

DuPONT's RENEWABLE ENERGY EXPERIENCE

(Thus far....This is a journey)

**Commission for Environmental Cooperation
Mexico City, Mexico**

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WHY DID DuPONT BECOME INVOLVED IN RENEWABLE ENERGY ISSUES?

- **To learn about the issues and the markets so as to better serve our existing and new customers. This is presently the best opportunity.**
- **To identify potential renewable energy sources that will be more sustainable**



POSSIBLE PRODUCTS AIDING **RENEWABLE ENERGY**

- **Fuel cell materials and devices**
- **Photovoltaic materials and devices**
- **Technology and products for biomass production and use**
- **Materials for improved electrical transmission**
- **High performance plastics and other compounds for all the above**



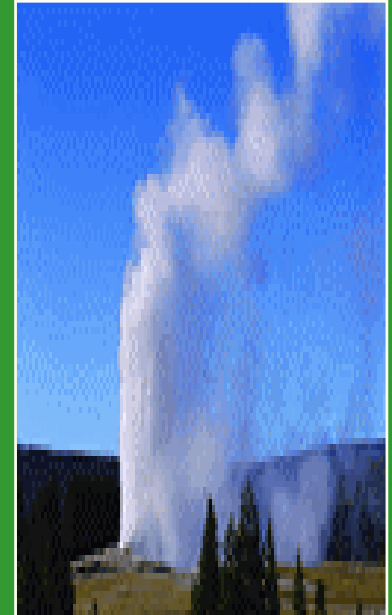
ENERGY GOALS

- **Supply 10% total DuPont energy needs from renewable resources at a cost competitive with best available fossil derived alternatives**
- **Hold energy use flat, 1990 through 2010**
- **Reduce GHG emissions 65% (CO₂ equivalents basis) by 2010 vs. base year of 1990**

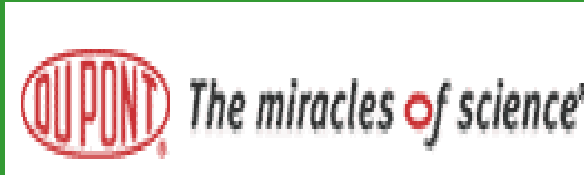


The Green Power Market Development Group

Develop corporate markets for
1,000 megawatts of new, cost-
competitive renewable energy by 2010



Green Power Market Development Group members



I n t e r f a c e



Renewable energy may provide significant advantages

- Independence from the supply and price fluctuations of fossil derived fuels
- Frequently, reduced levels of other controlled pollutants such as SO_x , NO_x , mercury, and fine particles
- Avoidance of present or future taxes or other penalties for the emission of CO_2



Renewable energy presently has significant disadvantages

- **Frequently at an inconvenient location**
- **Frequently intermittent, requiring the cost of an intermittent alternative**
- **Renewable electricity can conflict with co-generation plans and may be restricted by regulated supply systems**
- **Equipment is frequently less reliable**
- **Many suppliers have a weaker, or at least a shorter, history of reliability**



THE BUSINESS SITUATION

A manufacturing commodity with those advantages and disadvantages would normally sell at a discount.

However, renewable energy generally sells at a premium

- The exceptions are landfill gas, some readily available bio-mass, and some peak electrical demand periods.**
- The premium is generally 1-3 US c/kWh. (NO_x, SO_x and CO₂ credits might become 0.5-1 US c/kWh.)**



THE COST IMPACT

At a premium of 1 US c/kwh (or 1 US c/10K Btu.) a 10% renewable energy mix would cost, annually:

- US\$ 10×10^9 (!) for the United States' 100×10^{15} Btu. energy demand
- A proportionally smaller cost for Mexico and Canada, but still very large compared to their economies
- US\$ 20×10^6 for a corporation with an energy demand such as DuPont's



BUSINESS IMPLICATIONS

- **Industries whose energy demand is heavily thermal, instead of electrical, would do better by pursuing combined heat and power generation.**
- **Industries with constant energy demand (daily, weekly and yearly), are poorly matched for intermittent renewable electricity and will pay an additional premium for their back-up supply.**
- **Industrial sites of this nature are far better off spending their capital and engineering talent on energy efficiency. The environmental benefit of that is also greater.**



COST IMPLICATIONS

- **Industries, acting solely with their own resources, will not be able to afford large renewable electricity programs.**
- **Presently, large renewable electricity programs will not be sustainable without government support or requirements.**
- **Renewable portfolio standards seem the best mechanism for advancing renewable energy, particularly for electricity.**



RENEWABLE PORTFOLIO **STANDARDS SHOULD**

- **Enable the energy markets to function in a way that selects the lowest cost options**
- **Concentrate on simple, predictable and evolutionary programs consistent with a clear strategic plan**
- **Facilitate renewable energy, broadly, without selecting a technology in advance.**



RENEWABLE PORTFOLIO **STANDARDS SHOULD BE**

- **Tailored to the different segments of the energy market (e.g. electrical, mobile fuel, stationary fuel)**
- **Drawn from all the various renewable energy sources**
- **Based on free market trading of the “renewable energy credit”**
- **Facilitated by broad trading of credits**



ADDITIONAL OBSERVATIONS

- **Recognize unequal resource distribution**
- **Remove barriers to flexibility of supply**
- **Support R&D for emerging technologies and help those new technologies grow to adequate market size**
- **Remove regulatory barriers (e.g. Projects may trigger extensive regulatory reviews)**
- **Promote co-generation (CHP) including the ability to connect to grid, obtain emergency backup power and “sell” excess power.**



Thanks for your time !!!

