



Efficient Power Generation

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Recycled Energy Development

Renewable Energy and Energy Efficiency Expo and Forum

14 June 2007

Why Consider Alternatives?

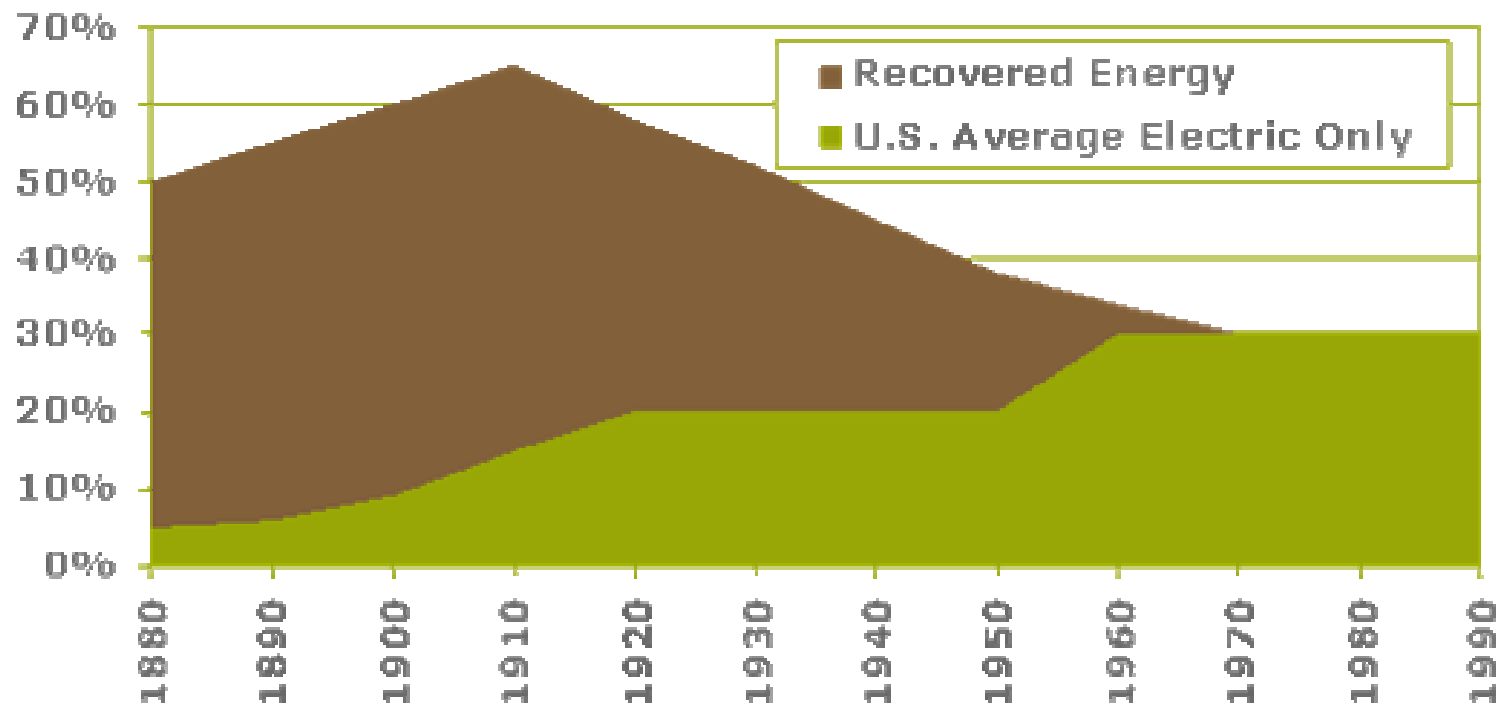
- Average plant built with 1950's technology
- Only 33% efficiency; burn three "lumps" of fuel to obtain one "lump" of electricity
- U.S. is an international laggard in generation efficiency
- Electric generators are largest polluters
- Unreliable supplies cost \$150 billion/yr
- U.S. consumer loses power 214 min/yr; 70 min/yr in UK; 6 min/yr in Japan

Rising Prices Focus One's Attention

- New coal plant costs \$2,500/kw, up from \$800/kw in late 1990s
- Clean Air Interstate Regulations (CAIR) and Clean Air Mercury Regulations will add \$550-850/kw for existing plants
- Pending costs: transmission expansion, greenhouse-gas reductions (carbon credits of \$20/ton would add 2 cents/kwh), fuel-cost volatility (3-5 times above 1990 levels; long-term contracts now below spot market)
- Prices could double in 5-10 years.

