Texas Instruments Sustainability in Microelectronics – Richardson Wafer FAB

The Balance of People, Profit, and the Planet

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Presentation Material Courtesy: Paul Westbrook - Sustainable Development Manager, Texas Instruments

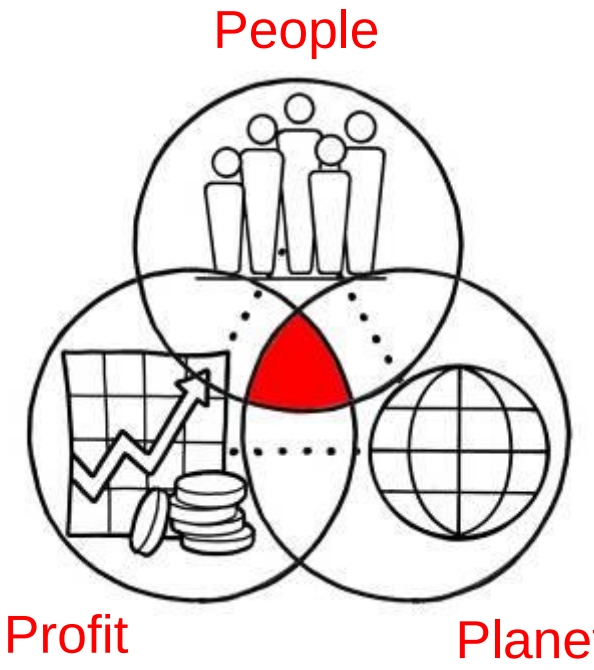
Sustainability Defined

SUSTAINABILITY
PEOPLE • PROFIT • PLANET

- Official Definition

Brundtland Commission of the United Nations, 1987

Simply stated . . .
The balance of people, profit, and the planet



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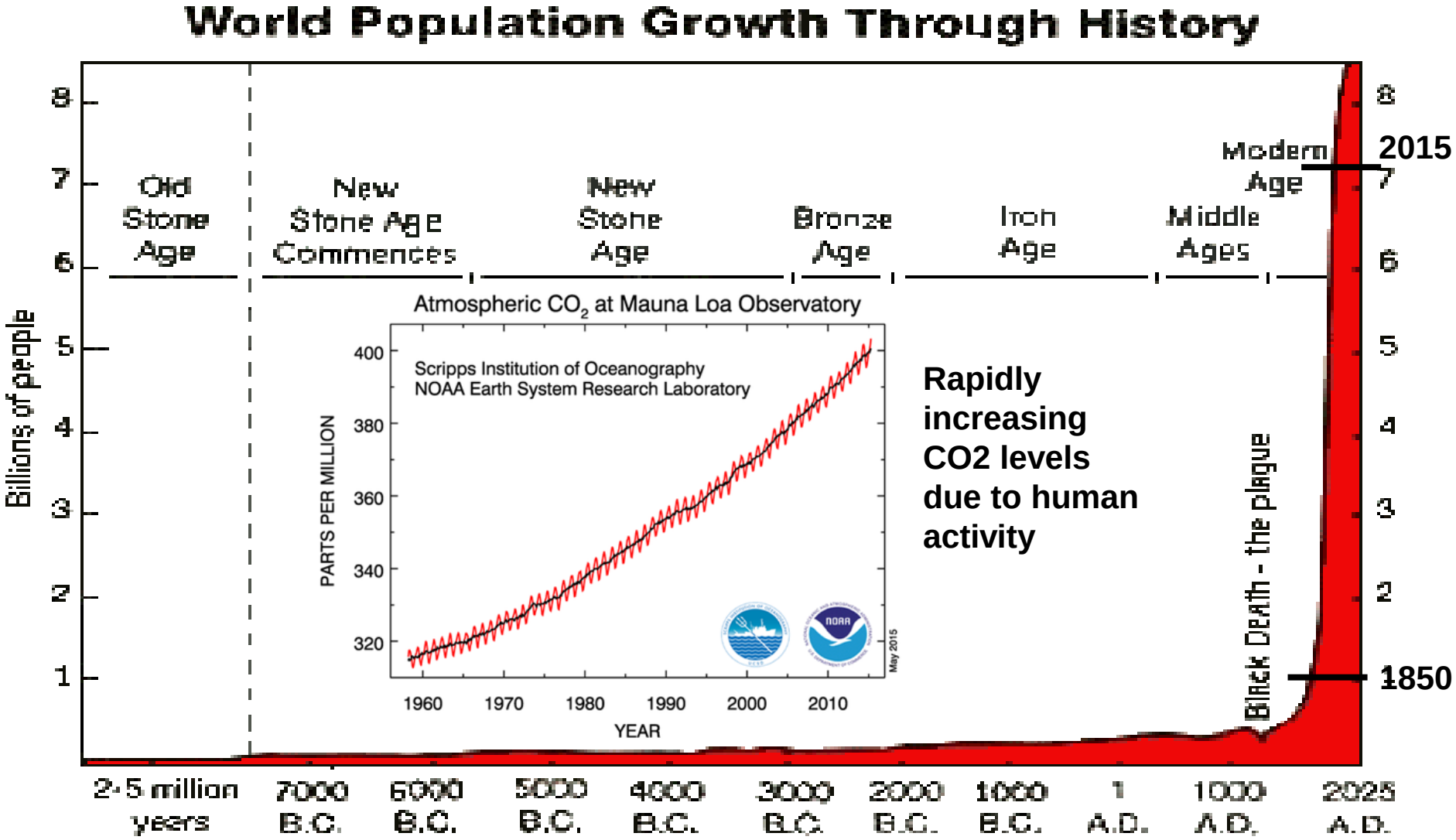
Climate Change + Resource Consumption



