

# The Morality of Wind Energy Landscapes During an Energy Transition

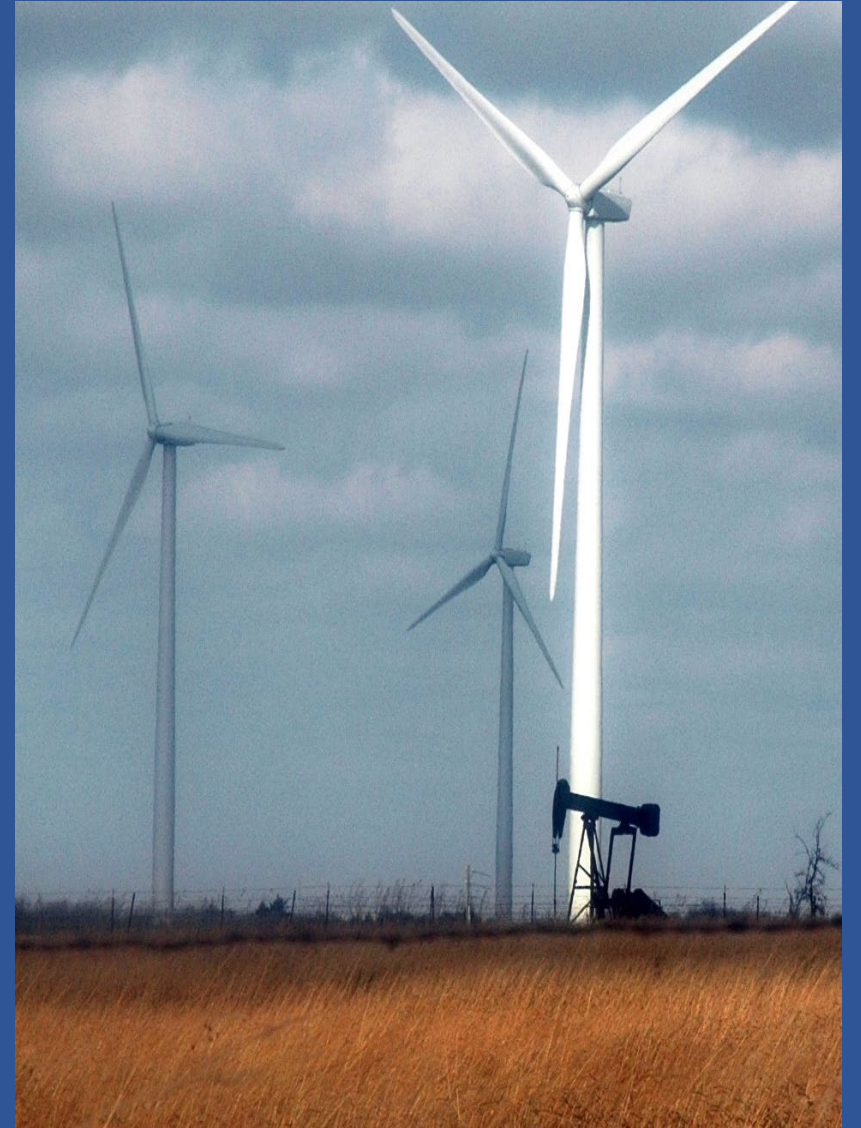
**Martin J. Pasqualetti**

*Professor, School of Geographical Sciences and Urban Planning  
Senior Scientist, Julie Ann Wrigley Global Futures Laboratory  
Arizona State University*

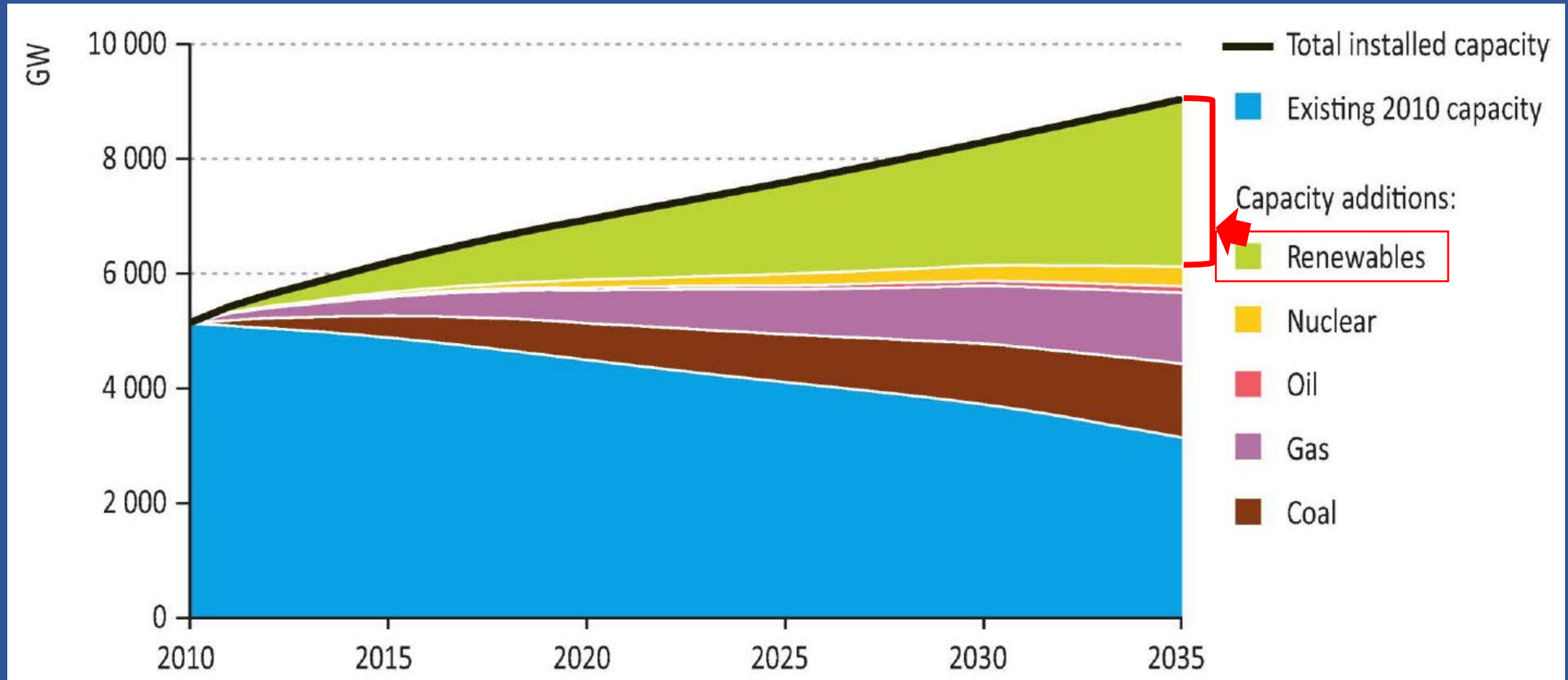
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University of Redlands

March 23, 2022



# The Promise of a Renewable Future



Source: <http://www.kurzweilai.net/images/Global-installed-power-generation-capacity.png>

# THE QUESTION

How do we get there?

# And How Can At the Same Protect the Environment?







# **The Morality of Wind Energy Landscapes**

## **During an Energy Transition**

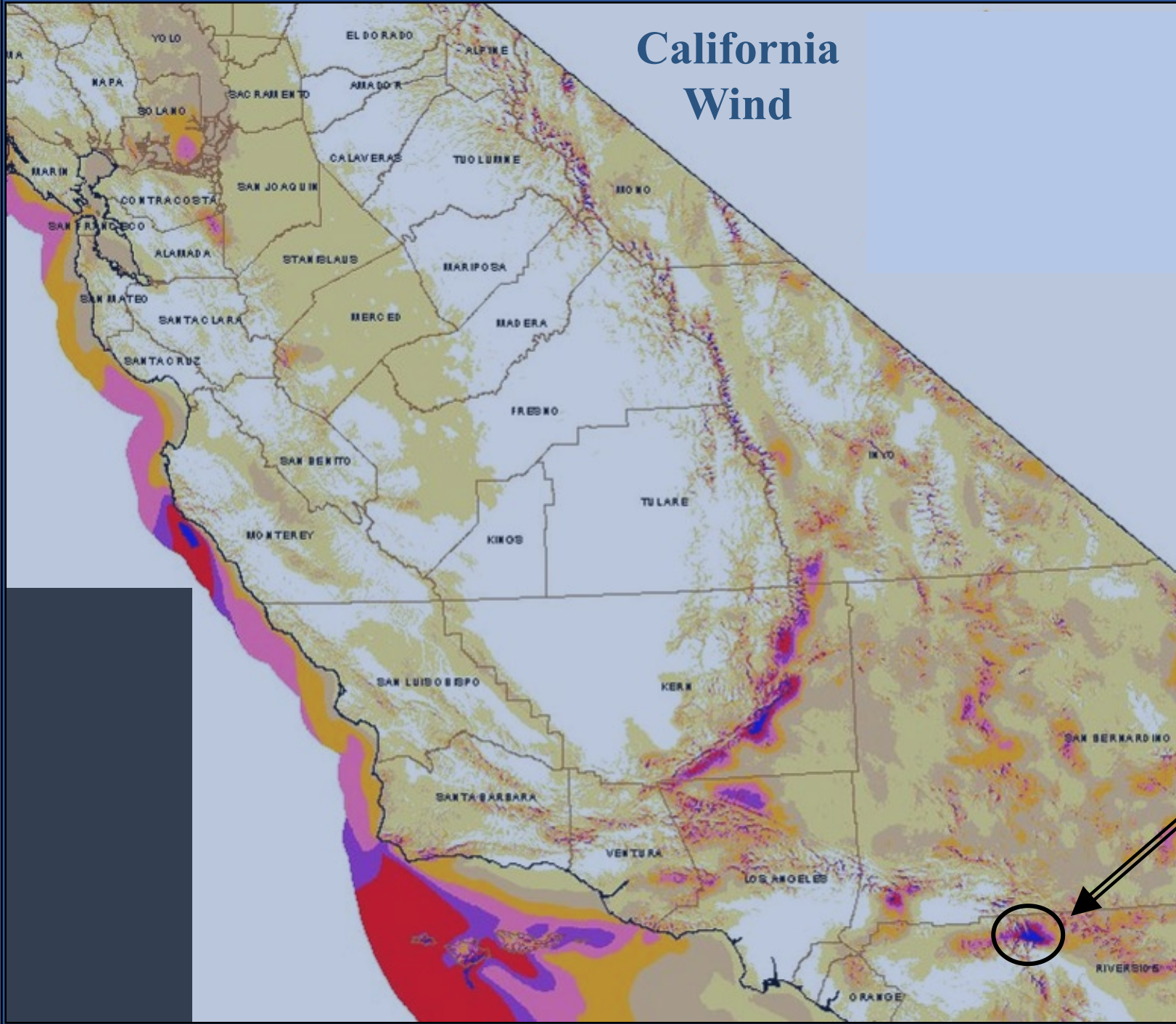
- I. Palm Springs as an early bellwether
- II. The environmental challenges of fossil fuels
- III. The energy transition gains momentum
- IV. The roadblock
- V. Enhancing acceptance
- VI. Palm Springs as a new bellwether



