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INFORSE
International Network for Sustainable Energy



Centre for
Alternative
Technology



Getting Ready for Zero Emissions and 100% Renewable Energy: Plans
and Scenarios to Pave the Way for the Transition
10 December, 2015 - 11:15-12:45 - Room 2
Side event to the UNFCCC COP21, Climate Generation Area, Paris, France

“THEY REGION, DENMARK - SINCE 2007 100% RENEWABLE ENERGY - AND BEYOND”,

Preben Maegaard

Director (ret.) Nordic Folkecenter for Renewable Energy

Founding President, World Wind Energy Association

Chairman, WCRE, World Council for Renewable Energy

www.folkecenter.net

*The event was organised by Nordic Folkecenter for Renewable Energy (Denmark) & NegaWatt (France) in cooperation with INFORSE, Track 0, Centre for Alternative Technology – CAT (UK).
The event was part of the “Climate Generation Area” Conference organised by the French Government parallel to the UNFCCC COP21- www.cop21.gouv.fr/en/les-espaces-generations-climat/*

100% Renewable Energy in Denmark

- ❑ You may know the Samsøe island with its 4 000 people
- ❑ You may not know the Thy region with its 46 000 people

The Thy Region was Pioneer within Community Power since 1981

- Community power is owned and operated by the community
- Wind power, solar thermal and power, biogas, biomass, and combined heat and power, CHP, and storage are basic community power technologies
- Financial benefits are returned to the community
- Community choose what infrastructure fits best to its needs and is economically efficient.

Community Supply of Electricity

Thy Region:

- 219 windmills
- 113 MW installed wind capacity
- 36 MW installed CHP capacity
- 2012: **power production** from wind energy of **297 GWh**
- 2012: **power consumption** of **322 GWh**
- **Electricity Consumption**
- 92% from wind
- 11% from biogas and CHP waste
- a small amount of PV





Nordisk Folkecenter

for Vedvarende Energi



Electricity 100%

of consumption in Thy
in 2012 was produced
fossile free

**with 3% surplus
for export**

Source: Danmarks Statistik

Wind: 297 GWh

Kilde: I/S Kraftvarmeværk Thisted

Waste: 20 GWh

Kilde: Thisted Rensningsanlæg + 4 aktører

Biogas: 9 GWh

Kilde: Thy-Mors Energi og Energi Hurup

Solar: 6 GWh

Fossile free total 332 GWh

Kilde: Thisted Kommune

Power consumption: 322 GWh





Small Wind Power, 6/10 kW for Rural Households. 70 installed since 2011



Vorupör, Community Combined Heat & Power 1,8 MW_{el}, 800 Inhabitants



EUROPEAN SOLAR PRIZE 2007

□ Mayor Erik Hove Olesen states:

"I am very proud and grateful that we today receive this award. Not us as authorities have the honour. Our 46.000 citizens, the Folkecenter and our 1700 local companies made the change. The many windmill owners, the farmers that have biogas plants and the community utilities, they have together made Thy self-sufficient with energy."

Dr. Hermann Scheer gives the Award to the Mayor



THE FUTURE FOR THY?

- **Since 2007 NO new wind turbines**
- **Since 1998 NO new community power**
- **The population is FOR wind power; they protest against investor wind projects**



In 2012 the local municipality declared:

Future wind projects must have the acceptance of the local residents.

