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CONFERENCE

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# Wind Project Development Process

## Toward Wildlife Friendly Windpower: A Focus On the Great Lakes

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# Clipper Windpower

- Formed in 2001...IPO in 2005... Growing...
- Project Developer...
  - 200+ MW Developed
  - 6,000 in Project Pipeline
- Turbine Manufacturer...
  - Liberty 2.5 MW – largest WTG manufactured in the US
    - Evolutionary improvements in key areas
    - High Reliability
    - Unscheduled maintenance costs
    - Grid compatibility



# Wind Industry

- Installed over 6000 MW of wind in the US to date
  - 25 billion kWh, energy equivalent of use of 1.6 million households
  - Offsets principally fossil fuels, mainly natural gas nationally but coal in some areas
- Globally about 60,000 MW of wind, equal to 10 million households
  - Some countries as high as 20% penetration, parts of Spain and Germany 25%

# Wind Industry

- Committed to building power plants that are renewable, emissions-free and safer for all living things, including humans, wildlife & habitat
- Wind industry has been a leader among industry groups in exploring its impacts on wildlife
  - Wind industry has put more \$ into wildlife research than many much larger industries
  - Bat Wind Energy Collaborative was a response to reported problems with bat collisions at eastern forested ridge sites
  - Current efforts by industry on bats are focused on deterrence
  - Research program difficult to fund w/ 1-2 year PTC

# Wind Developers Look For:

- Good wind resource, wind exposure
- High energy prices
- Proximity to load centers
- Good existing transmission
- Low permitting complexity, high procedural certainty
  - Long or uncertain permitting horizon not consistent with “PTC windows”
  - Higher permitting complexity forces projects to largest companies & larger project sizes
- Low to moderate tax load

# Wind Developers Look For:

- Good policy environment (eg, RPS, other incentives)
- Relatively low environmental impact areas
  - We are incentivized to avoid “problem” areas such as parks, reserves, areas of high wildlife concentration
  - Patterns of demand do create conflicts when loads are near or along routes to sensitive areas

# Development Process: Steps

(most conducted in parallel)

- **Site prospecting**

- Simultaneously taking first cut at wind resource, transmission, access, environmental, viewshed, land use, permitting, etc., AND power sales

