

# Reductions in power use

A study in continuous sustainability improvement in Lenovo

Over the last 5 years or so, Lenovo has made improvements to its products to reduce their power use. The results of these efforts are nothing short of dramatic.

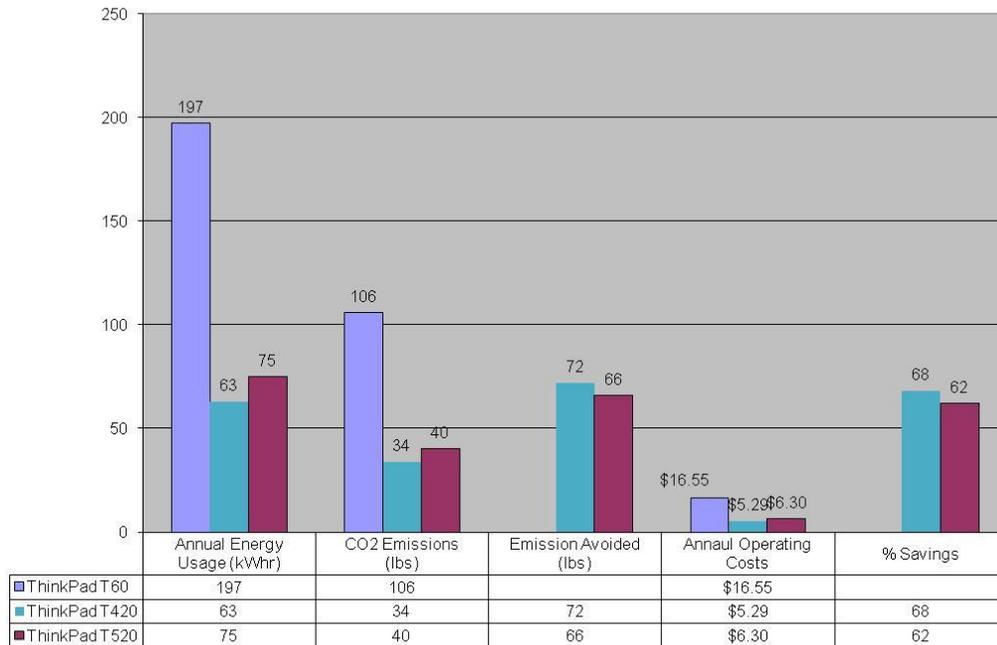
In this paper, we endeavor to show the improvements, why they have improved, and the benefits to our customers and planet that we share.

In this paper, we will show:

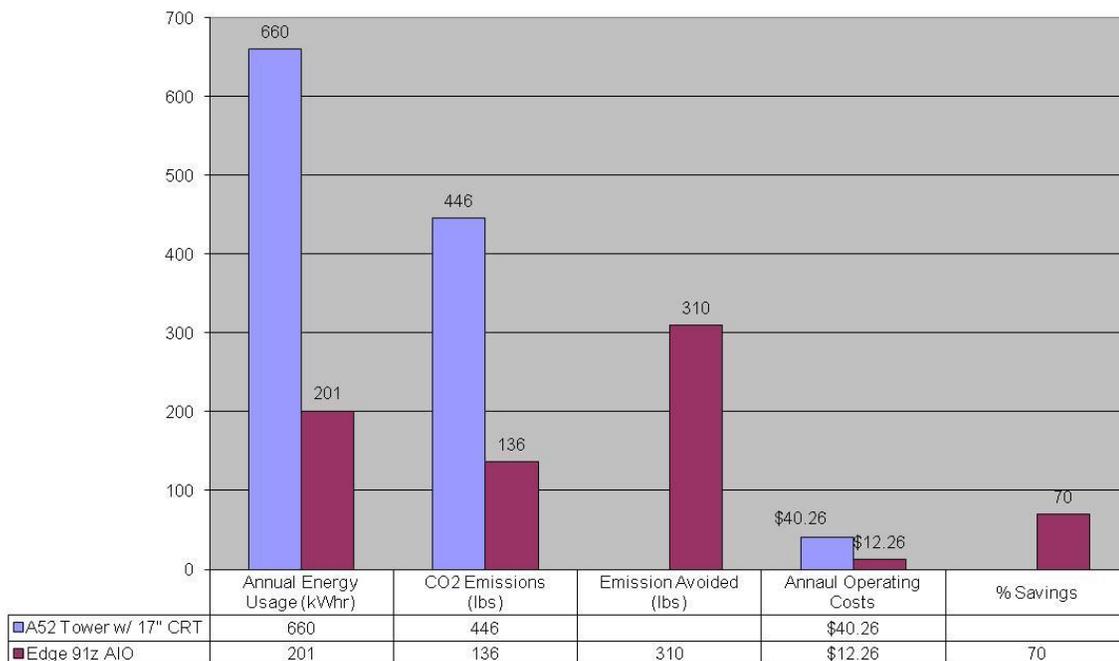
- The raw data
- Analysis of that data, and benefits rendered
- How those benefits came to be.
- The future direction and possibilities
- Reference material and links for those who want to know more.

# The Raw Data – 2 representative examples

## ThinkPad Energy Comparison (T420/T520 vs T60)



## ThinkCentre Energy Comparison (M52 Workstation vs Edge 91z AIO)



As you can see in the previous representative examples, power savings for this time period (approximately 5 years) is in the 60-70% range. The impact to CO2 and other emissions is a similar scale.

Annual customer savings in electrical costs are quite high for desktop products at just under \$30 per year, and for notebooks at around \$11/year.

## The benefits of power savings

As often is the case with almost any cause, the impact of one individual is rarely felt, but when they come together in a group the impact can be enormous.

