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# Power Over Electricity!



# A True Story in Total Power Purification

- The History of Power Convergence
- Total 'Power Over Electricity' Solution



**Let's Cross the Bridge together!**



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# Leveler's Mission

- Identify today's *Problems* affecting electronics within the global power infrastructure.
- Implement Revolutionary *Processes* that identify problems in electronic applications.
- Implement Revolutionary *Product* Technology to solve identified problems.
- Create a *Bridge* that protects electronics from today's problems within the global power infrastructure.

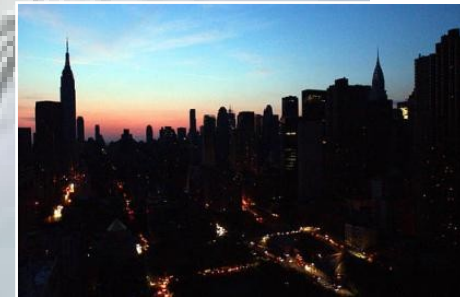


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# State of Electrical Infrastructure



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# Yesterday and Today

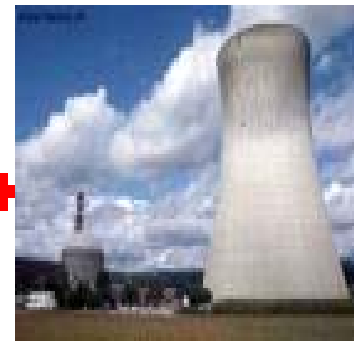
- Only the production method has changed, not the quality or the distribution method for the product!



1900



1930's



Today



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# Linear & Non Linear



**LINEAR : AC TO AC**



**NON LINEAR: AC TO DC**

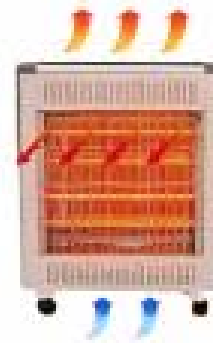


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# Linear Power Demands

- From 1900 to 1960 the demand consumption of electricity was **100%** Linear and simple!



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# Your Dad's Linear Office !

## A Simple Linear Power Demand



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# Your Non-Linear Office!

- Power Consumption has shifted from 100% Linear to **65% Non Linear**... in doubt?  
Look in your own office!



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# Power Convergence Problems

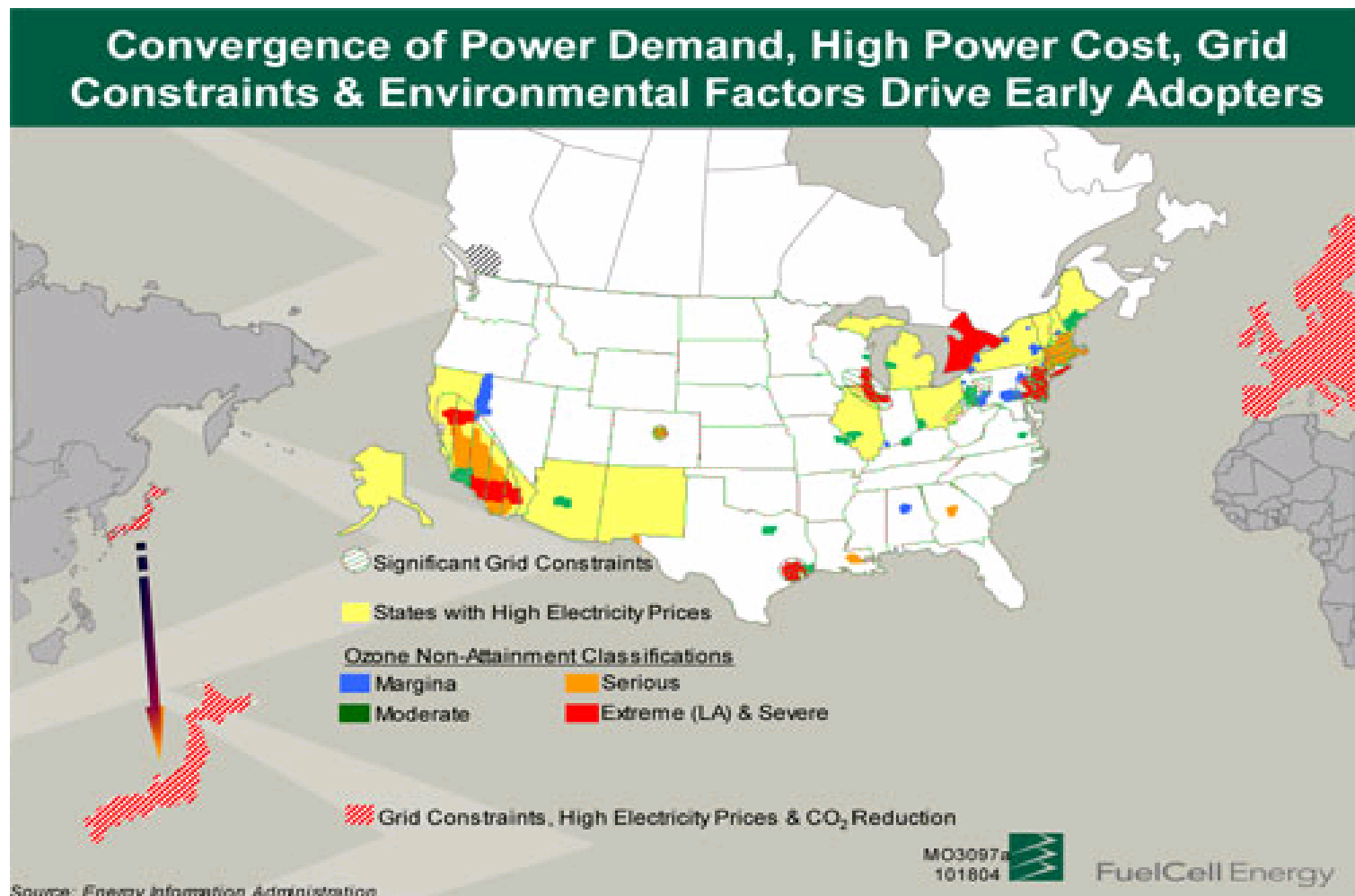
- Adverse Power Supply performance.
- Power Factor Degradation
- Harmonic Distortion
- Complete & Partial Power Outages
- Voltage & Current Distortion
- Transients
- Surges/Spikes
- In-Rush Currents



