

# A Lenovo Environmental Success Story

## “Using Recycled Content Plastics”

### **Background:**

Computer manufacturers have traditionally used virgin plastics in the production of decorative covers and selected internal mechanical parts to produce aesthetically pleasing and lighter weight product designs while providing unique functions (e.g., ease of assembly, user safety). To achieve these objectives, engineered virgin plastic materials were developed and used successfully for many decades. This practice has two significant environmental considerations.

First, as with all new materials the production of virgin plastics requires the use of natural resources and energy during their production which results in CO<sub>2</sub> emissions. Secondly, with the dramatic increase in the use of electronic and electrical products over recent years, large quantities of end of life equipment has resulted in the generation of large streams of recovered plastics requiring environmentally sound disposal options. While there are existing recycling infrastructure and demand for recycled metals and glass, the recovery and reuse of engineered plastics is not fully developed. Therefore, recovered plastics typically were either used in low level (reduced properties) non-IT applications, incinerated with energy recovery, or disposed by incineration or landfill.

### **Lenovo's Strategic Actions:**

In the early Lenovo days (2005-2006), Lenovo's Environmental and Product Development teams recognized these environmental considerations and the potential environmental benefits of using recycled content plastics and took strategic actions to increase their use in the production of Lenovo products. Initially, they identified recycled content plastics as an “environmentally preferred” material in order to reduce the use of natural resources and the carbon footprint of its products and build the infrastructure and demand for recycled content plastics. They also established environmental objectives and targets for the use of recycled content plastics in the manufacture of Lenovo products and began to work with selected plastic manufacturers and compounders in developing and qualifying “engineered” recycled content plastics.

Developing and qualifying “engineered” recycled content plastics was critical to ensure these materials would match both the properties and performance of the virgin plastics targeted for replacement and in gaining the confidence all stakeholders (e.g., product development teams (PDTs), Quality Control, Supply Chain, Customers). Additionally, it was important to ensure the recycled content came from verifiable sources.

### **Lenovo's Early Success:**

To demonstrate “engineered” recycled content plastics could successfully be used in computer applications and satisfy the demanding requirements, Lenovo's team first worked with post-industrial content (PIC) recycled plastics. This was easier since these streams typically came from known sources and were not contaminated by field use. Lenovo's team worked with a major plastic manufacturer to qualify and use a 25% PIC recycled FR-PC/ABS material in the production of Lenovo ThinkPad base covers.

Later the Lenovo team worked with a plastic compounder to develop and qualify another 25% PIC recycled FR-PC/ABS material which was used successfully in the production of Workstation bezels and internal parts. These early successes were critical in establishing both the practice of using recycled content plastics and building confidence in their use by Lenovo's PDTs and suppliers.

### **Industry's First PCC Usage:**

In 2007, Lenovo teams worked with a virgin plastic manufacturer in developing, qualifying, and implementing the use of 30% post-consumer content (PCC) recycled HB-ABS/PET plastic in the production of the Lenovo ThinkVision L193P monitor in October 2007. This material was based upon the recovery of end of life PET water bottles and represented the computer industry's first large scale use of PCC recycled plastics.

Over 17 million pounds of this recycled content material with over 5 million pounds net PCC was used over the next two years in the production of ThinkVision decorative parts and products with only minor processing changes and no significant production issues. Later, Lenovo teams worked with a plastic compounder in developing, qualifying, and using an alternative 30% PCC recycled FR-PC/ABS material which was used successfully in the production of Lenovo ThinkPad notebook and ThinkCentre desktop products and a 30% PCC HB-ABS material used in ThinkCentre, Workstation and ThinkVision products. These PCC recycled materials were based upon a mixture of recovered non-IT and IT plastics from end of life sources.

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### Lenovo’s Technical Achievements:

#### *Lenovo Notebooks*

In the summer of 2009, Lenovo challenged a recycled content supplier to develop and qualify a 30% PCC FR-PC/ABS recycled material with 15% talc to potentially replace a highly engineered virgin material used to produce Lenovo’s ThinkPad top covers. The targeted application represented a significant technical challenge based upon the required material properties (e.g., stiffness, thin wall) and end product performance.

The Lenovo team worked with the recycled PCC supplier in identifying the required material properties and performance and once the supplier developed a candidate material completed environmental qualification, part molding, and final part and product testing. Once these activities were successfully completed, the newly developed 30% PCC FR-PC/ABS recycled material with 15% talc was implemented in the production of select ThinkPad notebooks (e.g., SL 410, SL 510) which were released in October 2009 (see photos below).