I. PALM SPRINGS – AN EARLY BELLWETHER



# California Wind



San Geronimo Pass  
Wind Area - Palm  
Springs

← Los Angeles – 120 miles

San Geronimo Pass

Mt San Jacinto

Palm Springs – 1930s



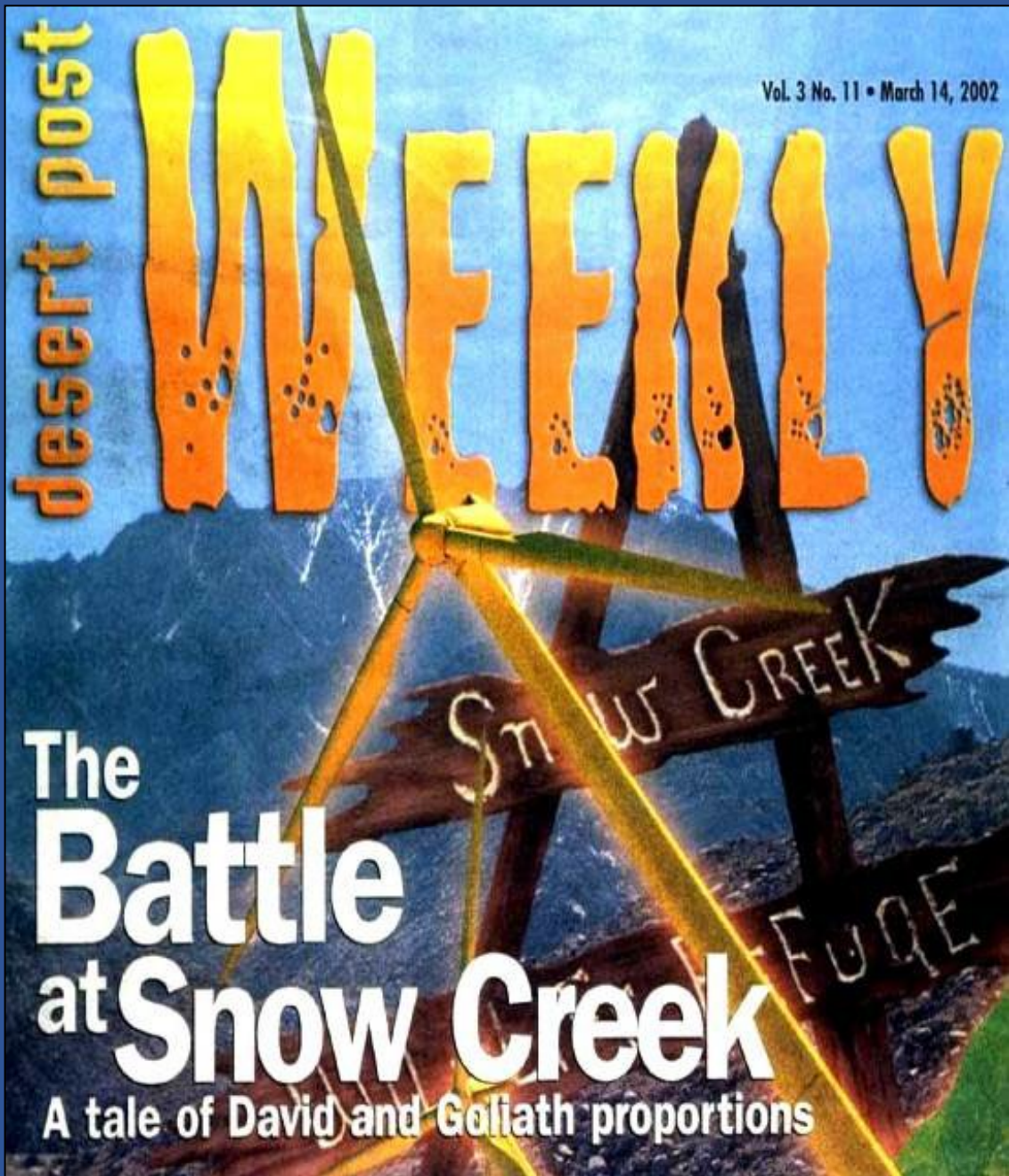
**MT SAN  
JACINTO**

**PALM  
SPRINGS**

**WIND  
DEVELOPMENTS**







Opposition from Homeowners  
to  
Proposed Energy Landscapes

*Snow Creek, the base of Mt  
San Jacinto*

Martin J. Pasqualetti. Wind Energy Landscapes: Society and Technology in the California Desert, *Society and Natural Resources*, 14(8):689-699. 2001.

# Opposition from Homeowners to Rapid Landscape Change



Martin J. Pasqualetti and Edgar Butler, Public reaction to wind development in California. *International Journal of Ambient Energy*, 8(3):83-90. 1987.

# Opposition from Celebrities

Bob and Dolores Hope's House in Palm Springs





# Entertainer SONNY BONO opposes wind turbines

and is elected mayor of palm springs



# Palm Springs Sues Over Wind Turbines

- *City of Palm Springs (et al.) v. U.S. Department of the Interior (et al., 1985) sues:*
  - *U.S. Bureau of Land Management (BLM)*
  - *Selected private developers of the nearby San Gorgonio wind resource area.*
- *The City claims that BLM and the developers had ignored mitigation measures stipulated in the environmental impact statement.*

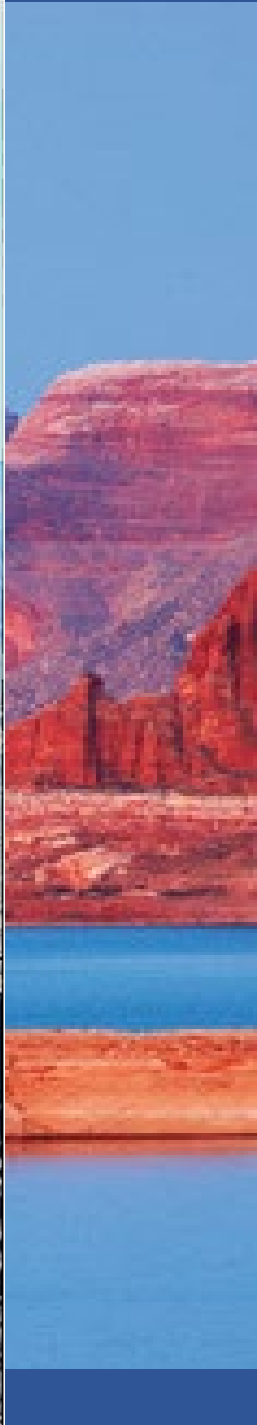
What was the principal takeaway

from the early Palm Springs  
Energy is a social issue  
experience with renewable energy?  
with a technical component,  
not the other way around

## II. THE CHALLENGES OF FOSSIL FUELS

Do you see  
the power  
plant?

Does it  
enhance  
the  
landscape?



# Costs of Fossil Fuels Are Varied, Numerous and Ubiquitous

## ALASKA'S NORTH SLOPE



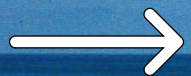
<http://airphoto.com/stocking/images/17514.jpg>

<http://cdn.c.photoseller.com/img-ge2/10000dcaT7geeVHM/fit=1000x750/06AK-3202-Alaska-Pipeline.jp>

# Oildale, CA



Off-Shore Drilling Rigs,  
Santa Barbara Channel







## Shale Oil: North Dakota

**‘This is changing the landscape so fast. I grieve now when I leave North Dakota.’ - Terry Evans, *Elegiac Images***

*From North Dakota’s Boom DYLAN WALSH, New York Times, Feb 15, 2013*

# Coal mines reshape the environment and reshape Lives



# Coal Mining by Mountain-Top Removal, West Virginia *and a holdout resident*

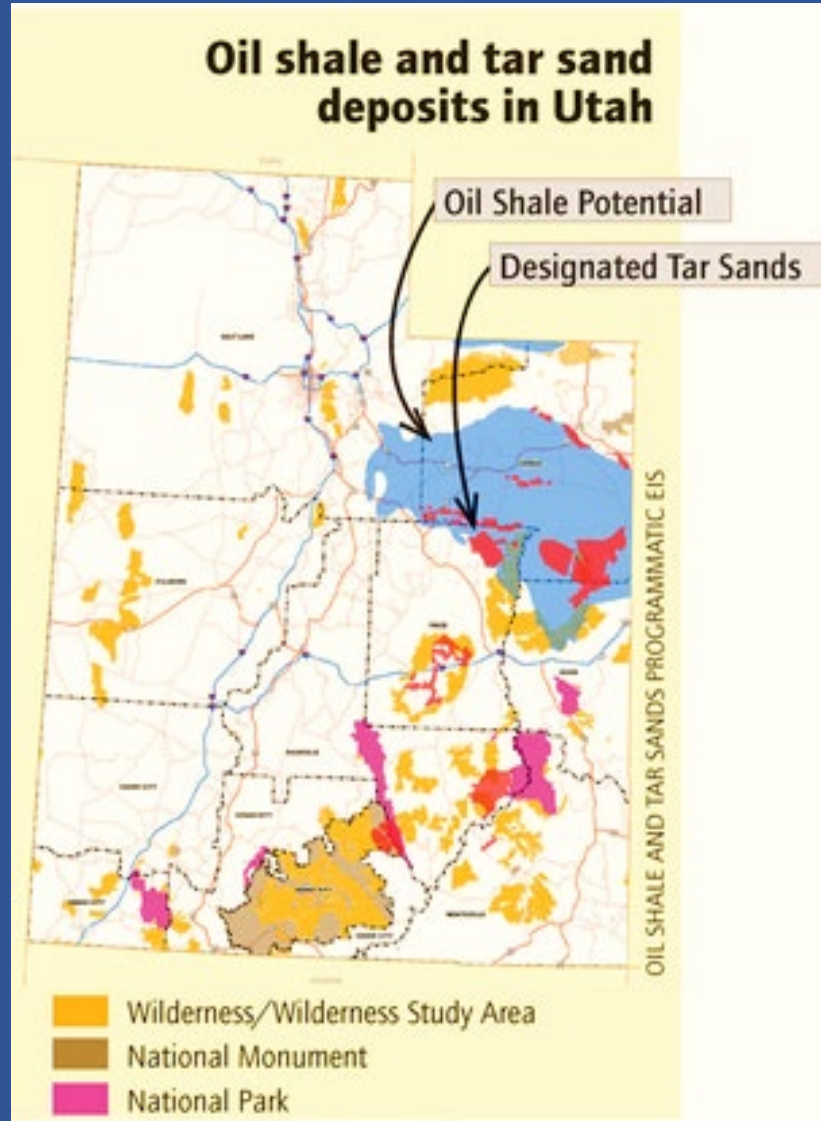


Photo © by Melissa Farlow

Martin J. Pasqualetti. 2012. Reading the Changing Energy Landscape. In *Sustainable Energy Landscapes: Designing, Planning, and Development*, Sven Stremke and Andy Van Den Dobbelen, eds. CRC Press, pp. 11-44, 2012.

# The Largest Energy Landscape: IS THE U.S. THE NEXT OIL SANDS SITE?

Oil Sands in Northern Alberta, Canada



# III. THE ENERGY TRANSITION GAINS MOMENTUM – 6 REASONS WHY

#1





Sea Level Rise and Its Unwanted Effect

# Developing all Forms of Oil Won't Buy Much Extra Time

World Oil Production (History + Projections)

(Barrels/day)

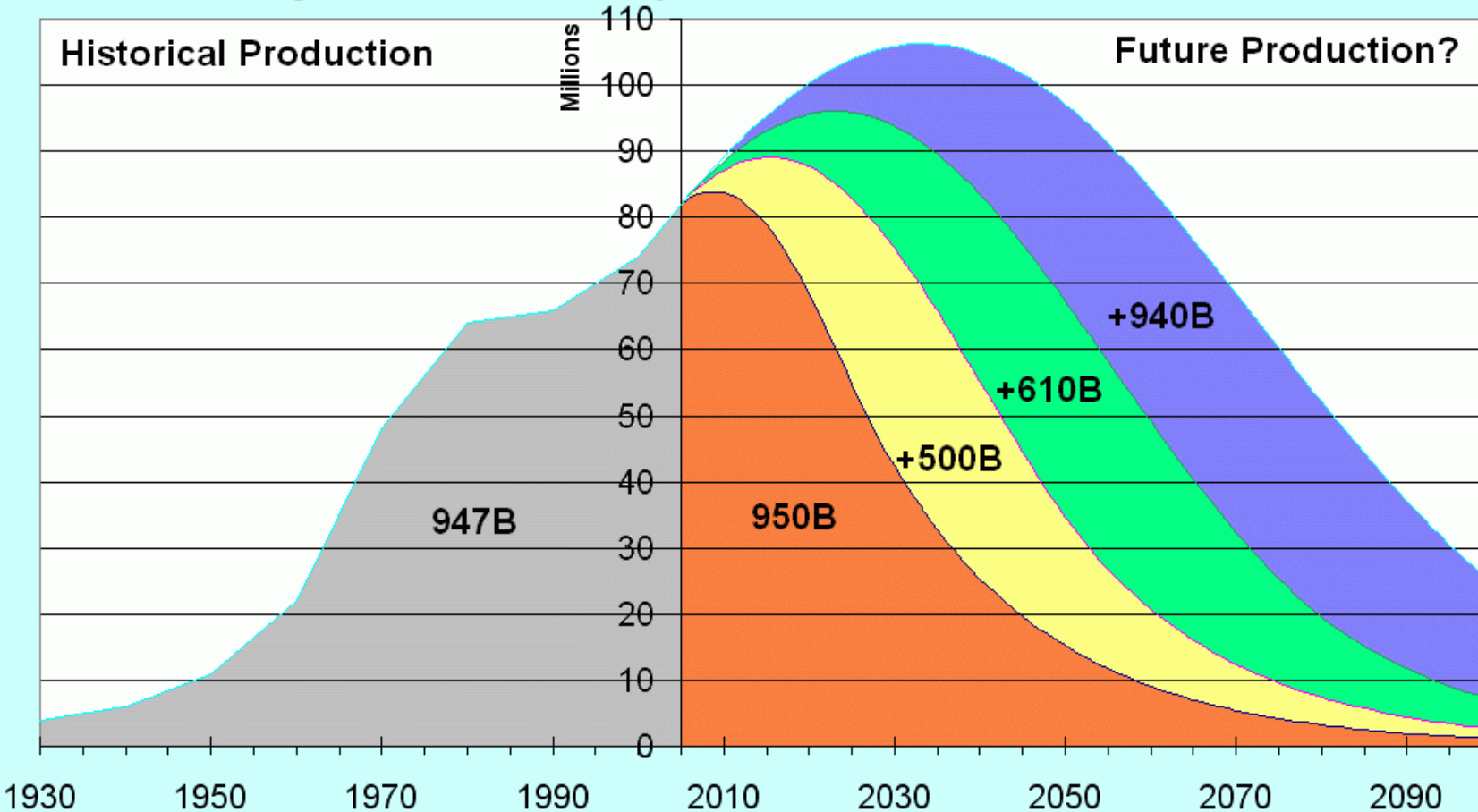
Peaks 2010-2035

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

- Campbell: 0.953Tb left, 2010 peak at 83mb/d
- Harper: 1.45tb left, 2015 peak at 89mb/d
- USGS 50% - 2.06tb left, 2024 peak at 97mb/d
- USGS 5%: 2.949tb left, 2033 peak at 106mb/d