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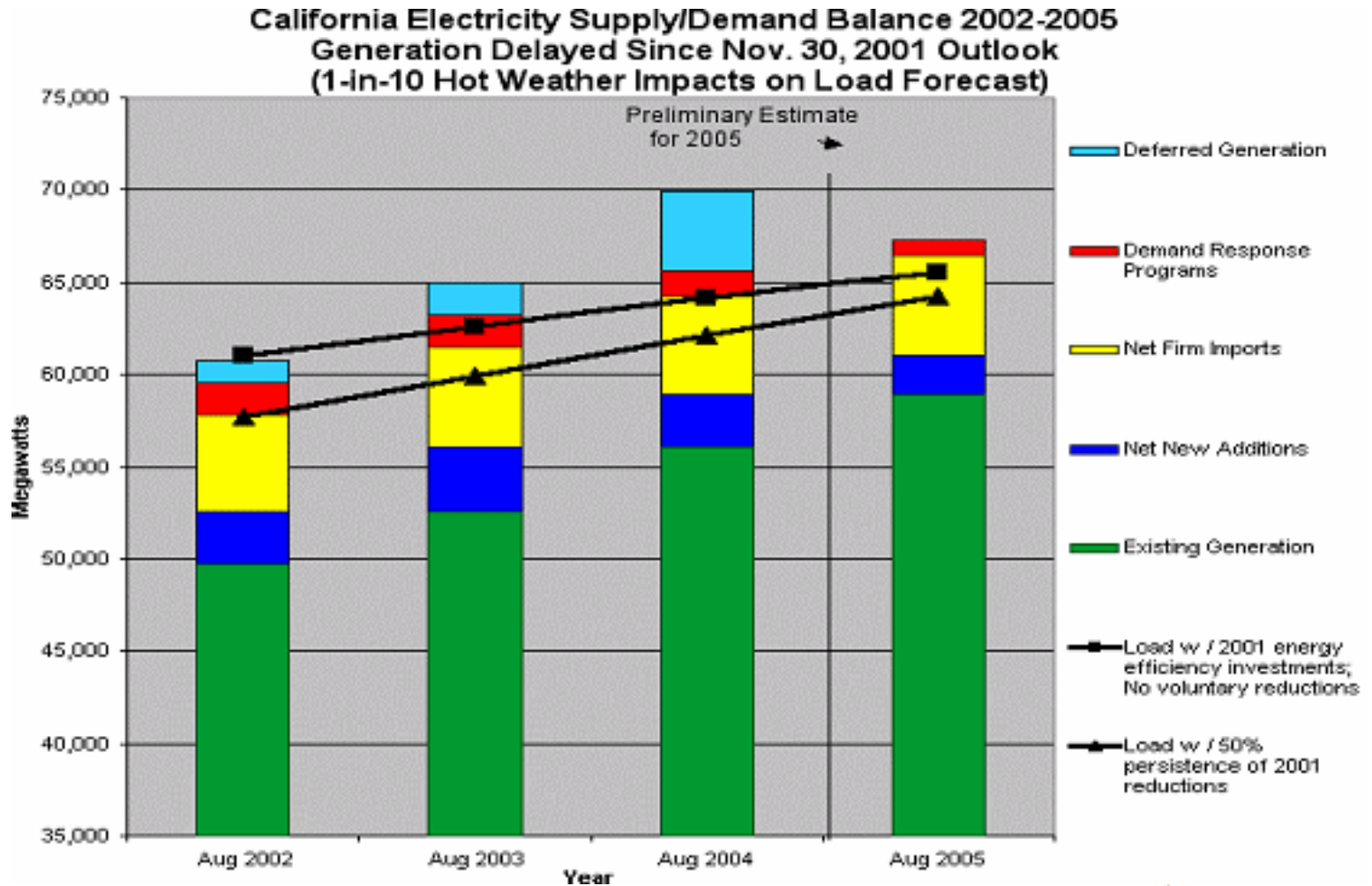
# Linear to Non Linear Convergence



