GREEN POWER MARKET DEVELOPMENT GROUP

Advancing green power for a clean energy future

Jennifer Layke
World Resources Institute

March 23, 2004
NEMS/Annual Energy Outlook 2004
Washington, DC

GREEN POWER MARKET DEVELOPMENT GROUP

The World Resources Institute (WRI)

WRI is an environmental think tank
that transforms ideas into action
to protect the planet and improve people's lives

The Green Power Market Development Group

Developing corporate markets for 1,000 MW of new, cost-competitive green power by 2010

Alcoa Inc.
Cargill Dow LLC
Delphi Corporation
The Dow Chemical Company
DuPont
General Motors
IBM
Interface
Johnson & Johnson
Kinko's
Pitney Bowes
Staples

Overview

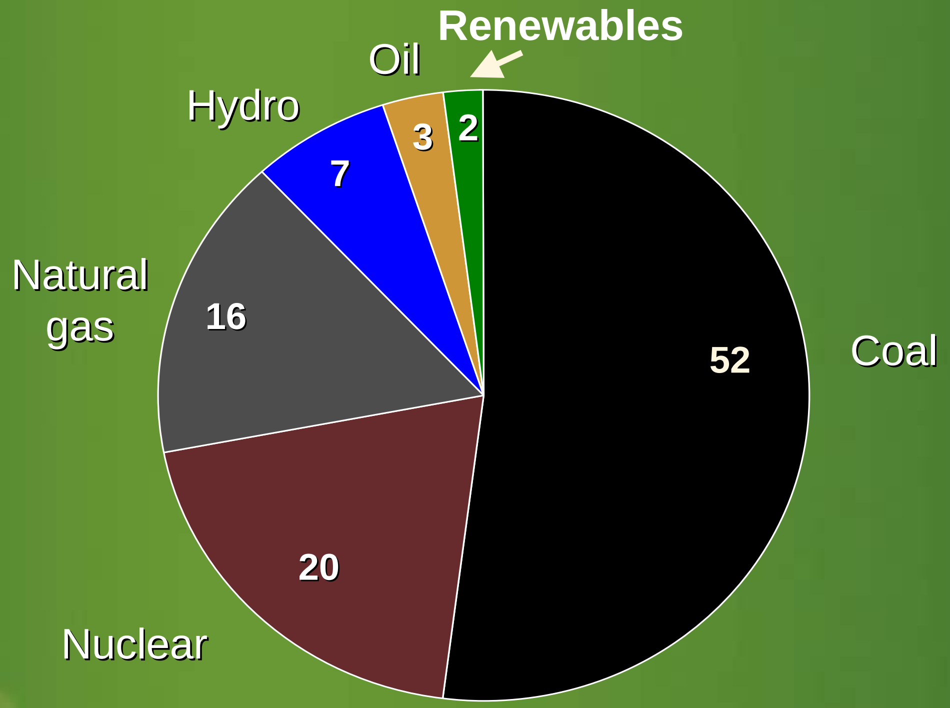
- Renewable energy markets: where are we today?

- Key developments in voluntary markets since 2000
  - Green power & green pricing programs grow
  - REC markets emerge providing an alternative for purchasors
  - Emerging business case

Non-hydro renewables account for ~2% of total U.S. electricity generation

U.S. net electricity generation, 2000

Percent, 100%= 3,802,105 GWh



Source: Energy Information Administration, *Energy in the United States 1635-2000* (2003)

Non-hydro renewables will need to grow between 11% and 20% per year over the decade in order to jump to 5-10% of U.S. electric generation market share

