficiency policies and activities: standards, labels, procurement, financial incentives, testing. Topten China serves as an information channel on these subjects.

After two years of work and the launch of the websites, Topten China has provided some key insights to the Chinese decision-making and market transformation potential of consumer goods:

- Basically the innovative approach of Topten was – after a time of hesitation – accepted and appreciated by the government agencies. The hesitation was due to the perception of

a potential competition of BAT products (maybe 5 %–10 % of the market) with the energy labelled products in the best China “Class 1” which often includes between 30 % and 80 % of all available products. The hesitance was overcome thanks to information sharing from both sides and when the website was actually launched and visible on-line.

- The fear was also that Topten would often select only high performance foreign brands (e.g. Electrolux, Siemens, Bosch, Toshiba, Panasonic, Osram, and Philips), neglect Chinese brands and thus cater for high price premium products and consumer segment only. However, the pilot site already showed by the end of 2009 and now the published site proves that this is not the case. There are many Chinese brands at acceptable prices that can compete easily with imported foreign brands. Around 40 % of the listed products are from foreign manufacturers from Japan, Korea, Europe, and the USA.
- The partnership efforts with VECC (dealing with cars) have been successful since an early stage. It was challenging to develop concrete projects supported by both sides and make the partnerships a meaningful cooperation project. VECC has contributed a lot, in kind, for the car methodology and selection procedure.
- An Advisory Group (AG) was created as an effort to involve and share information with a number of key organisations in China, contributing to the significance of the Topten approach. The AG has a Charter with an informal status. Initially, some high officials contacted saw a potential conflict of interest between their government role and their support to an NGO selecting BAT products, but at the same time they appreciated Topten's efforts contributing to the Chinese government's national policy on energy saving and greenhouse gases emission reduction.
- The first pilot conformity test has shown that testing needs to be repeated systematically for most of the product categories to secure the accuracy of the energy efficiency data.
- The key element in the process of market transformation is to ease and accelerate the access to better products. The Chinese market already offers a set of energy efficient products but they are not easy to find and not available in all retail stores.

Conclusions

The 17 national Topten websites in Europe, the USA and China guide consumers to the best products available for them, establishing a market-pull effect. Vast differences between national markets show: products differ completely from continent to

continent, but also within Europe the availability of efficient products varies strongly. As a consequence, a product can be the ‘best’ on one market, while it is only average on another.

Thanks to the global network of national websites, Topten is able to provide information on best available technologies (BAT) across nation or continent borders. The overview on energy efficient products can be used to promote a wide dissemination of the very best products across markets and increase the availability of highly efficient technologies.

- Market research experience at European level and the starting inter-continental activities confirm several issues for which Topten can help (alongside other initiatives, as Topten is one of the “soft measures” in the market transformation tool box):
- Testing standards are sometimes not harmonized internationally, not enabling to distinguish the various attributes of new technologies (e.g. quality of compact fluorescent lamps) and outdated. Topten advocates for revision and harmonisation of standards.
- Government minimum energy performance standards are sometimes set too low and / or not fully enforced. Topten identifies efficient products already marketed and advises on MEPS and labelling thresholds.
- Financial incentives are sometimes oriented towards increasing sales volume, and not towards top class energy efficiency. Topten helps driving incentives towards most efficient products.
- Procurement lists are often too long and include cheap low quality products as well as energy efficient products. Topten identifies the products on which professional buyers can focus.

The three Topten platforms in Europe, USA and China already showcase an important number of product categories and will continue to grow. In Europe, a first critical mass of Topten sites and visitors has already been reached, in the USA, the TopTen website has started with strong NGO and utilities partners and in China the relationships with government institutions are very promising. The long-term objectives are that the Topten network continues to grow worldwide, stands as a credible interlocutor for the industry and policy makers and is able to undertake inter-continental research projects on products' efficiency. The corresponding challenges are to develop new partnerships and secure funding for the many Topten activities: the core work of updating the Topten product lists, the communications around the websites, the advice to large buyers and retailers and the market analysis and research projects.