- **Land rights (leases, easements)**

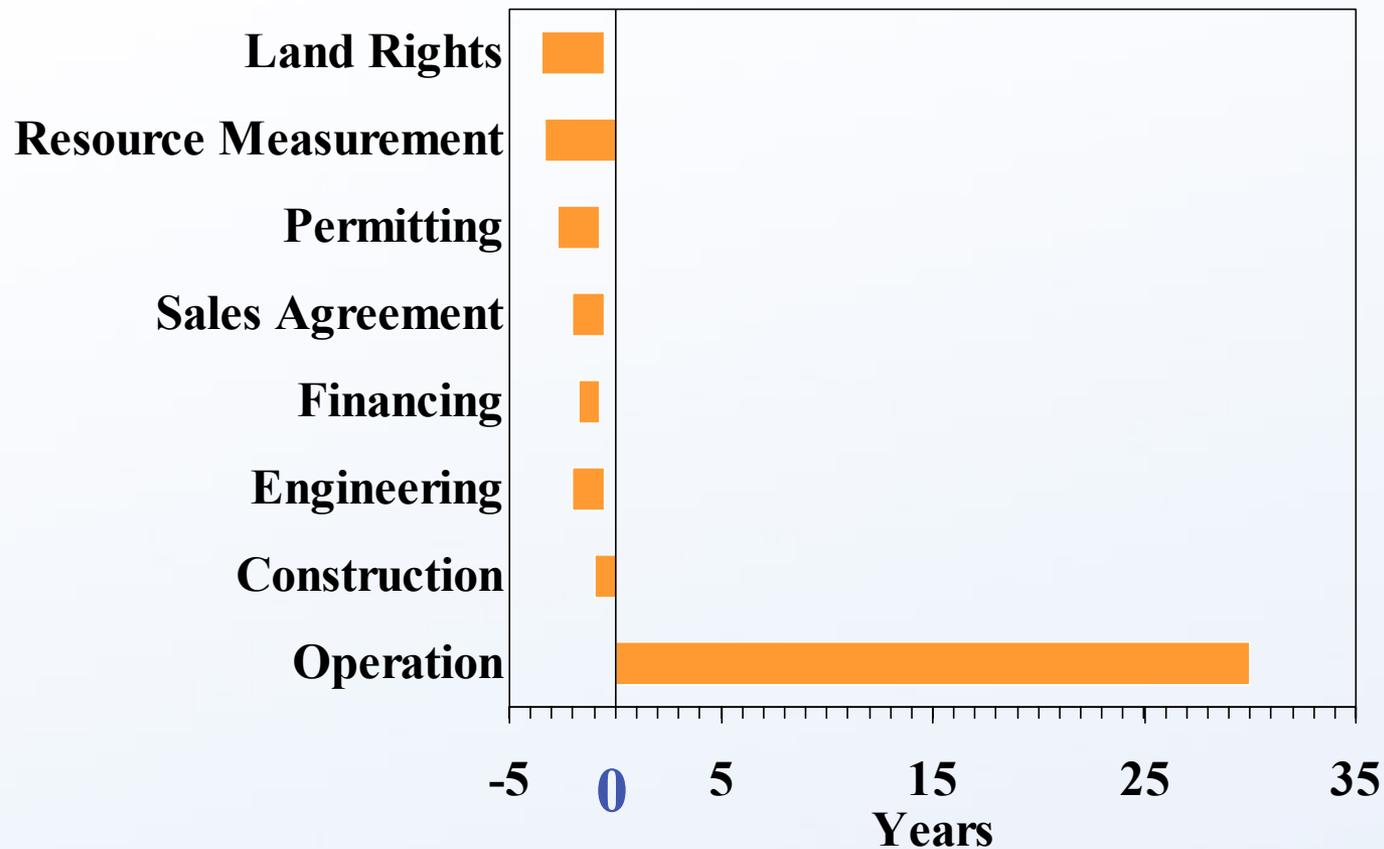
- **Site investigation**

- Wind measurement, analysis (2 yrs unless strongly correlated w/existing sites)
- Environmental studies
  - Sound, birds, bats, viewshed, other issues (lightning, erosion, other flora, fauna, telcom/EMF, shadow flicker)

# Development Process: Steps

- **Environmental Studies (cont'd)**
  - Cultural issues (artifacts, land use, religious concerns, historic structures)
  - Geotechnical
  - Construction logistics
- **Permitting**
- **PPA negotiation**
- **Engineering**
- **Financing**
- **Construction and Operation**

# Project Development Cycle



# Studying Direct & Indirect Impacts to:

- **Habitat, wildlife, human populations, built environment**

- Flora and Fauna

- Birds and bats
- Other wildlife
- Plants

- Habitat

- Fragmentation and other clearing
- Erosion
- Groundwater/Surface Water
- Wetlands

# Studying Potential Impacts

- **Sound**
- **Visual**
  - Viewshed
  - Shadow flicker
  - FAA Marker Lighting
- **Safety**
- **Cultural (historic, religious, etc.)**
- **Property values**
- **Decommissioning**

# Guidance

- Most studies have standard scopes adopted to location and gov't requirements
  - » Bird and esp bat study scopes less established
- Bird/bat studies are very site specific
  - Wind Energy/Bird Interaction (Methods & Metrics)
    - » Substantial effort to standardize methods
    - » Not a “cookbook”—requires judgment
  - USFWS Interim Voluntary Guidelines
- Established developers follow guidelines

# Guidance

- Scopes typically negotiated with state F&W
- Scopes evolve, utilize new techniques
- Latest “panacea” is marine radar, expensive but promising
- NEXRAD may allow us to correlate temporally and spatially larger-scale migration w/ local studies
- Bats are challenging because so little is known
  - Less guidance available
  - Predictive capability of studies unknown

# Competitive Reality

- Wind developers exist w/in competitive environment
  - Other wind developers can “poach” sites if announced prior to site control being established
  - Short PTC window creates conflict re studies
  - Developers need to get results from \$
    - Current predictive capability of studies limited
    - Need early screening tools that demonstrate that risk can be reduced
    - Resistance to spending \$ to differentiate btwn 2 and 3 birds/turbine/year
    - Developers want to avoid outlier sites

