



# Adiabatic Logic

Geoff Harvey  
CTO



Adiabatic Logic

Adiabatic Logic



Adiabatic Logic  
Power-Saving Electronics  
Solutions



Cambridge Technology Consultants



XJTAG  
JTAG / Boundary Scan Tools



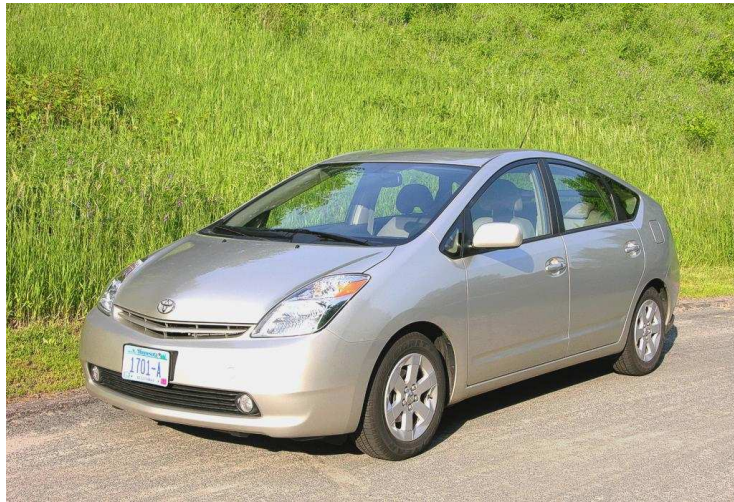
Adiabatic Logic **Adiabatic Logic**

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**Adiabatic Logic's mission is to become  
a Leader  
in the application of micro and nano scale energy re-  
cycling techniques to electronic system design and  
integration.**



# PRIUS



HYBRID  
ELECTRIC



### Battery Drive

All thrust is provided by the electric motor and all power is provided by the battery-pack.

### Regeneration Charge

As you approach a stop or just slow down, the excess kinetic energy is used to turn the generator. This creates electricity, which is used to charge the battery-pack.