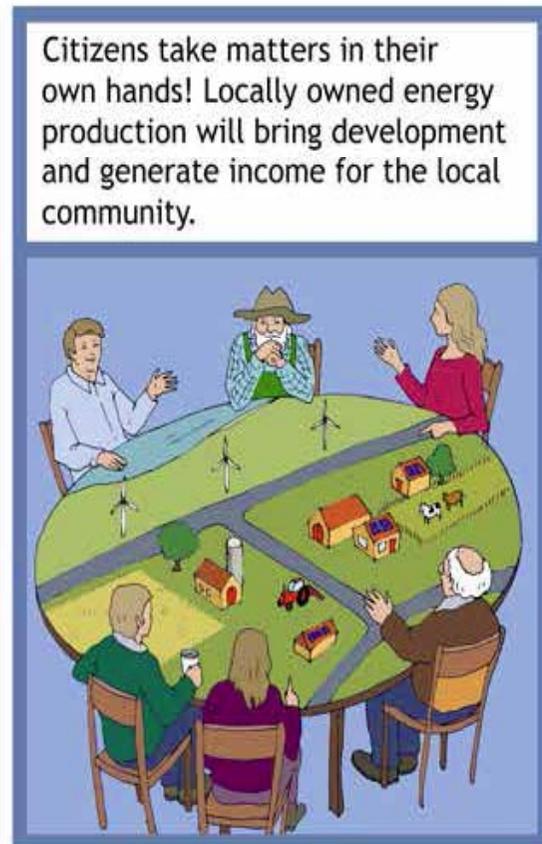
But is Energy Democracy possible?



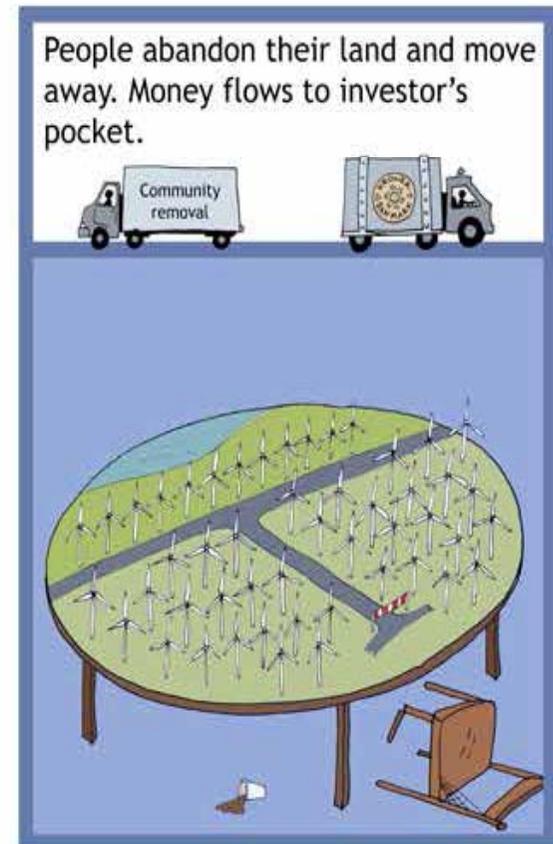
COMMUNITY WIND POWER for the World

Energy Democracy
Local Acceptance
Community Development
Lower Electricity Prices

Not 20% - but 100% local ownership as the alternative to external investors.