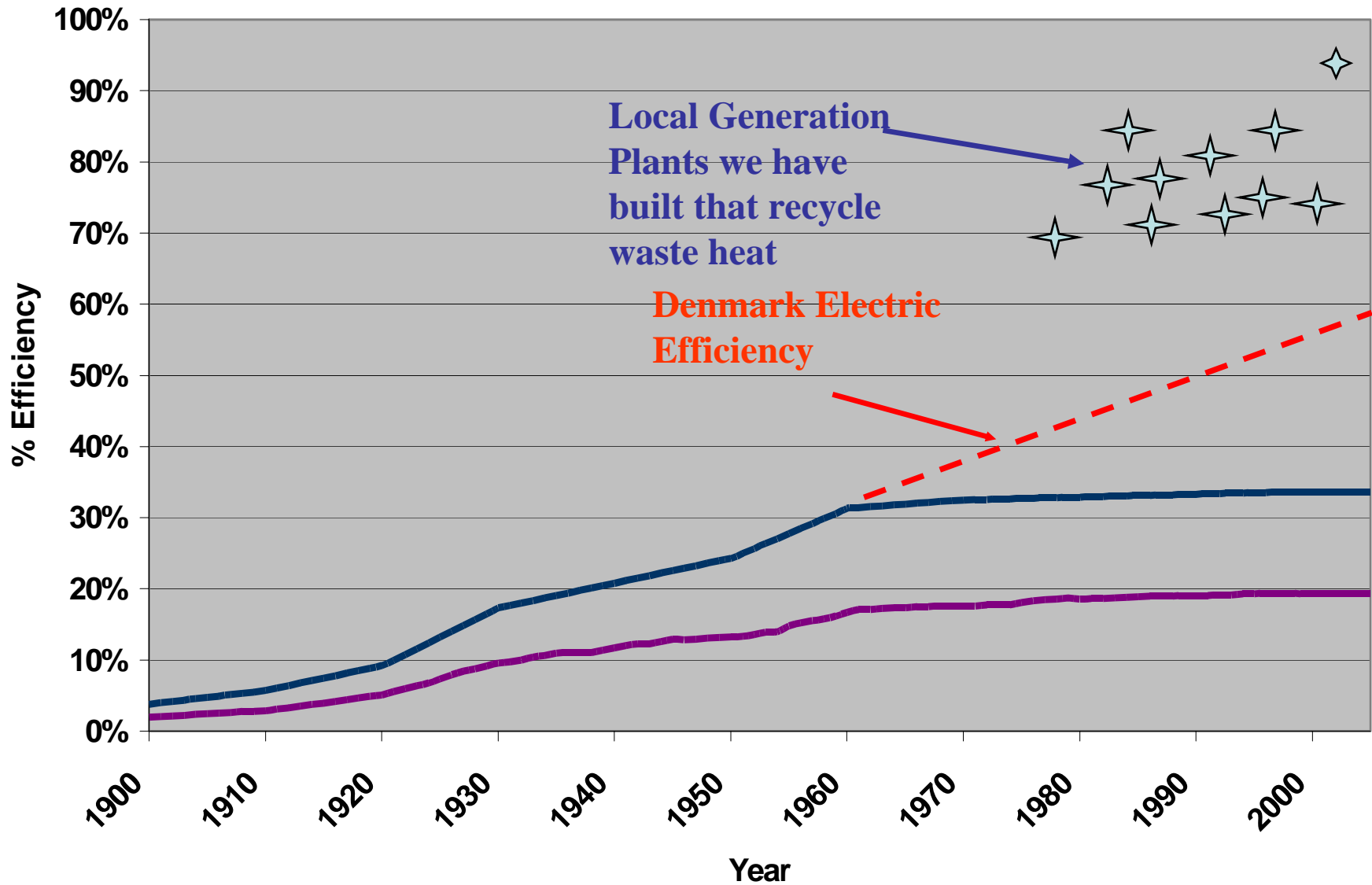
US Electric Fuel-Conversion Efficiency

US Electric Industry Fuel-Conversion Efficiency