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# Power Demand Example



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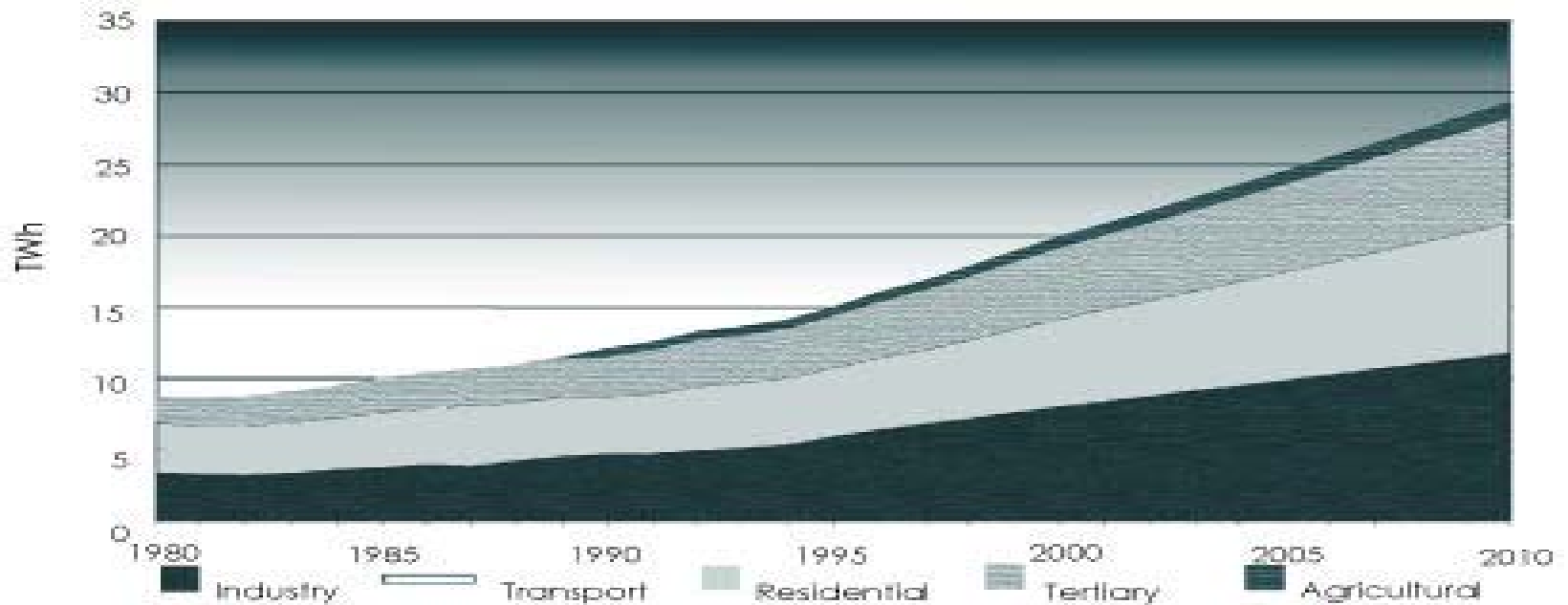
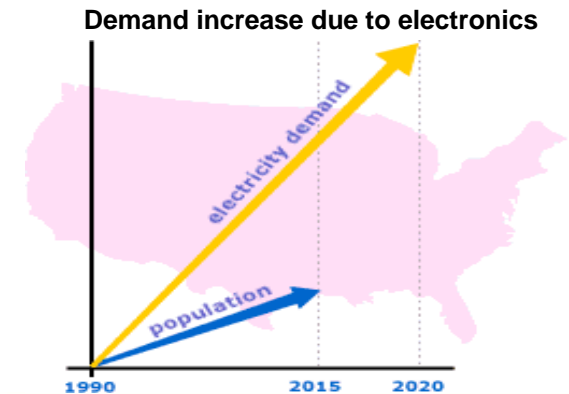
# The Demand Factor

America's population is predicted to grow 15 percent by 2015.

The American economy is expected to continue its unparalleled growth.

The World Energy Council predicts global electricity demand increases of 75 percent during the next decade.

America is predicted to experience an increase in electricity demand of 30% to 35% by 2010.



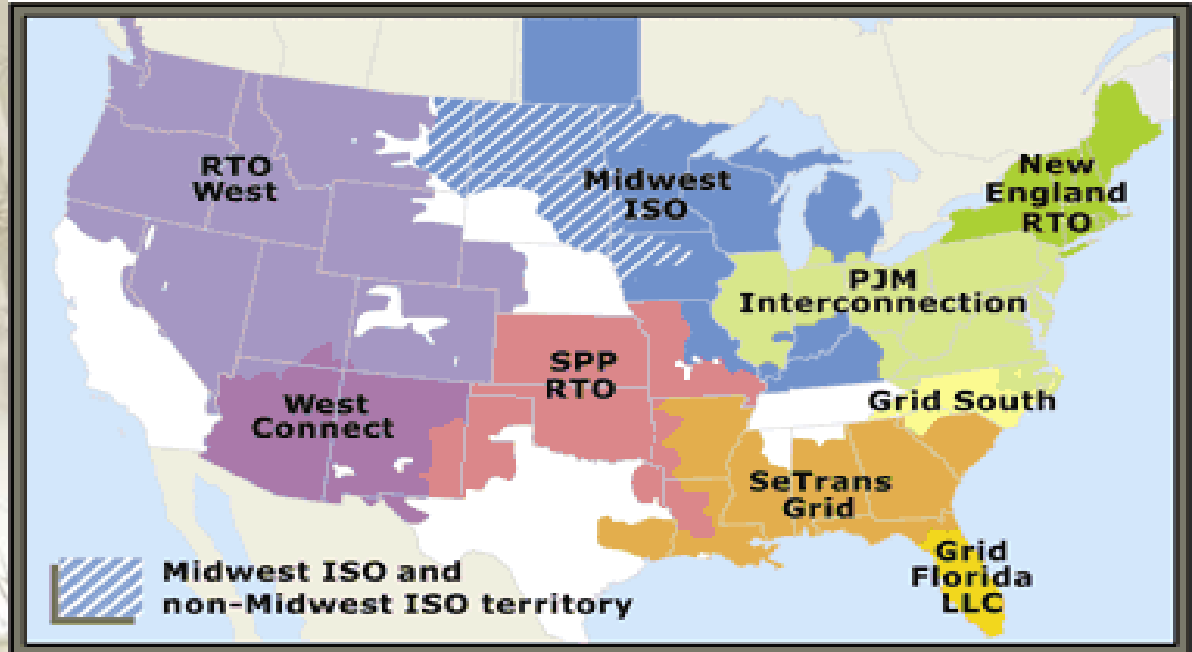
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# The Government's Response

## Regional Transmission



### Federal Energy Regulatory Commission (FERC) The Goal

To Modernize and Expand our aging Energy Infrastructure

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# Responsibility: “Where is the problem”?