For example, a building with 5,000 ThinkCentre desktop “seats”, would save \$140,000 per year in electrical costs, and over 1.5Million Lbs of emitted carbon.

If the number is impressive for 5,000 seats, imagine that Garner consulting predicts over 400 million computers will be sold in 2012. 400 Million. That is a big number. Lenovo has recently reported a worldwide 14% market share, using a forward projection of this history, Lenovo would sell nearly 60 million computers a year.

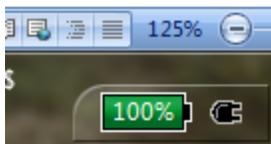
And it is the gift that keeps on giving. Lenovo products are highly reliable and last for years, so the benefits are not just 1 year. Those 5000 desktops total savings over 3 years? \$420,000. Electricity saved? (459KW x 5,000 x 3years= 6,885 Megawatts ).

## What happened ?

The computer industry and their suppliers as a whole are serious about reduction in power requirements. That along with government programs and regulations to prompt action such as “ENERGY STAR” combine to drive innovation and improvements.

Lenovo in particular has been instrumental in driving change.

Lenovo’s power manager for example is legendary, and runs on ThinkPad, ThinkPad Edge, ThinkCentre, and ThinkCentre Edge. On ThinkPads and ThinkPad Edge, many Lenovo users mistake its iconic battery status display for an industry or operating system application. We can assure you however, it is pure Lenovo.



Behind that icon, power manager has been programmed with an understanding of user’s behavior so that it maximizes productivity while minimizing power use. The simplest is that when you close the lid the system goes into a low power suspend mode. Open the lid and system quickly wakes up. Inside the power manager, things are much more advanced than that as users and their IT management can set

many various power related behaviors. More productivity along with more power savings, that is Power Manager's job.

Power manager also includes several important features that appeal to large enterprise customers:

There is "Power Agenda" that instructs the system to charge only during certain times of day. For example, in Japan after a large earthquake and tsunami, this feature was helpful to charge during off peak hours to reduce the stress on the country's power grid.

Smart Grid enablement – Large enterprises may want to put computers into a much larger power use scheme including lights, Heating, air conditioning, etc. Power Manager enables connections to these SmartGrid applications via Cisco's "EnergyWise" program.



[http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps10195/solution\\_overview\\_c22-676310.pdf](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps10195/solution_overview_c22-676310.pdf)

## Energy savings isnt just for the user

Energy consumption is also about how a computer is made and delivered.

- We are an industry leader in use of post consumer recycled plastic. This reduces our total energy input costs and reduces landfill needs.
- Packaging size has been reduced to allow for more units per pallet saving transportation energy costs.
- Packaging volume has been reduced so the energy input to packaging is less
- Packaging is made from recycled material, reducing creation energy costs
- When products are shipped, the most energy efficient mechanisms and routes are prioritized for cost and energy savings.

## What is next ?

Well, we are not out of ideas yet.

Upcoming improvements to power manager will include the ability to recognize patterns in user behavior and adapt the system power use accordingly.

Lenovo has access to solar power technology that will allow a computer to be used anywhere in the world. Where do you want to use your Lenovo computer?

Our connection to the smart grid is in its infancy. Will Lenovo computers be a “smart power client” or a part of the “collective smart grid brain” ?

Better energy standards. How do you measure power efficiency? Lenovo is participating in next generation power use industry standards.

## Want more?

Energy

[http://www.lenovo.com/social\\_responsibility/us/en/GreenPaper\\_Energy.pdf](http://www.lenovo.com/social_responsibility/us/en/GreenPaper_Energy.pdf)

Packaging

[http://www.lenovo.com/social\\_responsibility/us/en/GreenPaper\\_Packaging.pdf](http://www.lenovo.com/social_responsibility/us/en/GreenPaper_Packaging.pdf)

Low Halogen

[http://www.lenovo.com/social\\_responsibility/us/en/GreenPaper\\_Low\\_Halogen.pdf](http://www.lenovo.com/social_responsibility/us/en/GreenPaper_Low_Halogen.pdf)

Post Consumer Recycled Content

[http://www.lenovo.com/social\\_responsibility/us/en/GreenPaper\\_Recycled\\_Content.pdf](http://www.lenovo.com/social_responsibility/us/en/GreenPaper_Recycled_Content.pdf)

Overall system design

[http://www.lenovo.com/social\\_responsibility/us/en/GreenPaper\\_ThinkPad\\_Design\\_for\\_Environment.pdf](http://www.lenovo.com/social_responsibility/us/en/GreenPaper_ThinkPad_Design_for_Environment.pdf)

The future of “green” computing

[http://shop.lenovo.com/ISS\\_Static/WW/EMEA/merchandising/sitelets/Lenovo-Green/en/Green-White\\_paper\\_ONLINE.pdf](http://shop.lenovo.com/ISS_Static/WW/EMEA/merchandising/sitelets/Lenovo-Green/en/Green-White_paper_ONLINE.pdf)

Cisco’s Energy Wise program

<http://developer.cisco.com/web/partner/search?accountId=0014000000WIB52AAF>

Contributors:

Takumi Imai - Manager, Imaging Service & TVT Development, Lenovo Japan,  
[mc700444@lenovo.com](mailto:mc700444@lenovo.com)

Alvin Carter - Project Manager - Product Environmental Requirements, Lenovo US.  
[alcarter@lenovo.com](mailto:alcarter@lenovo.com)

Jay Johnson – Director of Quality programs & ThinkPad Green ODT leader, Lenovo US.  
[Jayj@lenovo.com](mailto:Jayj@lenovo.com)