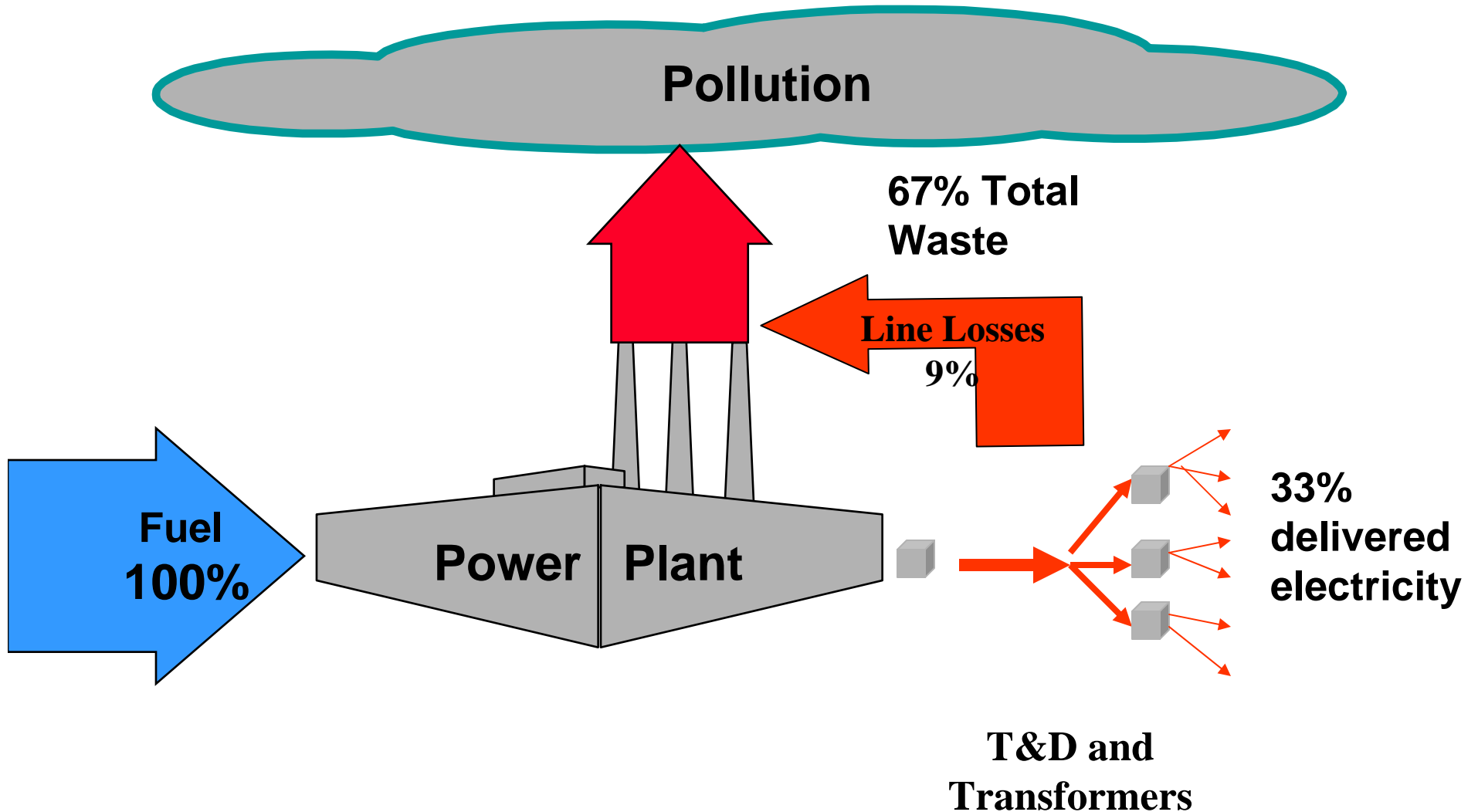


US Electric Efficiency, 1900-2005

■ Primary Efficiency, Delivered Electricity ■ Final Efficiency raw energy to useful work



