

Upside Down and Inside Out

The Rational for 100% Distributed
Renewable Energy

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The New Paradigm: Wind, Solar and biofuels are now the least cost new energy

- All the thinking and analysis in the public utility sector is turned **“upside down”**.
- Many coal and many atomic power plants are “underwater”. The big question is “how do we close these plants and manage the shut down expenses at minimal cost to the public.”

New “upside down” thinking: 20 X 20 - Coal Portfolio Standard (CPS)

- Policy to reduce reliance on coal fired generation to 20% by 2020
- Target zero percent (0%) by 2025
- Utility generators obligated to achieve 20% coal fired generation with policy to allow shutdown cost to pass through
- Provide re-training funds for power plant technicians to enter distributed renewable energy field

No new transmission line

Expenses: Build the grid from inside out.. (upside down thinking)

- With distributed wind, solar and CHP most of all electric power can be local.
- Local distribution grid improvements are needed. This is where the grid work should primarily be done and the money spent, LOCALLY for:
 - Local energy storage and controls
 - Connecting local distributed solar, wind, CHP, etc.
 - Management and monitoring of wind and solar
 - Electric vehicle charging and energy storage
 - Transition from fossil heating to renewable electric heating with storage, heat pumps, etc.

New Policy Proposals

- Eliminate the 1% limit regulated electric utilities have on “net metering” and have unlimited amounts at distribution level generation
- Eliminate the limited 10% renewable portfolio standard (RPS) and Change to 100% by 2025
- Eliminate the 10% cap on “customer choice” programs for local distribution level renewable power sources
- Implement the 20% by 2020 (20 x 20) Coal Portfolio Standard (CPS) – Implement 0% CPS by 2025.
- Implement a carbon tax for electric generation and gas supply of 1 or 2 cents per kW-hr (In Michigan = \$1 – \$2 Billion/year (proportional to carbon emissions) to help fund transition to 100% RE and provide energy efficiency assistance

THE POTENTIAL OF RENEWABLE ENERGIES WORLDWIDE

hydropower
 4.6×10^{13} kWh

biomass
 152.4×10^{13} kWh

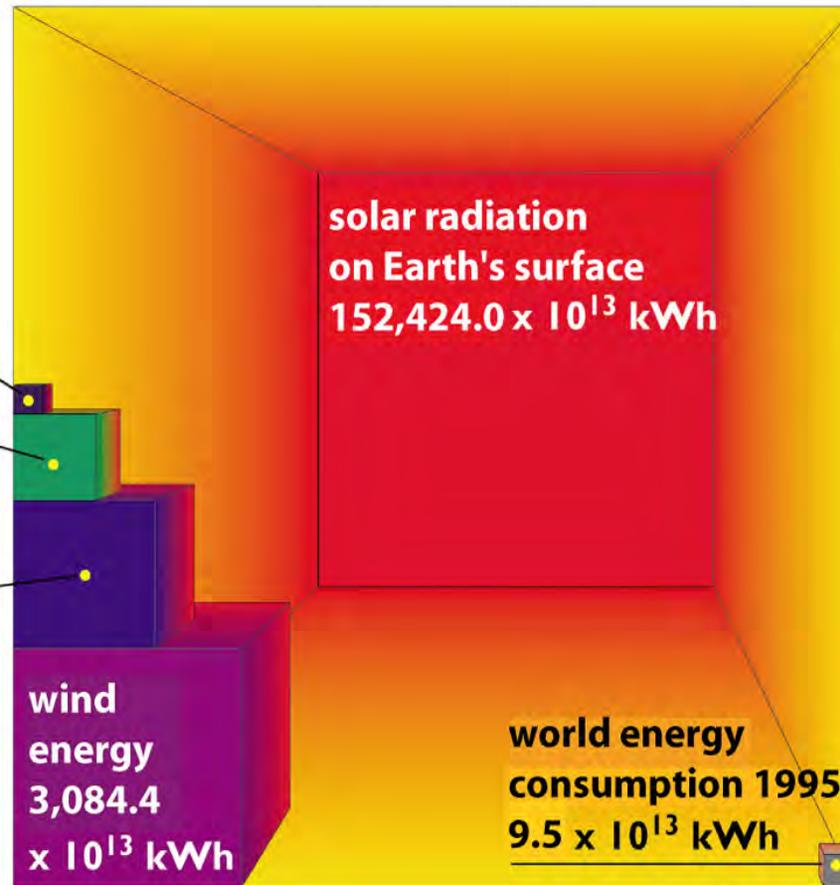
**energy of the
waves & sea**
 762.1×10^{13} kWh