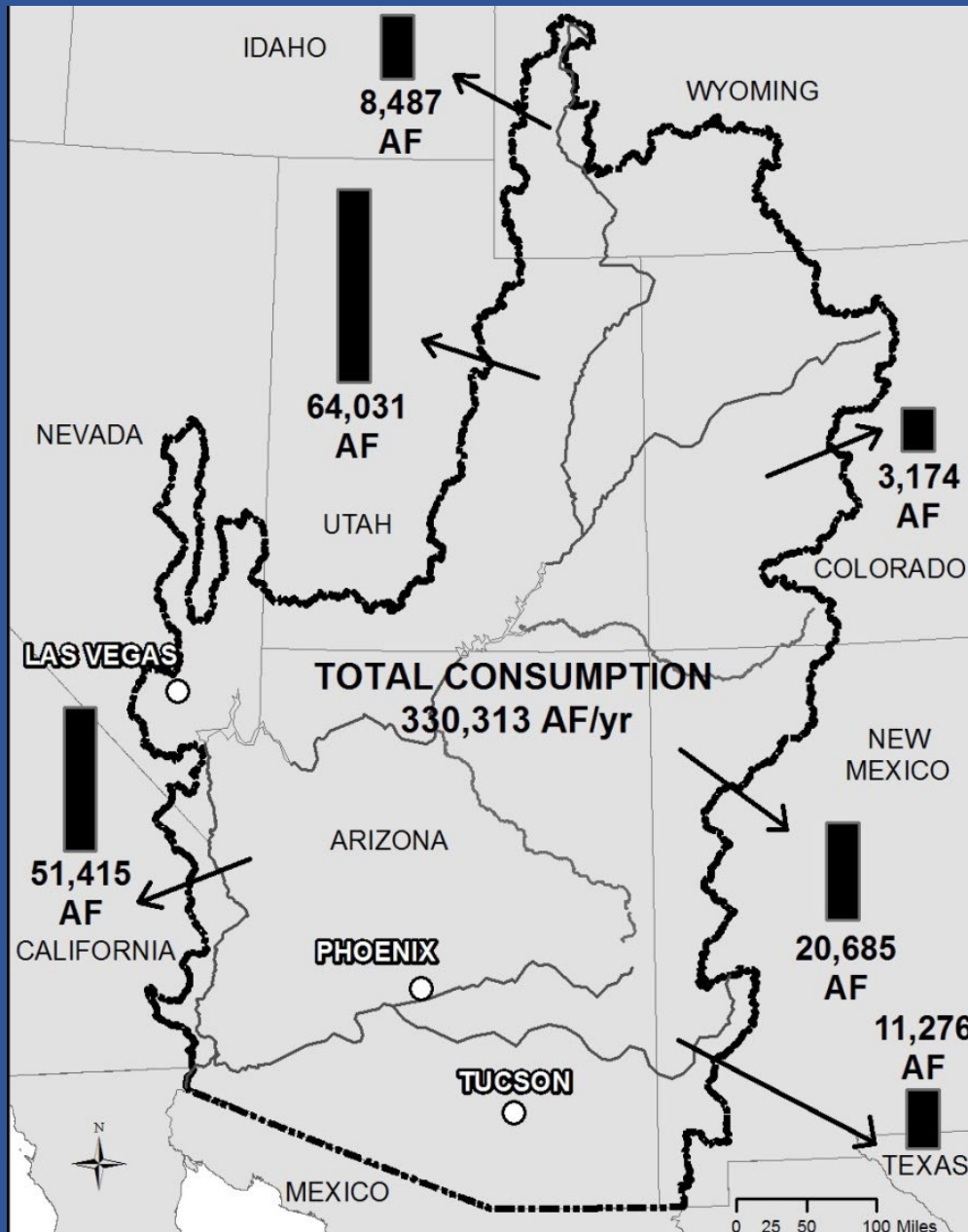


#2

If we identify **QUADRUPLE** our oil reserves, we will still have very little by the end of the century



#3



## Cooling Water Scarcity

Water used for **power** plant cooling > water used for **irrigation**.

An issue most obvious in the Colorado River Basin (330k AF/yr for power).

# Centralized Power Generation is Vulnerable

#4



# Conventional Energy Resources Hold Greater Hazard for Workers & Environment

#5



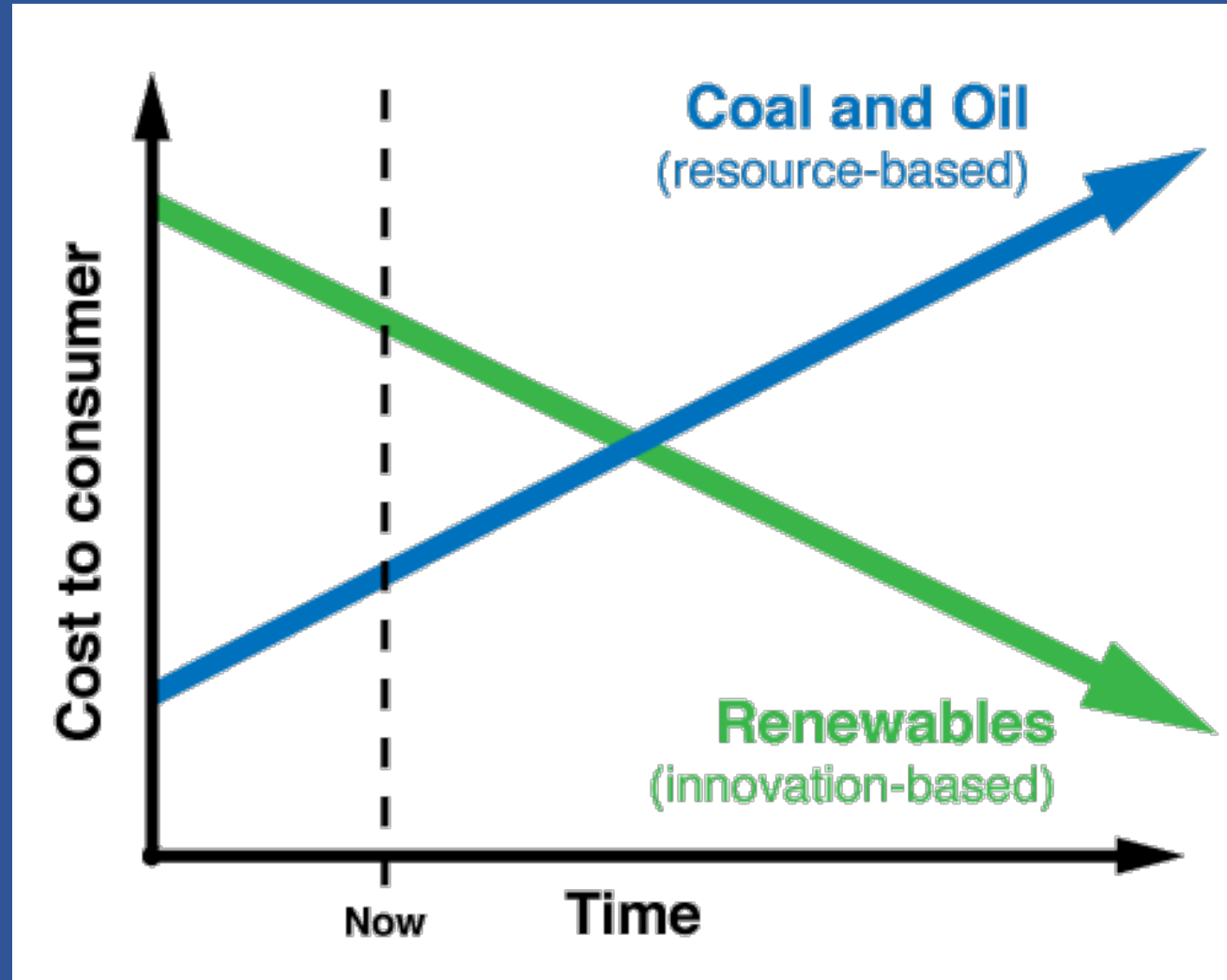
Deepwater Horizon Explosion and Oil Spill



Estimated extent of the near-shore Deepwater Horizon oil spill (from NOAA) and the hypoxic Dead Zone (from LUMCON). Graphic: David Steadman. University of Texas. 2010  
[http://www.utexas.edu/news/2010/06/14/liu\\_oil\\_spill/](http://www.utexas.edu/news/2010/06/14/liu_oil_spill/)

# Conventional Energy Prices and rising, while Renewable Energy Prices are falling

#6



*For these and  
other reasons*

*...the  
displacement of  
fossil fuels has  
already begun...*

*...and it can  
help reduce  
environmental  
impacts and  
increase energy  
security*



# IV. THE ROADBLOCK



# RENEWABLE ENERGY CHANGES LANDSCAPES IN UNFAMILIAR WAYS



# Wind Has the Most Obvious Impact

(and elicits the most common opposition)





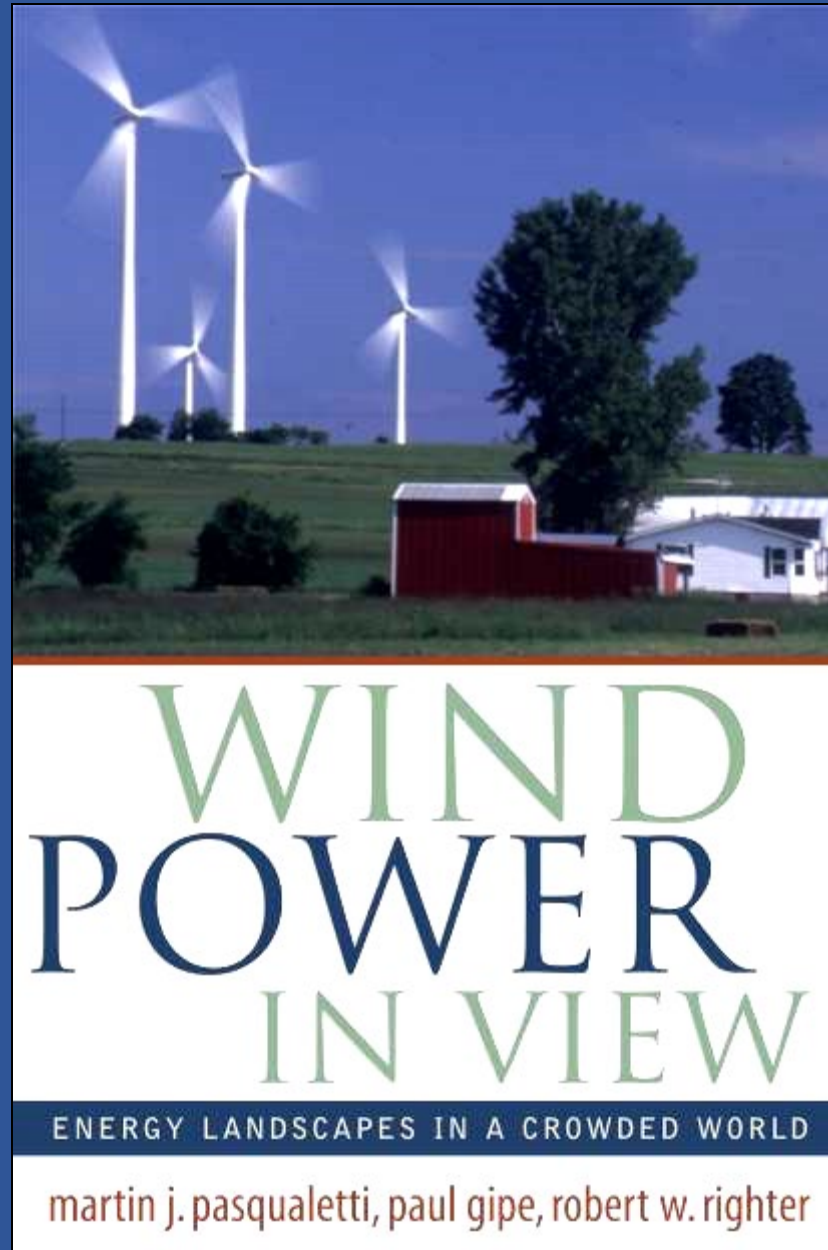
# Opposition to Wind Installations is Pervasive



# It's Mostly About NIMBY



(and fairness)



# THE ROANOKE TIMES

NE 4, 2005



## Highlands torn by winds of change

A proposal to build wind turbines in Highland County has polarized the rural community's residents.

