

TESTIMONY OF TODD BRADY, INTEL CORPORATION, BEFORE THE SENATE  
CHILDREN'S HEALTH AND ENVIRONMENTAL SUBCOMMITTEE, MAY 16, 2012

Thank you Senator Udall and Senator Alexander, for the opportunity to address the *Children's Health and Environmental Subcommittee* on the topic of environmental sustainability. My name is Todd Brady. I serve as the Global Environmental Director for Intel Corporation where I oversee the environmental performance of our worldwide manufacturing operations. Today, I hope to briefly convey how sustainability is integrated into our business strategy.

Introduction

Intel Corporation is the world's largest semiconductor company with revenues of \$54B in 2011. Intel employs over 100,000 employees over half of whom reside in the United States. Over three quarters of our chip manufacturing occurs in US factories located in Arizona, New Mexico, Oregon and Massachusetts. Our products are sold globally with more than three quarters of our revenues occurring outside the United States. Given this global footprint, Intel has long been an advocate for the environment, publishing our first public environmental report almost 20 years ago. We have been fortunate to receive recognition for our efforts, being regularly ranked among the corporate environmental leaders by organizations such as Forbes, Newsweek and Dow Jones. This commitment to the environment is embedded in our 40+ year history.

In 1965, Gordon Moore, co-founder of Intel, published an article in *Electronics* magazine noting that the number of transistors on a semiconductor chip doubled roughly every two years and that

this innovation needed to continue to meet the demands of new technologies. This prediction shortly thereafter became known as “Moore’s Law” and has held true for over 40 years. This law has driven the semiconductor industry to extraordinary achievements which today result in semiconductor chips that provide phones, tablets and notebooks with more computing power than rooms of computers only decades ago. Interestingly, the “law” is not one of physics, but one that conveys human inventiveness and costs up to \$12 billion a step and six years of engineering effort. To put this in perspective, if the automobile followed Moore’s Law, cars today would be capable of speeds of 470,000 miles per hour, get 100,000 miles to the gallon and cost 3 cents each!

I will now briefly describe Intel’s strategy as it relates to the environment. Specifically, I will highlight three primary areas: (1) reducing the environmental footprint of our operations (2) creating eco smart products and (3) using Intel technology to address critical environmental challenges.

#### Reducing the footprint of our operations

Approximately every two years Intel implements a new semiconductor manufacturing process technology to make faster chips with smaller feature sizes in the endless pursuit of Moore’s Law. Each semiconductor manufacturing generation is the result of many years of research and development and typically results in approximately 25% of the manufacturing tools being replaced in each fab (semiconductor chip fabrication factory). Moore’s Law inherently reduces natural resources used for construction and manufacturing. The technology to make computer chips with smaller feature sizes allows more computing capacity to be produced on each chip in

each factory. Intel has estimated that to produce the same computing power at the current technology node would have required four times as many factories just two generations before. Fewer factories require fewer resources for construction and less energy and natural resources to operate. This is the power of Moore's Law applied to sustainability.

To formalize the tie between Moore's law and sustainability, Intel created a "design for environment" process in the early 1990s, a collaborative approach among environmental, research and development (R&D) and high volume manufacturing engineering. The overarching goal of this approach was to make successful environmental performance a core responsibility of the technology development process. To achieve this, environmental goals are established during the early stages of technology development for air emissions, water conservation and waste minimization and recycling, among others. These goals are treated as equal in importance to other manufacturing goals, such as cost, process yield or throughput. The results of these efforts have been significant and because three quarters of Intel's manufacturing occurs in the US, those benefits apply directly here at home. For example, over the past decade Intel has invested over \$100M in water conservation initiatives that have yielded over 40B gallons of water savings. Greenhouse gas emissions have been reduced over 80% per chip, cut in half during a time when our manufacturing operations increased over two fold. Waste recycling stands at over 80% with less than 5% of all wastes going to landfill. Finally, Intel is the largest purchaser of green energy in the US since 2008 per the US EPA, purchasing over 2 billion kw-hrs of renewable energy each year.