2000 actual

- Net U.S. electricity generation: 3,802 billion kWh
- Non-hydro renewables = 2%

2010 EIA projections

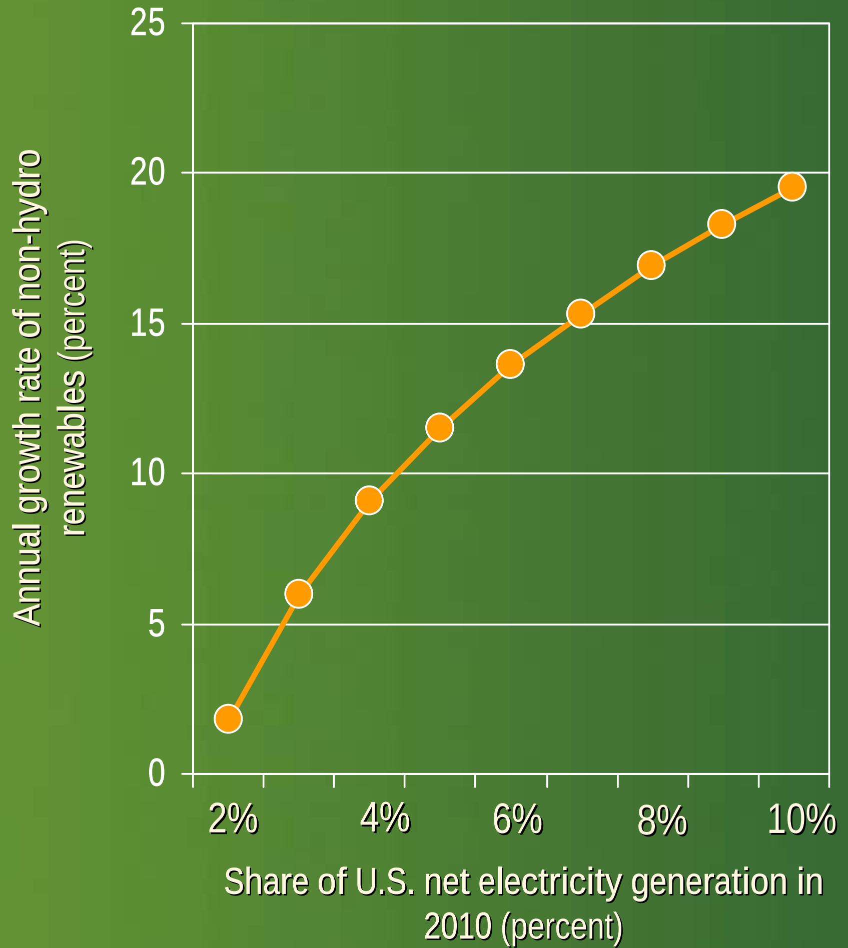
- Net U.S. electricity generation: 4,525 billion kWh
- 1.8% per year growth ('00 – '10)

Source: Energy Information Administration, *Annual Energy Outlook* (2003)

Non-hydro renewables will need to grow between 11% and 20% per year over the decade in order to jump to 5-10% of U.S. electric generation market share

2000 actual
- Net U.S. electricity generation: 3,802 billion kWh
- Non-hydro renewables = 2%

2010 EIA projections
- Net U.S. electricity generation: 4,525 billion kWh
- 1.8% per year growth ('00 – '10)



Source: Energy Information Administration, *Annual Energy Outlook* (2003)

