What is an energy efficient TV?
Trying to find the best TV in China and in Europe

Anette Michel, Eric Bush,
Conrad U. Brunner, Hu Bo
Topten International Services

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topten.info
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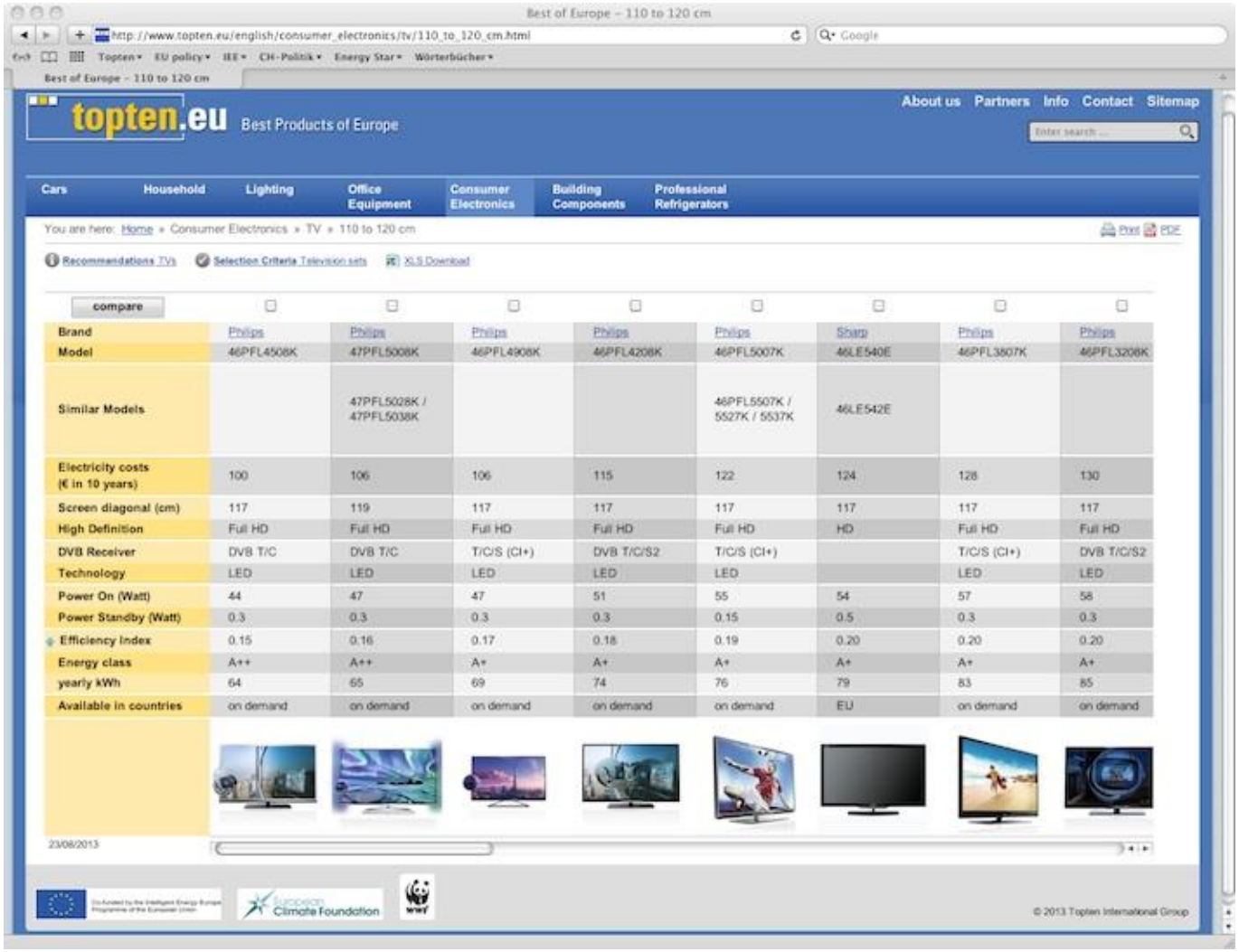
Why an international TV test