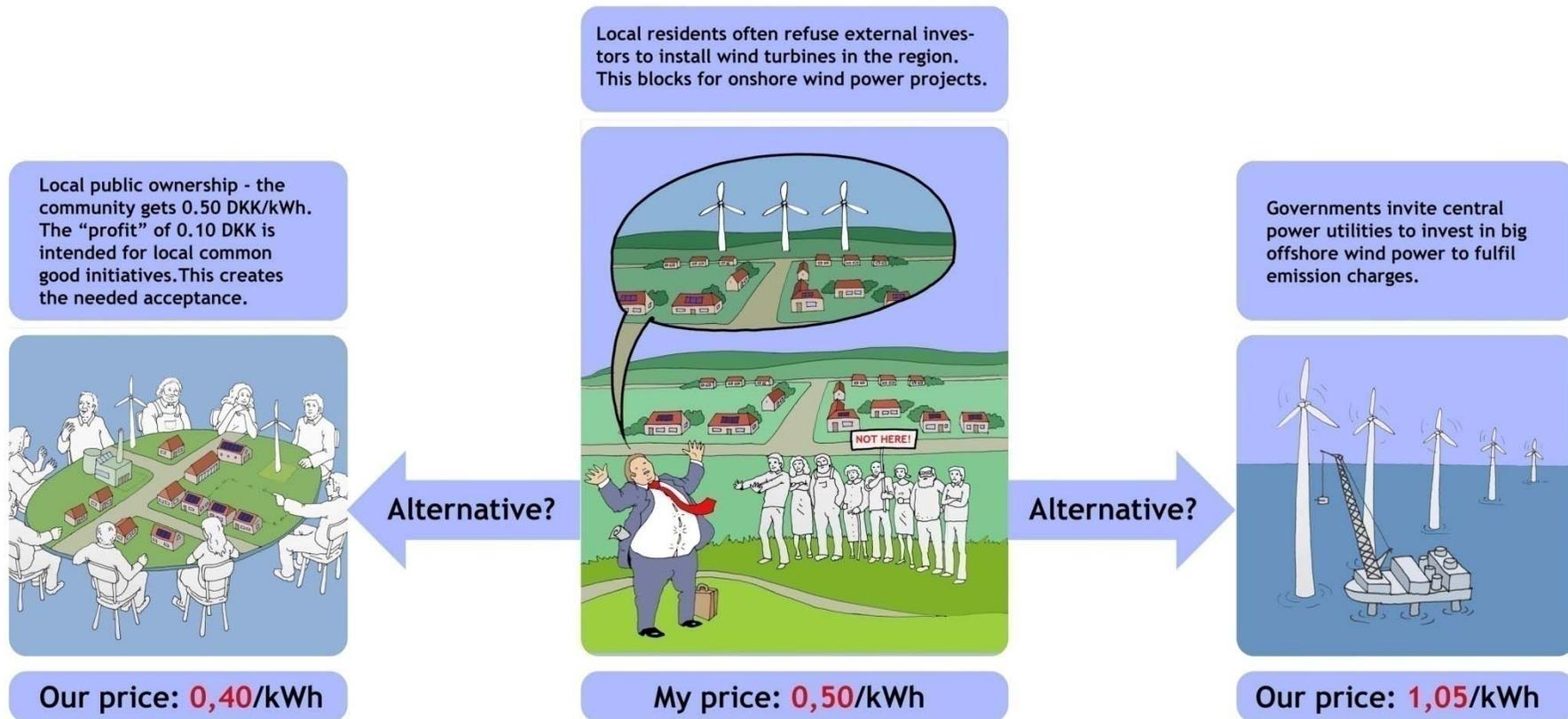


OPTION 1.



OPTION 2.

Welcome to Community Wind Power. It is cheaper as well!



Wind power prices in Denmark

ECONOMY OF ONSHORE AND OFFSHORE WIND POWER

WIND POWER COSTS



*Compared to onshore,
OFFSHORE wind energy
is an ECONOMIC
DISASTER!*

*Innovative
tariff model with
ACCEPT BONUS
leads to low electricity
prices, local acceptance
and development.*

Total wind electricity
production cost:
5 € cts/kWh

Electricity
production costs:
3 € cts/kWh

ACCEPT BONUS
for the community
2 € cts/kWh

BONUS for the
community:
**€ 0,3 million/year
per wind turbine**

(15 GWh x € cts 2 /kWh)
Subsidy, 50.000 full load hours;
similar to offshore in Denmark,
but with 5 times less total public subsidy.