You've got power!



Job well done!



So Why is my system down **AGAIN**?

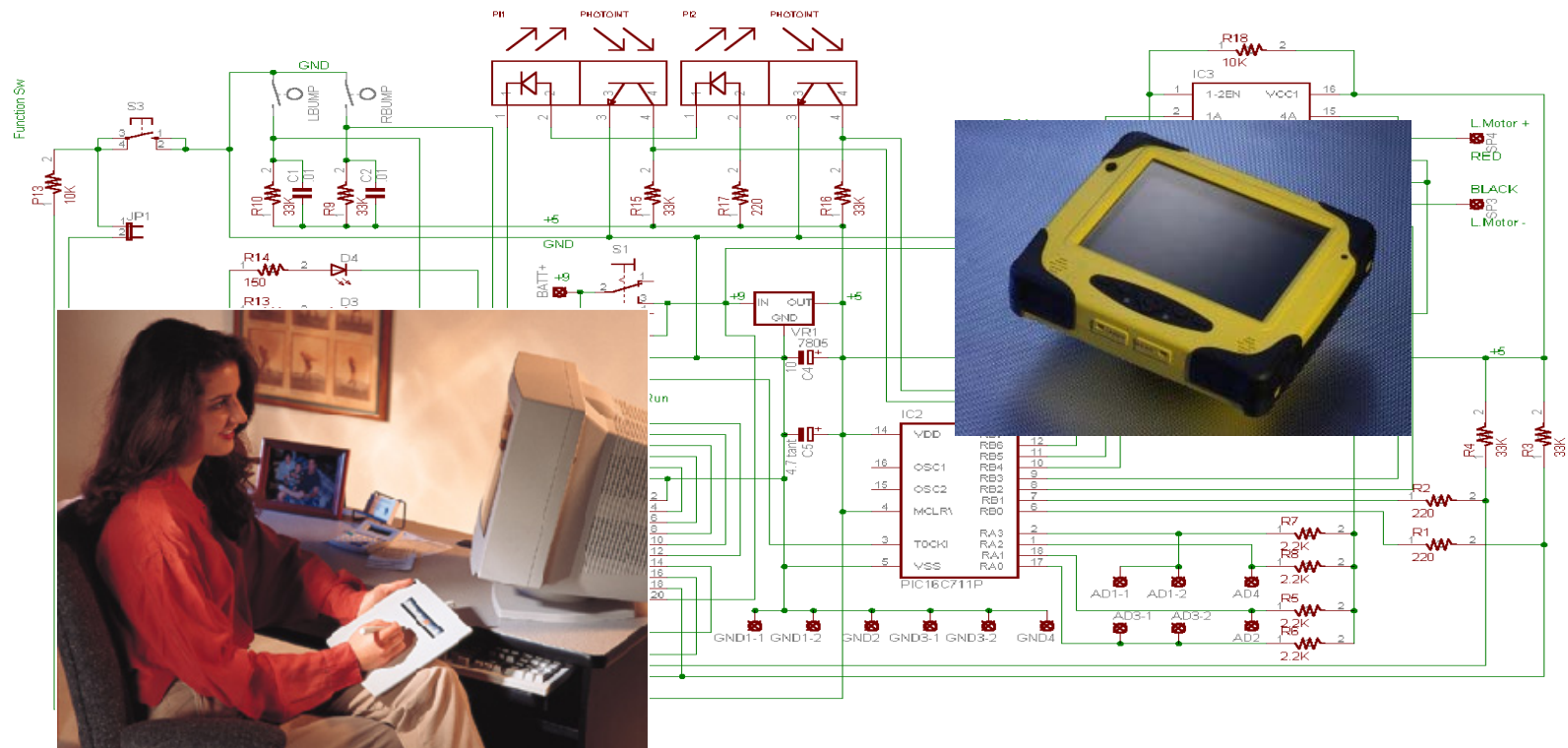


“Nothing wrong with our Equipment.”

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# Diagnosis - The First Step



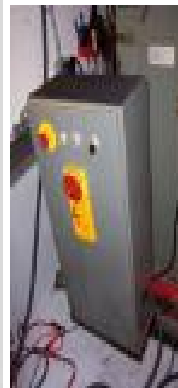
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# Here is where we start



It was in  
plain sight  
the whole  
time!



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# Our Technology Solves These Issues



Transients

Power/Spikes/Surges

Harmonics/Noise



- *Destructive surges*
- *Disruptive harmonics*
- *Degradation transients*
- *Load interaction*
- *All varieties of noise energy*

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# The Electronics Common Denominator: DC Power Supplies



All the previous products shown contain a power supply, that's reality!

The Truth is a Switch Mode Power Supply is the "current" path from AC to DC.

- Utilizes only a portion of the energy available the result is lower POWER FACTOR!



- When it "switches" it creates .....HARMONICS!

- It is an "open" wire for Electrical problems such as Spikes and Surges when providing power!



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# The “X” Factor

The retail price of a 300 Watt Power Supply has eroded by **80%** from **\$100** to **\$19.95** !