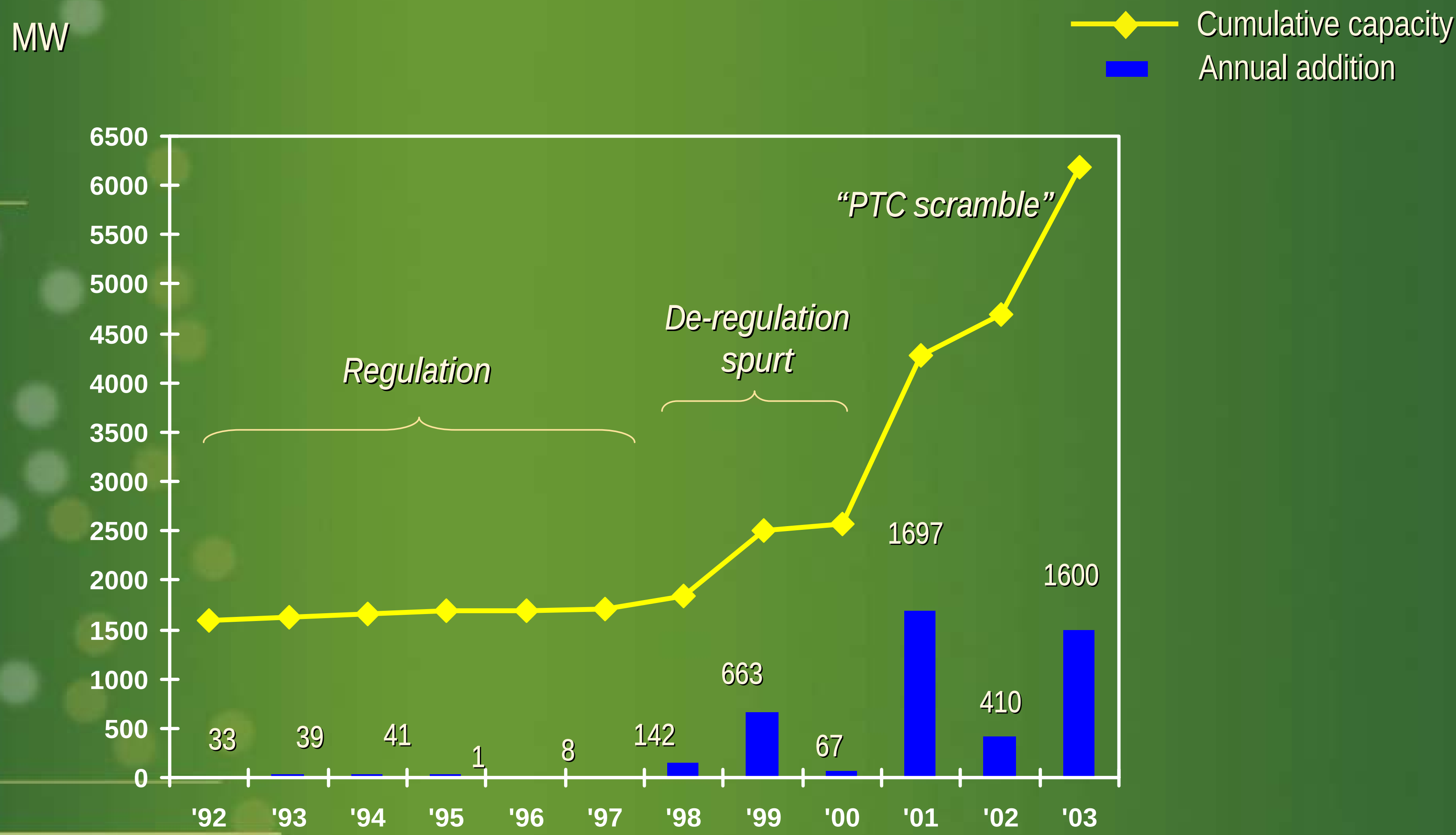
Wind has been the fastest growing renewable power resource since 2000

Resource	Installed nameplate capacity (MW) YE 2000	YE 2002	CAGR ('00-'02)
Wind	2,578	4,685	35%
Solar PV	139	212	24%
Biomass*	6,643	6,425	-2%
Geothermal	2,850	2,200	-12%
Landfill gas	857	1,021	9%
Total	13,067	14,543	5.5%

* Net summer peak capacity

Source: American Wind Energy Association, Energy Information Administration, International Energy Agency, Landfill Methane Outreach Program

Growth in US installed wind capacity



Source: U.S. Department of Energy (Wind Energy Program), AWEA. Available at: www.awea.org/faq/instcap.html

Overview

- Renewable energy markets: where are we today?
- Key developments in voluntary markets since 2000
  - Green power & green pricing programs grow
  - REC markets emerge providing an alternative for purchasors
  - Emerging business case

Overview of Voluntary Purchases: who is buying green power?