A Real Life Example – Richardson FAB

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RFAB: The Opportunity

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- Very tight temperature and humidity requirements . . .
  - 70F+/-2 (21C+/-1) and 45% RH +/- 3%
- Combined with a large amount of exhaust and subsequent make up air . . .
  - 650,000 cfm (307 m3/sec) = 2 Macy's Kermit balloons per second
- Combined with the need to recirculate a large volume of air through the filters for cleanliness . . .
  - 4,400,000 cfm (2077 m3/sec) = 22 Goodyear blimps a minute
- Combined with hundreds of process tools with vacuum pumps, RF generators, and support equipment . . .
- Combined with extensive use of deionized (DI) water to rinse the wafers during processing . . .

Sustainability at RFAB

SUSTAINABILITY

Native Meadow Restoration

Exterior Shades

Solar Water Heating

Efficient cooling system with waste heat recovery

Rain Water Reuse Pond

Day lighting

Water Turbine Powered Faucet

Reflective Roof

Dark Skies Friendly Lighting

Efficient Lights

Bicycle Parking

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RFAB Results

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- With investment of less than $1.5 million in Leadership in Energy and Environmental Design (LEED) related items significant benefits were achieved.
- Even with these investments overall project cost was 30 percent less than our previous 300 mm fab.
- In the first full year of partial operation, we saved >$1 million in operating costs. ROI at full operation of much less than 1 year.
- At full build out, we will save more than $4 million per year:
  - 20 percent energy reduction (>35% for facilities systems)
  - 40 percent water-use reduction
  - 50 percent emissions reduction
  - LEED Gold Certified Office and Fab
- RFAB became TI's most energy efficient fab in 2Q2012