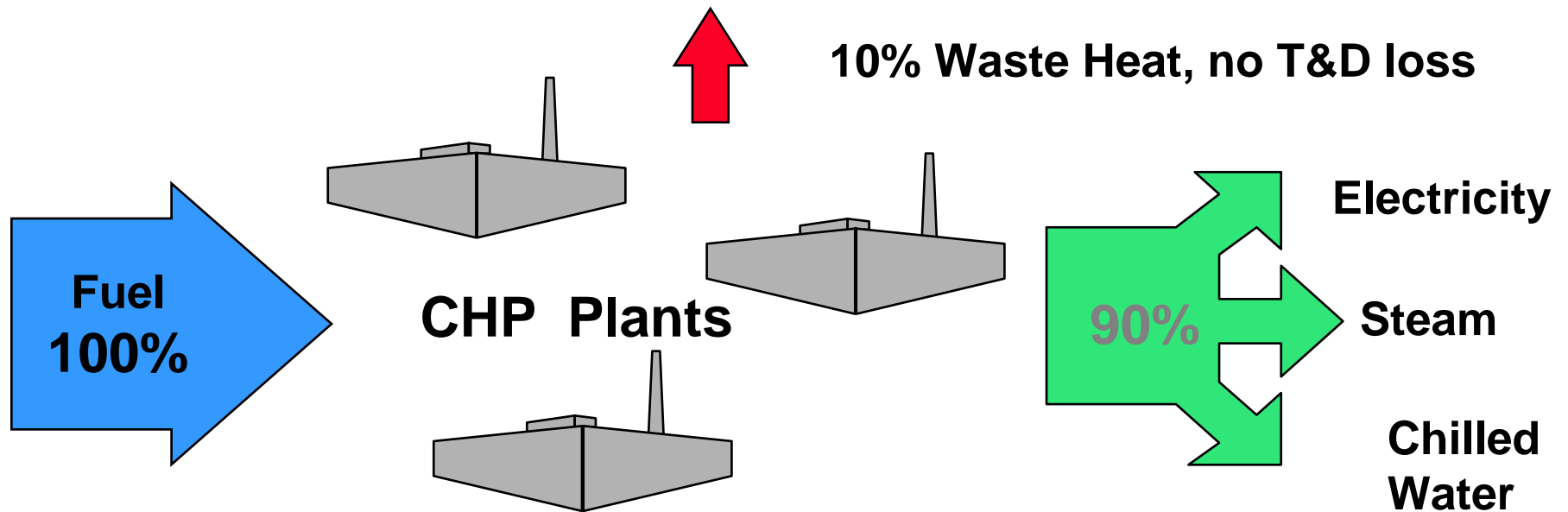
Conventional Central Generation



Combined Heat and Power (CHP)