Source:
Eurec. Agency/Eurosolar, WIP:
Power for the World – A Common Concept

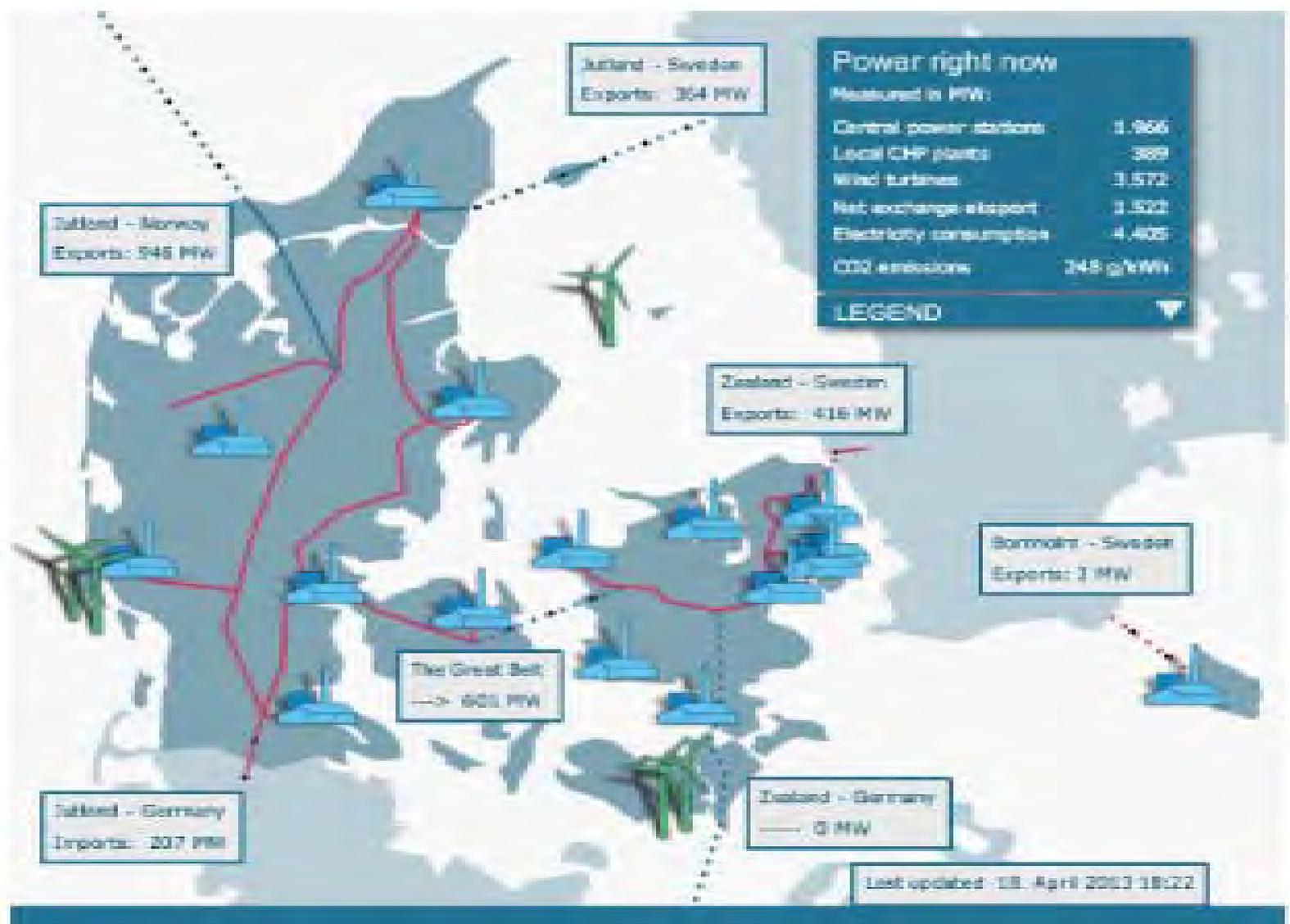
**wind
energy**
 $3,084.4$
 $\times 10^{13}$ kWh

**solar radiation
on Earth's surface**
 $152,424.0 \times 10^{13}$ kWh

**world energy
consumption 1995**
 9.5×10^{13} kWh



Denmark - April 18, 2013 - 81% Wind Power



Is there enough solar energy in Traverse City?

