

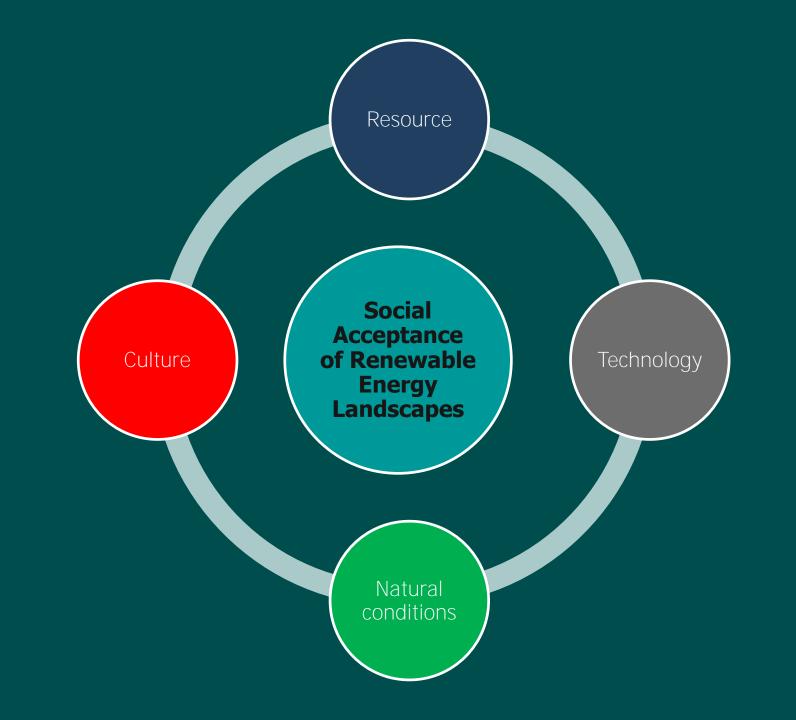




## Social Acceptance of Renewable Energy

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## 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

#### Geothermal

- Flash system
- Binary system
- Emission control
- Waste water

#### Solar

- PV vs CSP
- Stationary
- Tracking
- Heliostat op
- Cell material
- Storage type

#### Wind

- Height
- Diameter
- Blade design
- Finish

## **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

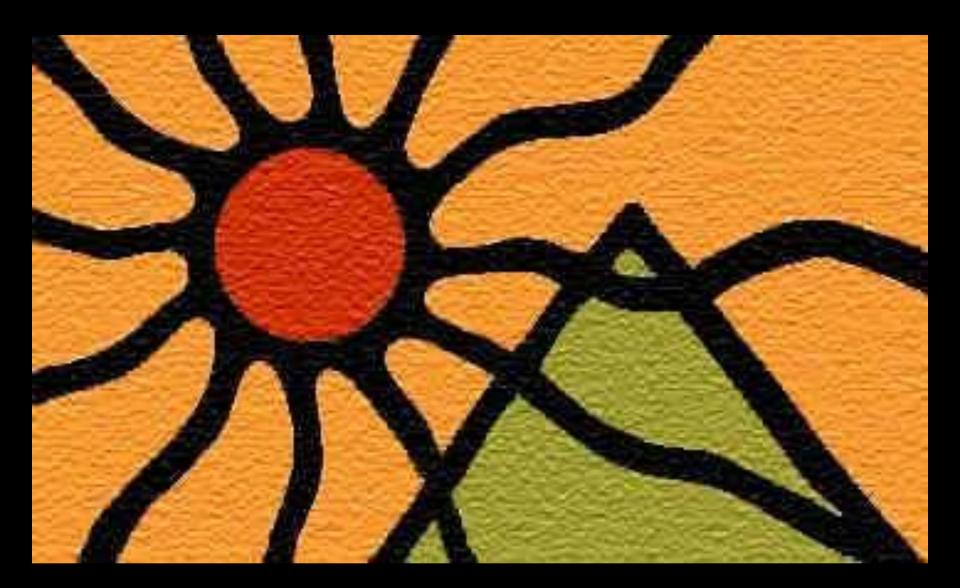


# Resistance to Geothermal: Recreation





## Solar Energy



## The New York Times

Solar Projects Draw New Opposition



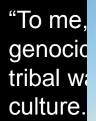
September 24, 2008, on page SPG2 of the New York edition

## 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



"All this electricity and who ge us."