2002

- 270,000 participating in regulated utility programs
- 4,000 non-residential: a 54% increase from 2001

Total MW of new renewables by utilities:

- 287 MW in 2002
- 140 MW in 2003 (est)

Source:Green Power Marketing in the United States: A Status Report, NREL, October 2003

The availability of green pricing and green power programs have grown since 2000

Market	Description of green pricing/power programs	2000 →	2003
Regulated	Number of states with program	28	32
	Number of utilities	82	387
	Average premium ($/MWh)	$31.00	$26.40
Dereg	Number of states with program	5	8 + D.C.
	Number of marketers	12	22
	Average premium ($/MWh)	$12.50	$12.70

(Source: www.eere.energy.gov/greenpower/)

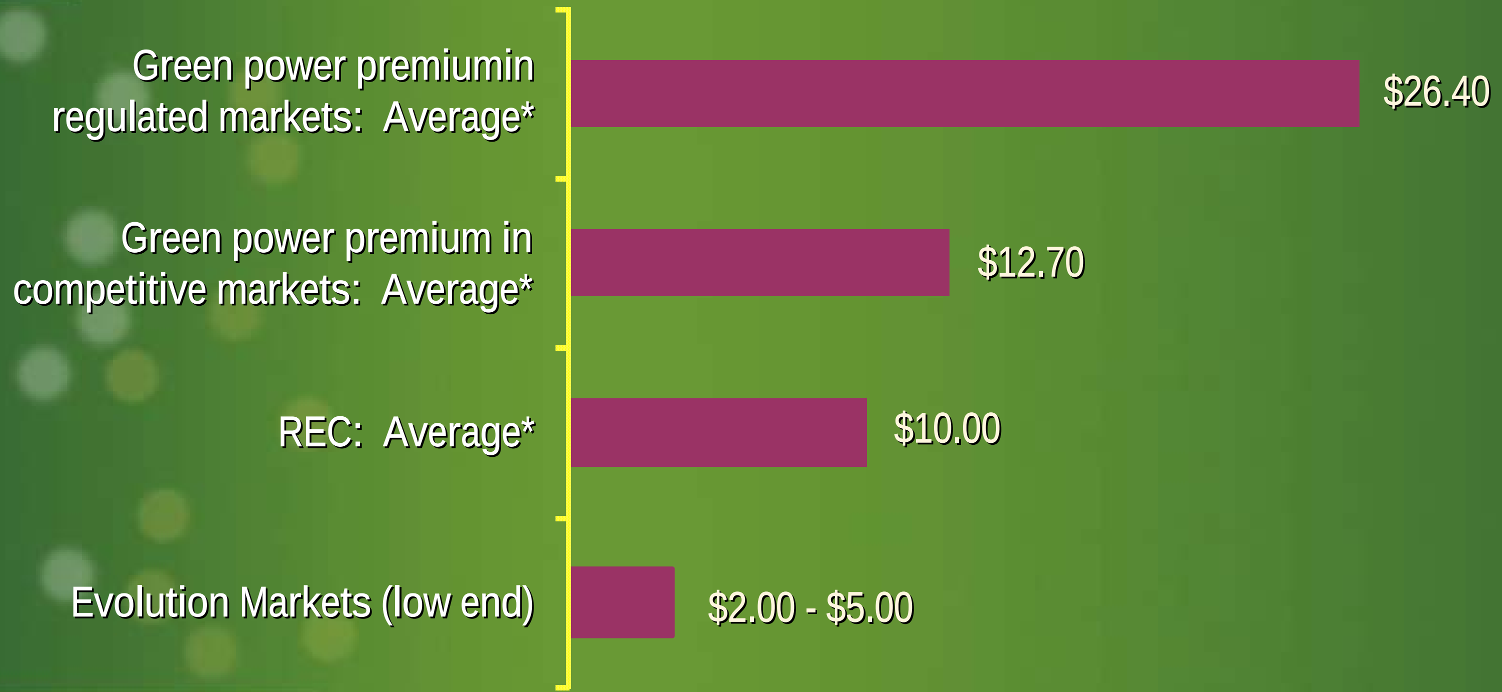
REC markets have emerged since 2000

- REC marketers increase from ~4 to over 12
- Green-e® certification of RECs starts in 2002
- Offers alternative to green power or green pricing programs
  - Wider selection of suppliers
  - Greater variety of renewable resource options
  - Simplified transactions
  - Lower cost

RECs have emerged to offer a lower cost means of greening a customer's electricity supply