Pollution

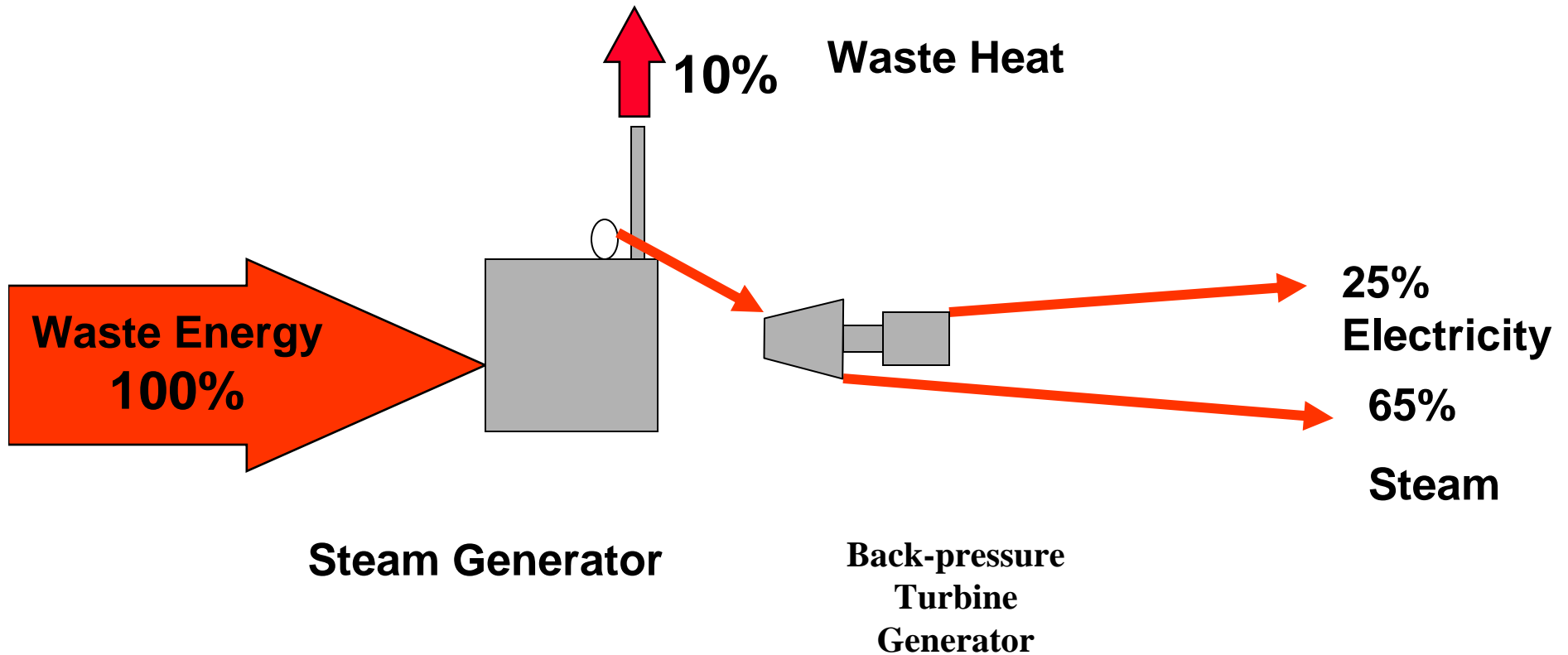
10% Waste Heat, no T&D loss