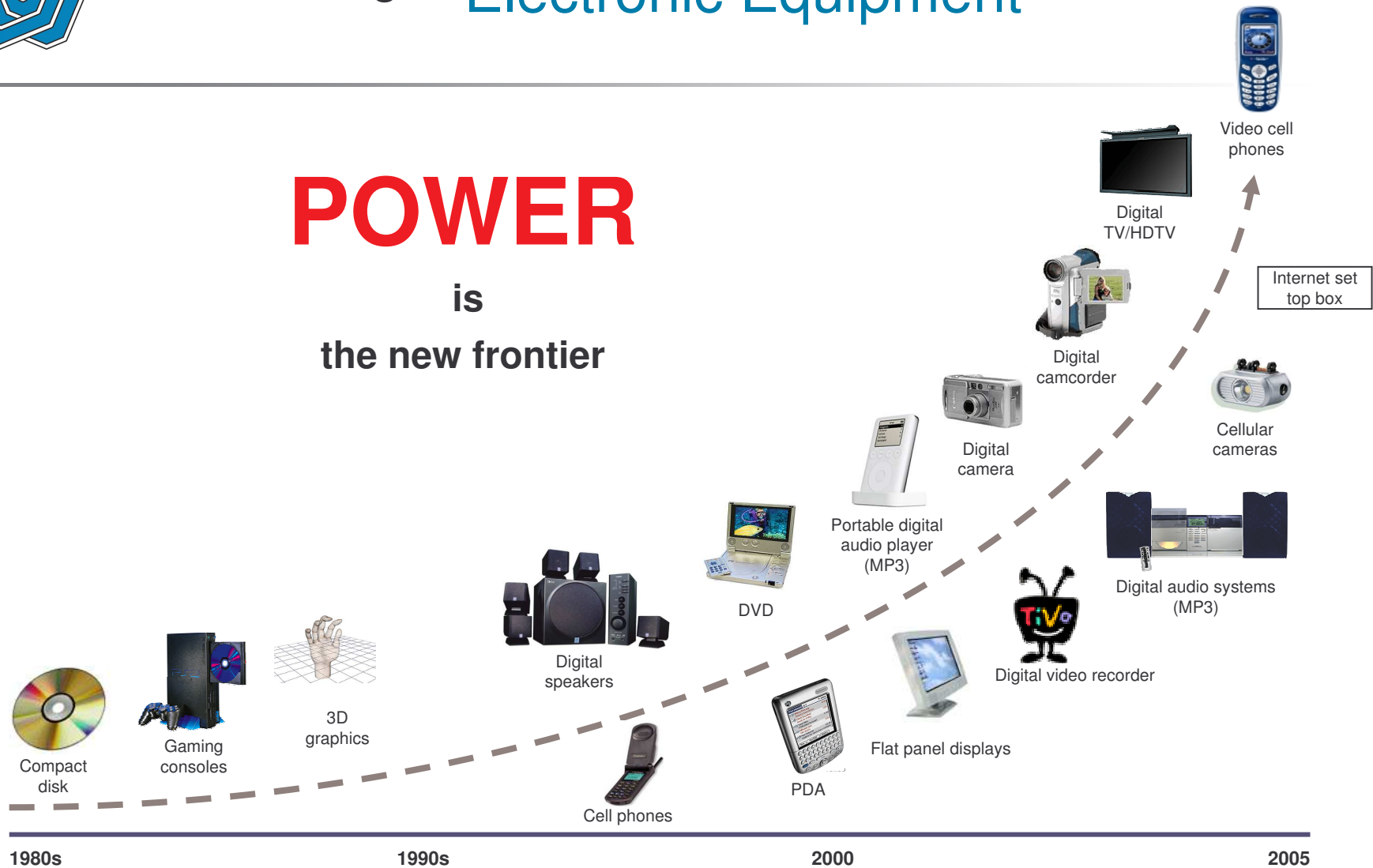
There will be some losses since no system is perfect

