

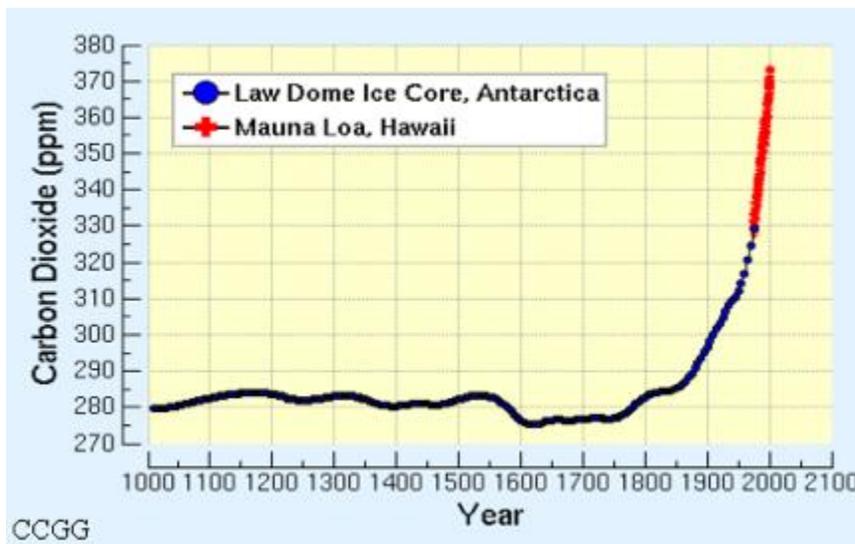
# Environmentally Conscious Product Design

## Goal

The goal of the ThinkPad Green Team is to produce environmentally friendly ThinkPads. To achieve this goal, we develop our products by reducing energy consumption, eliminating materials of concern, and taking sustainability into account by using innovation and continual improvements.

## Product Energy

Since ancient times, CO<sub>2</sub> concentration has been increased from 280ppm to 380ppm and it is thought that these “Green House Gasses” (GHG) have caused climate change and global warming. With innovation and exceptional technologies, ThinkPads are all ENERGY STAR qualified products and are designed to meet all regulatory requirements such as EU Directive (2009/125/EC) and Japan Energy Saving Law (“The Law concerning the Rational Use of Energy”), etc.



Lenovo also considers carbon footprint of products and has been working with others in industry, academics, and not-for-profits to pilot common methods for establishing product carbon footprints (PCFs) for Lenovo products. Lenovo supports the development of universally accepted methodologies for measuring PCFs with the goal that a common measurement system will promote targeted product energy reductions actions and allow for product differentiation. Lenovo is participating in the Stakeholder Advisory Group for the World Resources Institute’s development of the Product GHG Lifecycle Standard. Lenovo is also engaged with other members of the ICT industry, academia, and the US EPA’s ENERGY STAR program in the development of a tool to simplify and expedite the determination of the PCF for laptop computers. Lenovo hope is that this work will move the industry forward towards a standardized method for measuring PCF. Lenovo is working towards establishing product specific PCF goals during 2011.



# Eliminate materials of concern

## **Reduce Halogen:**

Due to concerns about the release of hazardous materials when halogenated flame retardants and PVC are burned under improper conditions during waste treatment, Lenovo has undergone a concerted effort to minimize the use of these materials.



Lenovo supports the iNEMI definition of low halogen, specified here:

[http://thor.inemi.org/webdownload/projects/ese/HFR-Free/Low-Halogen\\_Def.pdf](http://thor.inemi.org/webdownload/projects/ese/HFR-Free/Low-Halogen_Def.pdf)

Lenovo is one of several iNEMI member companies supporting this definition, and promoting low halogen.



Lenovo evaluates products with iNEMI definition for low halogen as through the use of 1752 materials declaration forms obtained from Lenovo suppliers. These forms track the use of halogens per the iNEMI definition, as shown below.

Other	Low Halogen, RoHS candidate: Bromine (Br) in PCB laminates	900 ppm maximum. Not homogen
Other	Low Halogen, RoHS candidate: Chlorine (Cl) in PCB laminates	900 ppm maximum. Not homogen
Other	Low Halogen, RoHS candidate: Bromine (Br) in Brominated Flame R	1000 ppm in BFR
Other	Low Halogen, RoHS candidate: Chlorine (Cl) in Chlorinated Flame R	1000 ppm in CFR
Other	Low Halogen, RoHS candidate: Chlorine (Cl) in Polyvinyl Chloride (P	1000 ppm in PVC