"Some say who..."



## Opposition in Highland County, VA



# Opposition in Scotland



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

ANTI wind farm protesters reacted with anger last night as plans for another 35 turbines were unveiled for the Braes O'Doune hillside.

Seventeen turbines are being proposed in the north of the country, while in the Fife Valley, energy suppliers want to erect 18.

The local council, however, said it would not be possible to erect more than 10 turbines on the hillside.

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Continued on Page 11



OPPOSED TO THE NEW WIND FARM PLANS ARE THE LOCAL COUNCIL AND THE LOCAL PEOPLE.

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

PLANS to build a wind farm in 12 turbines have drawn an angry reaction from residents in the Fife Valley.

The 12 turbines would be sited in a line across the hillside, and would be visible from the town of Stirling.

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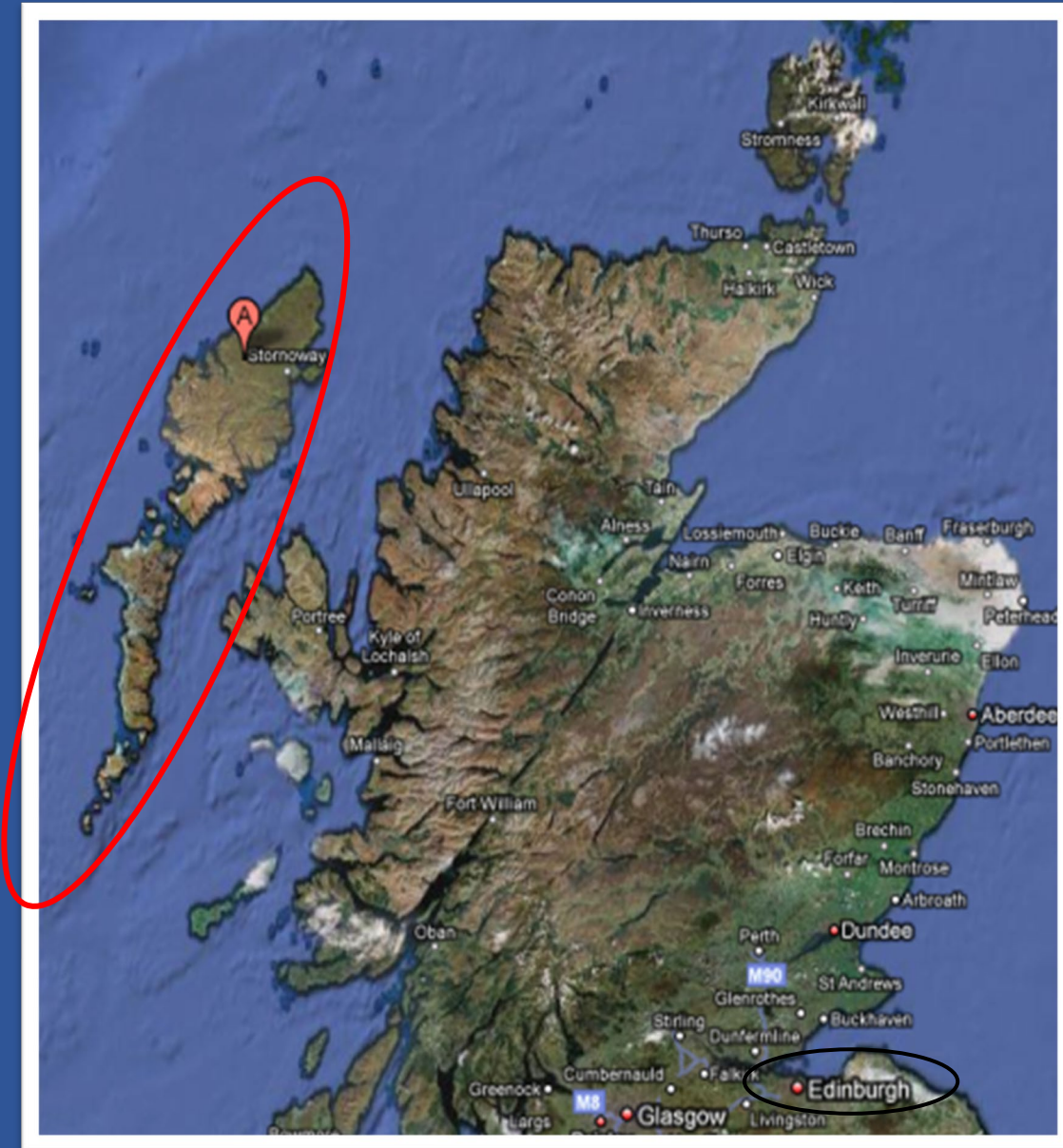
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## Action group campaigners say three into one just won't go

CIVIL DISOBEDIENCE is being planned by a group of campaigners who are opposed to the Braes O'Doune wind farm. The group, which is called 'Three into One', is planning to occupy the site of the wind farm and to erect a large sculpture in the shape of a wind turbine. The group is also planning to erect a large sculpture in the shape of a wind turbine. The group is also planning to erect a large sculpture in the shape of a wind turbine.

# Isle of Lewis, Scotland



**NO  
WIND  
FACTORY**



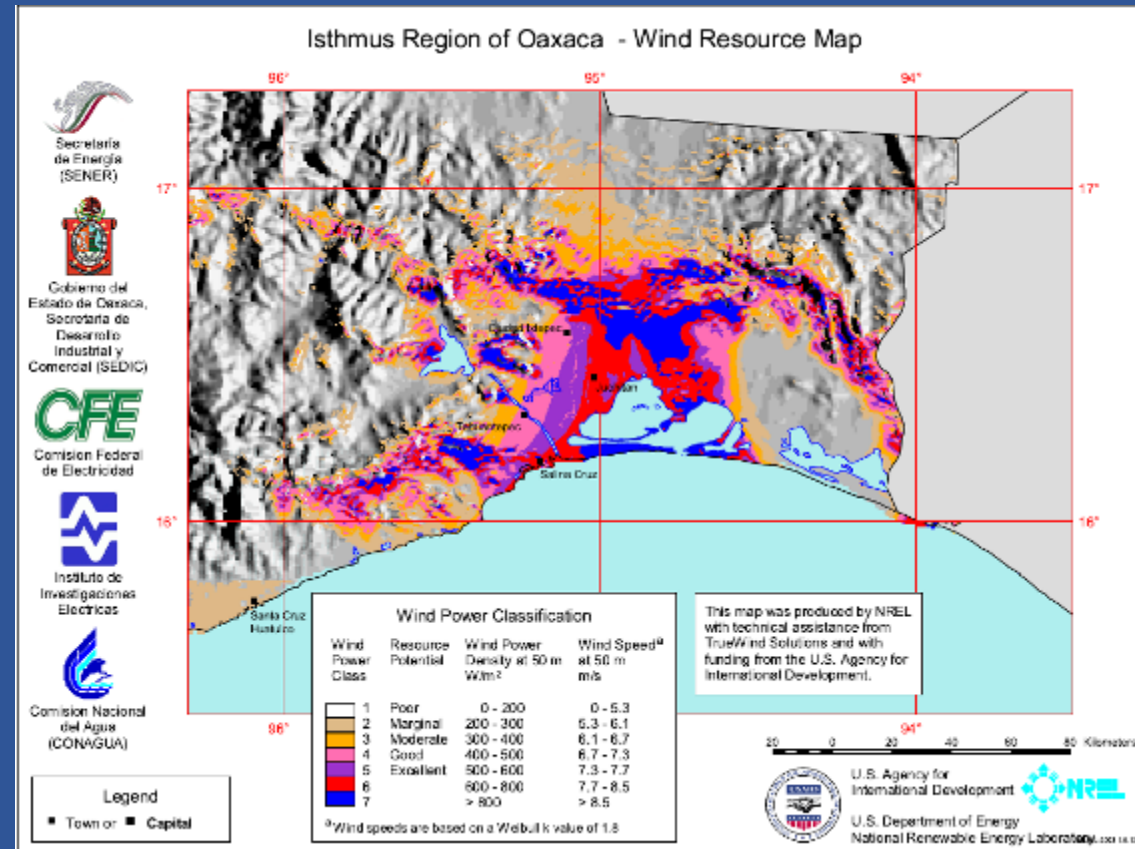
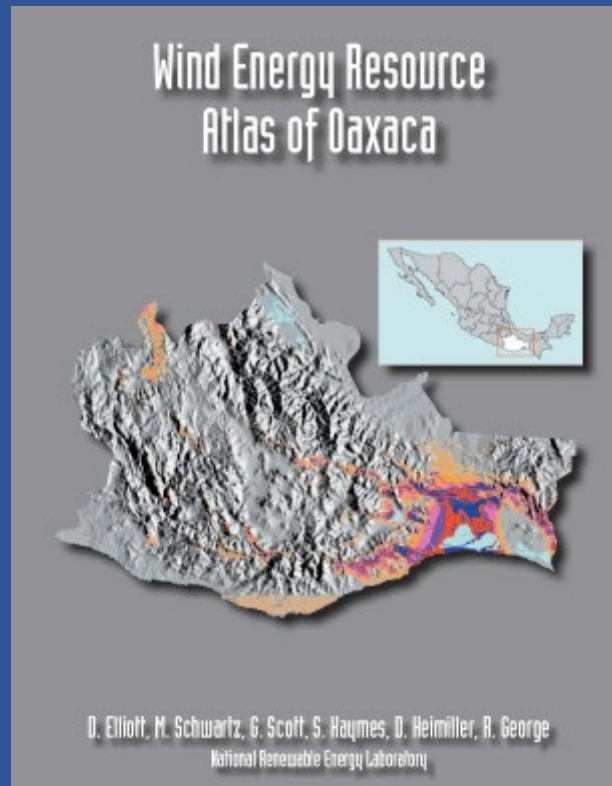
**ON LEWIS**

