

# Innovating for Sustainability and Profitability

Balu Balakrishnan Chairman and CEO, Power Integrations, Inc.

# Power Semiconductors are Critical to a Lower-Carbon Future

Efficiency and renewables hold the key to achieving carbon-reduction targets



# Partnering and Innovating for Sustainability

Engagement with Energy Policy Makers and Leading Researchers To Understand Global Problems

Elimination of Standby Waste Through Clever Circuits and Control Systems

Driving Efficiency Through New Power Conversion Topologies and Technologies

Healthy Growth and Profitability





Lawrence Berkeley National Laboratory





# My Golden Rules of Innovation for Sustainability & Profitability

# Rule #1: Don't Design Only to Meet Standards – Innovate to Set New Ones

 Lawrence Berkeley National Lab investigation showed standby waste accounted for ~10% of electricity usage in the US

# Results from the investigations on leaking electricity in the USA

Alan Meier, Wolfgang Huber Environmental Energy Technologies Division Lawrence Berkeley National Laboratory Berkeley, California



- Executive order by US President Bush limited standby energy use
  - One watt on government purchases
- Our first "low standby" product was capable of <u>30 mW</u> no-load

# **Thinking Past Standards Creates Global Impact**

180

160 140

120

100

80

60

20

1999

kWh saved (B)

Cumulative kWh saved (Billions)

#### >20 Billion

EcoSmart Chips Sold since 1998

#### Estimated 16 TWh

of standby energy saved in 2022

Saved ~7 M tons of CO<sub>2</sub> emissions<sup>\*</sup>

### Low standby now ubiquitous in power supplies

# 15 10 2022

Estimated Energy Savings

from EcoSmart Devices

## **Rule #2: Think Systems, Not Components**



# **System Focus Delivers Superior Performance**

+

+

#### GaN switch +

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Innovative control Digital USB PD MCU Custom power package

Highest efficiency across load and insignificant "no-load" consumption

Smallest notebook fast charger with no cost penalty

Efficiency Comparison Over Load at 5 V Output



## Rule #3: Integrate To Reduce Materials, Ease Design



## Rule #3: Integrate To Reduce Materials, Ease Design



101 🔿 45 Parts

# Rule # 4: Advance Efficiency With Each New <u>Product</u>



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## **Rule #5: Reduce Upstream Impacts for Sustainability**







GaN requires substantially less energy to produce than SiC

#### Source and quantity of upstream energy use are crucial

# Net Zero: World Response to Climate Change



#### Total carbon budget for the energy sector

# **Spectacular Levels of Investment!**

#### Annual average capital investment in the NZE



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# **Balu Balakrishnan**

