

Alternative Energy

23rd Pacific Islands Environment
Conference

Saipan, CNMI

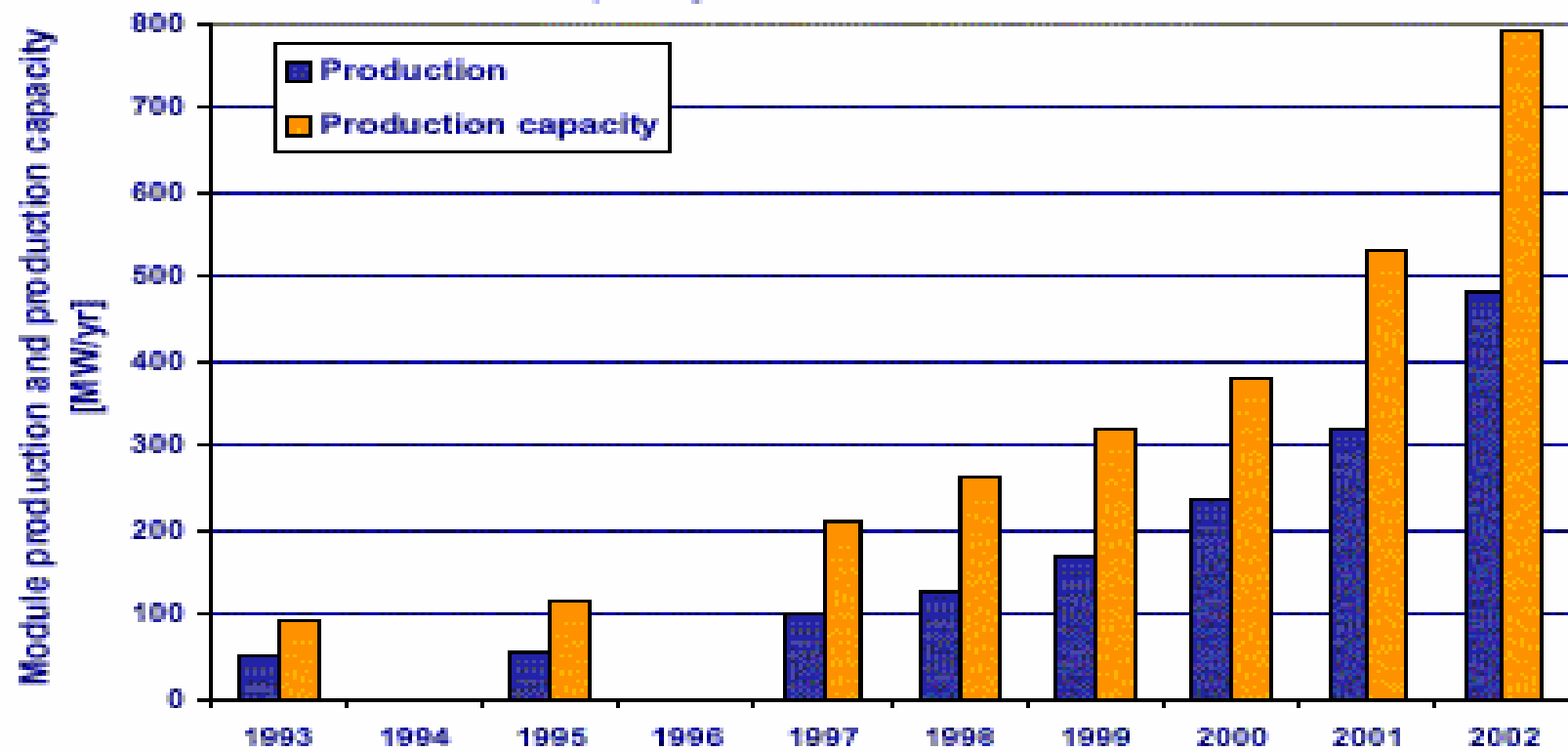
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Alternative Energy - A Global Status Report

- Solar Photovoltaic
- Wind
- Biofuels
- Geothermal
- Hydrogen
- Wave/Tidal
- Energy Efficiency

Solar PV Highlights and Trends

Figure 4: PV module production and module production capacity between 1993 and 2002



Solar PV Highlights and Trends

- June 2002 - \$5.65/Watt (Average Module Price)
- June 2003 - \$5.33/Watt;
- June 2004 - \$5.16/Watt
- Lowest retail price for monocrystalline (Sunrocera)
- Large volume prices at \$4.90/Watt and below)
- Module cost = 45-55% of total system cost

Flexible Solar Cells



Wind Highlights and Trends

- Wind is the least expensive electrical energy supply technology in the world today
- Wind spreads rapidly around the world with applications in Europe; onshore applications in the US and Australia
- Global wind energy generating capacity now exceeds 39,000 MW

Wind Highlights and Trends

- Wind generating capacity increased by 8,000 MW in 2002, a 25% increase
- \$9 billion invested in new wind power in 2002
- Growth forecast in double digits in the next decade
- Top 5 markets - installed capacity (Germany, U.S., Spain, Denmark, India)

Biofuels Highlights and Trends

- Growing industry for bio-based fuels
- Electricity generated from waste methane (wastewater treatment plants, landfills, animal manure) generation
- Specialized markets for electricity from agricultural and forestry residues
combustion

Geothermal Highlights and Trends

- High and low temperature systems
- 8,000 MW of geothermal electricity produced globally
- 2,800 MW of geothermal electricity produced in the US
- Other major producers of geothermal energy are Iceland, New Zealand
- Energy cost is about 4-6 cents per kWh in the US, 2 cents per kWh in Iceland

Hydrogen Highlights and Trends

- Hydrogen generation technologies are well-developed (steam reformation of natural gas and electrolysis of water)
- Major government and industrial commitment to hydrogen infrastructure and end-use applications
- Remaining barriers are: wide-scale availability of hydrogen and cost of end-use applications (primarily for fuel cell catalysts)

Wave/Tidal Highlights and Trends

- Almost unlimited energy potential of waves and tides
- 3 tidal projects to-date worldwide (France, Canada, Korea) from 10 MW
- Potential is the same especially for tidal power (tidal change between land masses)
World's first wave energy system - Isle of Islay in the UK (Wavegen)

Energy Efficiency

Highlights and Trends

- Energy efficient investments are the quickest return on investment over the life cycle of supply technology.
• More stringent efficiency standards will avoid the need to construct up to 150 new power plants over the next 20 years.
- From 1970 to 2000 US energy consumption grew 45% while the US GDP increased 160%.
Efficiency is smart business - PFRIOD!