Government/industry partnerships can be key in achieving such operational results. Intel was one of the first companies to participate in the Project XL initiative, working with local and federal agencies to develop an environmental permit model that provided manufacturers flexibility in a dynamic industry while ensuring environmental controls and public transparency. In 1998, Intel led the semiconductor industry to sign the first ever voluntary agreement with EPA to reduce greenhouse gas emissions. In 2010, both Intel and the semiconductor industry participants completed this agreement and exceeded the commitment to reduce GHG emissions 10% below 1995 levels.

#### Energy efficient products

Although Intel is the world's largest semiconductor manufacturer, the focus on environmental improvement cannot end there. In fact, when evaluating our environmental footprint, the use of our products in commerce has a potentially much larger impact than the internal manufacture of those same products. In 2006 Intel made a major change in processor architecture to emphasize energy efficiency. The new chip architecture along with software to optimize power management has resulted in dramatic improvements. For example, a new laptop computer with the latest Intel processor and with power management features enabled can use up to 26 times less energy than a four year old desktop system. Given the dramatic growth in the use of notebook and mobile computers relative to desktop computers, the potential savings are staggering. Intel technology will enable the billion PCs and servers installed between 2007 and 2014 to consume half the energy and 17X the computing capacity of the first billion computers.

In addition to energy efficiency, we have focused on reducing the environmental footprint of our products from design through disposal, which includes evaluating and minimizing the use of environmentally sensitive materials in our products. Over the past decade, Intel has worked with suppliers and customers and participated in several industry consortia to eliminate lead and halogenated flame retardants from our products. We have now shipped over 500 million lead-free products worldwide.

#### Using Intel technology to solve environmental challenges

Clean manufacturing and energy efficient products are important but perhaps the most compelling sustainability application of IT products is their use to address some of the world's most challenging environmental problems. For example, the development and application of "smart" technologies to manage buildings, transportation systems, manufacturing, health care, retail and many other applications has the potential to significantly reduce emissions and energy use. A recent report by the Climate Group and Global Sustainability Initiative concludes that better use of IT technologies has the potential to reduce worldwide greenhouse gas (GHG) emissions by 7.8 gigatons by the year 2020. This savings represents 15% of global GHG emissions and in economic terms translates into saving nearly \$950 billion in costs (The Climate Group, 2008).

For Intel and the IT industry, creating new technologies that enable efficiency, connect people, share ideas and enable actions that were once only available in science fiction novels are at the heart of the industry's growth. These same technologies have also had a very positive impact on the environment. Online banking saves a trip to the local bank branch office and associated auto emissions; online shopping saves emissions associated with travelling to multiple stores;

downloading music avoids the manufacture, packaging and distribution of CDs and its environmental impacts, meetings; conferences can be held virtually; companies can monitor and optimize the shipment and transport of goods real-time. The potential applications are endless.

Intel believes so strongly in the role that our technology can play in driving energy efficiency and sustainability progress in the rest of society that we founded the Digital Energy and Sustainability Solutions (DESSC) initiative. DESSC includes as members most of the leading IT brand-name companies and a number of environmental and energy efficiency groups. It focuses on raising awareness of how IT applications can improve energy efficiency and water resource management in other sectors and in working with governments to develop smart public policies that enable the growth of these IT solutions.

#### Communicating to the public and our employees

As companies develop their environmental strategies and programs it is critical to engage both their employees and the general public. To engage employees, we have established recognition programs, provided grant money to fund employee-driven sustainability programs, and created an internal social networking site dedicated to environmental topics. Four years ago we tied the financial compensation of all employees to the environmental performance of the company by setting environmental targets which factor into our annual employee bonus payout.

To engage the public, Intel employees volunteered over 1 million hours of service in their communities in 2011, many of those hours spent supporting environmental initiatives in their respective communities. In addition, in most areas where Intel operates, it has created community environmental groups to both review and receive feedback on its performance. Most recently, we have launched [exploreintel.com](http://exploreintel.com) a new website to be as transparent as possible in

our environmental performance by sharing information with public related to our operational environmental footprint.

In summary, for Intel sustainability and business excellence go hand in hand whether it is minimizing our environmental footprint in our manufacturing operations, creating energy efficient products or identifying sustainable applications of these products. Investing in our sustainability initiatives is investing in our business.

More information regarding Intel's environmental strategy and performance can be found at:  
<http://www.intel.com/content/www/us/en/corporate-responsibility/corporate-responsibility.html>