**Adiabatic = “pertaining to a condition where no heat enters or leaves a system” (OED).**



# Adiabatic Logic Electronic Equipment

**POWER**  
is  
the new frontier



1980s

1990s

2000

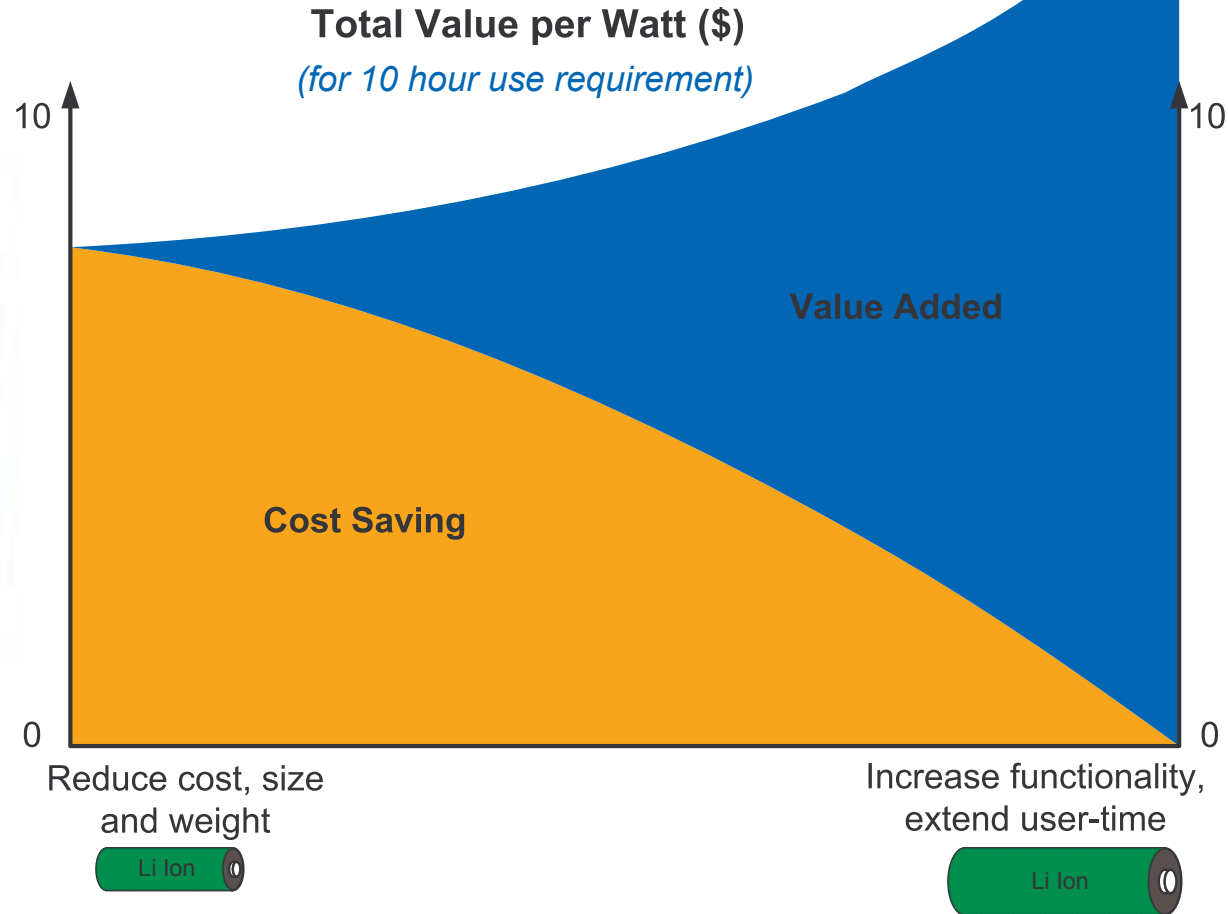
2005

Note:

Source: CIBC World Markets with changes



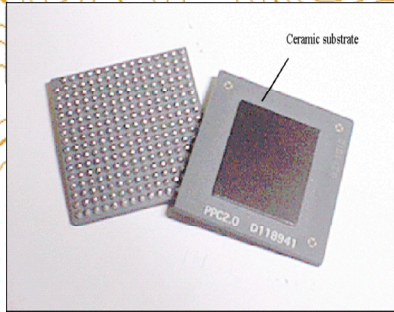
# Battery pack savings







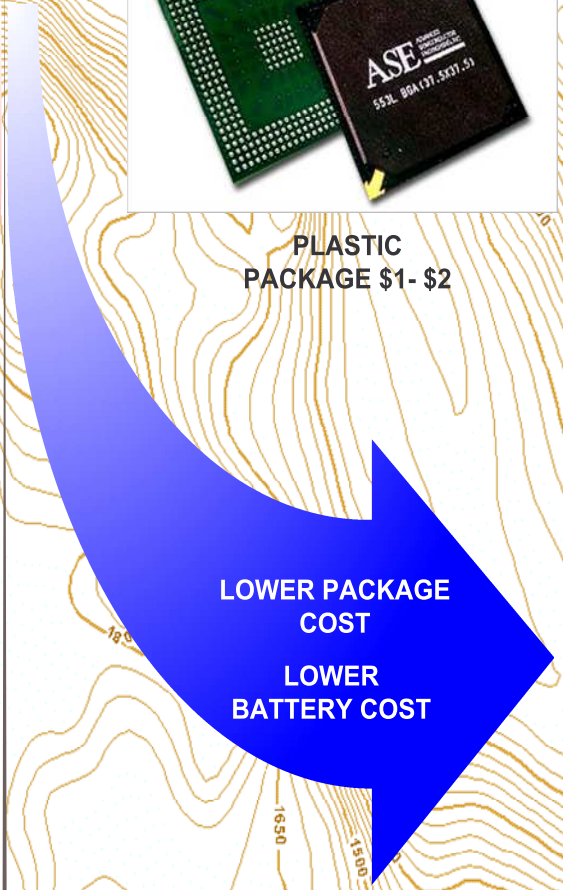
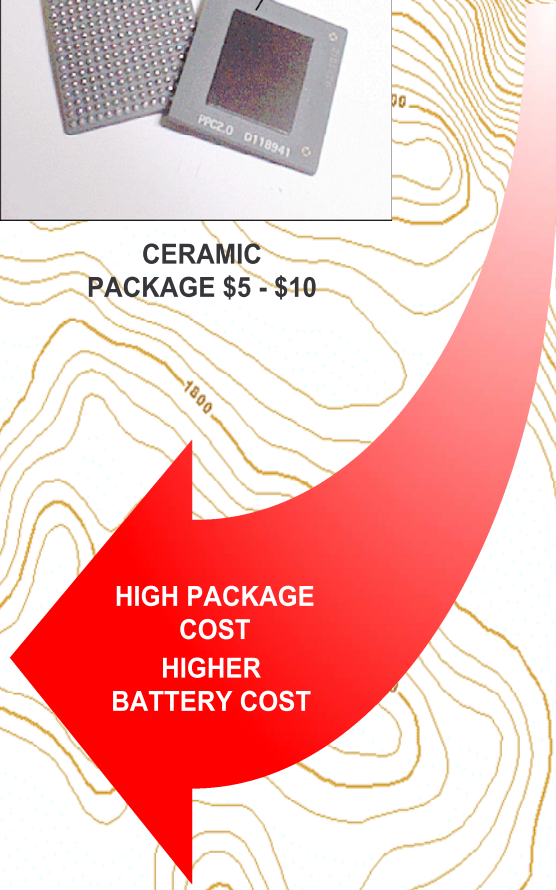
# Adiabatic Logic Electronic packaging savings