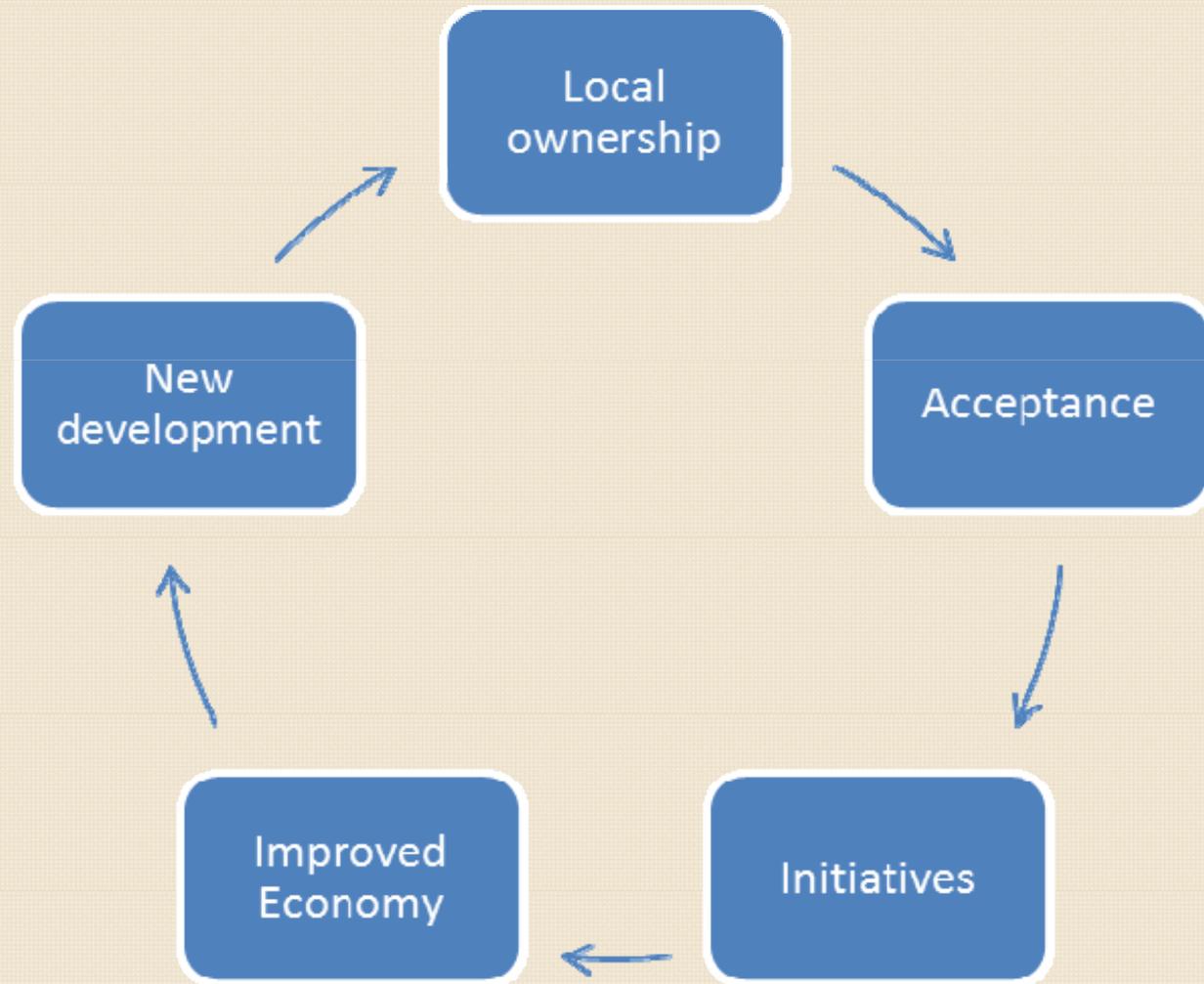
EXAMPLE OF NEW COMMUNITY WIND POWER ECONOMY