# POWER IN VIEW

ENERGY LANDSCAPES IN A CROWDED WORLD

martin j. pasqualetti, paul gipe, robert w. righter





Canada



France

Australia



England

Stirling Castle

Teenlay, April 17, 2407

## Protest at gale force

By Robert Brooks

DOCUMENTS OF STREET

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#### Ruining the clean lines of the hills'

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#### Stirling Castle and the 72 MW Braes O'Doune Windfarm

#### Action group campaigners say three into one just won't go

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## Scots Expressing Love for Wind Power



Source: <a href="http://www.auchencorth.org.uk/">http://www.auchencorth.org.uk/</a>. 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

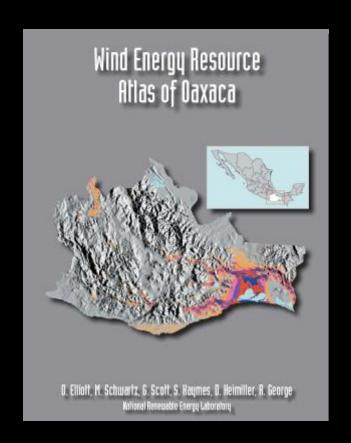
## Isle of Lewis, Scotland

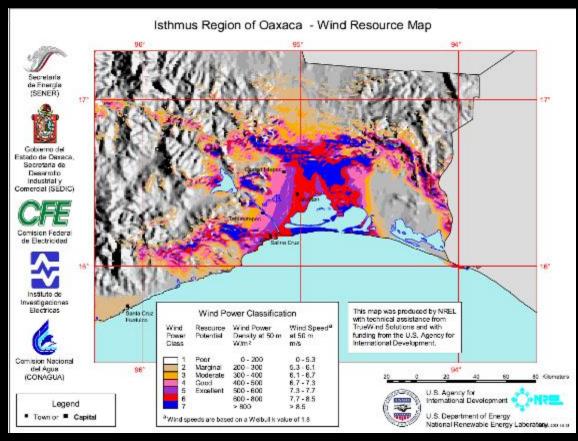


## NO WIND FACTORY



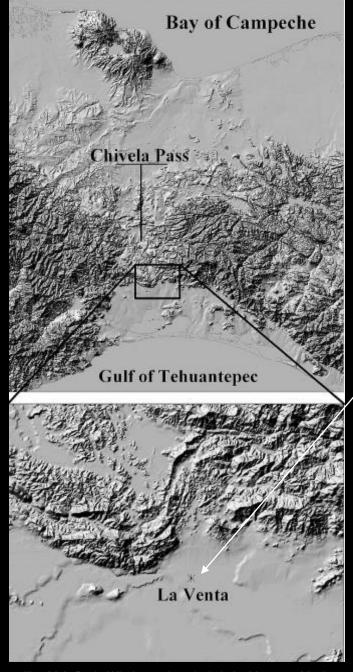
## Wind in Oaxaca, Mexico





Source: NREL/TP-500-34519

M.J. Pasqualetti. Opposing Wind Energy Landscapes: A Search for Common Cause. *Annals of Association of American Geographers*. July (forthcoming)



### Chivela Pass region and La Venta



Source: <a href="http://www.yachana.org/reports/mex07/uploaded images/IMG 9388-721217.JPG">http://www.yachana.org/reports/mex07/uploaded images/IMG 9388-721217.JPG</a>

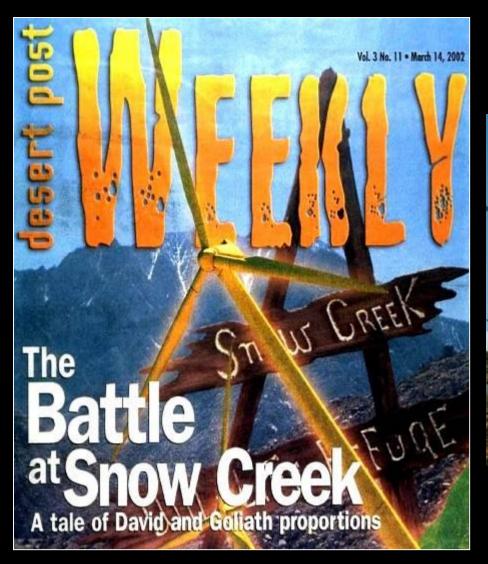
Studies show that La Venta has some of the best winds in the world, with constant steady winds of 9 to 14 meters per second while most places only have 2 to 5 mps.