**CERAMIC  
PACKAGE \$5 - \$10**



**PLASTIC  
PACKAGE \$1- \$2**





# Air conditioning savings



**13.5kW**



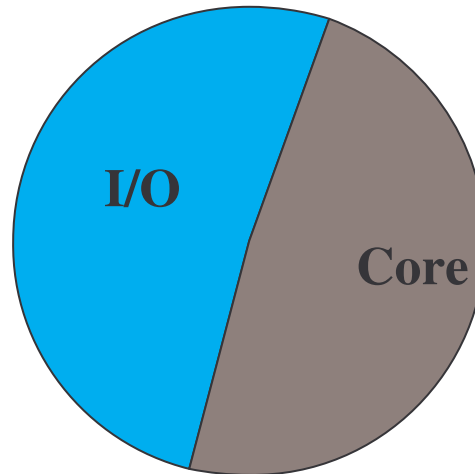
**15kW**





# Adiabatic Logic Chip to chip communication

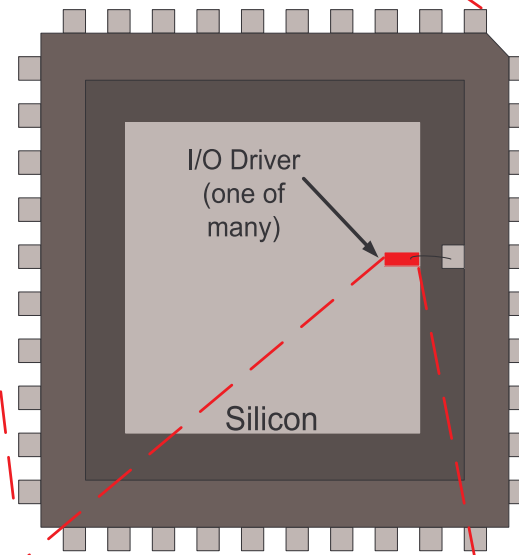
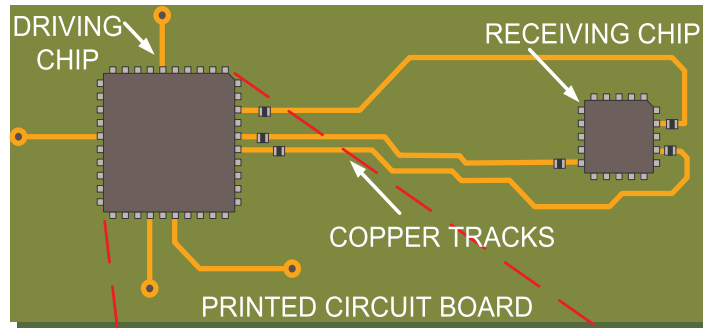
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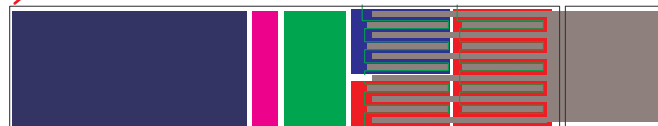
**“A huge part of power consumption is lost in bus connections in and out of the chips”**  
*Arnaud Duclap, DSP business development manager at Texas Instruments*

