Is Renewable Energy Development Bad for the Environment?

Do Environmental Laws Hinder Development of Renewable Energy?
Altamont Pass Wind Farm

- East of San Francisco
- 1981; one of oldest
- ~7,000 turbines
- ~29 square miles
- 630,000 kW
- 550,000,000 kWh
- Power a city of 250,000
- 1% North CA electricity
Altamont

28–43 golden eagles killed by turbine blades each year
Altamont 2-Year Study

182 dead birds, including 119 raptors

- Collisions with turbines: 55% of raptor deaths
- Power line electrocutions: 8%
- Collisions with wires: 11%
- Unknown causes: 26%
Bats

- Populations in decline
- 1,400–4,000 killed at WV wind facility in 2003
- Fatalities:
  - Highest: forested ridges eastern US
  - Lowest: Rockies, Pacific NW
  - Variable: upper, Midwestern US
Bats

- Certain species susceptible to turbines
- "Migratory tree bats" roost in trees, migrate long distances
- No federal protection; only T&E species
Mojave Desert Solar Projects

• BLM land
• Between Mojave National Preserve and Joshua Tree National Park
• Applications for 14 solar, 5 wind energy projects (6 CSP approved last 3 mos)
Mojave Desert Solar Projects

- Desert tortoise (federally threatened)
- Potential destruction of habitat
- Limited water supply
Solar Thermal

- Water needed for:
  - Cleaning mirrors
  - Cooling steam exhaust (wet-cooling)

- Parabolic trough = same amount of water as coal, nuclear (800 gal/MWh)
What Environmental Laws Apply?

Altamont violates:

- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act
- CA Fish and Game Code
What Environmental Laws Apply?

Mojave solar:
- National/State Environmental Policy Acts
- Endangered Species Act
- Clean Water Act
- State, local laws
Federal Laws

- NEPA (CEQ)
- MBTA (USFWS)
- ESA (USFWS)
- CWA (EPA, COE)
- Bald and Golden Eagle Protection Act (USFWS)
- NHPA (NPS)
National Environmental Policy Act

- Federal lands/federal nexus
- Decision-making process
- EA/FONSI or EIS/ROD
- Public involvement required
- Very time-consuming
Migratory Bird Treaty Act

- Birds that live, reproduce, or migrate within or across international borders
- Not only T or E
- Protects 836 species, 58 legally hunted
- Strict liability; no permits to cover accidental impacts
Strict Liability

- Responsibility for damages regardless of fault
- Often applies to inherently hazardous activities
Migratory Flyways

- Central
- Mississippi
- Pacific
- Atlantic
Bald and Golden Eagle Protection Act

- Bald and golden eagles, parts, nests, eggs
- Golden Eagle Nest Take permit to move a nest
- No permits to cover accidental impacts
Endangered Species Act

- §7 consultation recommended
  - List of T&E species, critical habitats from USFWS, state
  - BO: Jeopardy of continuation of species, adverse habitat modification
- §9 prohibition of take
  - Incidental Take Permit; exempts project from prohibitions, other permitting requirements
Endangered Species Act

- Can apply for Incidental Take Permit (ITP) if no §7 consultation
  - Requires Habitat Conservation Plan
  - Triggers federal action, consultation
  - Triggers NEPA (EA or EIS)
Clean Water Act § 402
NPDES Permit Program

- Regulates point sources discharge (pipes, man-made ditches)
- Land disturbance $\geq 1$ acre: NPDES General Stormwater Permit for construction (clearing, grading, excavation)
- Individual Stormwater Permit for construction if large site, sensitive areas
- 30-day public review
Clean Water Act § 404

- Regulates placement of dredged/fill materials into wetlands, “Waters of the US”
- General Permit: Minimal adverse impacts
- Nationwide Permit: 50 types for construction
- Individual Permit for
  - significant impact to waters, wetlands
  - activities covered by no other permits
    - 6-12+ months
    - Can require costly studies, EIS
Do environmental laws inhibit development of renewable energy projects?

- NEPA: Costly, time consuming; developers avoid federal lands
- ESA: Incidental Take Permit = NEPA
- CWA Individual Permit may require EI S = NEPA
Visual Impacts

- No specific federal law
- Usually evaluated in EA/EIS (NEPA)
  - State/local laws
  - Coastal areas
Lessons from Altamont

• National Wind Coordinating Committee (NWCC) to address wind/avian issues

• Studies to prevent recurrence:
  – Paint blades to increase visibility
  – Understand raptor hearing to avoid turbines
  – Insulate wires, cover parts of poles, design lines to avoid electrocution
  – Most project power lines now buried
  – Tubular towers rather than lattice
Far Less Raptor Mortality

- Fatal flaw analysis
- Wildlife surveys before, after installation
- Site redesign
- Habitat loss mitigation
Bats

- Turbine cut-in speed 8/9 mph to 11 mph = reduce fatalities from 43% to up to 93%; annual energy loss <1%
- Sonar "jamming" device; deter turbine ultrasound emissions
- Paint turbines colors less attractive to insects
Solar Thermal

- Dry-cooling (air cooled)
  - Very little water
  - Less efficient; more expensive
- Hybrid wet/dry: 10% of water 97% of cases
- Gas instead of steam
- Mojave: 2 plants wet-cooling (private land, dedicated water); others dry-cooling
How to tell if your apartment is on a major bird migration route
# Annual Bird Deaths

<table>
<thead>
<tr>
<th>Source</th>
<th>Annual Deaths</th>
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<tbody>
<tr>
<td>Cats</td>
<td>100s of millions</td>
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<tr>
<td>Collisions with plate glass</td>
<td>97.5 million</td>
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<td>Pesticides</td>
<td>72 million</td>
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<td>Collisions with vehicles</td>
<td>60 million</td>
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<td>Cell towers</td>
<td>40-50 million</td>
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<td>Oil, wastewater pits</td>
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<tr>
<td>Collisions with tall structures</td>
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<tr>
<td>Habitat loss</td>
<td>unknown</td>
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<tr>
<td>Wind turbines</td>
<td>33,000</td>
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</table>
• Exxon Valdez oil spill: 500,000 migratory birds died
• Florida coal-fired power plant, one day: 3,000 birds died during migration
• Coal, nuclear power plants: Major habitat loss