- Topten: shows the most energy efficient appliances online, based on official regional standards
- Global presence of Topten allows comparing apparent Best Available Technology (BAT): in China, Europe and the USA
- Data from Topten: Energy Consumption of Chinese TVs seemed to be significantly higher than of EU- and US TVs

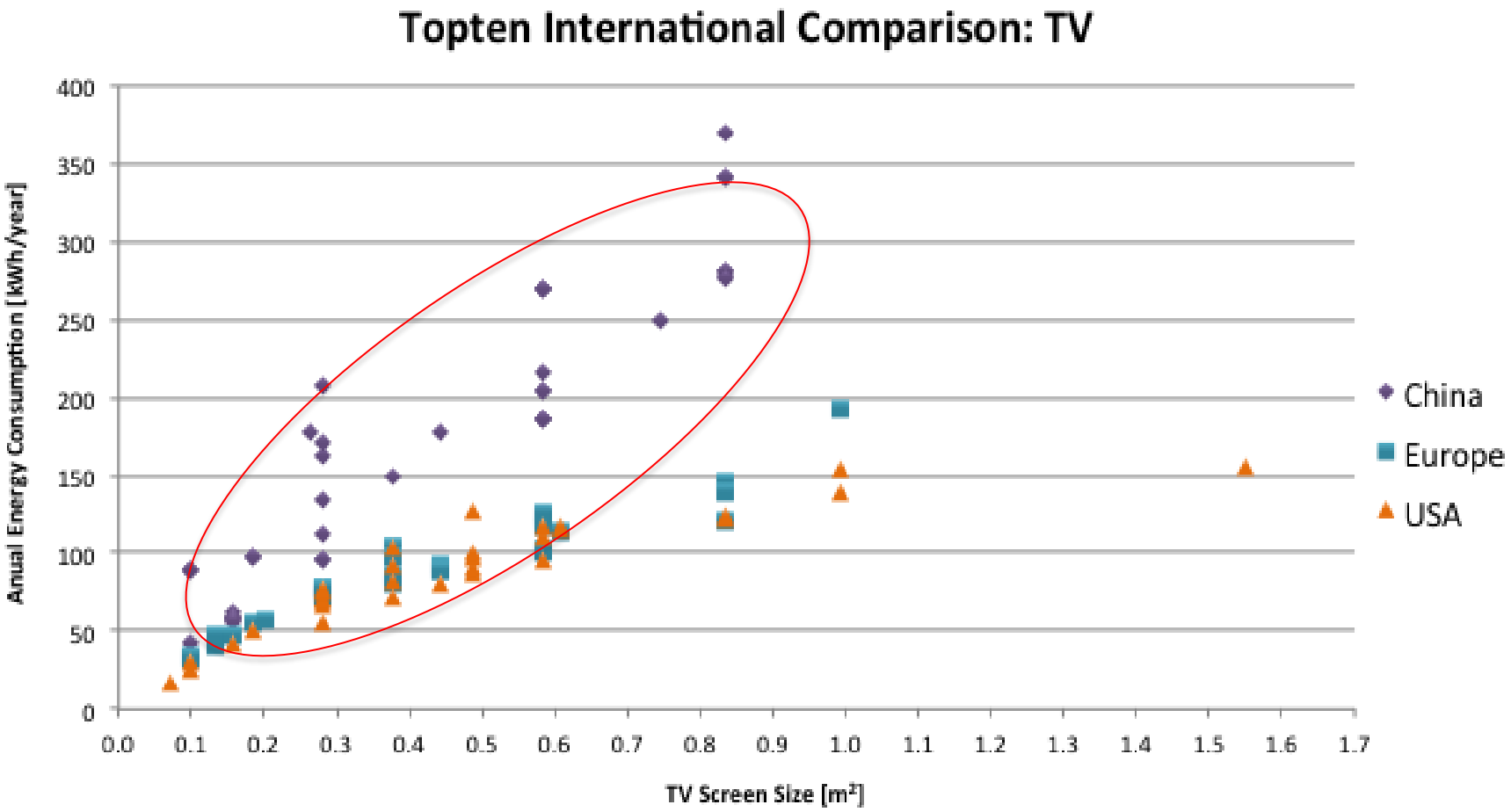
➔ **a test project was launched, including a high efficiency TV from China and one from Europe:**

- "Are Chinese TVs less efficient than European TVs, or is it only the declaration that differs?"
- "What are differences in testing and declaring?"