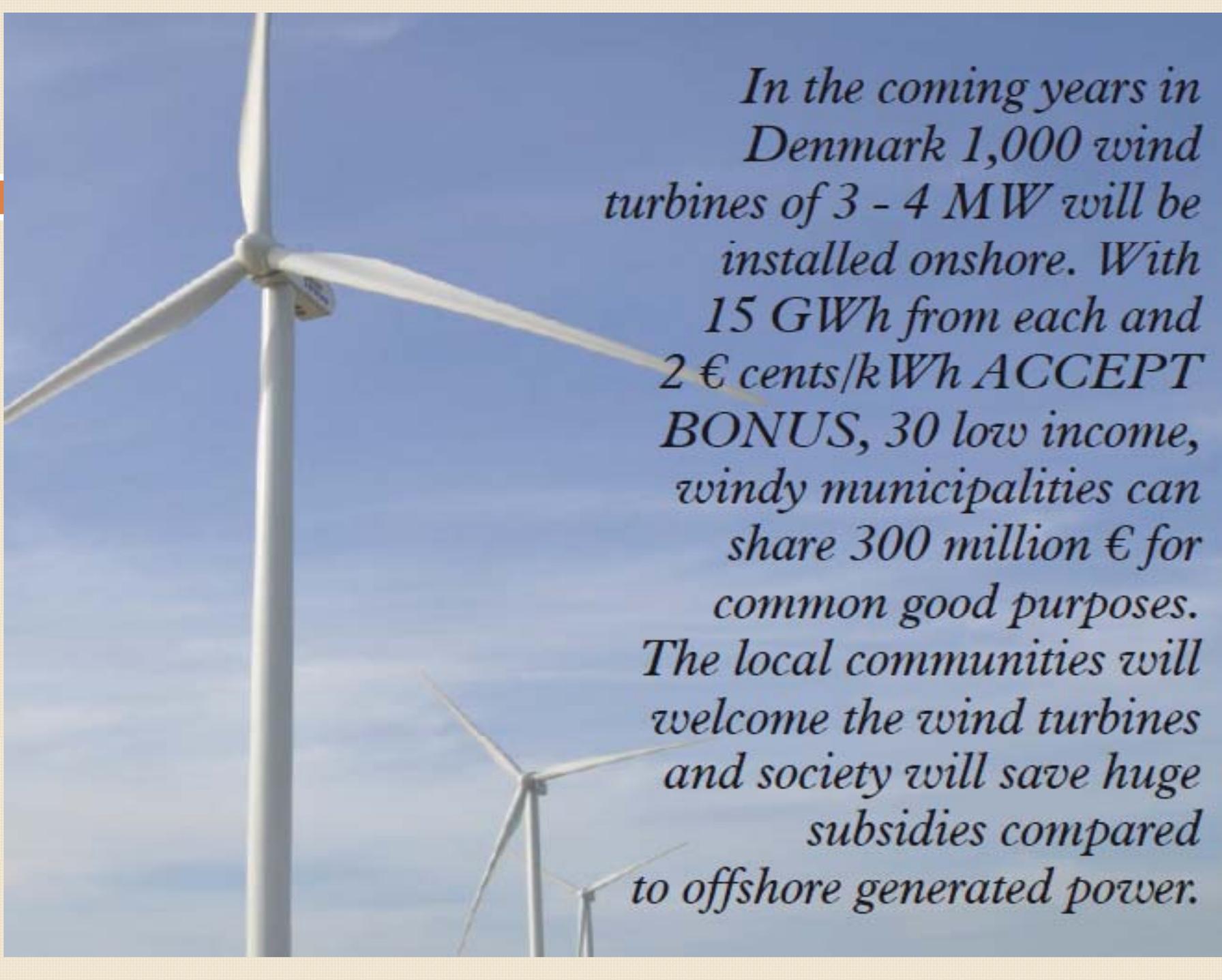
- 3 MW wind turbine
- 15 GWh/year (West coast of Denmark)
- Costs of wind turbine installed: € 4 million
- Electricity production cost: 3 € cts/kWh with:
 - 20 years linear depreciation
 - 4% interest
 - O&M costs: 0,8 € cts/kWh
 - Land costs as for other common good infrastructure

ACCEPT BONUS FOR THE LOCAL COMMUNITY

- The **ACCEPT BONUS from renewable energy projects will benefit the residents of local communities**, i.e. the main objective is achieving the **common good**.
- In contrast, the main objective of commercial ownership models is **to generate private profit**.

Acceptance and New Economy with Community Power





In the coming years in Denmark 1,000 wind turbines of 3 - 4 MW will be installed onshore. With 15 GWh from each and 2 € cents/kWh ACCEPT BONUS, 30 low income, windy municipalities can share 300 million € for common good purposes. The local communities will welcome the wind turbines and society will save huge subsidies compared to offshore generated power.