- This area, in the green line, in Traverse City, MI receives 4.3 billion kW-hrs of solar energy insolation per year.
- 12% of the area with 15% solar PV electric efficiency (today's technology) would produce 78 million kW-hrs per year.
- What is the electric consumption of this area?
- 78 million kW-hrs/yr!!



Real & Potential Examples of 100% RE – and the 100% Renewable Energy Movement

- Wal-Mart – 100% by 2020
- Jim W: House and car 100% Solar Electric
- Northport Creek Golf Course: 100% Solar in 2013
- TC West Side: 100% Solar
- Traverse City – 100% RE by 2025
- Habitat for Humanity – 100% solar coming
- NEAT (Northport) Members: LCE, homes, Township..
- Hemlock Semiconductor – 400 MW + solar potential
- Ski and golf resorts can easily be 100% renewable
- Danish communities, Thy, etc. 150% wind powered

Rapid Change in the Transition to the Solar Economy

- 82% of new USA electric generation first quarter 2013 was renewable
- 70% of new generation in 15 state Midwest Independent System Operator (MISO) region in 2012 was wind power
- If EPA finally issues new pollution rules MISO predicts 12,000 MW's of grandfathered (dirty) coal fired generation will shut down in its system (Consumers Energy peaks at 8,800 MW, Traverse City at 70 MW)
- Denmark is running on wind power often at 50% to 80% of the electric supply.
- The Province of Ontario is shutting down all coal fired generation
- Edison Institute reports major shift to Distributed Energy.
- NRG President (one of largest USA utilities) "warns" solar roofs will displace electric utility power while natural gas kills coal and atomic power.
- Wal-Mart going 100% solar by 2020
- Homes, businesses, institutions can be 100% renewable with a good investment return. NOW
- Wind power competes with retail natural gas prices for heating. Wind power beats "fracking"

The Value of Solar Electric

- Solar electric power (PV) is a daytime “peaking” power source and any economic comparison must be made with other peaking power generation costs.
- When solar PV costs are evaluated with “apples to apples” financing, environmental benefits, supply chain savings, transmission savings, etc. no new generation sources can compete except for wind and CHP natural gas (while gas prices are low).
- The true value of solar PV to an electric utility is at the RETAIL utility price - or higher! Therefore “net metering” should be encouraged and expanded as much as possible. This will improve our utility economics.

The Value of Commercial Wind Power

- Recent bids for commercial wind power in Michigan have been under 5 cents/kWh.
- On a windy night the marginal cost of wind power can be 2 cents/kWh.
- Wind power can be stored in hot water, with or without heat pumps, for heating at a lower cost than natural gas--and used for cooling.
- Wind power controls can be used to improve utility grid power quality, providing added benefits to electric utilities.

The Value of Local Solar and Wind Electric, Continued. Benefits include:

- Avoided energy costs
- Avoided capacity costs for solar peak generation
- Reduced costs for ancillary services
- Lower line losses for transmission and distribution
- Reduced investments in T&D facilities
- Lower costs for the utility purchase of other renewable generation
- Local economic multiplier benefits, 2 times or more
- Significant and yet undervalued external environmental cost benefits: health, heart and lungs, less mercury in fish and people, fights against global warming.



Do We Have the renewable technology Resources to achieve 100% by 2025? YES!

