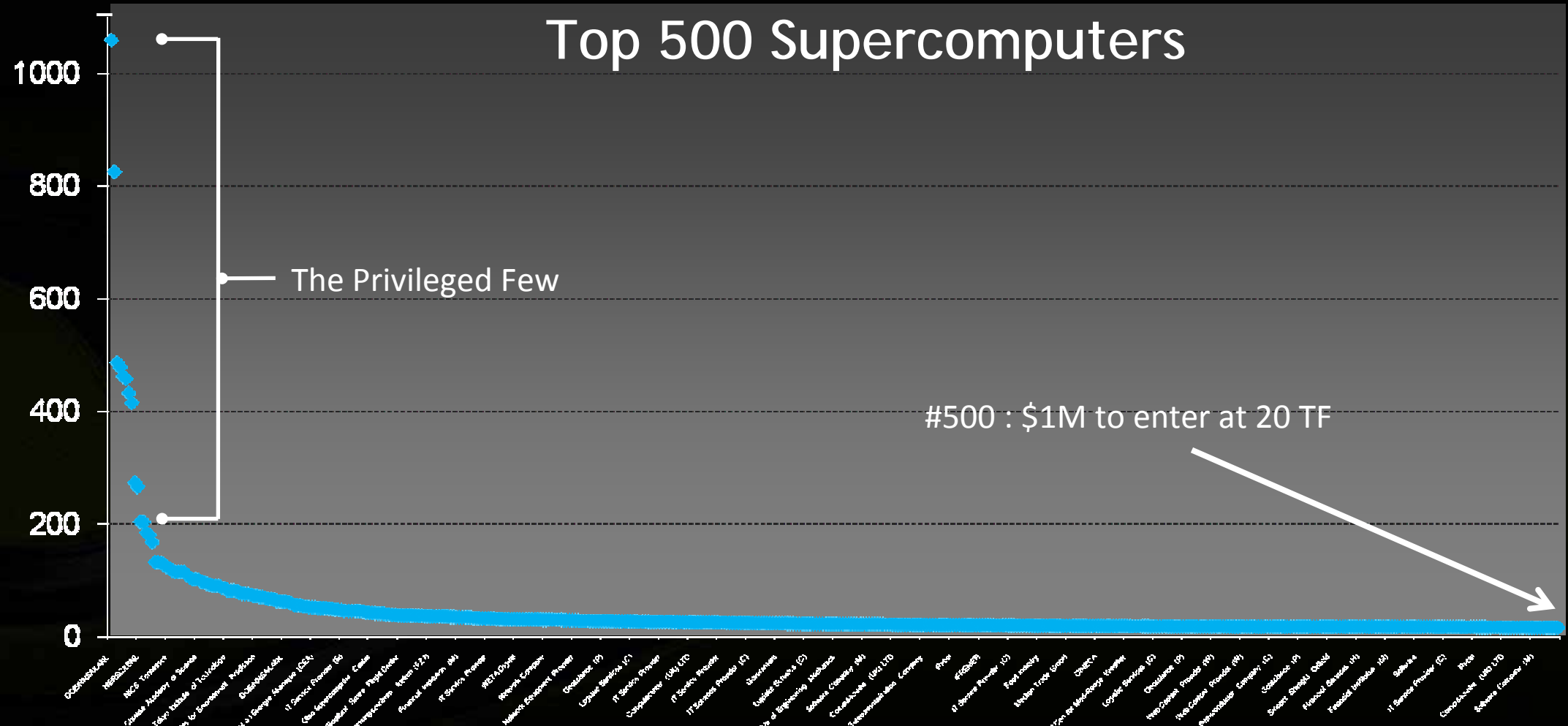


Tesla Taiwan Seminar
Changing the Economics of
Supercomputing

Today: Supercomputing is Expensive



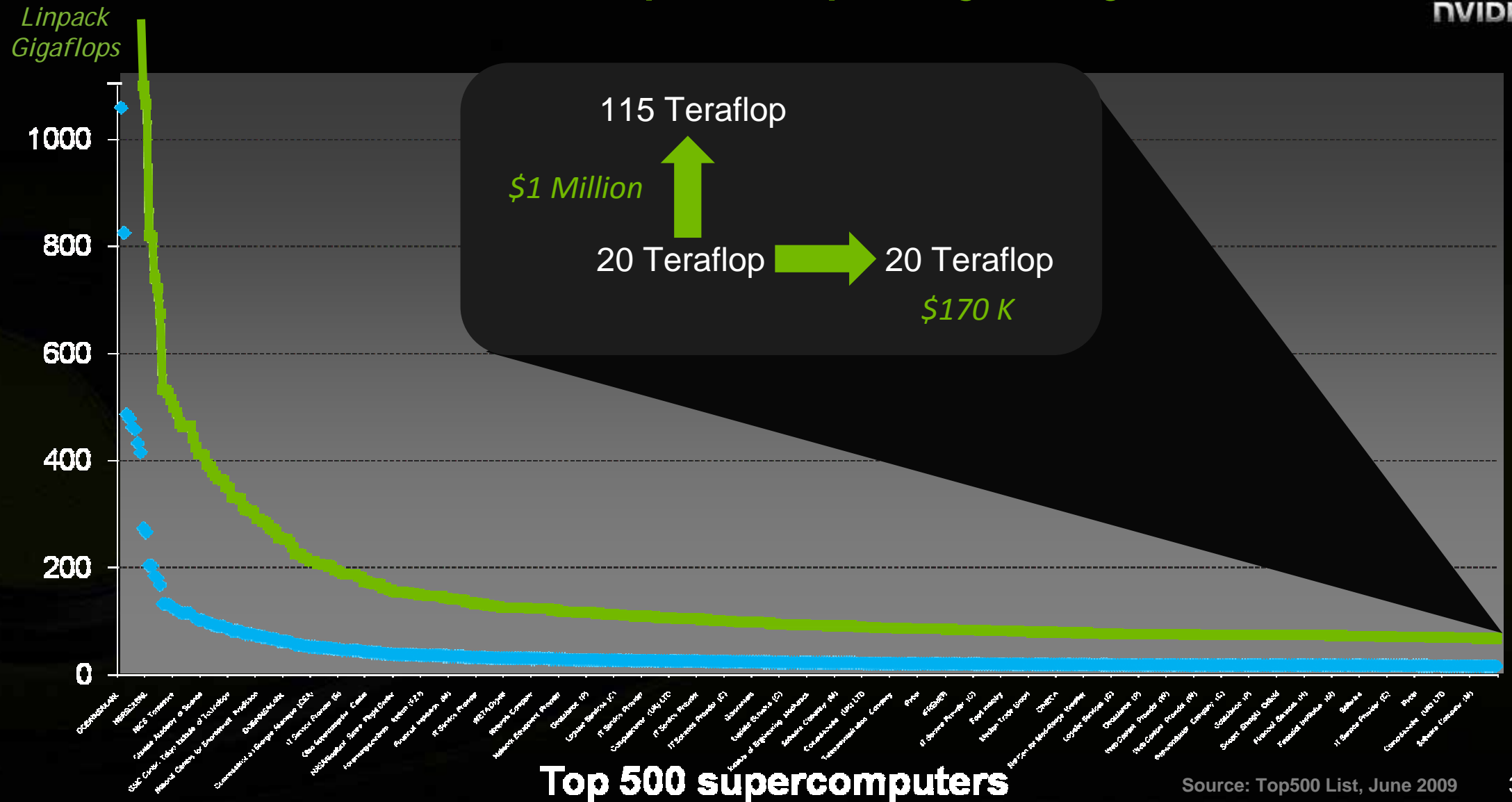
Linpack
Gigaflops



Top 500 supercomputers

Source: Top500 List, June 2009