# Scots Expressing Their View about Wind Power



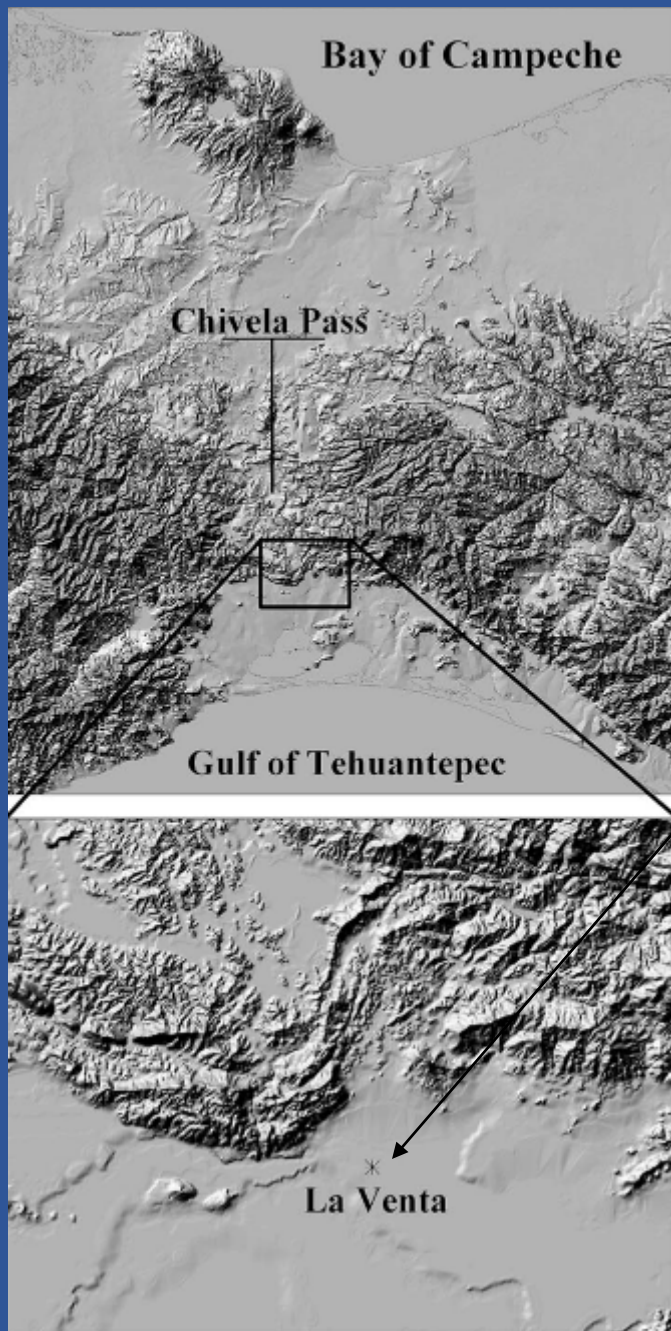
Source: <http://www.auchencorth.org.uk/>. PEPA (Penicuik Environment Protection Association ) was formed by residents of Penicuik, Carlops and Howgate communities to protect Auchencorth Moss near Penicuik from EON's proposal to build 18 x 2.5 MW wind turbines

# 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: [http://www.sachana.org/reports/mex07/uploaded\\_images/IMG\\_9388-721317.JPG](http://www.sachana.org/reports/mex07/uploaded_images/IMG_9388-721317.JPG)

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.



# Wind Protests in Oaxaca, Mexico



Photo from the *Asamblea de Pueblos del Istmo*, used with permission.  
<http://globalvoicesonline.org/2012/12/27/mexico-federal-court-halts-controversial-wind-park/>



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

# Common Threads in the Opposition to Wind Energy and the Impacts they Create

- **IMMOBILITY** (wind power is site specific)
- **IMMUTABILITY** (people believe in landscape permanence)
- **SOLIDARITY** (people love their land)
- **IMPOSITION** (an increased sense of marginalization)
- **PLACE IDENTITY** (a loss of security and familiarity)

How Do We “Move the Needle”  
toward a Renewable (and more  
equitable) Energy Future?

# Moving the Needle Toward Wind (and other renewables)

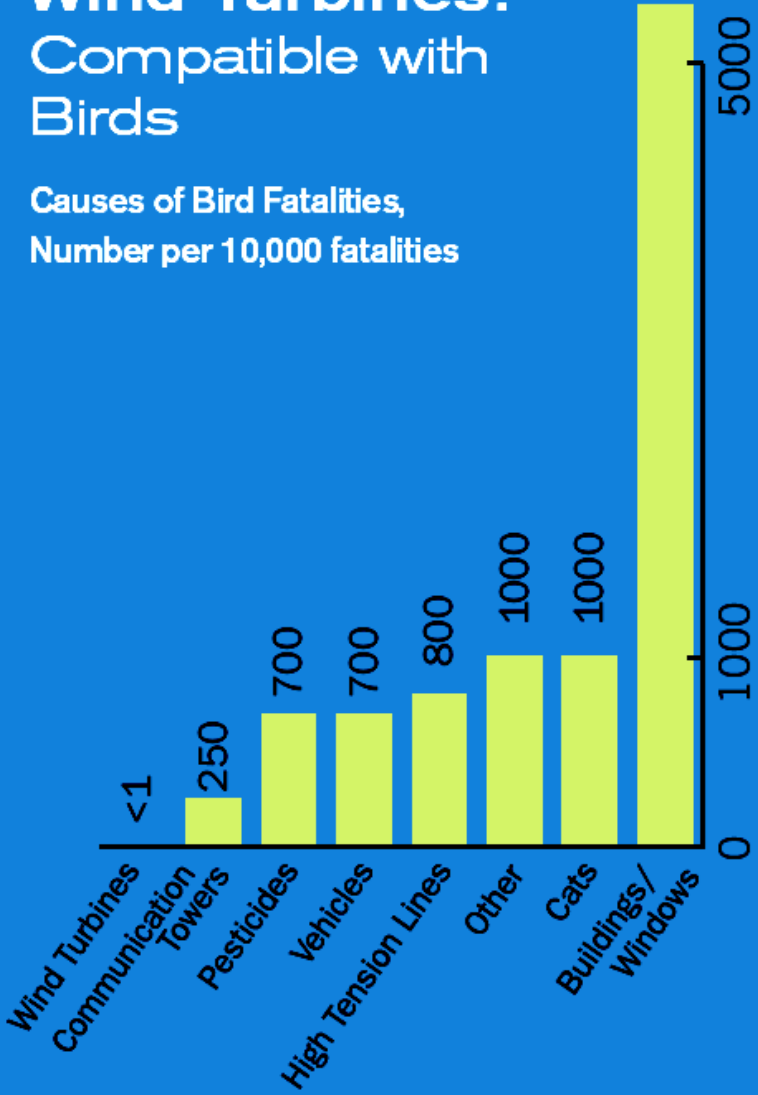
## Short and Long Term

- **Short-term**
  - **Avoid unnecessary conflicts**
  - **Make it affordable and profitable**
- **Long-term**
  - **Make it simple to accept and implement**
  - **Work to change policy (and policy-makers)**
  - **Reduce or remove subsidies to conventional fuels**
  - **Encourage utilities to change their business model**
  - **Educate (e.g. stakeholders, policy makers, and the public)**

Wind Power is not the enemy of birds

### Wind Turbines: Compatible with Birds

Causes of Bird Fatalities,  
Number per 10,000 fatalities



Data Sources: Erickson et al., 2002. Summary of Anthropogenic Causes of Bird Mortality.