Topten shows Best available Technology



Topten international comparison



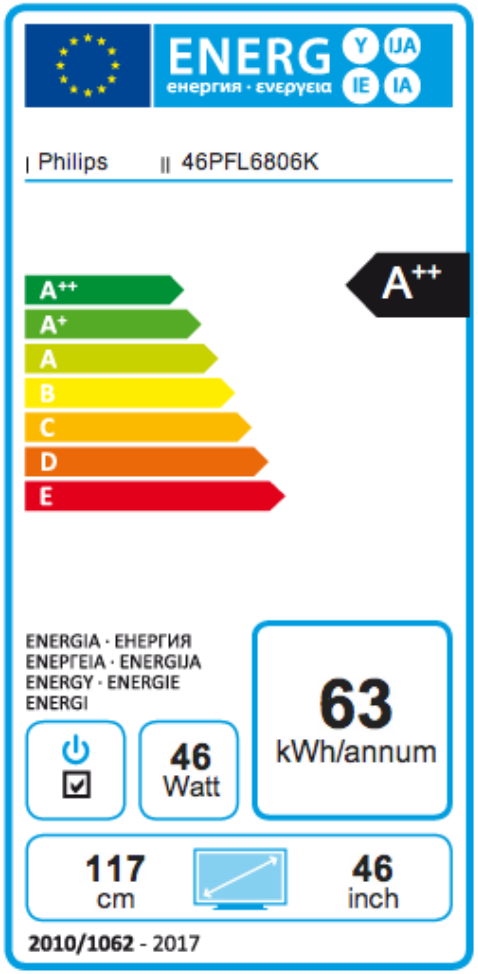
The project

- 1 efficient TV from China, 1 from Europe
- TV models selected from Topten product lists
- Both TVs tested in 2 Chinese and 1 European testing institutes
- Both TVs tested and rated according to the
  - Chinese Energy label and relevant measurement standards
  - EU Energy label and relevant measurement standards

Image: www.computerbase.de

Image: www.taboa-buying-agent.com

TV Energy Labels

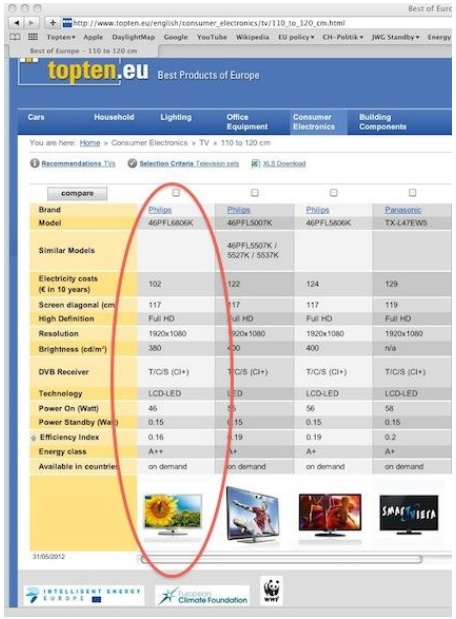


Selection of TVs from Topten lists

- Screen diagonal: 46 inch / 117 cm
- Selected were those TV models with lowest On mode power

Topten **China**:

Hisense LED46K200, **Grade 1**



Topten **Europe**:

Philips 46PFL6806K, **A++**

TV test: Participating test institutes

CVC: Guangzhou Vkan Certification & Testing Institute, China National Center for Quality Supervision & Test of Electrical Appliances. Guangzhou, China.