Price beyond power, $/MWh

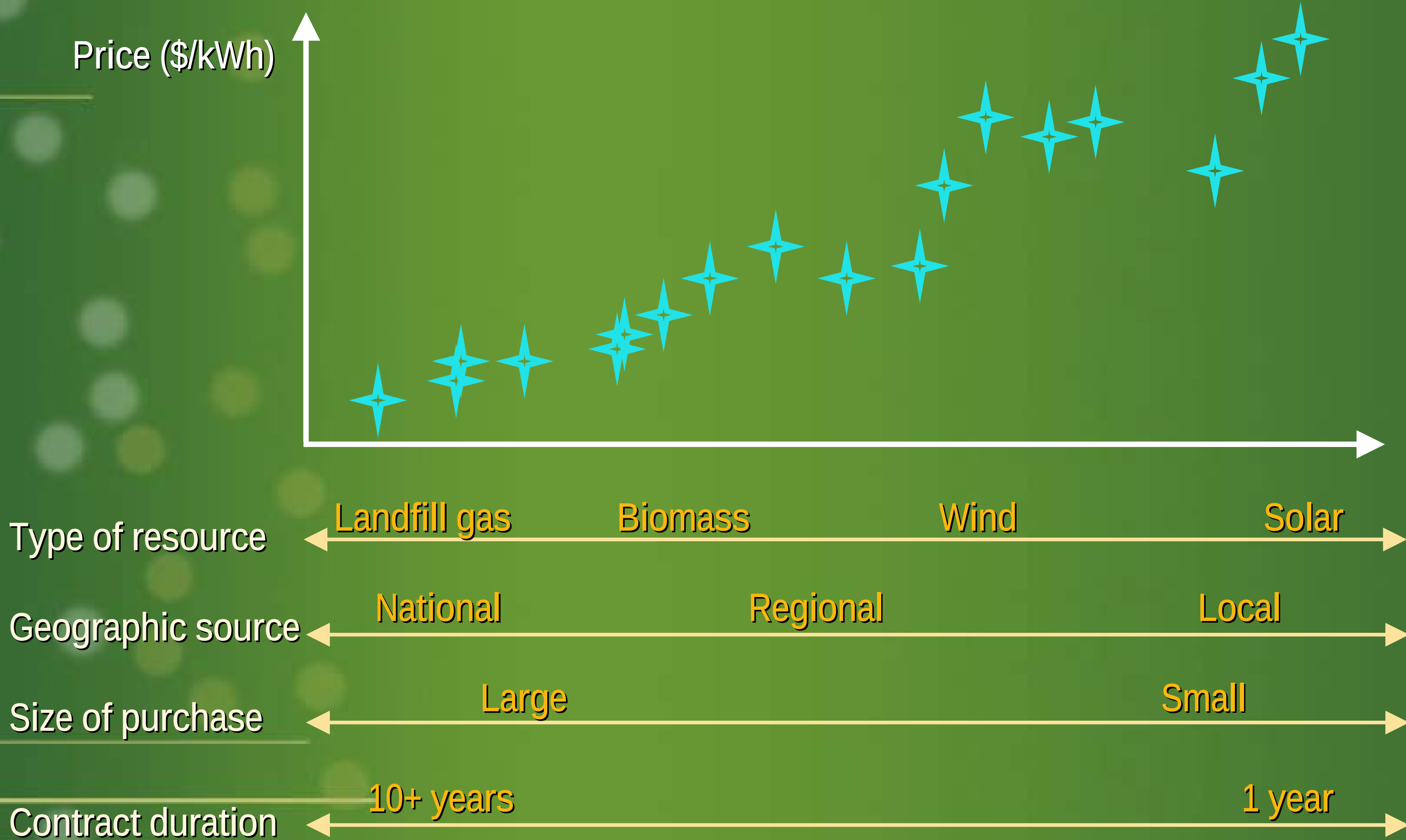
Summer 2003



Source: WRI, U.S. Department of Energy (2003)