# Recognize the Environmental and Social Costs of Fossil Fuels, and....



Oil Sands in Alberta



Well Blowout in Gulf of Mexico



Mountain-Top Removal in WV

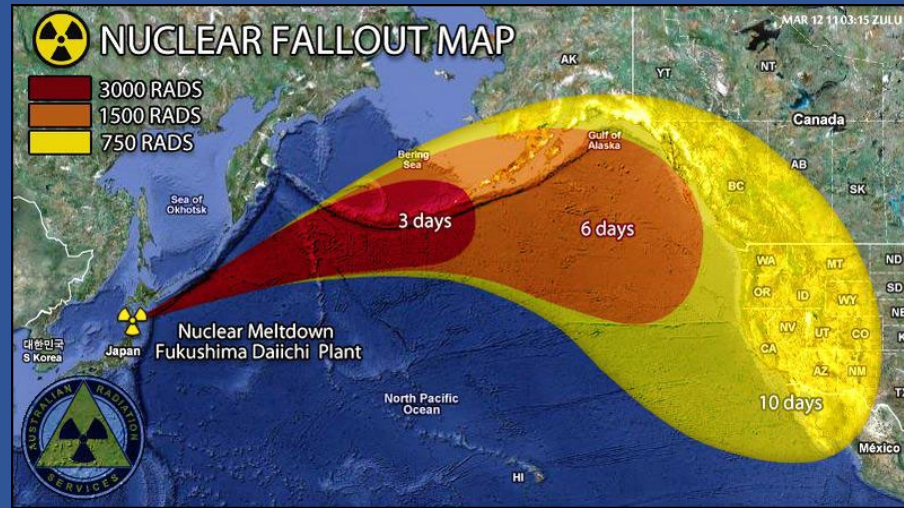


Air Pollution

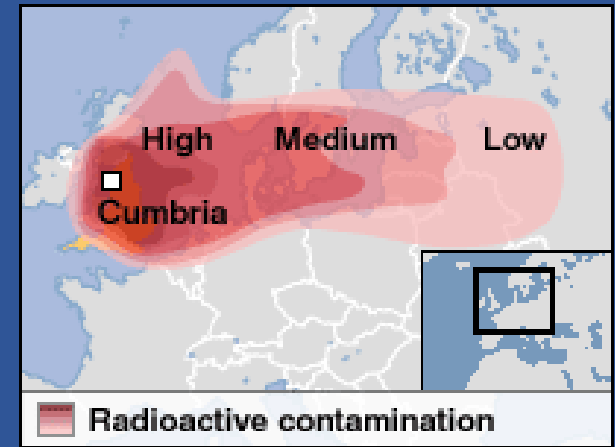


Indian Removals in AZ

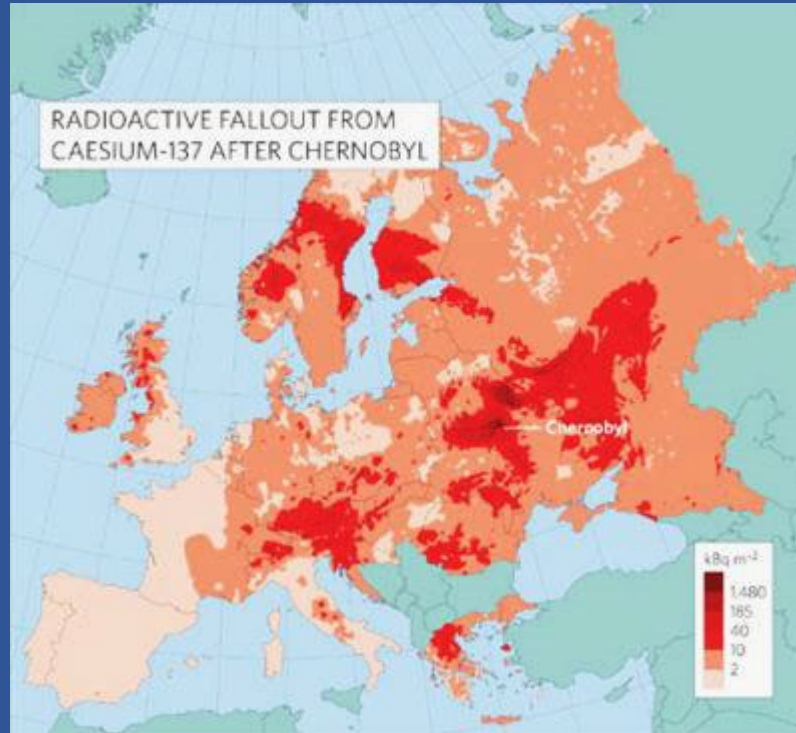
# ...Nuclear Fuels



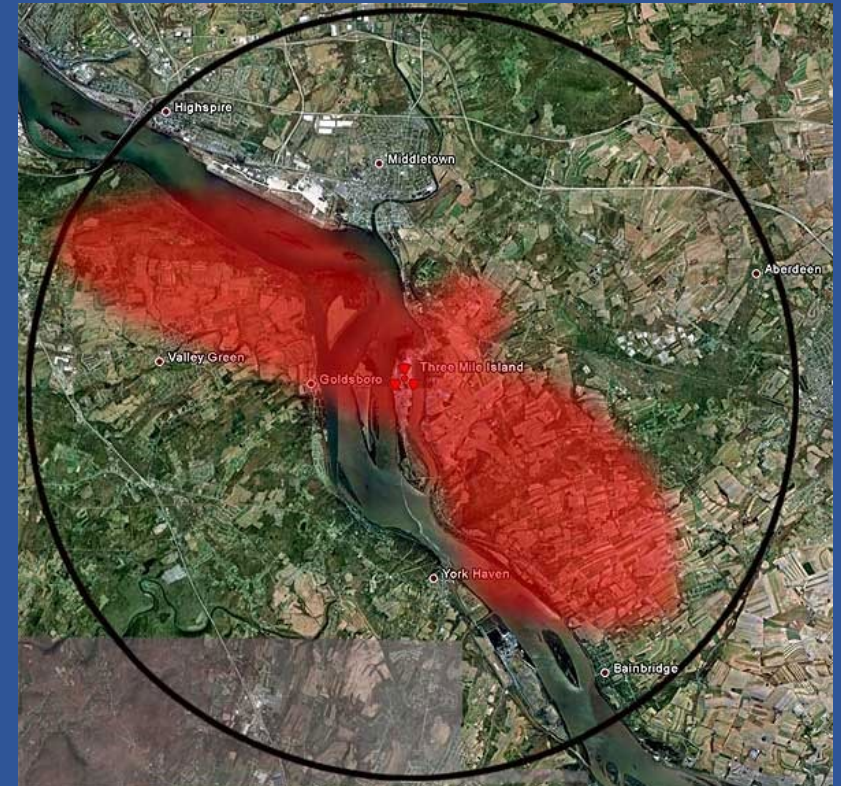
Fukushima 2011



Windscale 1957



Chernobyl 1986

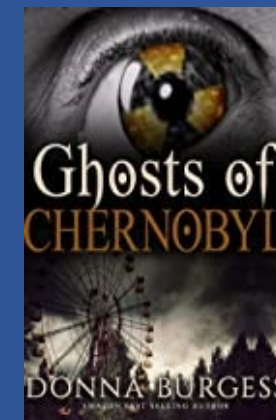
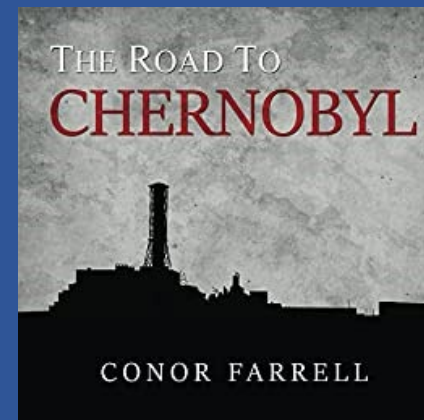
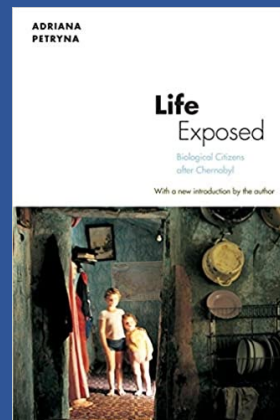
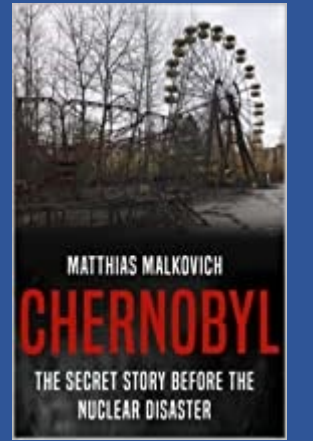
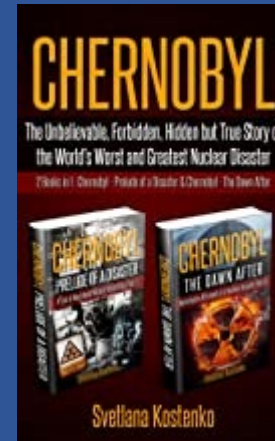
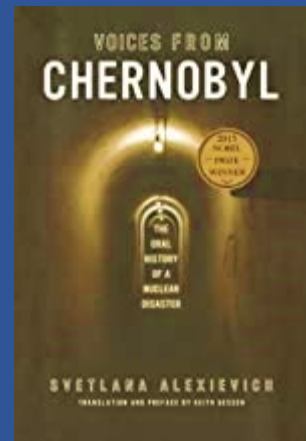
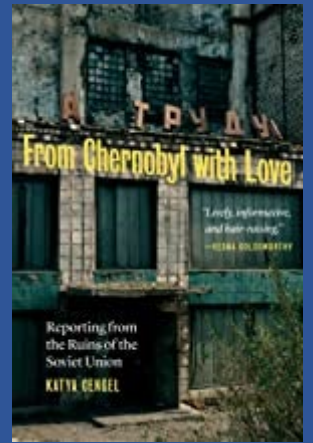
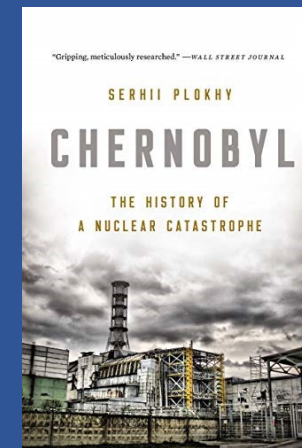
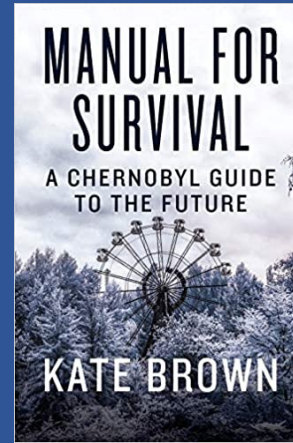
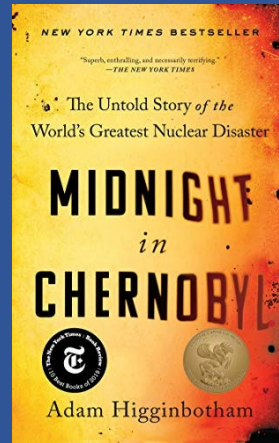


Three Mile Island 1979

# The New York Times

*“Damaged Chernobyl Nuclear Plant, Occupied by Russia, Loses Outside Power” – March 9, 2022*

The worst nuclear accident in the world produced a hazardous exclusion zone that the Russian military recently disturbed, creating a spike in radioactivity in the area.



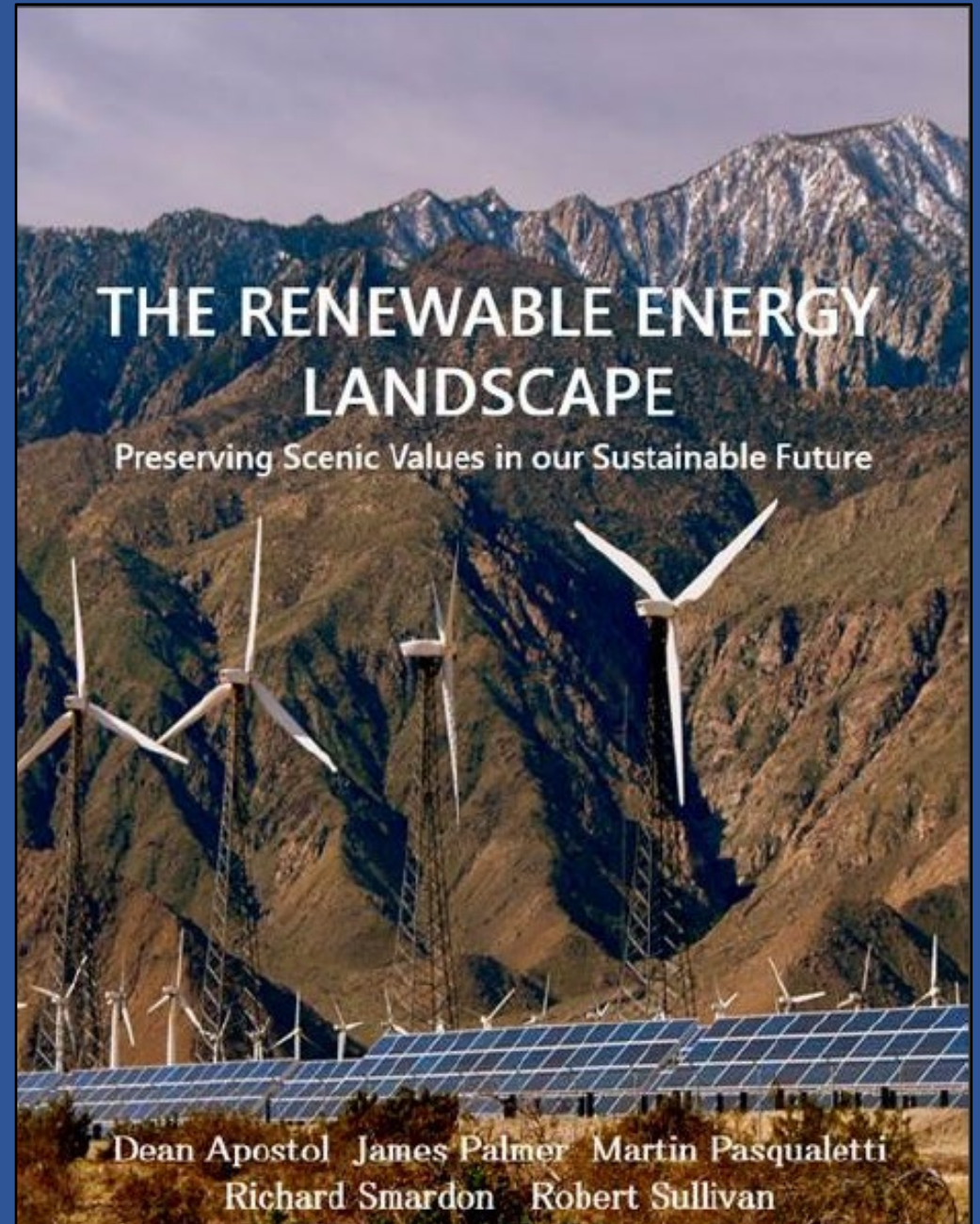


# Realize That We Must Reduce Water Needed by Thermal Power Plants



## V. ENHANCING ACCEPTANCE

*10 things we can do*



1.

EMBRACE THE  
REWARDS OF  
MULTI-USE  
DEVELOPMENT



2.  
PROMOTE THROUGH  
ART, FAMILIARITY,  
AESTHETICS



<https://www.britain.com/culture/india-celebrates-1>  
*“Windance” Celebrates the Beauty of Wind  
Turbines*