COSTS OF NEW ENERGY MATTERS

Onshore Wind (5 €cts/kWh) compared to:

- **Offshore 9 to 19 € cts/kWh paves the way for**
- **Atomic energy, Hinkley Point C, UK, 3600 MW: 12 € cts /kWh, (guaranteed for 35 years)**

At the previous 20 COP meetings the states of the world failed to make an agreement because the transition from fossil fuels was too costly. Not least therefore the energy costs aspect is crucial.



Is Wind Power for the Common Good? Is FIT the Future?

- FIT – over time lead to capitalization costs of land that can be exorbitant – more than the costs than the wind turbine!
- Compensation to land owners is standard practice for common good projects such as transmission towers, roads, railways, airports, harbours etc. Leads to much lower overall costs (for windmills a factor of 100 or more).

**Real World Example:
Hvide Sande, fishery harbour Denmark:
100% local acceptance**



Book: Off-grid Renewable Energy

Distributed Renewable Energies for Off-Grid Communities. ISBN 978-0-12-397178-4, Trim 229mmx152mm

Spine 26.98

Energy/Engineering

DISTRIBUTED RENEWABLE ENERGIES FOR OFF-GRID COMMUNITIES

Strategies and Technologies toward Achieving
Sustainability in Energy Generation and Supply

Nasir El Bassam
Preben Maegaard
Marcia Lawton Schlichting

- Helps you to choose the optimal decentralized energy solutions to address your specific off-grid power supply challenges
- Includes coverage of wind, solar and biomass applications for both rural and urban communities
- Over 200 charts and diagrams, together with case studies and equations, provided as tools for concrete analysis

It is estimated that more than two billion people worldwide lack access to modern energy resources. Renewable energy has the potential to bring power to these many communities and individuals who function off the grid. *Distributed Renewable Energies for Off-Grid Communities* describes the latest advances in distributed and off-grid renewable energy technologies and offers strategies and guidelines for planning and implementation of sustainable, decentralized energy supply. Coverage includes wind, solar, geothermal, and biomass systems planning and integration, economic assessment models and the role of legislative structures.

Related Titles

Sørensen, *Renewable Energy, Fourth Edition*, 978-0-12-375025-9

Sioshansi, *Smart Grid*, 978-0-12-388452-9

Clark, *Sustainable Communities Design Handbook*, 978-1-85617-804-4



www.Elsevier.com

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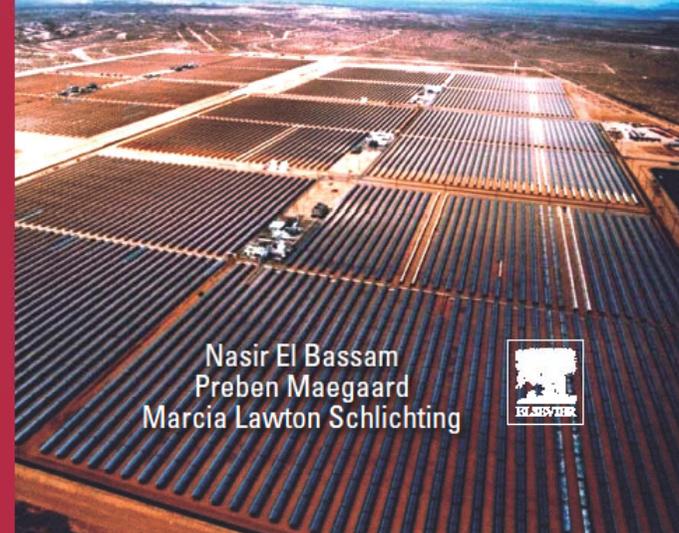