- A Primary Design Criteria..cost reduction
- Performance based on Price Point driven economics.
- **Result:** Increased Power Quality Issues



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# How the “X” Factor “GAP” Impacts the CEC

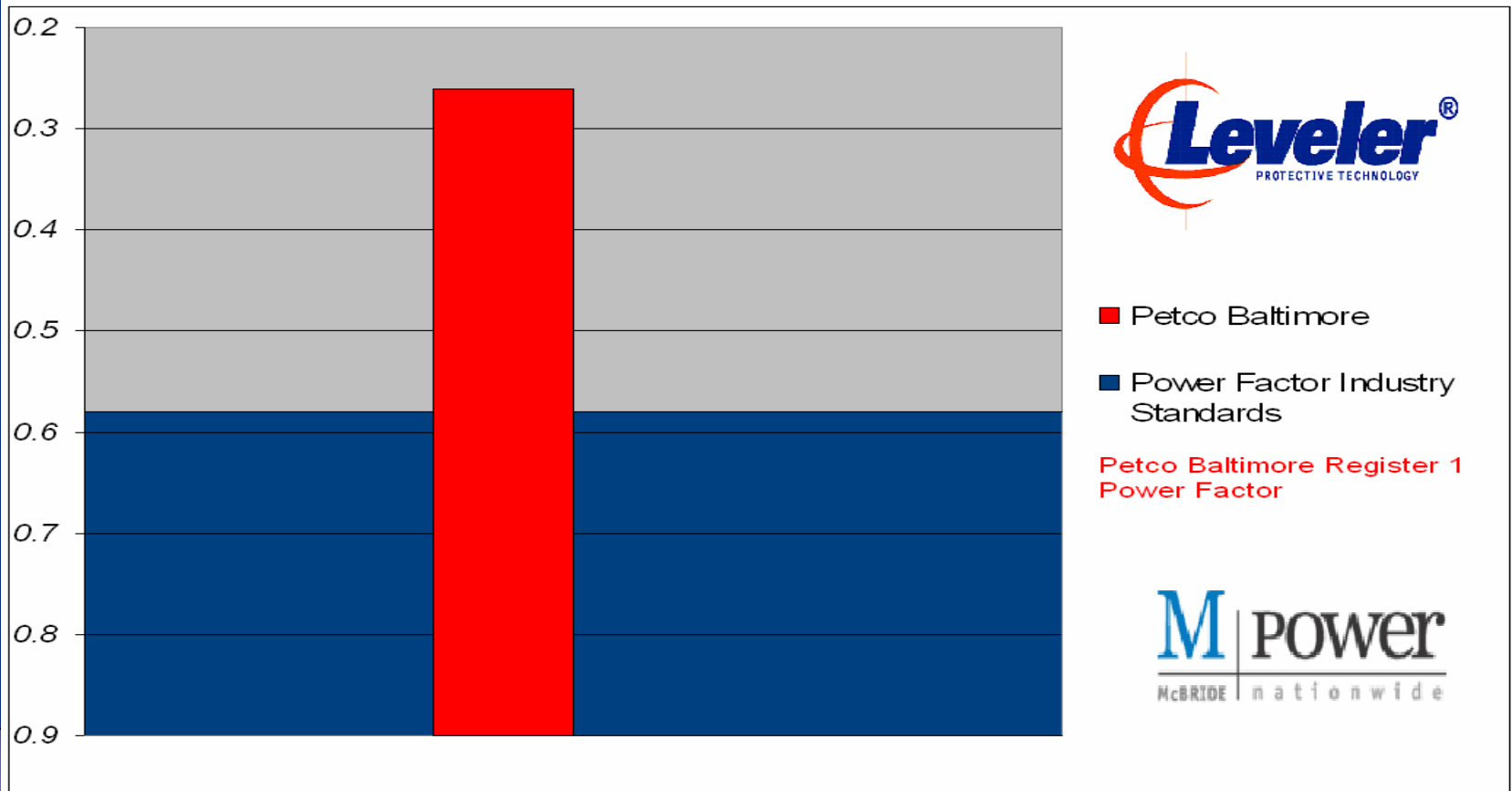
- No-Load Specifications are the current power supply and electronic industry standards.
- No-Load specifications only address the power supplies performance, not the actual performance in the application it is tasked to power. Power supplies do not operate alone!
- True performance and energy efficiency can only judged **with a Load** .
- Leveler’s Technology can bridge the gap for the CEC and the power supply industry.



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# Why “With Load” is Important Actual Customer Power Factor Loss



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**The Bridge between Electricity and Electronics has been crossed!**

**The Power Supply  
Factor**





# Leveler's Technology Benefits

- Provides the highest level of patented Power Purification.
- Leveler technology provides protection for electronic devices from all negative aspects of power convergence, including line Electro Magnetic Pulses(EMP)
- Our dual aspect technology provides full electrical protection while simultaneously enhancing power supply performance.



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# HOW LEVELER TECHNOLOGY IMPACTS POWER SUPPLY PERFORMANCE

- Improves Power Factor up to 40%
- Reduces Harmonics by 30-40%
- Reduces Current draw by 20%
- Reduces Heat buildup in Power supplies by -10 degrees F.
- All the above can be achieved without added energy costs!
- Improved M.T.B.F.



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# Current Technology Responses for Electronics Protection.

**Surge Protectors/Power Strips**



**Transformer Based Power  
Conditioners**



**Uninterruptible Power Supplies  
(UPS)**



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# What Actually Provides True Protection For Electronic Devices?