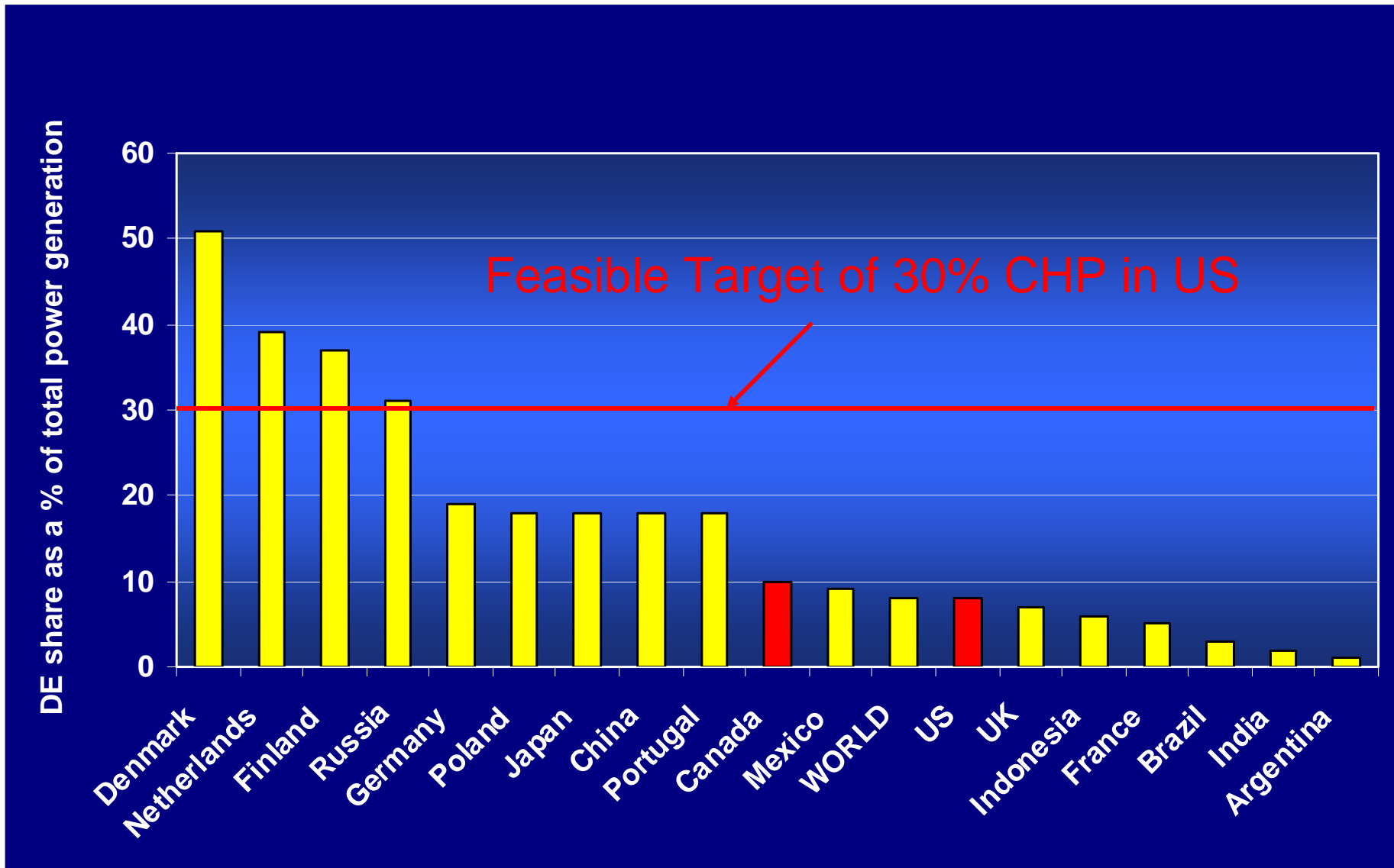
(At or near thermal users)