GPUs enable Supercomputing Everywhere



GPUs can Accelerate Scientific Insight

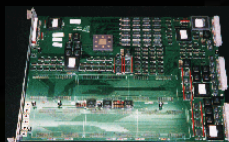
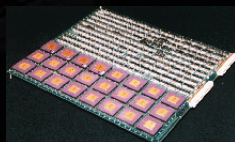
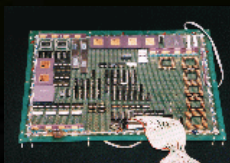
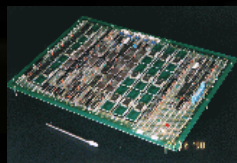
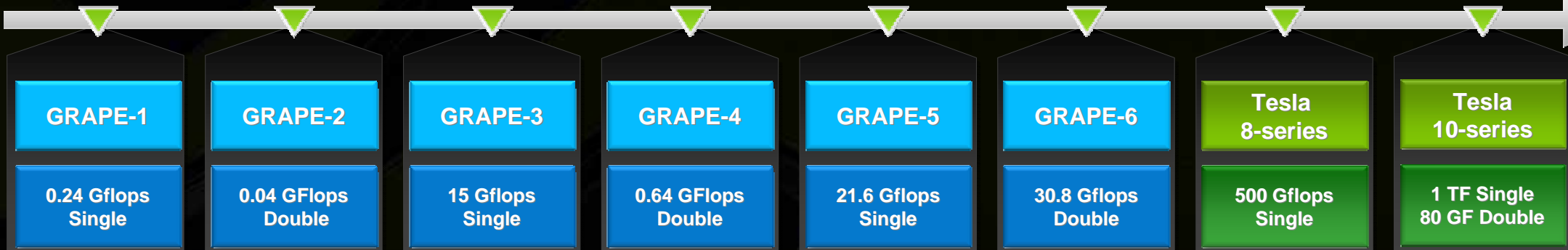