**Surge  
Protectors/Power  
Strips**



**Transformer-  
Based Power  
Conditioners**



**Uninterruptible  
Power Supplies  
(UPS)**

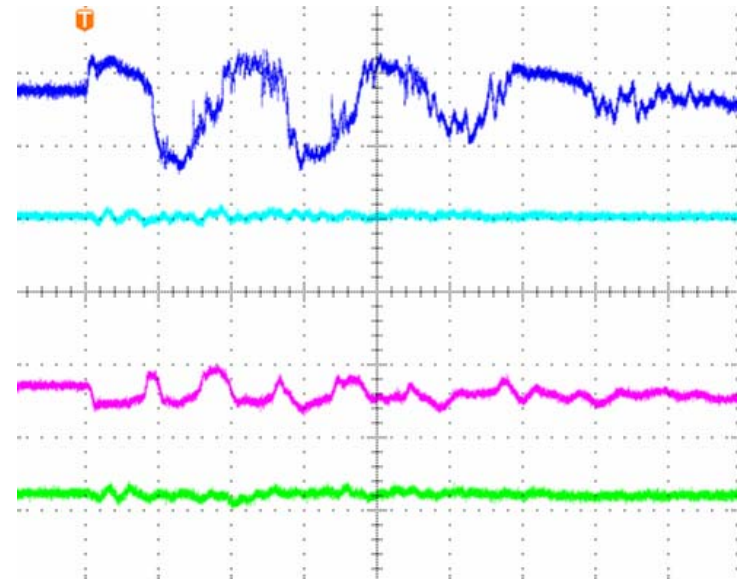
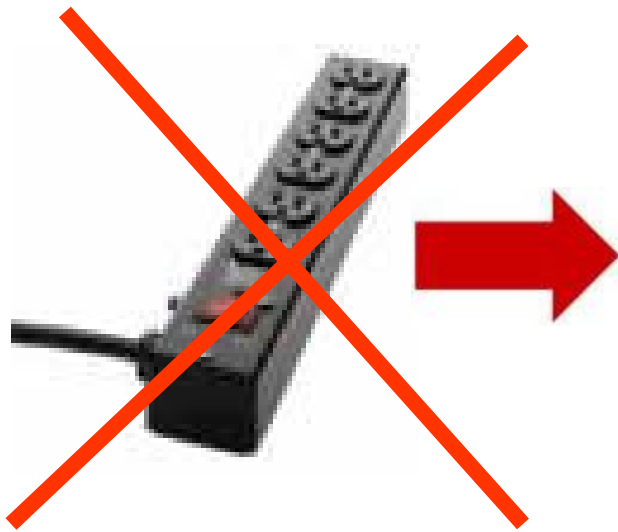


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# Surge Protectors/Power Strips...

The Harmful Energy Passes Through to the Power Supply and beyond!



## NO PROTECTION!

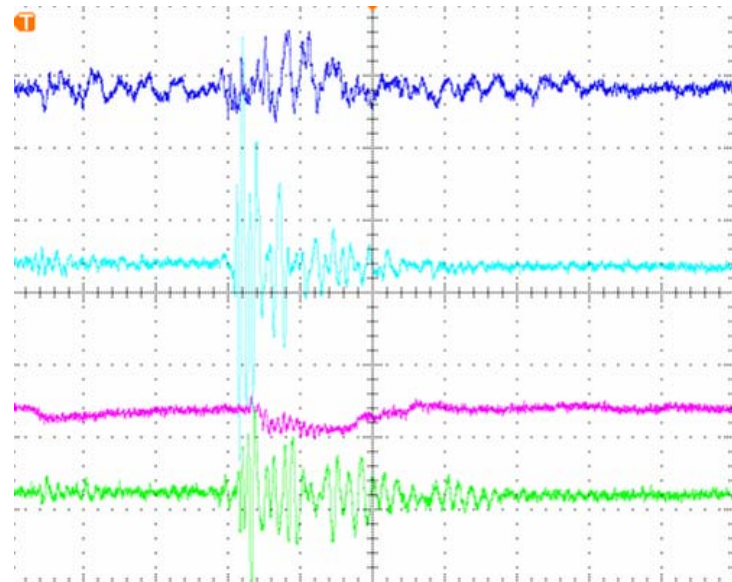
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# Transformer- Based Power Conditioners...

Harmful Energy Passes Through to the Power Supply and generates heat.. A loss of Energy!



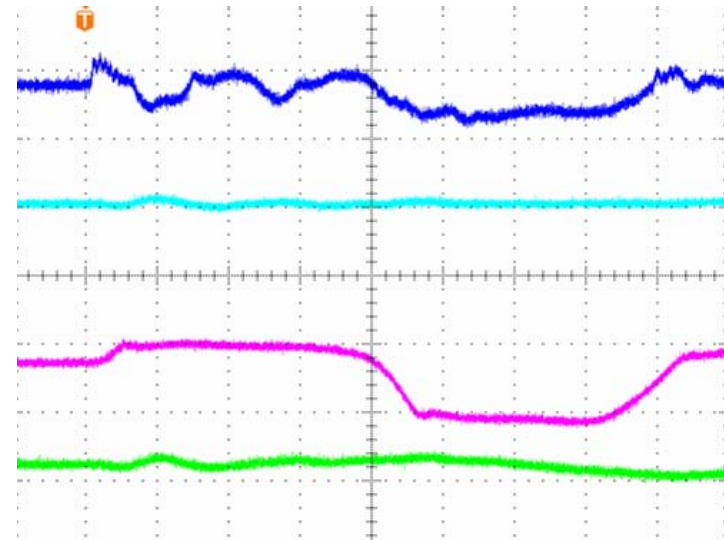
## NO PROTECTION!

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# Uninterruptible Power Supplies (UPS)...

Once Again Harmful Energy passes  
Through to the Power Supply and is in  
constant use of energy!