3.  
PROMOTE  
SIDE-BY-SIDE  
COMPRISONS

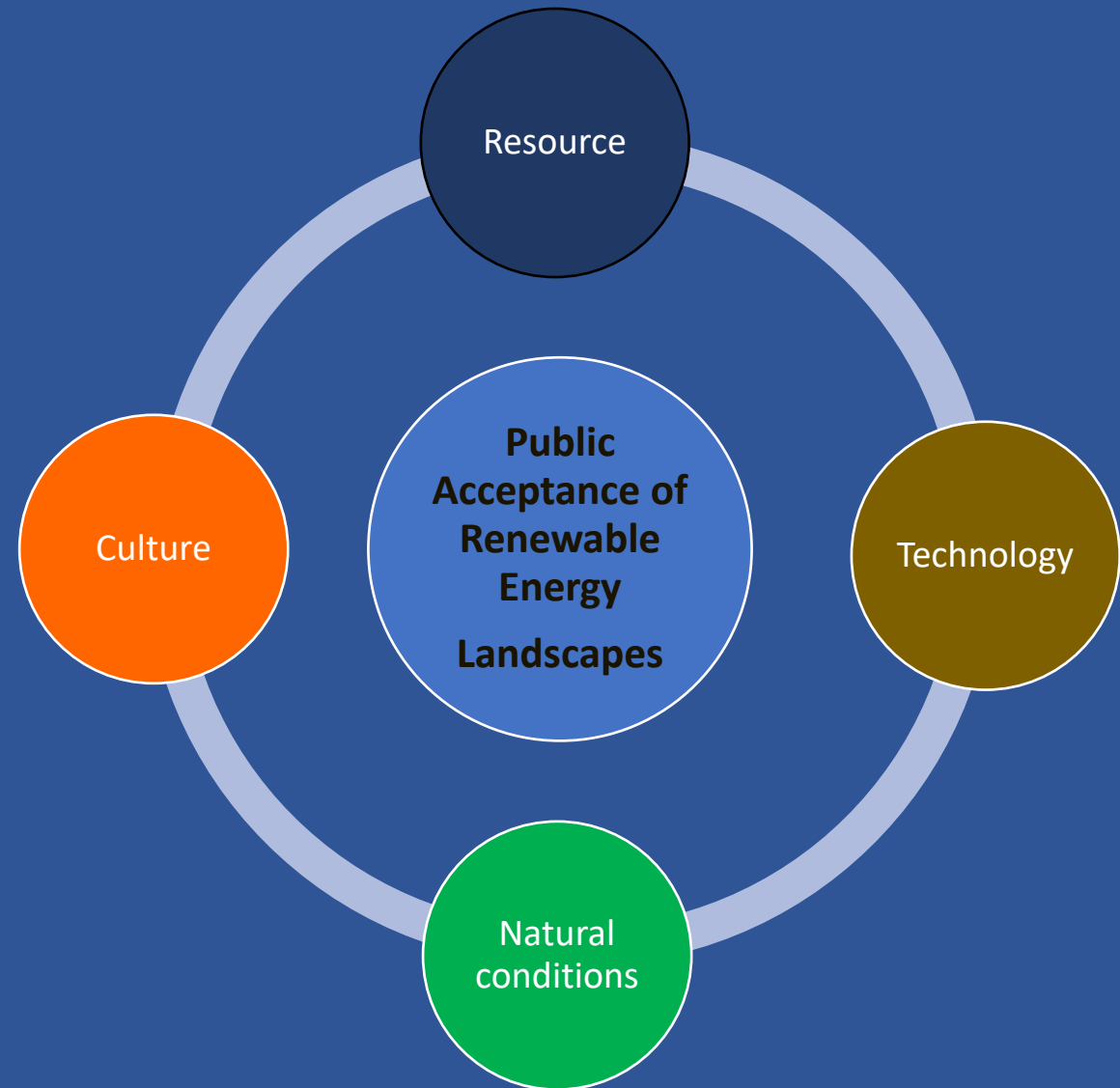


4.  
EMPLOY  
VISUALIZATION  
TOOLS



Red Oak Knob, Virginia

5.  
RECOGNIZE  
RESOURCE  
CHARACTERISTICS  
AND LIMITATIONS



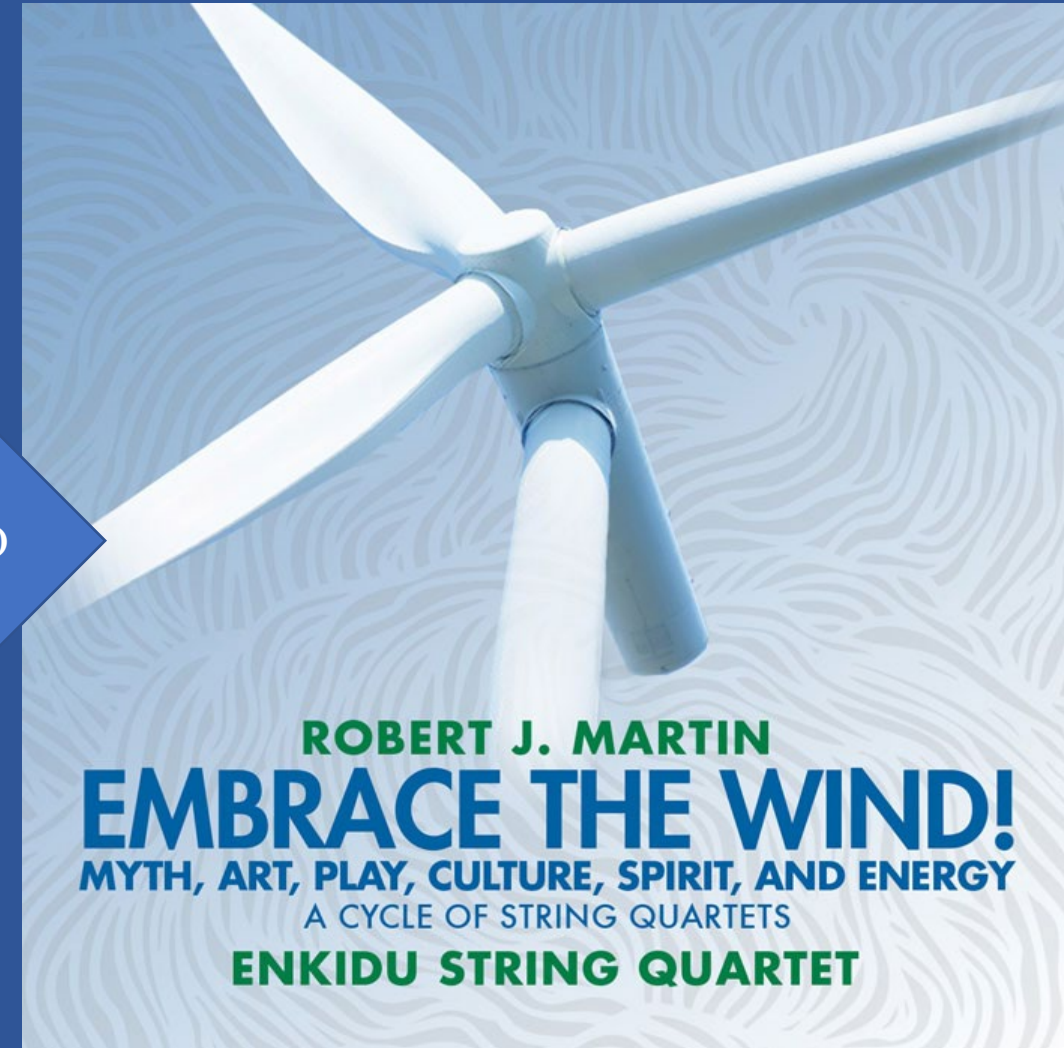
PIMBY

NIMBY



Not In My BackYard

TO



Please In My BackYard

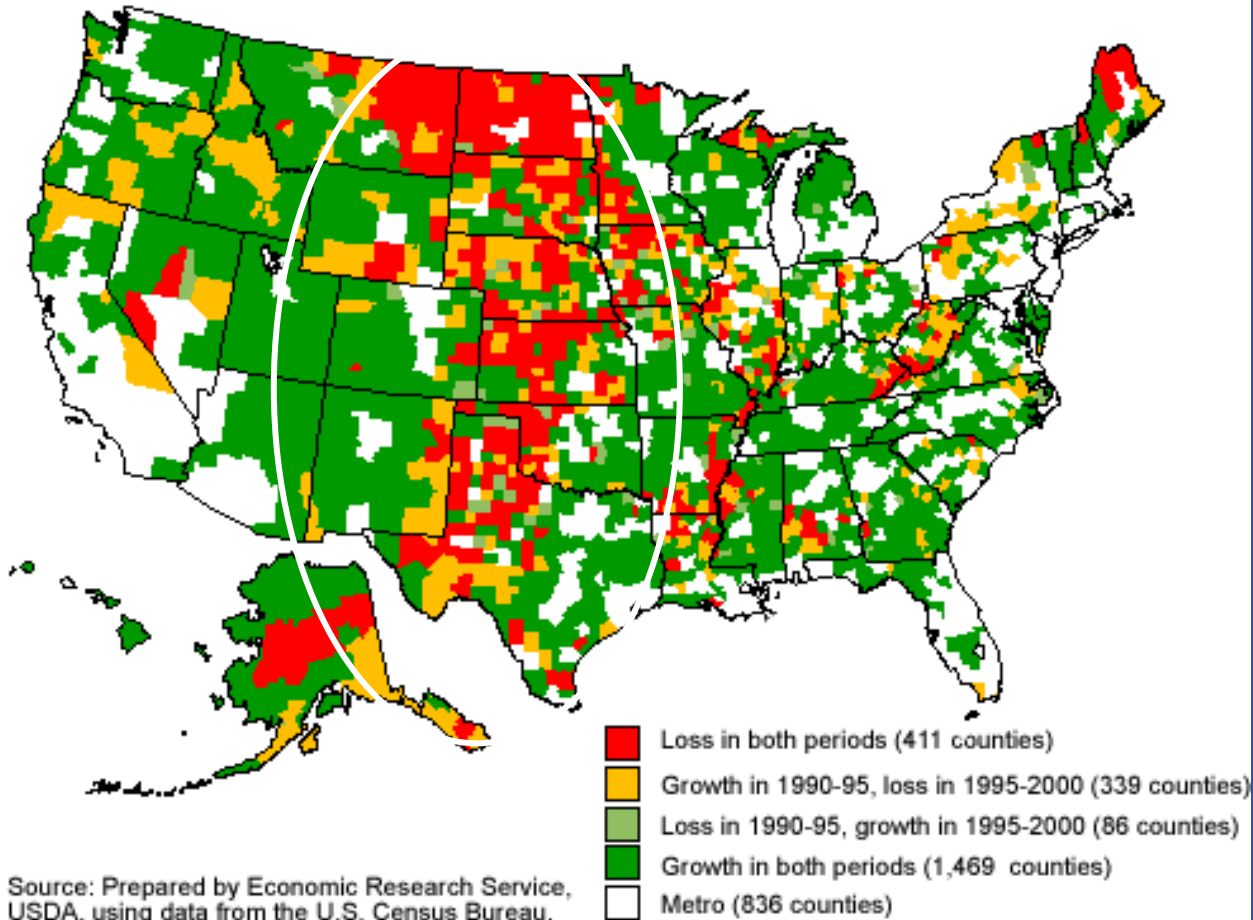
6.  
MIGRATE  
FROM...



# ...thereby realizing that Wind Power Can Help Save the Small Family Farm

## Patterns in nonmetro population change, 1990-1995 versus 1995-2000

Some 339 widely distributed nonmetro counties reverted from growth to decline in 1995-2000



7.  
EMPHASIZE OFFSHORE  
DEVELOPMENT

# Offshore windfarms 'can provide more electricity than the world needs'

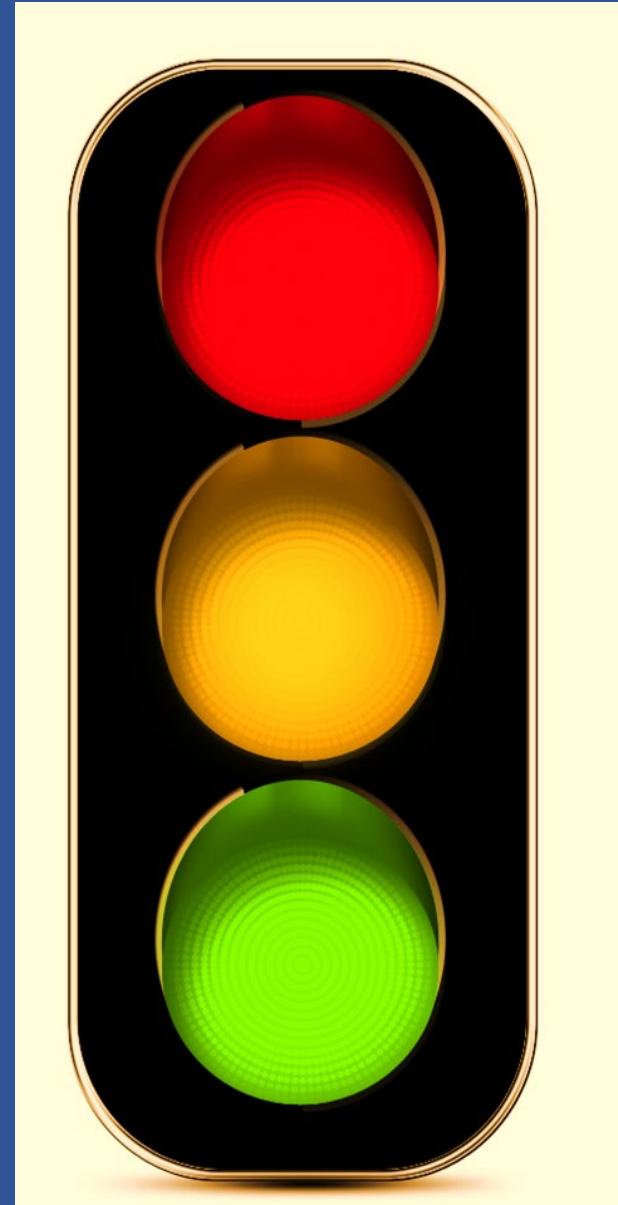
**Supplies from turbines will prove to be the next great energy revolution, IEA predicts**



▲ A sailing boat passes the Kentish Flats offshore windfarm. Photograph: Gareth Fuller/PA

<https://www.theguardian.com/environment/2019/oct/24/offshore-windfarms-can-provide-more-electricity-than-the-world-needs>

8.  
DESIGNATE  
RANKINGS



RANK #1 locations would be those areas not only suitable but where RE is encouraged and requested, such as farms in Illinois or Iowa.

These would be the center of the PIMBY approach



RANK #2 locations would likely be acceptable. These would be areas of good energy resource that are sparsely settled and absent recognized scenic value.



RANK #3 locations *might* be acceptable in certain circumstances. These would be areas such as near Palm Springs that might be acceptable, if conditions, public opinion, and planning are carefully considered in advance. These would usually be promising but populated areas identified by development companies.