GRAPE-4
1 Teraflop
Gordon Bell '96

GRAPE-6
48 Teraflops
Gordon Bell
2000, 01, 03

NVIDIA G80
91 Teraflops
Nominated for
Gordon Bell 2009

1989 1990 1991 1995 1998 1998 2007 2008



Top 500 achievable with Personal Supercomputers



16 Tesla PSCs

No Data Center Required

236 CPU Servers

16 kWatts

10x Lower Power

158 kWatts

\$170 K

5x Lower Capital Expense

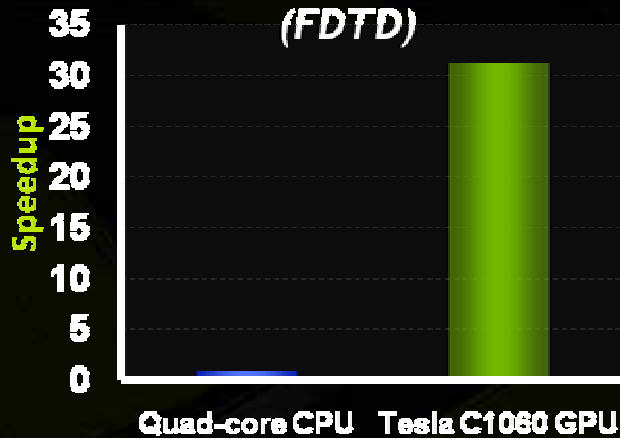
\$950 K

Real Speedups in Real Applications



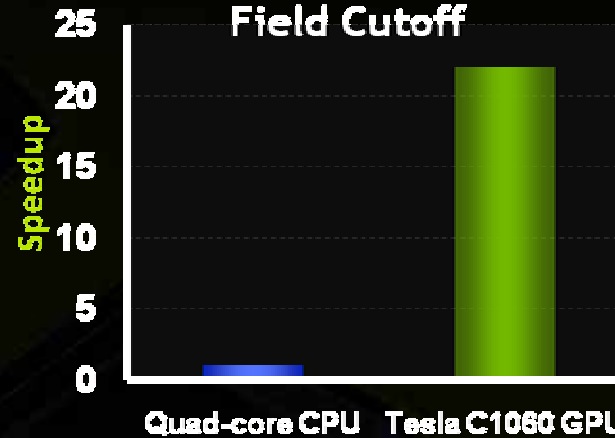
31 X

Seismic Processing
Wave Propagation
(FDTD)



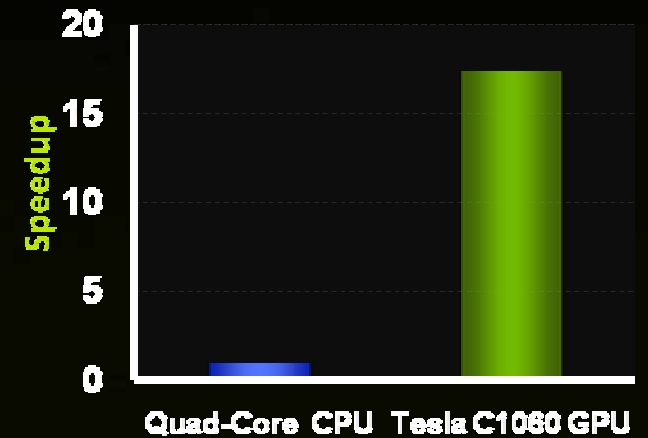
22 X

Molecular Dynamics
GROMACS Reaction
Field Cutoff



17 X

Molecular Dynamics
AMBER



Fermi: The Computational GPU

Performance

- 13x Double Precision of CPUs
- Memory Caches
- Fast/wide GDDR5 memory I/F

Usability

- ECC
- Wider language support (C++)