Factors underlying price differences

ILLUSTRATIVE



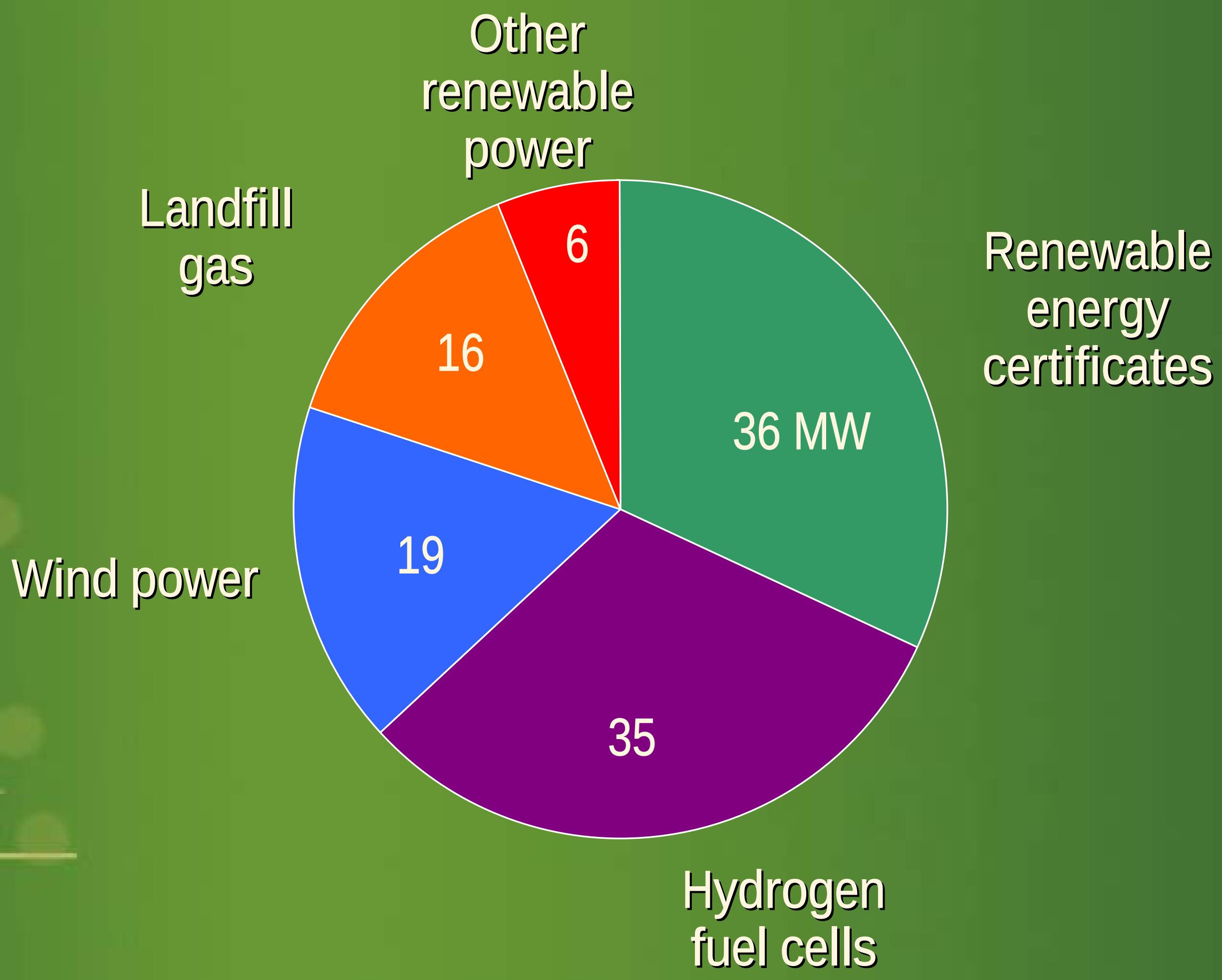
Overview

- Renewable energy markets: where are we today?
- Key developments in voluntary markets since 2000
  - Green power & green pricing programs grow
  - REC markets emerge providing an alternative for purchasors
  - Emerging business case

The Green Power Market Development Group has completed 112 MW of green power purchases

Total = 112 megawatts (MW)

As of September 2003



Green power can provide several business benefits

1. Reduce corporate emissions (e.g., CO_2)
2. Meet corporate targets
3. Strengthen stakeholder relations
   - Customers
   - Employees and local communities
   - Shareholders
4. Improve costs
   - Cost savings
   - "Peak-shaving"
   - Cost stabilization: Fossil fuel price hedge

Explore procurement strategies along the value chain

Retail green power purchase

RECs purchase

Wholesale energy purchase

Ownership/ on-site

Successful Procurement Strategies

- Competititively bid
- Review different green power options:
    - RECS
    - Geographic scope
    - Technology choice
- Aggregate demand
- Finance deals with energy efficiency savings
- Switch providers to lower rates

World's most broadly based manufacturer of health care products and services

Environmental commitments

- *Reduce CO_2 emissions 4% by 2005*
- *Reduce CO_2 emissions 7% by 2010*

Since June 2002

- Wind power
  - 19.1 million kWh/year for all NJ facilities
  - 8.7 million kWh/year for TX facilities
- On-site solar photovoltaics
  - Janssen Pharmaceutica (NJ): 500 kW