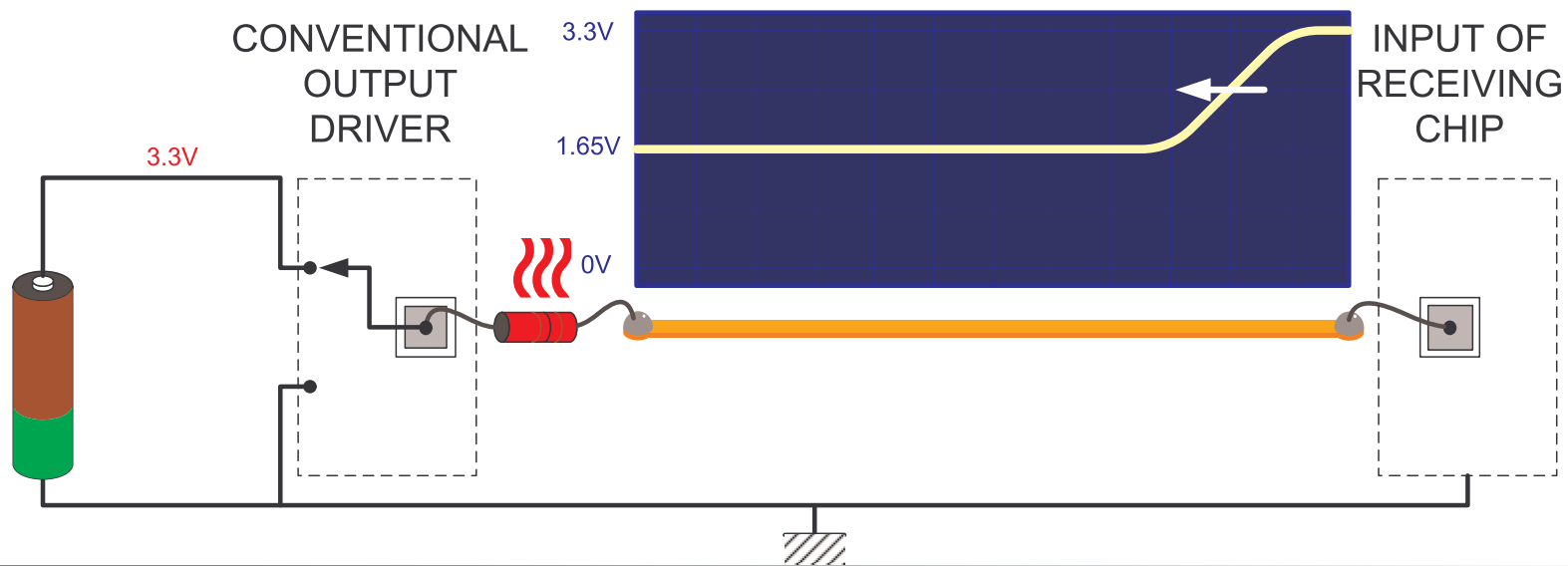
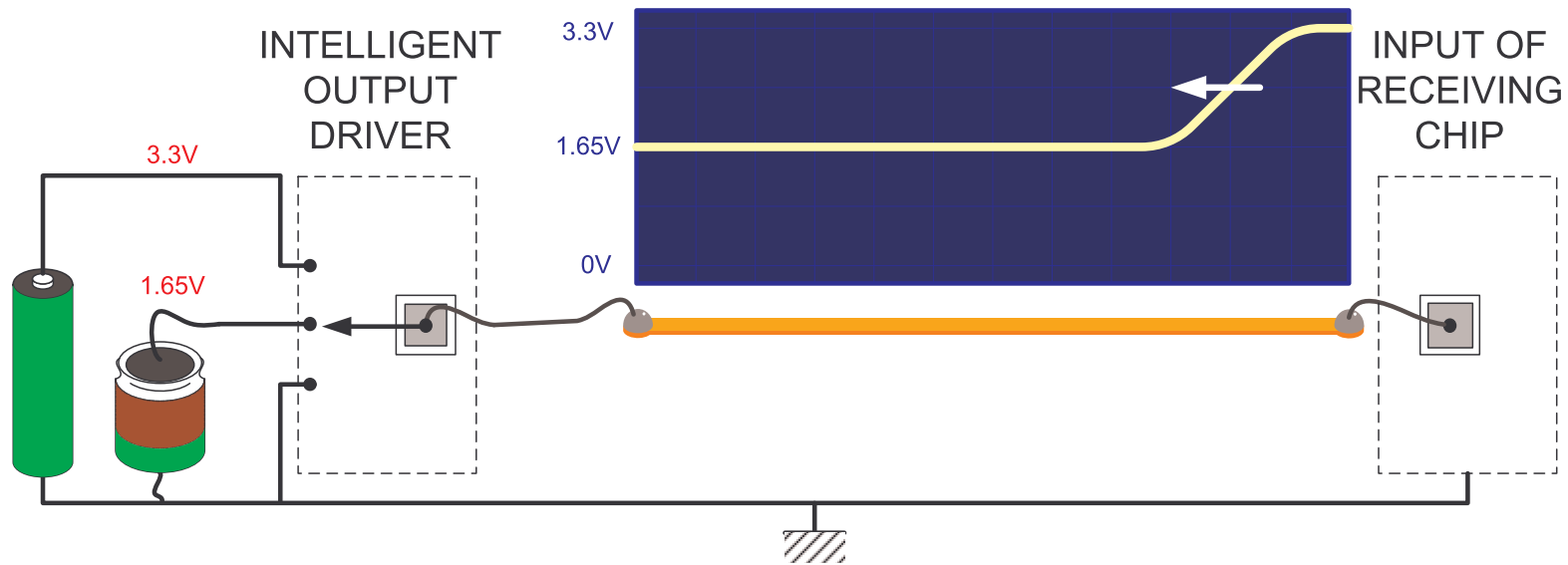


- What is an Intelligent Output Driver?
  - IOD is a patented output buffer which actively matches itself to the electrical environment
  - IOD cell replaces a conventional IO Buffer cell
  
- What does the IOD achieve?
  - Reduces power losses in driven load by up to 75%
  - Reduces the number of components in a system