NIM: National Institute of Metrology. Beijing, China.

VDE: Association for Electrical, Electronic and Information Technologies VDE. Offenbach, Germany.

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TV test: Regulations, standards & definitions

	China	Europe
Labelling regulation	GB 24850: 2010	Regulation No 1062/2010
	MEPS, labelling scale and measurement standard in 1 document	Only basis for Label. No clear reference to measurement standard
Efficiency Index: On mode power	Brightness/Power [cd/W]	$P/P_{ref}(dm^2)$ [W/W]
On mode power measurement		
Test video	IEC 62087:2011, average 10 min.	
TV settings	Brightness adjusted to 8-greylevel-signal	Out of the box / 'Home' mode
	ABC off	ABC off

CN test: settings adjusted to 8-greylevel pattern

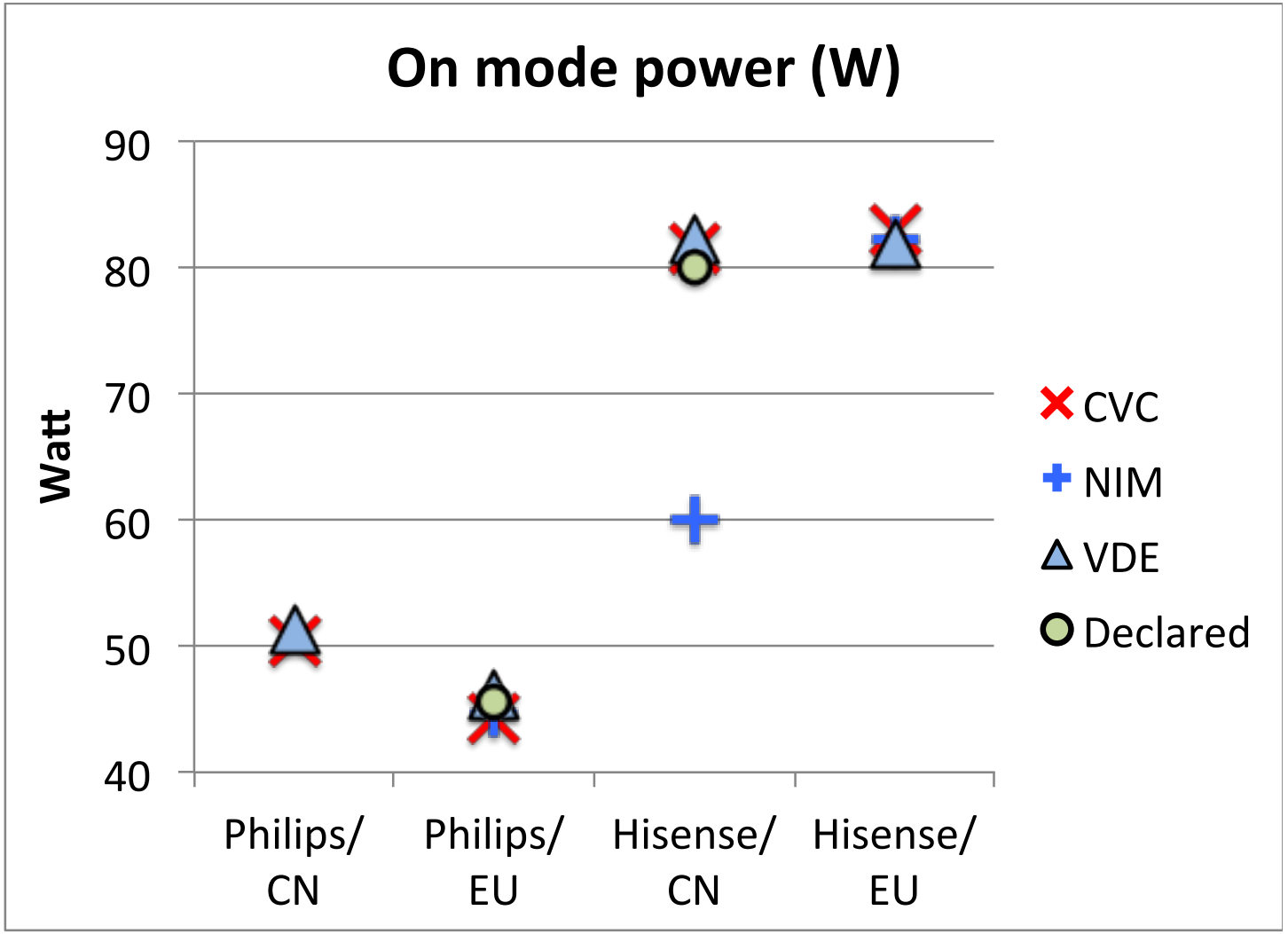
8-greylevel test pattern from GB 24850-2010

