Submission # 15

Microsoft

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The Research Director
Environment and Resources Committee
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To The Research Director,

Re: Inquiry into Energy Efficiency Improvements

Microsoft is pleased to submit the following response to the *Environment and Resources Committee* regarding the *Inquiry into Energy Efficiency Improvements* (the Inquiry).

Yours faithfully,

Simon Edwards
Head of Government and Industry Affairs

Microsoft's experience and investment in software development has confirmed that software and technology innovation can help people and organisations around the world improve the environment. Given that the ICT (information and communication technology) sector accounts for 2% of global greenhouse gas emissions[1], a key area of Microsoft's investment focus is on reducing the energy required to run software and related applications. This response focuses on the economic and environmental costs and benefits arising from energy efficiency improvements including power management settings and virtualisation technology.

1) ***What have been the economic and environmental costs and benefits of energy efficiency initiatives affecting households, industries/businesses, governments and communities in Queensland?***

Households, industries/businesses, governments and communities in both Queensland and other locales benefit economically and environmentally from energy efficient computing. Microsoft's software platform has been engineered to specifically enable energy efficiency in information technology (IT) equipment such as desktop PC's, servers and data centres. Small unit benefits derived from energy efficient technologies can aggregate to substantial power usage savings and reductions in hardware demand.

Two examples of the benefits of using improved power management and virtualisation technology are:

- **Reduction in greenhouse gas generation and energy costs** – a high power-consuming 5,000 seat company that utilised the power setting features of Windows Vista was estimated to be able to reduce its power costs by up to $262,000 annually. This equates to removing over 1,877 tons of CO2 from the environment – which is the same as taking nearly 323 cars off the road[2].
- **Reduction in electronic waste** going to landfill due to a reduction in hardware requirements (e.g servers) - Using Windows Server 2008 Hyper-V, a medical centre in New England, USA, consolidated 400 servers down to 100. They expected to consolidate an additional 75 servers using Hyper-V technology, leading to a cost saving of more than U.S. $325,000 annually[3].

Power Management

Microsoft has engineered into its latest versions of the Windows operating system a number of energy saving features including the ability to turn off the display and automatically put the system to sleep when the user is not interacting with the computer. The latest operating system, Windows 7, builds upon these investments by extending the existing capabilities and focusing on reducing power consumption when the system is idle.

Windows Vista® has more than 36 built-in power management features that can reduce a users' energy consumption by as much as 30%. These features include intelligent idling of hardware to

[1] Gartner, (April 2007) *Gartner Estimates ICT Industry Accounts for 2 Percent of Global CO2 Emissions* https://www.gartner.com/it/page.jsp?id=503867

[2] Microsoft (Feb 2009) *Saving Costs and Energy with Windows Vista* http://www.microsoft.com/windowsvista

[3] Microsoft, (Nov 2008) *How Customers Are Cutting Costs and Building Value with Microsoft Virtualization* http://www.microsoft.com/virtualization

conserve power, customisable power plans to refine power settings, and centralized management of power settings. According to the US Natural Resources Defense Council, those features can help eliminate 3 million tons of carbon emissions annually in the U.S. alone[4]. It is estimated that the built in energy efficiency features of Vista can save a commercial organisation more than $50 per PC per year[5].

Windows 7® reduces power consumption of the processor, disk, memory, and network activity on the system when idle. Windows 7 also enables the hardware to go into lower power states during long periods of inactivity, and dims the display after short periods of inactivity. Windows 7 also gives IT departments the ability to affect these changes on the broader enterprise at a more granular level[6].

Virtualisation

Microsoft® **Virtualization (such as Windows Server 8 with Hyper V)** enables multiple operating systems to run on a single server, eliminating the need for additional servers and avoiding energy generation and landfill.

For example, one Hyper-V server with 10 Internet Information Services (IIS) compared to a standalone web server with 10 IIS's, generates a 90% saving in both energy and costs (Table 1)[7].

Table 1: Power Consumption Comparison

Server Setup	Av. watts	kWh/year	Cost ($US)	KG of CO2
Standalone IIS x 10	5,001	43,839	$4,007	34,084
One Hyper-V server with 10 IIS7 VMs	512	4,490	$410	3,491
Savings	*4,489*	*39,349*	*$3,597*	*30,593*

Virtualisation also results in a reduced heat footprint (and therefore lower air conditioning/heating costs) and smart grid enablement. It also contributes to significant cost efficiencies in new equipment outlay, personnel, and space.

Managing Carbon Emissions

Microsoft has developed a range of tools to help home users and businesses measure and manage their carbon footprint. **Microsoft Hohm** is a free web-based beta application that empowers residential consumers to understand their home energy usage, get recommendations to conserve energy and start saving money. Hohm enables consumers to benefit from energy saving advice even if they do not have a smart meter, by inputting data that is relevant to their home and geography[8]. **Microsoft Dynamics AX** includes a sustainability dashboard displaying energy consumption and

[4] *Microsoft on the Topic: Climate Change*, http://www.microsoft.com/citizenship

[5] (Internal) MSFT Solutions ES Deck Michael Gorrian EBC presentation

[6] Microsoft (April 2009) *Windows 7 Power Management* http://www.microsoft.com/environment/windows7.aspx

[7] Microsoft, (Nov 2008) *How Customers Are Cutting Costs and Building Value with Microsoft Virtualization* http://www.microsoft.com/virtualization

[8] Microsoft Hohm http://www.microsoft-hohm.com/Home/Default.aspx

greenhouse gas emissions, helping businesses identify opportunities for cost savings and mitigation of their environmental impact[9].

4) What additional policies should the Queensland Government implement to encourage energy efficiency improvements?

Government can play an important role in providing both policy frameworks to spur a transition to a low-energy, lower carbon economy and by being a leading demonstrator of the potential benefits of lower energy utilising technologies. For example the Government can:

- Provide direct funding for the basic research into renewable and sustainable low-carbon energy sources that is critical to development of breakthrough technology;
- Support market-based mechanisms that are stable and predictable over the long-term and lead the private sector to invest in the transition to sustainable low-carbon energy sources and technologies;
- Implement systems within Government that support innovation and eliminate barriers within agencies to the adoption of sustainable low-carbon technologies[10].
- Build an ecosystem of technology and energy partners who can provide information and advice through online applications to empower consumers to better understand their energy usage, get recommendations and save money and energy in the home relevant to their circumstances, domestic settings and geography[11].

Applying the Potential of Software to Address Environmental Concerns

Microsoft believes that energy efficiency will play a crucial role in lowering human generated carbon emissions while enabling economic growth across the globe. Long-term solutions will require dramatic technological innovations if the world is to transition to a sustainable low-carbon economy while continuing to support economic opportunity and development for the billions of people who currently live in poverty. Microsoft believes that transformational software will play a key role in enabling this transition and is investing accordingly in pure science and computation research, energy efficiency and product development aimed at further lowering the energy use requirements of information technologies.

Further information about the capacity of Microsoft technologies to help businesses manage their carbon footprint, rethink business practices and support breakthroughs in environmental science research can be found at http://www.microsoft.com/environment/.

[9] Environmental Sustainability Dashboard for Microsoft Dynamics AX
http://www.microsoft.com/environment/business_solutions/articles/dynamics_ax.aspx
[10] Microsoft, (Feb 2009) *Microsoft Climate Change Policy Statement*
http://www.microsoft.com/environment/commitment_policies/policies_principles.aspx
[11] Microsoft Hohm http://www.microsoft-hohm.com/Home/Default.aspx