**Licensable IP Cell  
from Adiabatic Logic**







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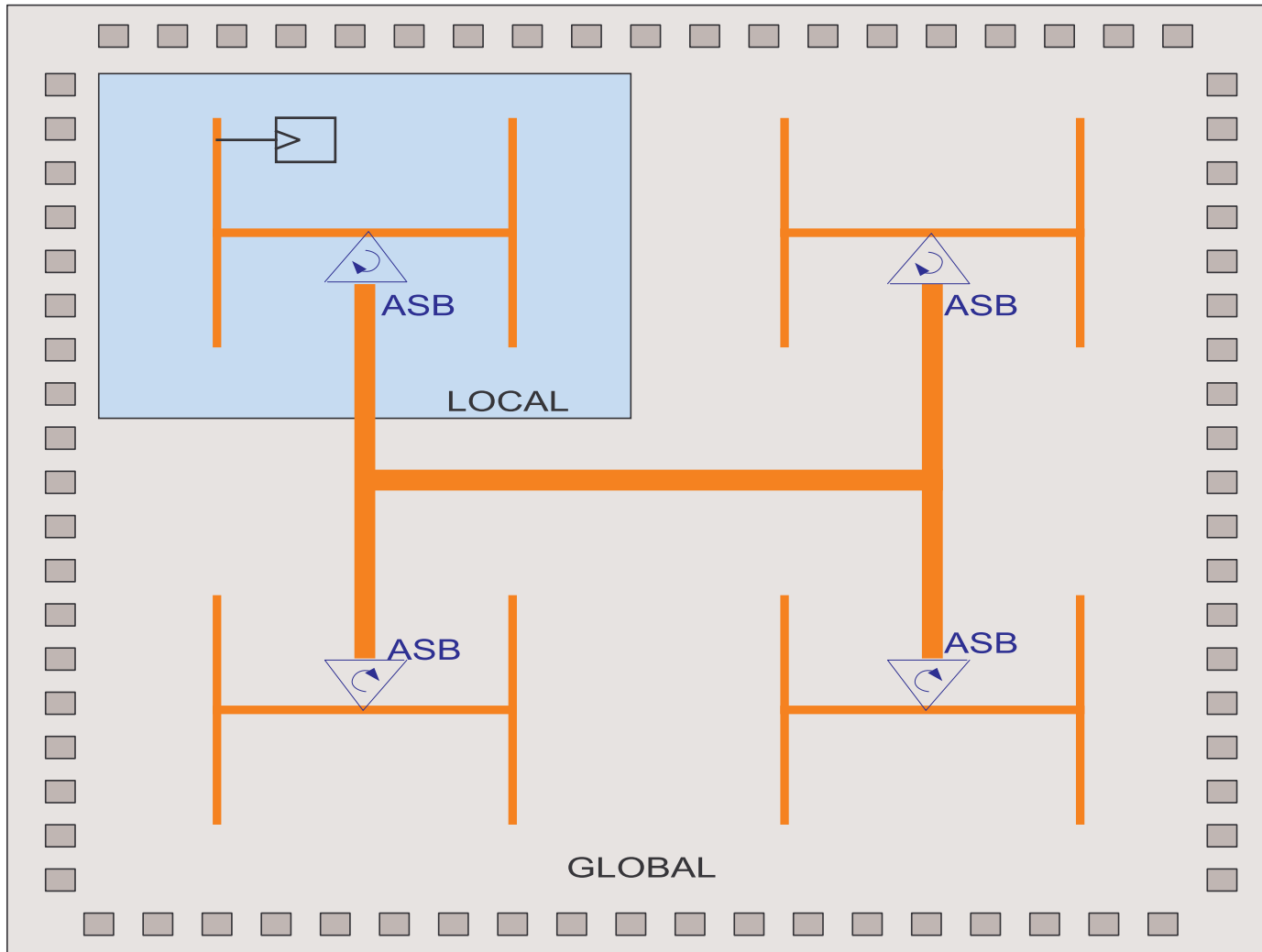
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Up to 75% of I/O power can be saved





# Adiabatic Logic Future direction - Recycle energy *inside* chips





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Logic

Geoff Harvey CTO