# Resistance to Wind Projects in Oaxaca



Source: Assembly in Defense of Land and Territory. Protests in Juchitan against wind companies. http://www.anarkismo.net/article/9779

## Opposition - Palm Springs

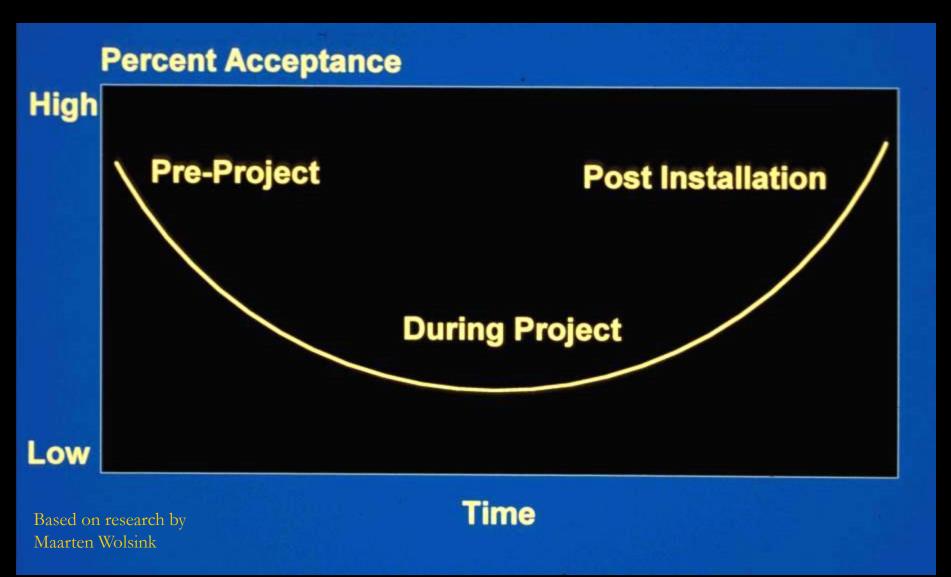




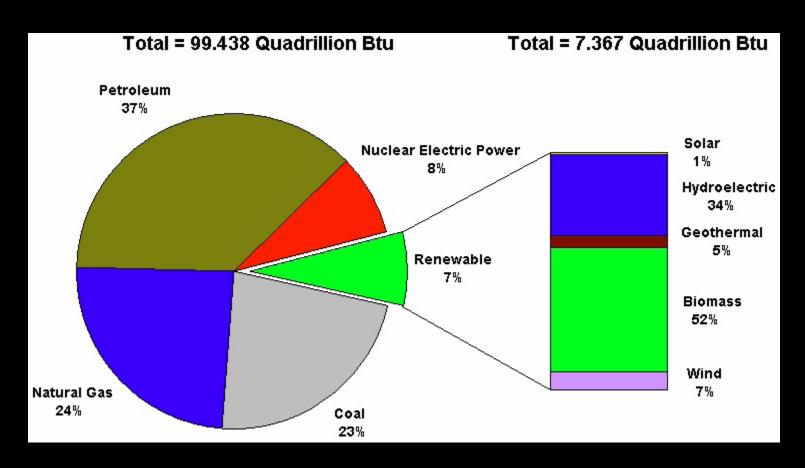
## Growing Acceptance



## Sequence of Acceptance



## Renewable Energy is Minor at Present



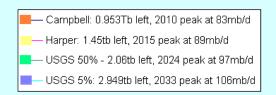
Source: U.S. EIA http://www.eia.gov/cneaf/solar.renewables/page/rea\_data/rea.pdf

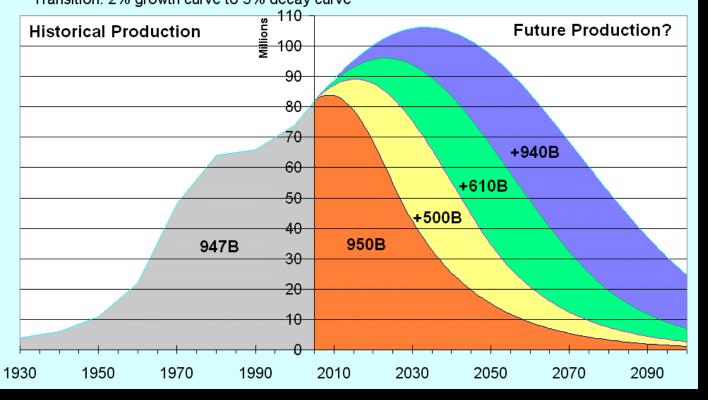
## Moving the Needle Reality Check

- 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**



World consumed ~960 Billion barrels: 1930-2004 ~0.95, 1.45, 2.06, 2.95 trillion barrels remaining Transition: 2% growth curve to 5% decay curve





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?