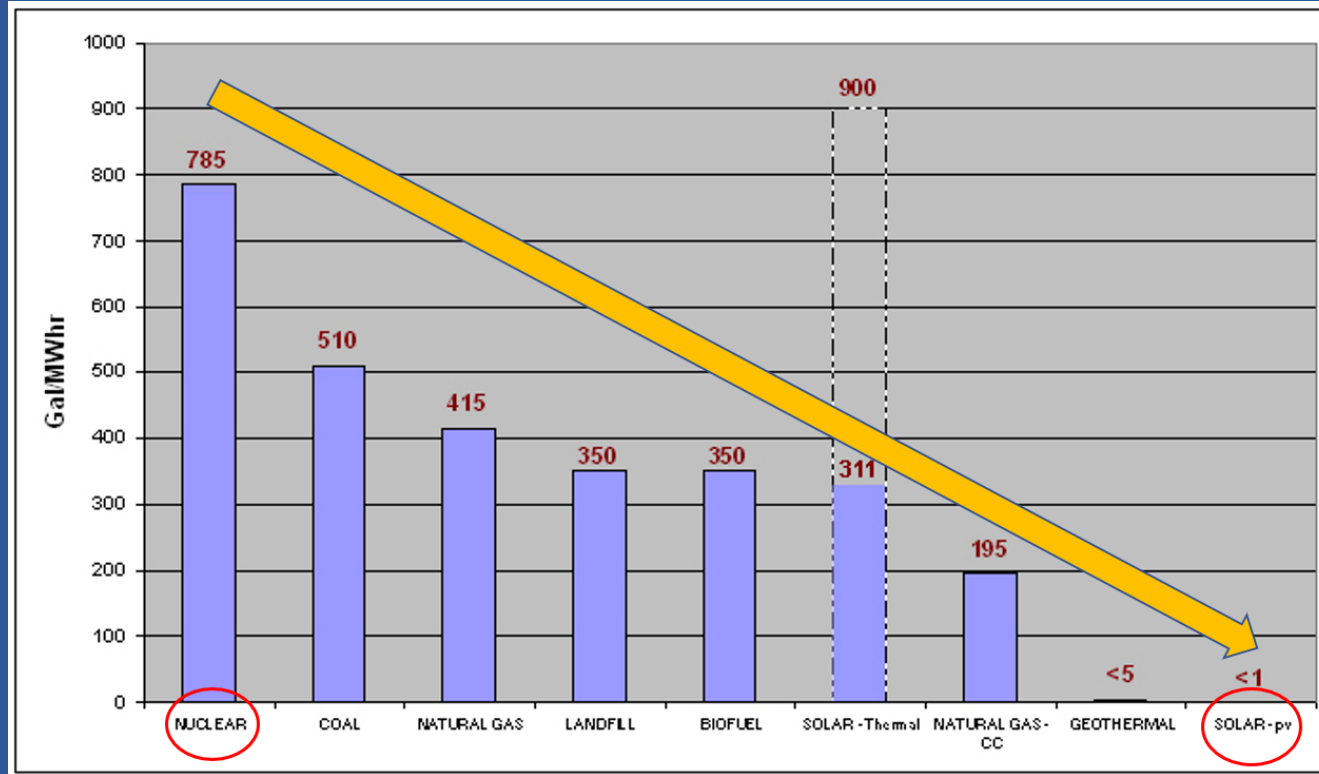


- RANK #4 locations would be, by consensus or legal protection, completely off-limits, for example, in the John Muir Wilderness, Gettysburg, or Mt. Rushmore

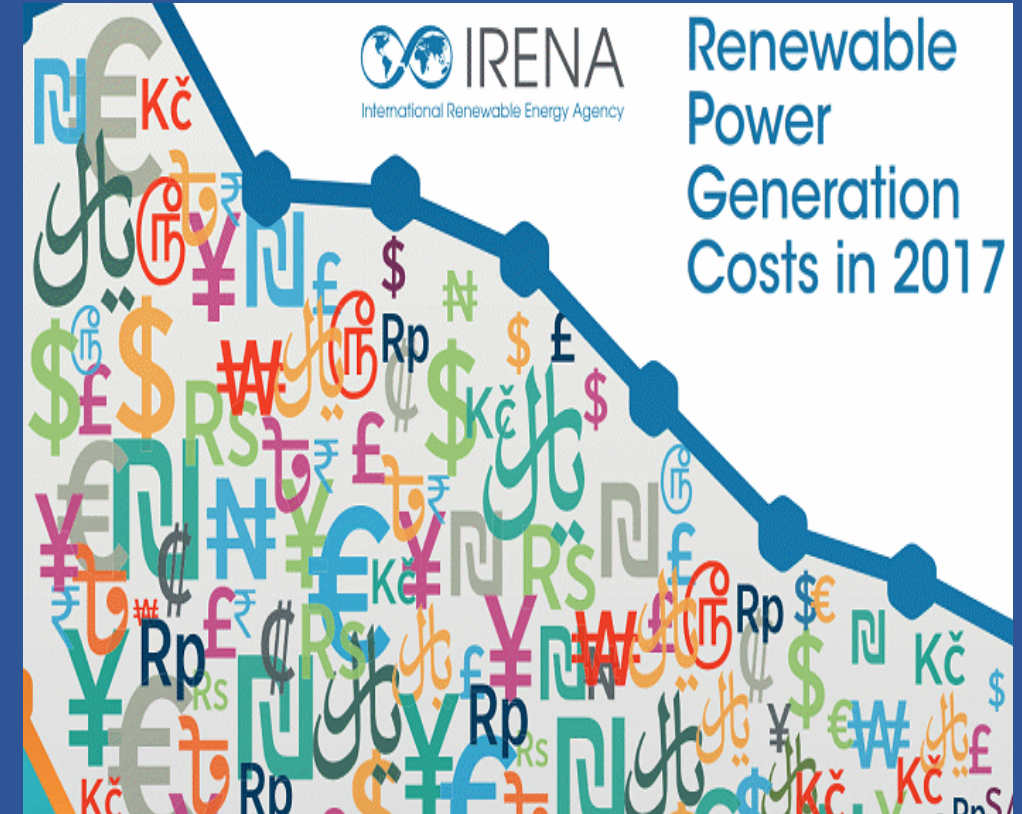


# 9. Highlight Advantages...

## Low Water Requirement



## Lowest Cost



Christopher Scott and Martin 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. 2011

<https://www.solarquotes.com.au/blog/solar-electricity-costs-irena-mb0415/>



...including through wind tourism



10.  
RECOGNIZE THE  
MORALITY OF  
WIND ENERGY  
LANDSCAPES

*Wind Power  
Promotes Awareness  
of Energy Supplies*



A scenic mountain landscape. In the foreground, there is a large, smooth, reddish-brown boulder resting on a hillside covered with green and yellowish vegetation. To the left, a bare, dark tree branch reaches across the frame. The middle ground shows a valley with green hillsides. In the background, a large mountain range stretches across the horizon under a clear blue sky. The mountain peaks are partially covered in snow or light-colored rock. The overall scene is bright and clear, suggesting a sunny day.

VI. PALM SPRINGS – A RENEWED  
BELLWETHER



Palm Springs

Wind Developments

# Positive Image of Wind



**PALM SPRINGS POWER**

**BASEBALL IS BACK!**

[www.PalmSpringsPowerBaseball.com](http://www.PalmSpringsPowerBaseball.com)

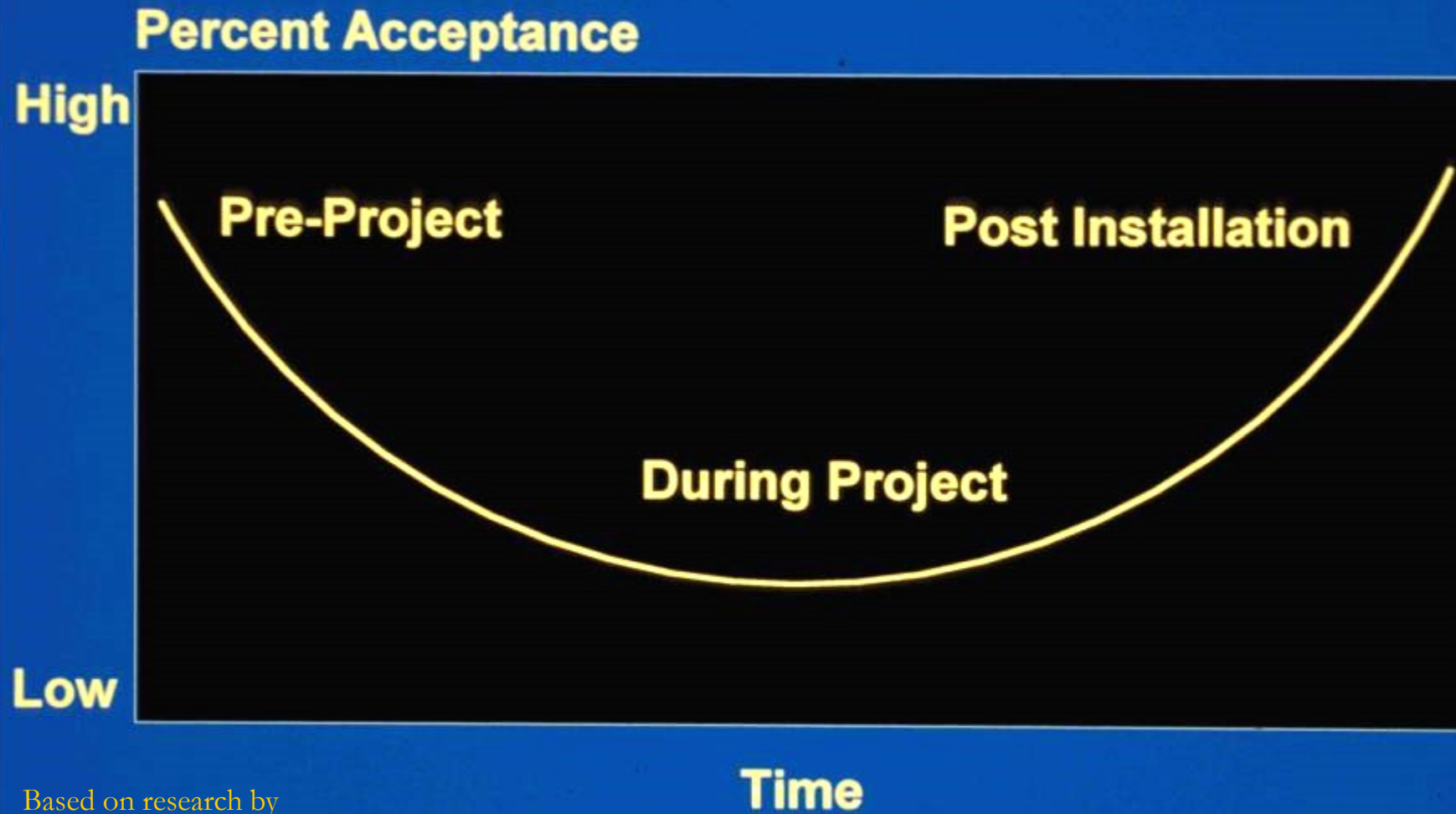
All Home Games Played  
at Palm Springs Stadium

**760-864-6278**

# Acceptance Instead of Rejection



# Sequence of Acceptance



Based on research by  
Maarten Wolsink

WE ARE ALREADY BEGINNING THE TRANSITION TO  
A MORE SUSTAINABLE ENERGY FUTURE











Let's move from this....



To this.



P.S.

That's not wind.  
We're blowing you a kiss.

*Love, Palm Springs*

FAIRWAY



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



# Conventional Energy

- Cooling water requirements
- Drilling
- Air pollution
- Acid rain
- Acid streams
- Ground water contamination
- Induced seismicity
- Methane flaring
- Greenhouse gases
- Mining dangers
- Black lung disease
- Nuclear accidents
- Long-term waste disposal
- Mining
- Pumping
- Refining
- Transportation
- Pipeline construction
- Tanker accidents
- Oil spills
- Aesthetic intrusion
- Potential proliferation

# Wind Energy

## Benefits

- No cooling water
- No emissions
- No mining, extraction, refining, transport, long-term waste, proliferation potential
- Little reliance on imports
- Renewable
- Individually profitable
- Readily reversible

## Asserted Costs

- Bird collisions (comparatively small)
- Flickering (occasional but rare)
- Lowered property value (disproven)
- Noise (occasional)
- Visual changes (persistent and valuable)



**Constant Reminder:**  
**Your electricity must come from somewhere**



If we do our job right, we will cease complaining about alternative energy resources and start accepting **the morality of wind energy landscapes**



**THANK YOU**

# The Morality of Wind Energy Landscapes During an Energy Transition

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