TI RFAB Efficiency

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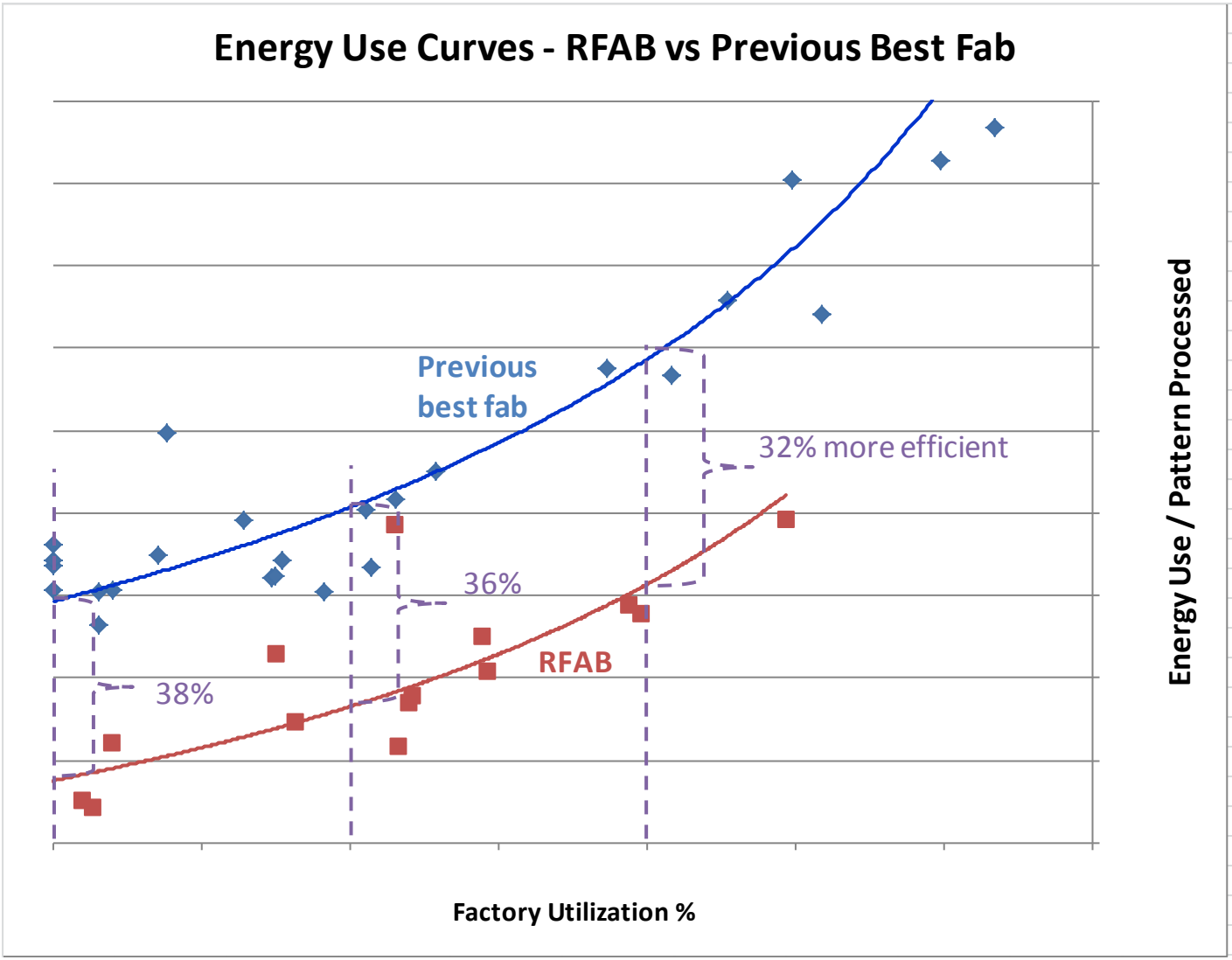

- **RFAB**
  - RFAB uses 38% less energy to process a wafer pattern than DM6, which is located 6 miles away (same climate) and was built 10 years before RFAB.

What's Next?

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- New major projects at TI will be LEED registered:
  - Building addition at our site in the Philippines (the first LEED-certified project in that country – Silver)
  - New assembly and test facility in the Philippines – Clark (LEED Gold Certified)
  - New office/lab in Sugar Land, TX (LEED Gold Certified)
- We are integrating LEED-EB credits into our Best Practice Standards for our existing fabs and buildings
- We are allocating dedicated capital for utility savings projects
- TI provides vanpools, subsidized DART passes, EV charging stations, flexible hours, and many other incentives to help reduce commuting energy and cost
- Extensive waste recycling and reuse programs have allowed us to maintain a 90%-95% recycling rate
- TI releases an annual corporate citizenship report detailing sustainability efforts – www.ti.com/ccr