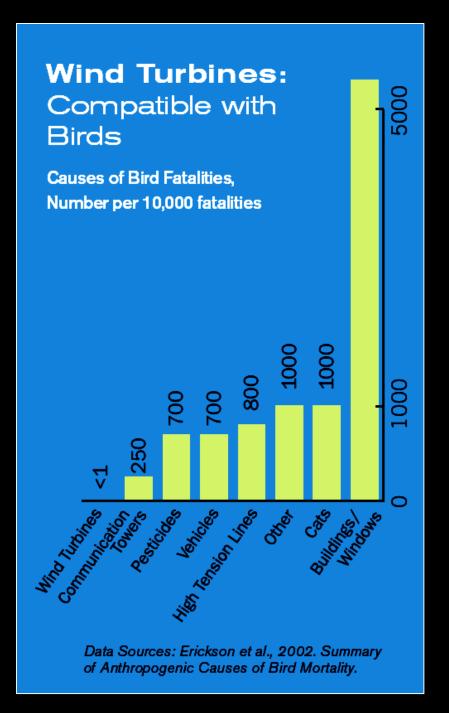
## Moving the Needle Short and Long Term

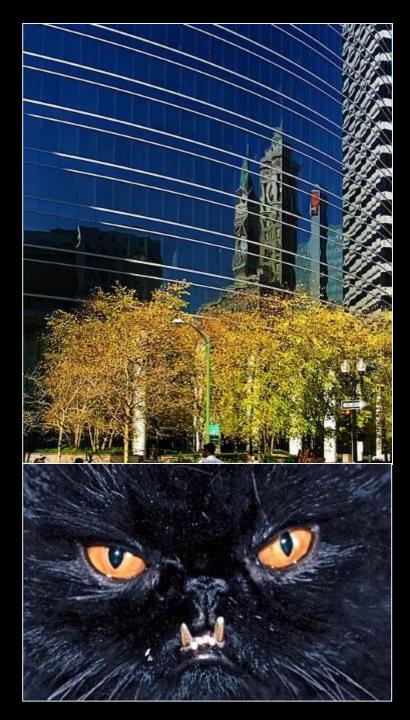
- Short-term
  - Avoid unnecessary conflicts
  - Make it profitable
- Long-term
  - Make it simple to accept and implement
  - Work to change policy (and policy-makers)
  - Remove competitive subsidies to conventional fuels
  - Educate (e.g. stakeholders, policy makers, and the public)

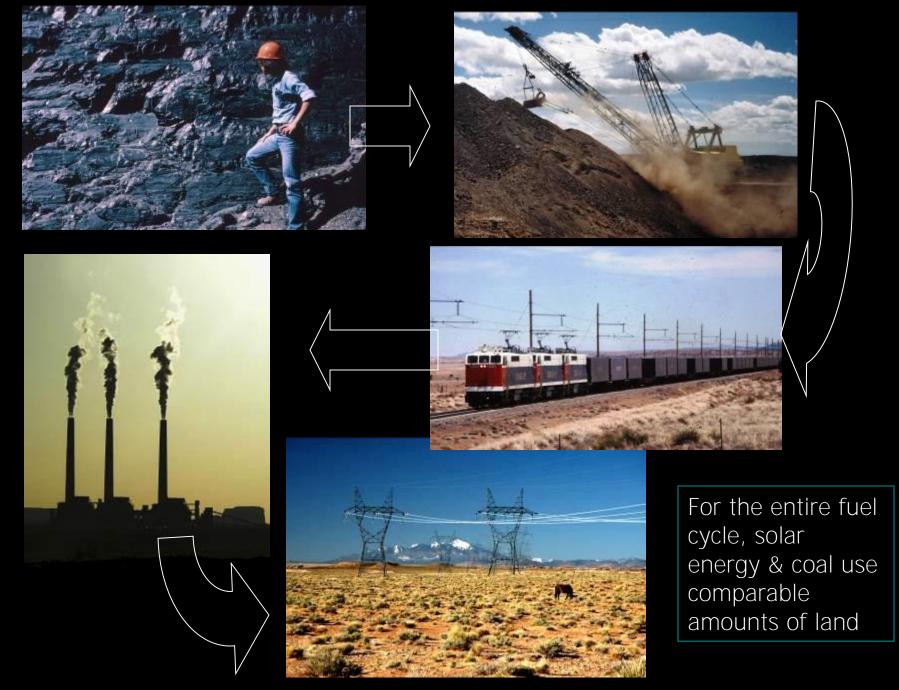
# Moving the Needle Educate



Saving the small family farm in Illinois. An example of NIMBY becoming PIMBY







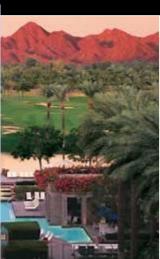
Source: M. J. Pasqualetti and B.A. Miller, Land requirements for the solar and coal options, *The Geographical Journal*, July, 152(2):192-212.