El Bassam
Maegaard
Schlichting

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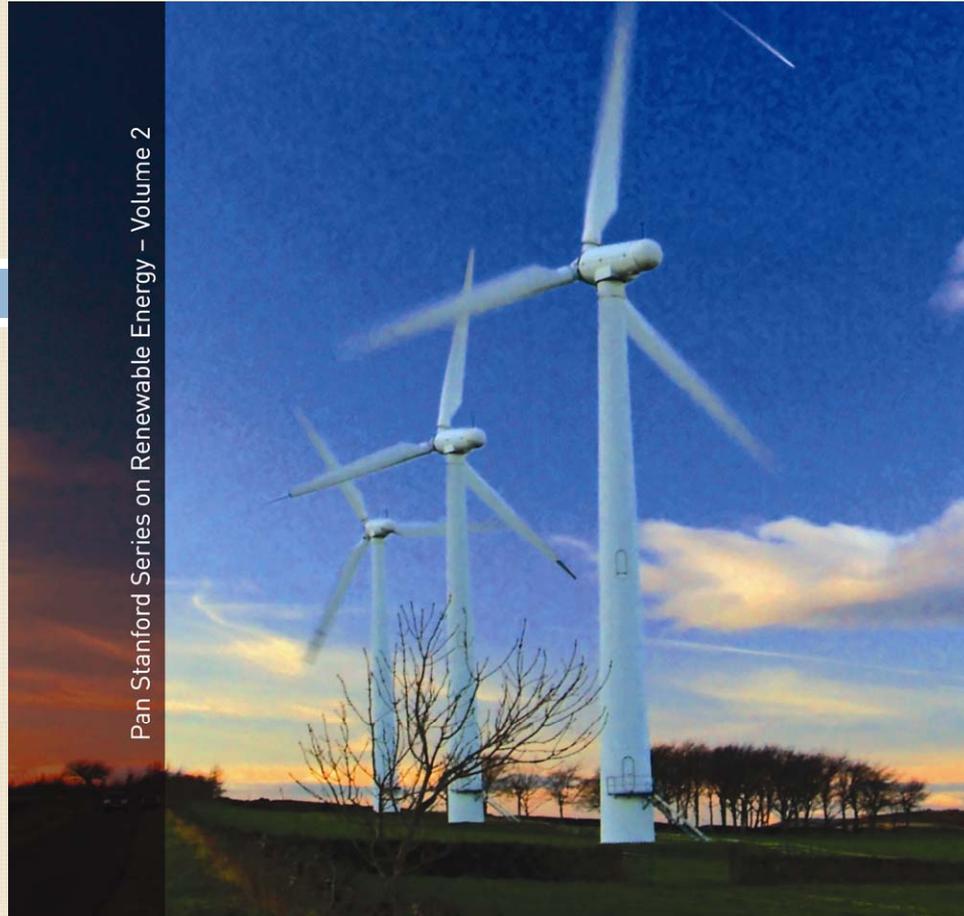


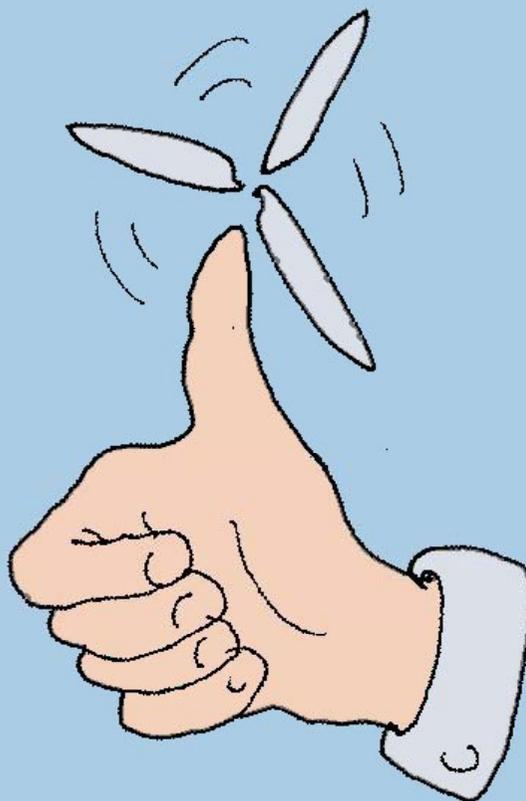
Pan Stanford Series on Renewable Energy – Volume 2

Preben Maegaard
Anna Krenz
Wolfgang Palz

The Emergence of Wind Energy

POWER for the World





END

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