Social Acceptance of Renewable Energy

Martin J. Pasqualetti, Professor, School of Geographical Sciences and Urban Planning
Senior Sustainability Scientist, Global Institute of Sustainability
Arizona State University
Pasqualetti@asu.edu

Social Acceptance of Renewable Energy Landscapes

- Resource
- Technology
- Natural conditions
- Culture
Resource

Geothermal
- Site specific
- Low efficiency
- Large well field
- Thermal cycle
- Baseload power
- Cooling water

Solar
- Site flexible
- Low energy density
- Stationary
- No emissions
- No water

Wind
- Site specific
- Sensitive to diameter
- Sensitive to wind speed
- Movement
- No emissions
- No water
# Technology

<table>
<thead>
<tr>
<th>Geothermal</th>
<th>Solar</th>
<th>Wind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash system</td>
<td>PV vs CSP</td>
<td>Height</td>
</tr>
<tr>
<td>Binary system</td>
<td>Stationary</td>
<td>Diameter</td>
</tr>
<tr>
<td>Emission control</td>
<td>Tracking</td>
<td>Blade design</td>
</tr>
<tr>
<td>Waste water</td>
<td>Heliostat op</td>
<td>Finish</td>
</tr>
<tr>
<td></td>
<td>Cell material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage type</td>
<td></td>
</tr>
</tbody>
</table>
Natural Conditions

- Topography
- Vegetation
- Climate
- Wildlife
- Water depth (wind)
Culture

- History of settlement
- Density of population
- Land use and tenure
- Public perceptions
- Economic returns
- Quality of life
- Community values
Geothermal
Resistance to Geothermal: Recreation
Resistance to Geothermal: Agriculture
Solar Energy
Solar Projects Draw New Opposition
Claim: “Big Solar” uses land

- The push for Big Solar promotes the permanent destruction of hundreds of thousands of acres

“TRIBE SUES TO BLOCK DESERT SOLAR PROJECT; PROTESTERS GATHER IN OCOTILLO TO OPPOSE ONE OF WORLD'S LARGEST SOLAR PROJECTS”
— East County Magazine, Nov 17, 2010

“To me, it is a genocide of our tribal ways and culture.

“All this electricity and who gets it? Not us.”

http://www.eastcountymagazine.org/node/4801
WIND POWER IN VIEW
ENERGY LANDSCAPES IN A CROWDED WORLD
martin j. pasqualetti, paul gipe, robert w. righter
Wind in Scotland

Stirling Castle

Stirling Castle and the 72 MW Braes O'Doune Windfarm

Anger as new North-East wind farm plans are unveiled

Protest at gale force

By Robert Brooke

Controversy has been reignited over the proposed 72 MW wind farm which is to be sited near O'Doune.

The plans for the new wind farm at Braes O'Doune near Stirling have been met with widespread opposition.

The project, which will involve the construction of 15 turbines, is expected to cost £200 million and will generate enough electricity to power 50,000 homes.

However, residents in the area have expressed concerns about the impact of the turbines on their quality of life.

One resident, who lives near the proposed site, said: "I'm worried about the noise and the visual impact of the turbines."

"I don't think it's a good idea to sit so close to the town and have these huge structures towering above us."

"I think it's an excellent opportunity for the country to do something about the environment, but not at the expense of people's lives."

The council is due to make a decision on the plans in the coming weeks, and a public meeting is scheduled to discuss the issue further.

"We are aware of the concerns raised by residents," said a council spokesperson.

"We are working closely with the developers to address these concerns and ensure that the plans are as good as possible for the local community."

"We will be making a decision on the application in the coming weeks, and we will ensure that the public is kept informed of the progress."
Scots Expressing Love for Wind Power

Source: http://www.auchencorth.org.uk/. PEPA (Penicuik Environment Protection Association) was formed by residents of Penicuik, Carlops and Howgate communities to protect Auchencorth Moss near Penicuik from EON's proposal to build 18 x 2.5 MW wind turbines.
Isle of Lewis, Scotland
Studies show that La Venta has some of the best winds in the world, with constant steady winds of 9 to 14 meters per second while most places only have 2 to 5 mps.
Resistance to Wind Projects in Oaxaca

Si los siembran hoy, ¿qué cosecharemos mañana?

El istmo es nuestro,
por el bien de tus hijos
¡informate y Pasa la voz!

Por un proyecto justo,
antes de firmar, organize.

Espacio de Comunicación del Istmo

Opposition - Palm Springs
Growing Acceptance
Sequence of Acceptance

Based on research by Maarten Wolsink
Renewable Energy is Minor at Present

Moving the Needle
Reality Check

- Limited Penetration – RE is a small contributor
- Inertia - an existing system is already in place
- Profits – existing approach makes money
- Status quo – introducing RE suggest change
- Technology – conventional reserves are growing
- Population – people are everywhere
- Differences – Approaches cannot be the same
- Finite resources – conventional won’t last forever
Even the most optimistic estimates for future fossil fuels do not solve the problem.
How Do We “Move the Needle” to a Renewable Energy Future?
Moving the Needle
Short and Long Term

- **Short-term**
  - Avoid unnecessary conflicts
  - Make it profitable

- **Long-term**
  - Make it simple to accept and implement
  - Work to change policy (and policy-makers)
  - Remove competitive subsidies to conventional fuels
  - **Educate** (e.g. stakeholders, policy makers, and the public)
Moving the Needle
Educate

Saving the small family farm in Illinois. 

An example of NIMBY becoming PIMBY
Wind Turbines: Compatible with Birds

Causes of Bird Fatalities, Number per 10,000 fatalities

For the entire fuel cycle, solar energy & coal use comparable amounts of land.

The growing costs of fossil fuels
Water Use in Arizona
Rise in the Water Costs of Power

Average Gals/MWhr*

* For Arizona power consumption. Note logarithmic scale. First-sale only.

Moving the Needle
Motivate

- **Carrots**
  - Make it profitable
  - Make it easier
  - Make it acceptable

- **Sticks**
  - Make polluters pay
  - Publicize failures and costs
Moving the Needle
Mitigate

Understand problems and offer solutions
From this....
....to this

P.S. That's not wind. We're blowing you a kiss. Love, Palm Springs
The Future of Renewable Energy Will Require Recognizing that.....
Energy is a social issue with a technical component, not the other way around.