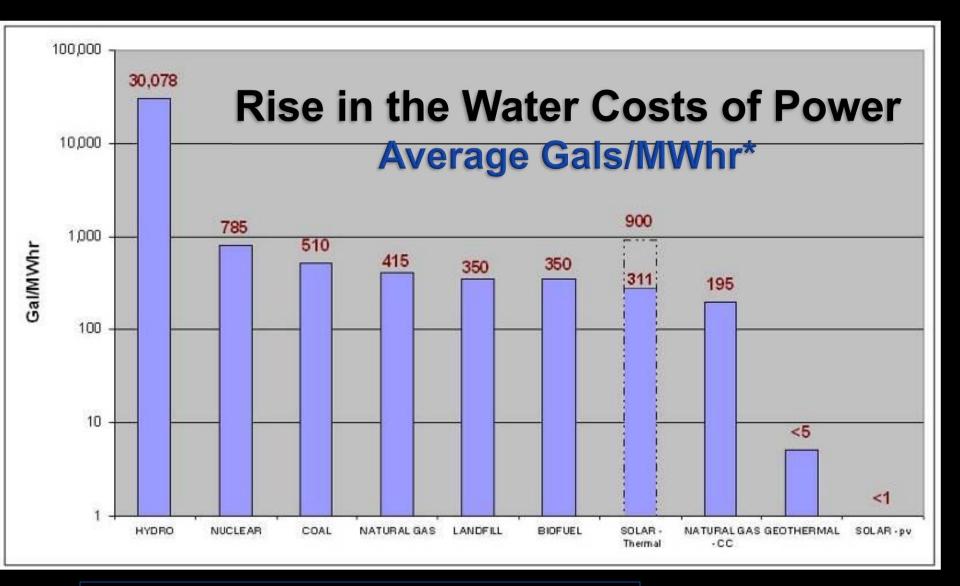
## The growing costs of fossil fuels



## Water Use in Arizona







<sup>\*</sup> For Arizona power consumption. Note logarithmic scale. First-sale only.

Sources: M.J. Pasqualetti. The Water Bargain of Solar and Wind Energy. 2011. In *The Water-Energy Nexus in the Western United States*, ed by Douglas Kenney (in press); Christopher Scott and M.J. Pasqualetti. Energy and Water Resources Scarcity: Critical Infrastructure for Growth and Economic Development in Arizona and Sonora. *Natural Resources Journal*, 50 (3): 645-682.

# 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

## Reducing Visual Impacts of Renewable Energy Facilities

on BLM-Administered Lands

First Edition - 2013



https://webapps.anl.gov/file\_t ransfer/downloads?guid=c65 2d53e-2a6c-5a54-b606a3a4caddec2f

Web site good 3-10 Oct 2013

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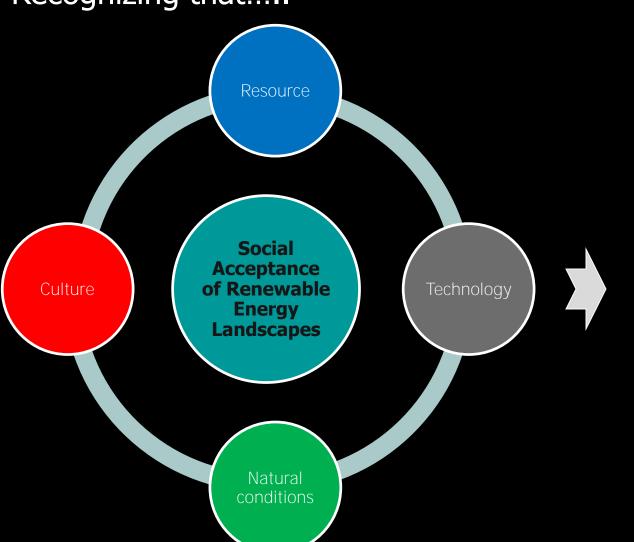


## ....to this



### The Future of Renewable Energy Will Require

Recognizing that.....









# Energy is a social issue with a technical component, not the other way around