  - Neutrogena (CA): Additional 346 kW
- 19.1 million kWh/year of small-scale hydropower & 200 kW fuel cell

Business case for green power

Mid-Atlantic region windfarm

Photo courtesy of Community Energy, Inc.

Titusville (NJ): 500 kW

Photo courtesy of Johnson & Johnson

- Reduce GHG emissions
- Reduce daytime electricity costs through "peak shaving"
- Strengthen relationships with customers, employees, & community
- Our credo

On-Site project strategies

- Develop special relationships with resource
- Overcoming high capital requirements:
  - Service model
  - Leveraging state funds

DOW

A leading science and technology company that provides innovative chemicals, plastics and agricultural products and services to many essential consumer markets

Environmental commitments
• *Reduce amount of energy used per pound of product by 2% per year from 1995 - 2005* • *Increase use of renewable energy*
Since June 2002
• Signed 35 MW fuel cell contract • World's largest corporate fuel cell deal • Provides electricity for Dow Freeport Texas Operations • Hydrogen co-product as fuel source

Impact of the world's largest fuel cell deal


Photo courtesy of The Dow Chemical Company

- Reduces emissions
- Decreases demand for natural gas
- Provides cost-competitive electricity
- Improves fuel cell design and increases fuel cell production scale

Green power resources & tools

On-line green power marketplace

www.thegreenpowergroup.org

- Technology overviews
- Corporate Guide to Green Power Markets
- Case studies
- Policy recommendations
- Green Power Analysis Tool