## **Meet EPEAT (IEEE1680) criteria:**

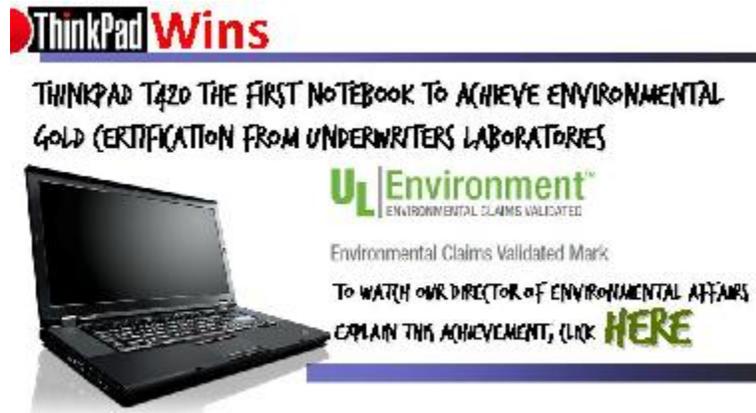
In order to ensure that Lenovo ThinkPad products meet all applicable materials restriction requirements, including both legal and voluntary programs such as EPEAT, Lenovo evaluates products with more stringent criteria than RoHS by using the 1752 materials declaration form as follows.

Other	EPEAT 4.1.2.1 Elimination of intentionally added Cadmium (Cd)	50 ppm in homogeneous materials
Other	EPEAT 4.1.4.1 Elimination of intentionally added Lead (Pb)	50 ppm or Intentionally Added unkn
Other	EPEAT 4.1.5.1 Elimination of intentionally added Hexavalent chromiu	500 ppm by weight in homogeneo
Other	EPEAT 4.2.1.1-3 Percentage of postconsumer recycled plastic meas	Report % weight of total plastic in

**Meet more stringent criteria than RoHS**

### **Obtain 3<sup>rd</sup> party certifications:**

In addition to the above, Lenovo received 3<sup>rd</sup> party certifications from UL Environment and Nordic Swan.



<http://www.ulenvironment.com/ulenvironment/eng/pages/env/about/>  
<http://www.svanen.se/en/Search-result/?q=lenovo&searchType=1>

## **Sustainable Product Design**

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Lenovo devises the choice of materials for the crucial goal on the establishment of a recycling society. ThinkPad is so designed that the sustainability is taken into account.

### **Device Materials**

ThinkPads use uniform materials with uniform colors:

ThinkPad is made to be recycled. One example is the "unification of the material."

To make recycling process easier, unification of the material including the color is considered. Also, all plastics over 25g are material-coded for recycling.

Use PCC (Post-Consumer Recycled Content):

Years ago, we were using Pre-Consumer recycled plastics such as post-industrial recycled content (PIC). Lenovo overall began using PCC in significant volumes in 2007, mainly in monitor and desktop applications. Using PCC in mobile applications presented unique engineering challenges that required an investment in development time to overcome. The ThinkPad team, however, challenged ourselves and started to use Post-Consumer recycled Contents (PCC) from 2009. PCC is material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. In order to use these types of materials in mobile applications, Lenovo had to work very closely with its supply chain to develop and qualify engineering grades of PCC that met or exceeded all the property values of the virgin plastic material they replaced. In mobile applications, materials need to be both lightweight and also engineered withstand the rigors placed upon notebooks. This combination was particularly challenging for Lenovo and its suppliers, but by working together we were successful in qualifying several new materials for use in notebook applications. Now every ThinkPad uses PCC.

Avoid adhesion of dissimilar materials and surface treatment:

To contribute to recycling, ThinkPad is designed to avoid adhesion of different types of materials, and surface treatment and plating that could interfere with recycling.

### **Device Design**

Reduce the number of screws:

To reduce the time for dismantling machines and separating parts, ThinkPad is so designed that the number of screws is reduced, screw type is unified, and the screw's installation direction is considered.

Reusable unit / fewer parts:

The units used in ThinkPad can be replaced very easily and the reduction of parts is considered. This design concept allows longer life of the product, and reduce disposal of wastes.

ThinkPad is designed to contribute environmental conservation in terms of Reduce, Reuse, and Recycle.

## Declarations/Certifications

As a summary, Lenovo claims the following declarations and certifications on current ThinkPad models.

	T series (T410/T420, T510/T520)	X series (X201/X220)	W series (W510/W520)	L series (L412/L420, L512/L520)	Edges (11",13",14",15")
EPEAT*					
UL Environment					
Nordic Swan**					
ENERGY STAR					
ECMA 370					
GREENGUARD					
PCC Use***					
Reduced Halogen					

\*: Rating in USA

\*\* : Contains outlook

\*\*\* : PCC: Post-Consumer recycled Contents

## Biography

### Hiroshi Shigaki

Hiroshi Shigaki has been working in Lenovo (with the experience of former IBM PC Division) since 2005. He specialized in Mechanical Engineering at Kyushu University. His background is a mechanical engineer in IBM, and now working for ThinkPad environmental focal point in Lenovo. He is also a member of the Lenovo Green team.



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