Recycled Energy *(At user sites)*

No Added Pollution



Comparative Deployment of Combined Heat and Power in 2004

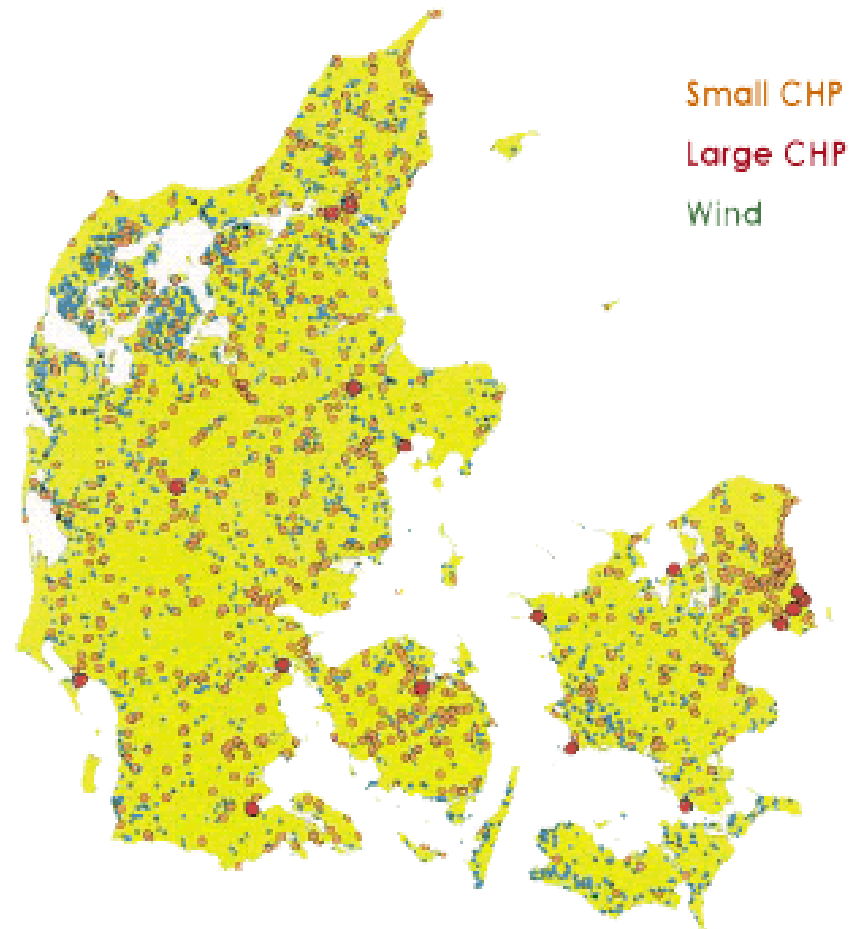


Denmark Changed in Two Decades

Centralized System of the mid 1980's

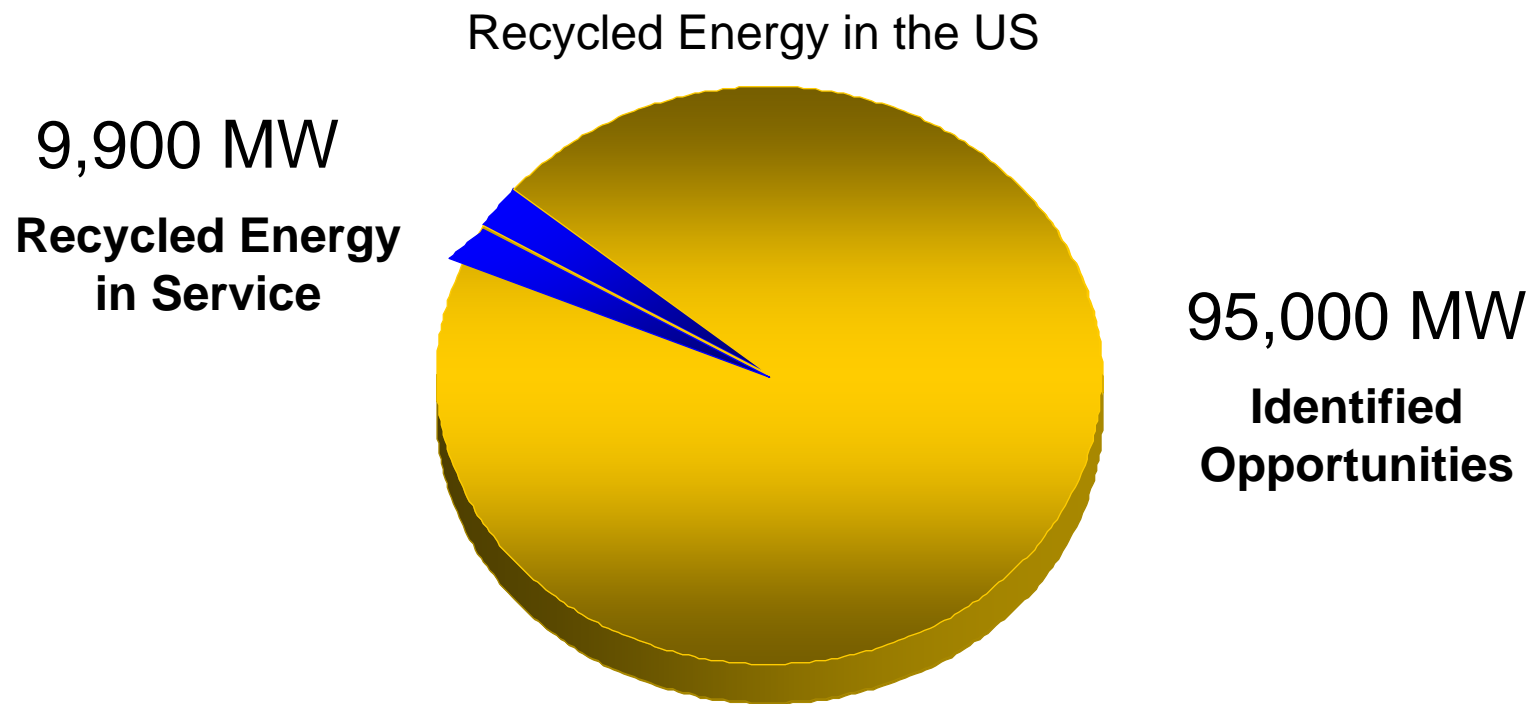


More Decentralized System of Today



Best New Generation: Recycle Industrial Energy

- Wasted energy streams in nineteen industries could generate 19% of US electricity



Source:USEPA 2004 Study

Industrial Energy Recycling 90 MW Recycled from Coke Production



Policy Options

- Recognize the value of Clean Distributed Generation's Benefits – less T&D, reduced line losses, grid stability. Subtitle D in House Energy bill.
- CHP Investment Tax Credit (HR 2001)
- Energy Efficiency Resource Standard
- Induce Efficient Biofuel Production
- Enable Market for Excess Power

Thank You

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