- Solar PV? – Hemlock Semiconductor (Saginaw) (Dow Corning/Japanese) 3,500 MW of solar material per year!
- Over--supply of solar PV production capacity in world – as well as solar thermal
- Many major wind manufacturers ready and able to ramp up.
- Much hydro and biofuel generation capacity exists and is ready to go forward

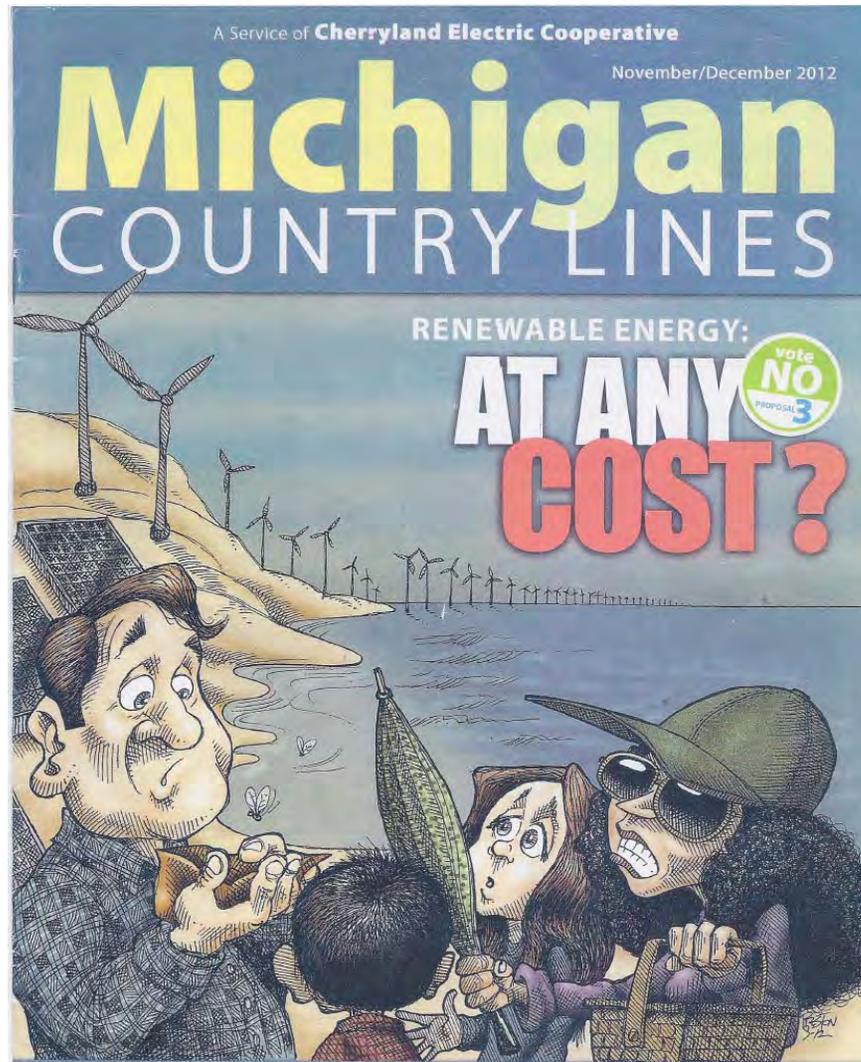


Policy Initiative - STOP WASTE - Protect our water and use energy efficiently

- STOP WATER and ENERGY WASTE:
 - Tax water waste used for fracking and central power plant cooling
 - Stop the large amount of water wasted in “fracking”.
 - Tax and reduce the large amount of water wasted for coal and atomic power plant cooling
 - Burn natural gas efficiently (a non-renewable fuel). It must only be allowed to be used at 75% plus efficiency for heating and electric generation.
 - Low cost energy efficiency programs must be funded, financed, subsidized and accelerated

How Do We Change To Upside Down Thinking?

- No electric utility manager or utility board can now say “we cannot afford renewable energy”.
- We cannot allow more false claims and economic deceptions by our public utility servants, as illustrated in the 25 x 25 Proposal 3 initiative for renewable energy



Economic Benefits of Going 100% Renewable Energy

- City of Traverse City: \$320 million + NPV
- Individual businesses and homeowners – 8%-10% return on investment with 6 – 10 year simple payback
- Local utilities can distribute **MORE** electric energy increasing sales, not less, but only by displacing non-renewable energy, coal and natural gas
- Creating jobs and money from local utility, construction, electrical and mechanical work—keeping money at home!
- Local economic multiplier effects 2 X plus.



Thank you for listening

Governor Synder

John Quackenbush, MPSC Commissioner

Steve Bakka, MEDC Energy Director:

Respectively submitted:

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