

## **Manmade Machines Can Be Efficient**

<b>Energy Conversion Process</b>	<b>Efficiency [%]</b>
Large electricity generators	98-99
Large power plant boilers	90-98
Large electric motors	90-97
Best bacterial growth	50-65
Improved wood stoves	25-45
Internal combustion engines	15-25
Mammalian muscle growth	15-20
Milk production	15-20
Traditional stoves	10-15
Broiler production	10-15
Beef production	5-10
Peak field photosynthesis	4-5
Most productive ecosystems	1-2
Global photosynthetic mean	0.3



Sources: Tester (2005), Smil (1998)

Michael E. Webber, Ph.D.  
Energy Basics 21  
January 26, 2010