The source of this new PCC recycled plastic material was recovered plastics from end of life electronic equipment. This application represents a significant step in the evolution of Lenovo’s PCC usage program due to the particular challenges of developing and implementing PCC recycled plastics in notebook computing applications. PCC recycled plastics were used in the manufacture of most major ThinkPad notebook parts including: LCD cover, base cover, top cover, palm rest and thermal door. After this implementation, Lenovo suppliers used over 1.3 million pounds of recycled content plastics in 2010 to produce Lenovo ThinkPad products with over 400,000 pounds of net PCC.

### ThinkPad Notebooks Using PCC



**Lenovo SL510 Notebook**



**Lenovo SL410 Notebook**

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### *Lenovo Monitors:*

In 2009, Lenovo worked with a Lenovo recycled plastic supplier to develop and qualify a new HB-ABS recycled material with 65% PCC plus 20% PIC for use in producing decorative monitor parts. This material contained no virgin resin and the PCC source was plastics recovered from end of life electronic products.

After successfully completing molding trials and product testing, this material was eventually introduced in the production of Lenovo’s new series of ThinkVision monitors (see below) in October 2009. The Lenovo team believed this implementation represented the highest use of PCC recycled plastics in the production of any PC product with worldwide availability.



Lenovo L2251x Wide Monitor

### **Lenovo Environmental Leadership:**

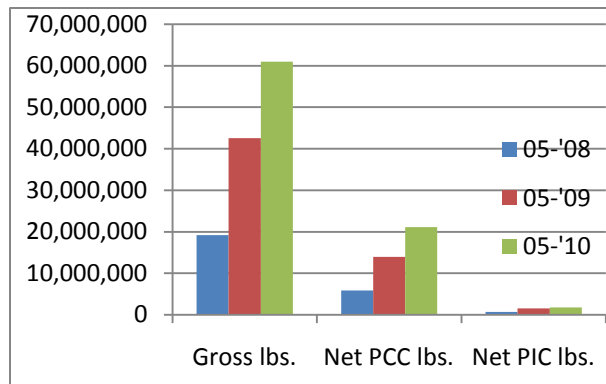
The completion of these activities and continuing efforts have resulted in a range of qualified PIC and PCC recycled plastics which are available for use in the manufacture of all Lenovo products. Using these “environmentally preferred” materials in the manufacture of Lenovo products has established Lenovo as clear leader in this field. The use of recycled plastics, especially PCC, is major a contributor to Lenovo's leadership position in developing and manufacturing "green" products which meet customer expectations and in satisfying the postconsumer recycled plastics criteria of the IEEE 1680.1 standard for computers.

These achievements have also enabled Lenovo PDTs to register numerous Lenovo products on the EPEAT (Electronic Products Environmental Assessment Tool) with “Silver” or “Gold” product ratings.

Lenovo has experienced tremendous growth in the use of PCC recycled plastics over time. In fact, Lenovo has used over 60 million pounds of recycle content plastics with over 20 million net PCC since beginning these efforts (see chart below). In 2010 alone, more than 10% of all Lenovo supplier purchased plastics for the production of Lenovo products contained recycled content (PIC and/or PCC).

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Lenovo PCC & PIC Usage over Time



In using recycled plastics, Lenovo has satisfied the original objectives of reducing the carbon footprint of Lenovo products (avoided emission of greater than 34 million pounds of CO<sub>2</sub>) and building the infrastructure and demand for recycled plastics. Consistent with Lenovo’s commitment to continuous improvement, Lenovo’s environmental and product development teams continue to drive the use of these “environmentally preferred” materials in the production of Lenovo products by establishing the following fiscal year 2011/2012 EMS objectives and targets applicable to all Lenovo products.

- PDTs to grow the use of PCC plastics by 20% over the previous year
- PDTs to use some PCC plastics in every new product released

### Lenovo’s Environmental Success Story:

This significant accomplishment in a relatively short period of time was made possible by the vision, dedication, and cooperation of the entire Lenovo team and Lenovo suppliers of both recycled plastics and Lenovo products. Together they overcame multiple design, technical and supply chain challenges to improve the “greenness” of Lenovo’s products and prove to the computer industry using recycled plastics is not only the right environmental thing to do, but makes good business sense.

### Biography

Dewey Pitts is a Senior Engineer in Lenovo’s Global Environmental Affairs with Project Program responsibilities for Lenovo’s Preferred Materials and Product End of Life Management. Prior to his Lenovo employment, Dewey worked in IBM’s Materials Laboratory and Engineering Center for Environmentally Conscious Products. He enjoys working with Lenovo’s PCC material suppliers and PDTs in promoting the use of recycled plastics.

Thomas Philbrook is an engineer within the Notebook Platform Procurement Engineering team supporting the worldwide sourcing and manufacturing of ThinkPad computers. Prior to his Lenovo employment, Tom worked in IBM’s RTP Manufacturing Engineering area supporting notebook, monitor and PC manufacturing teams. Tom has also worked on other environmental opportunities such as RoHS, lead free and halogen free programs.