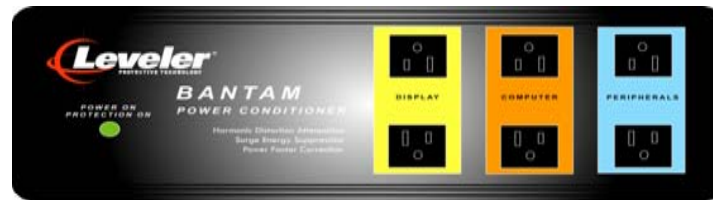


## NO PROTECTION!

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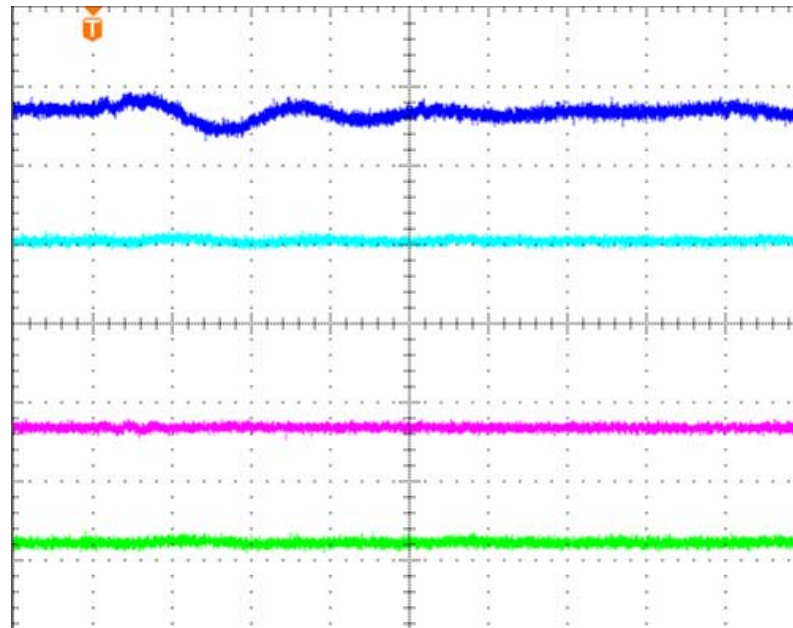
# Leveler Protective Technology Products...



A True  
Solution !



No Harmful  
Energy, Ever,  
Time and Again



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# Product Technology Comparisons

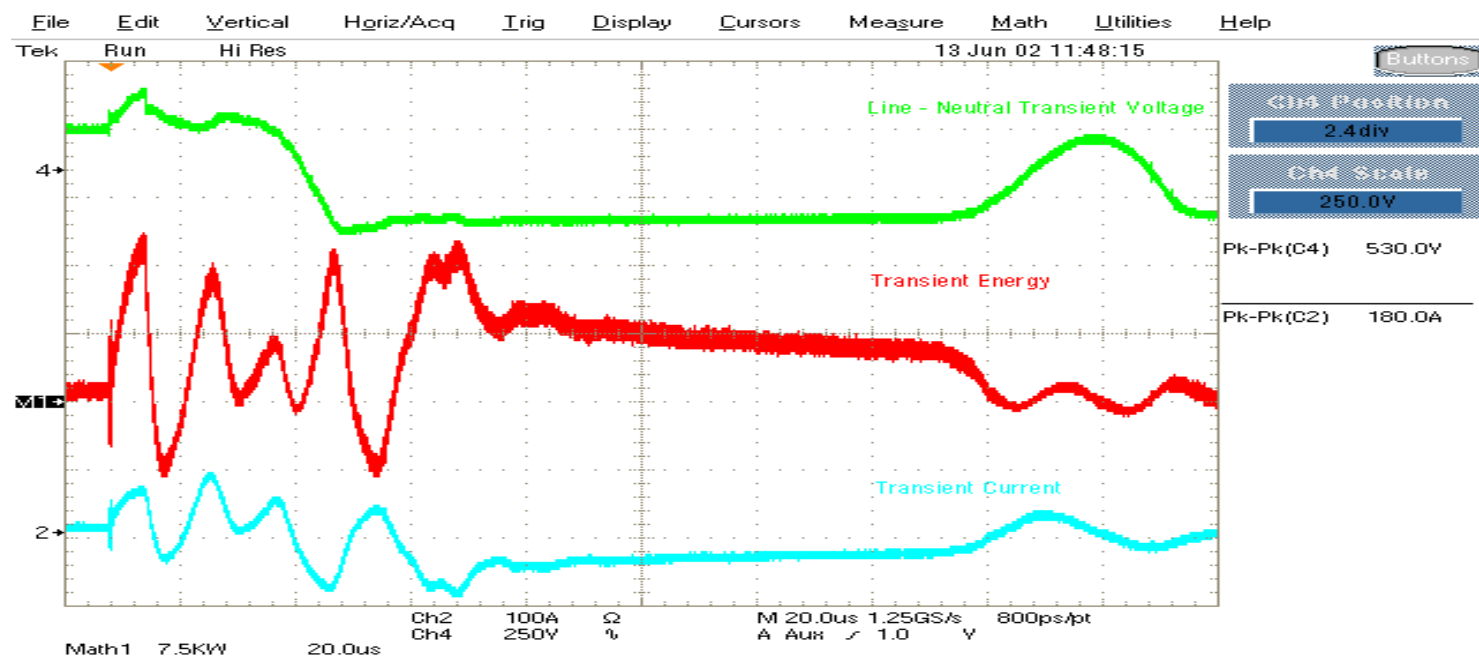
TECHNOLOGY	Leveler® Power Conditioners	Surge Suppressor	Isolation Transformer	UPS*
Power Conditioning-specific patents?	YES	no	no	no
Energy Consumption (Wattage)	<1 Watt	2 Watts	100 Watts or more	100 watts or more
Saves Money on Power Bill	YES	no	no	no
Efficiency (Power Factor)	99.9%	99.9%	67%	61%
Transient Voltage Surge Suppressor UL 1449, 2nd Ed.-compliant	YES	yes	no	no
Transient Voltage Surge Suppressor UL 1449, 3rd Ed.-ready	YES	no	no	no
Battery-Backup Feature (UPS function) Available	YES	no	yes	yes
<b>PERFORMANCE (UNDER LOAD)</b>				
Surge Suppression on Line, Neutral, and Ground	YES	no	no	no
Provides a clean, zero-reference Ground	YES	no	limited	no
Blocks Damaging Current to Reference Ground	YES	no	no	no
Minimizes Harmonic Distortion	YES	no	no	no
Power Factor Correction (Efficient Use of Required Power)	YES	no	no	no
High-Frequency Noise Filtration	YES	no	limited	no
Protects DC Power Buss (CPU/Motherboard, etc.)	YES	no	no	no
Filters output from Load onto the Neutral wire	YES	no	no	no
<b>Steady State (Normal)</b>				
Voltage Conditioning, Bi-directional	YES	limited	yes	no
Current Conditioning, Bi-directional	YES	no	no	no
<b>Damaging Event (Severe)</b>				
Surge Voltage Blocked Effectively	YES	no	limited	no
Surge Current Blocked Effectively	YES	no	no	no
Lightning Strike Energy Blocked	YES	no	no	no
Switching Transient Energy Blocked	YES	no	no	no
Repeating Condition Protection	YES	no	no	no
Blocks (EMP) Electro-Magnetic Pulses induced in lines	YES	no	no	no
Stays on to keep safe power to the load	YES	no	limited	no
<b>U.S. GOVT. SURGE PROTECTIVE DEVICE DESCRIPTION**</b>				
Grade (A=B3 Ring Wave, B=B2, C=B3)	A	C	not qualified	not qualified
Class (1=330 Volts or lower suppressed, 2=400 V, 3=500 V)	1***	1,2,3	not qualified	not qualified
Mode (1=Line & Neutral only, 2=all Line, Neutral, Ground combos)	2	1,2	not qualified	not qualified
Passes UL 1449 Adjunct Test*	YES	limited	not qualified	not qualified
*6000V, 3000A for 24 hours	zero change	limited	not qualified	not qualified
<b>WARRANTY</b>				
Materials and Workmanship	5 years	varies	varies	varies
<b>OVERALL</b>				
BEST PROTECTION FOR ALL YOUR ELECTRONICS	YES	no	no	no