Results 1: EEI and Class

EU Energy Label				
	Philips 46PFL6806K		Hisense LED46K200	
	EEI*	Class*	EEI	Class
CVC	0.161	A+	0.302	B
NIM	0.163	A+	0.302	B
VDE	0.169	A+	0.301	B
*Incl. the 5% discount for the ABC, the A++ (EEI< 0.16) was confirmed by all institutes				

China energy labelling standard				
	Philips 46PFL6806K		Hisense LED46K200	
	EEI	Class	EEI	Class
CVC	1.15 (1.34**)	2 (2**)	1.36 (1.50**)	2 (1**)
NIM	-	-	2.33	1
VDE	1.43**	1**	2.86**	1**
**Measured with HDMI input terminal. Officially RF should be used.				

Results 2: On mode power



Main results - summary

1. According to the **EU Energy Label**, the **Philips 46PFL6806K is more energy efficient** than the Hisense LED46K200
2. According to the **Chinese Energy Label**, the **Hisense is more energy efficient** than the Philips TV
3. The **Hisense TV has a higher On mode power** than the Philips, for all measurements
4. The institutes reached **different results according to the Chinese standard**. Especially the (European) Philips TV was difficult to measure
5. For the **luminance** the institutes reached also different results according to the EU standard, even in factory settings.
6. All institutes failed to include the 5% discount for ABC for the EU Energy Label

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Conclusions 1: TV efficiency

Efficiency: relative power

China: power relative to screen size + brightness

EU: power relative to screen size

Sufficiency: absolute power

power

Conclusions 2: standards influence products

- ➔ Our results show: manufacturers optimise products very much according to (regional) standards and labels. Standards and labels strongly influence product design!
- ➔ Hence precise definitions of these are key
- ➔ There is no global agreement on the definition of 'TV efficiency'
- ➔ Harmonisation would facilitate performance comparison and trade of efficient products

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Conclusions 3: Settings matter!

- Modern TVs with dynamic backlight have a complex menu!
- Even small changes in several settings (backlight or LCD brightness, contrast, colour temperature, volume) can sum up to change the power by 30%
- ‘factory settings’ of a TV are not necessarily clearly defined:
  - They can change over time with software updates
  - Choosing ‘factory settings’ in the menu does not necessarily reset all settings

➔ Requirement for a clear set of ‘factory settings’?

➔ Consider variability in forecasts and models!

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Conclusions 3: Strengths and weaknesses of the labels

EU Energy Label (and Ecodesign) regulation:

+ Favours **low power** relative to size
+ Considers **factory settings and maximum brightness** of TVs
- Favours **large** TVs
- **Compliance cannot be checked** from declaration (tuners, ABC)
- **Unclear references** to standards, 7 documents needed for test

Conclusions 3: Strengths and weaknesses of the labels

China Labelling Standard

+ 'All in one' – **1 document** contains all info, clear references to standards

-Favours **large and bright** TVs

-Different labelling scale for **Plasma TVs** - their low efficiency is not visible. Only Grade, EEI and Standby power are declared

-**Measurement** based on adjustment to 8-greylevel-signal **not fully repeatable**; different settings are possible. Unclear how to change brightness for dynamic backlight. Dark room is not real-life condition


Thank you for your attention!