2005 – 2014 Metrics

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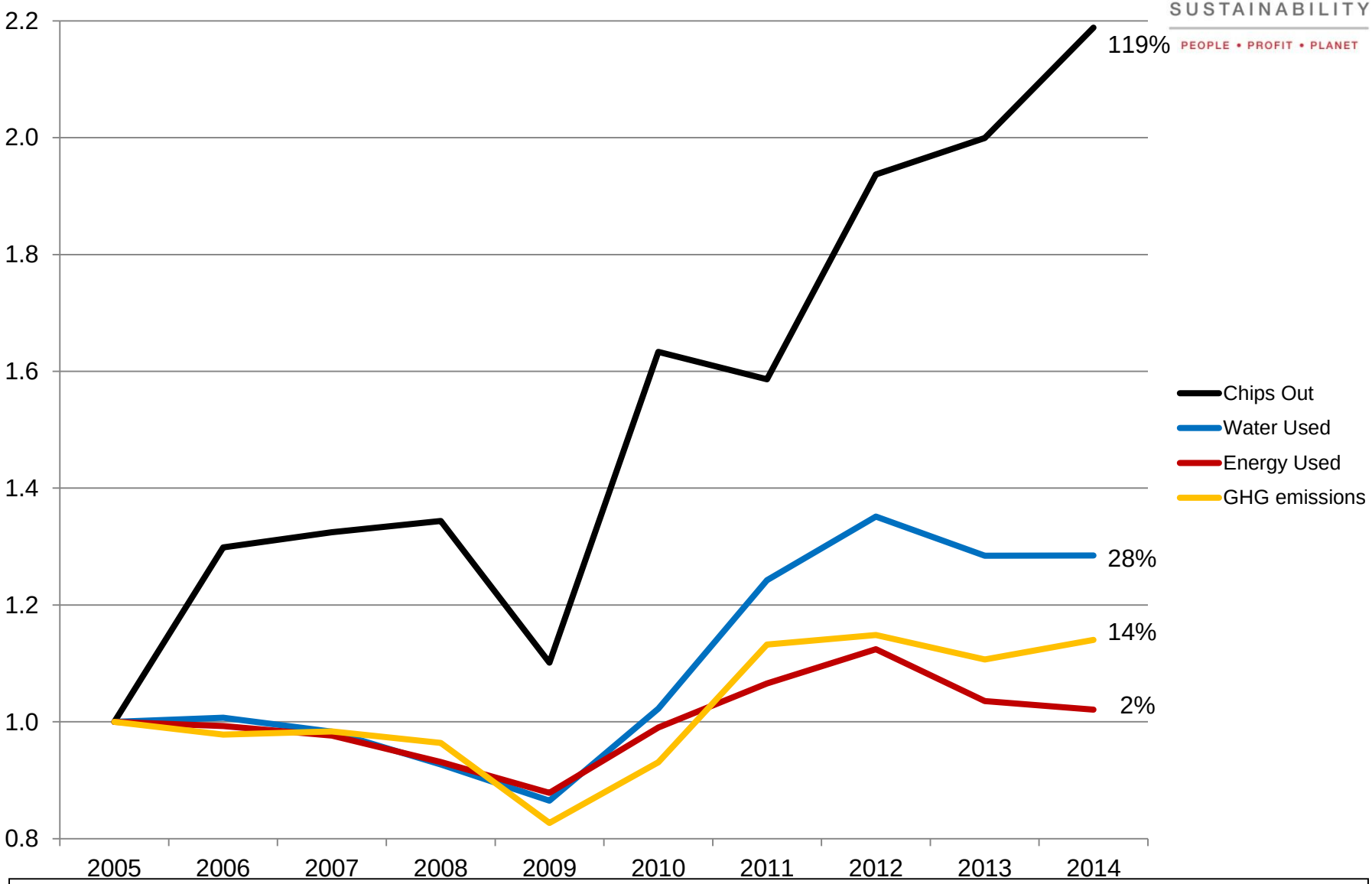

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The Bottom Line

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- A focus on sustainability is important as population increases and resources become more scarce.
- Sustainability is not only good for the planet but typically makes good business sense.
- Significant benefits in productivity and energy reduction can be achieved by proactively planning these efforts from the beginning.