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# Yesterdays Technology !

Actual Scope Output Measuring the Transient Energy a Computer would get during a 6000V, 500A Normal Mode surge with an Industrial Grade Surge Suppressor.



The Computer experiences a 530V, 180A energy increase for 72 microseconds.

This is a disruptive event with unpredictable results, ranging from data corruption to component failure.



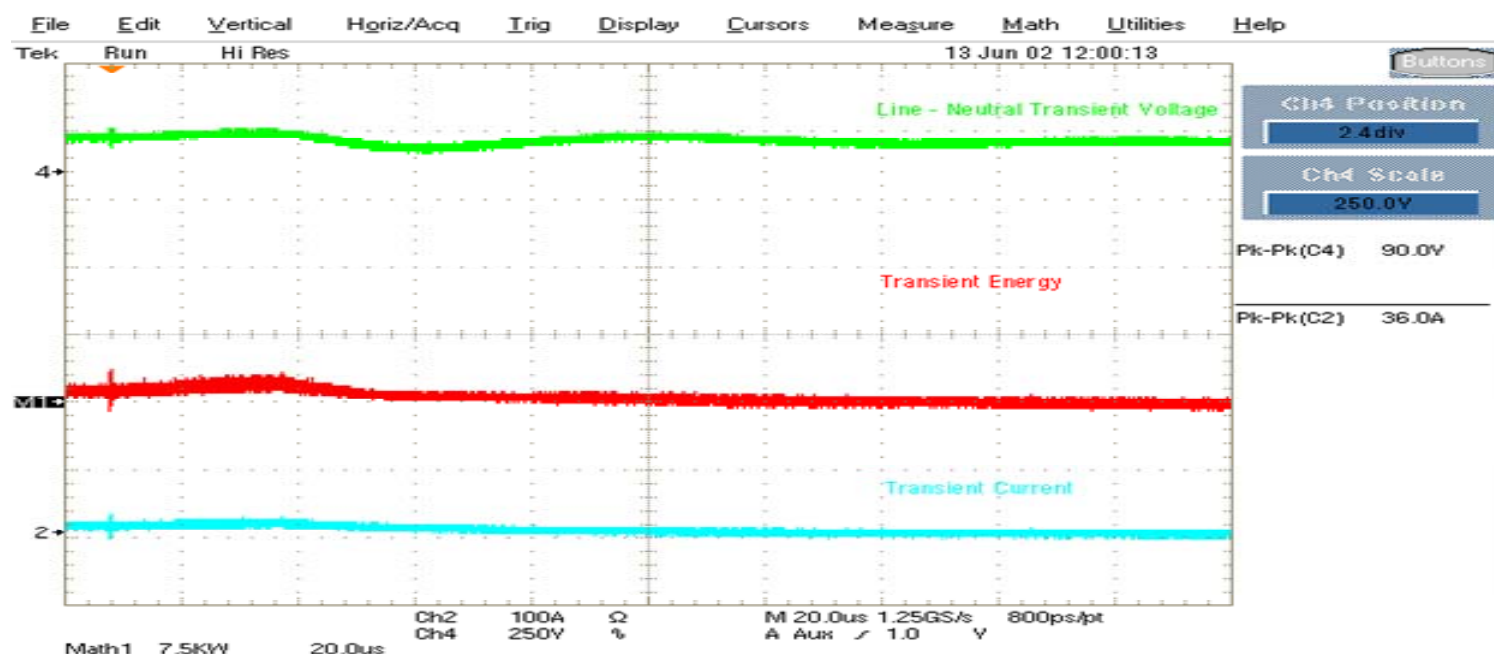
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# Today's Technology

## The Leveler Technology Solution

Actual Scope Output Measuring the Transient Energy a Computer would get during a 6000V, 500A Normal Mode surge with Leveler Protection



The Computer experiences a **90V**, **36A** energy increase for only **1** microsecond.

This is within tolerance for the computer power supply.



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# OEM Products



**Leveler can incorporate power purification technology directly into all OEM products.**



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# Thanks for Interest In Leveler

We look forward to bridging the power supply efficiency gap for the CEC!



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