# Studies

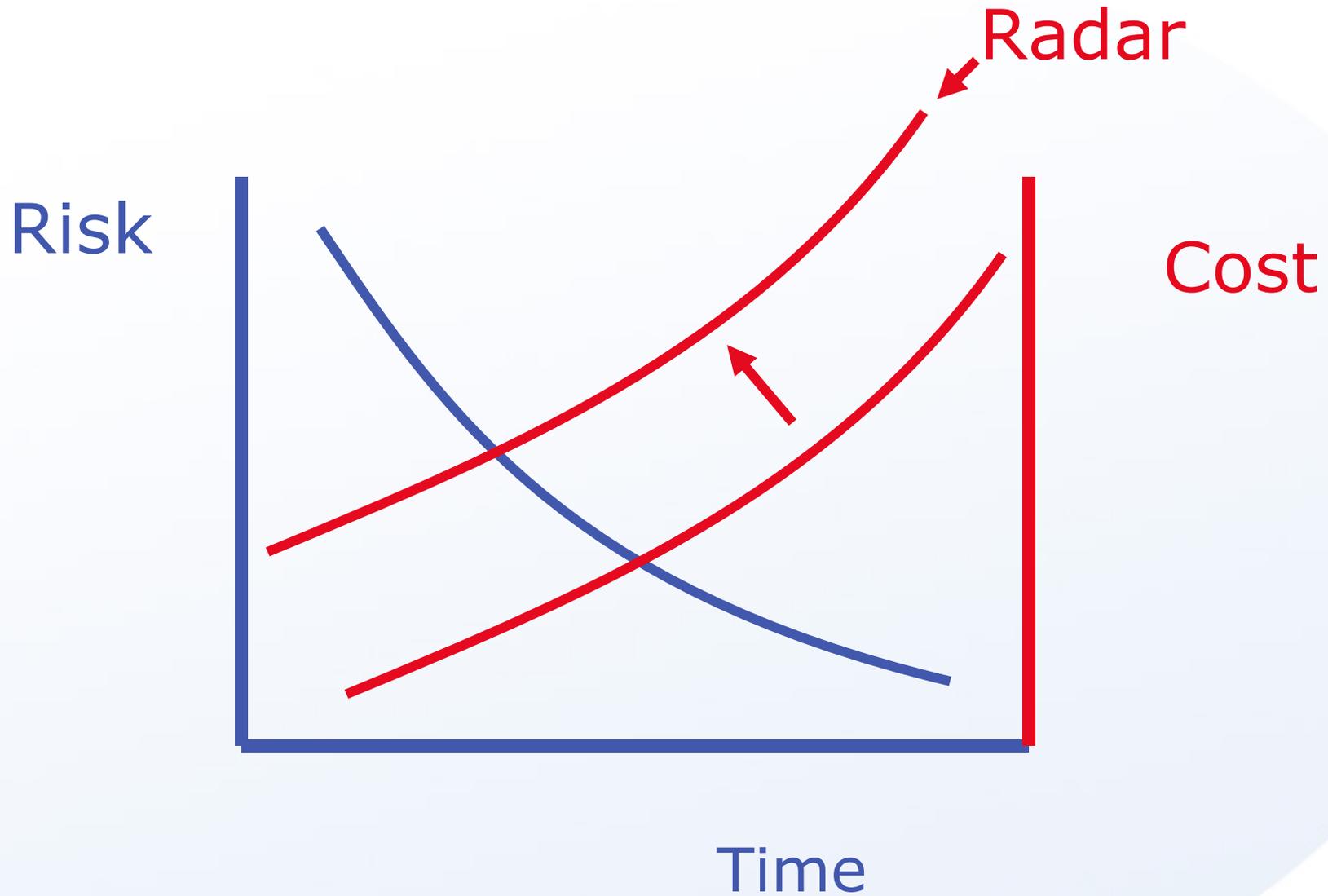
## Cost and timing of studies

- Virtually no discussion of cost in conference talks
- Development cost is \$1-3 million, more at some complex or difficult sites (highest in east, CA)
  - At-risk capital
  - Cost of studies should be compared to total development cost, not to installed cost
  - Environmental studies typically \$250k-\$1 million +
- Tax credit window is typically 1-2 years
  - Multi-year studies dramatically increase risk of a lost investment

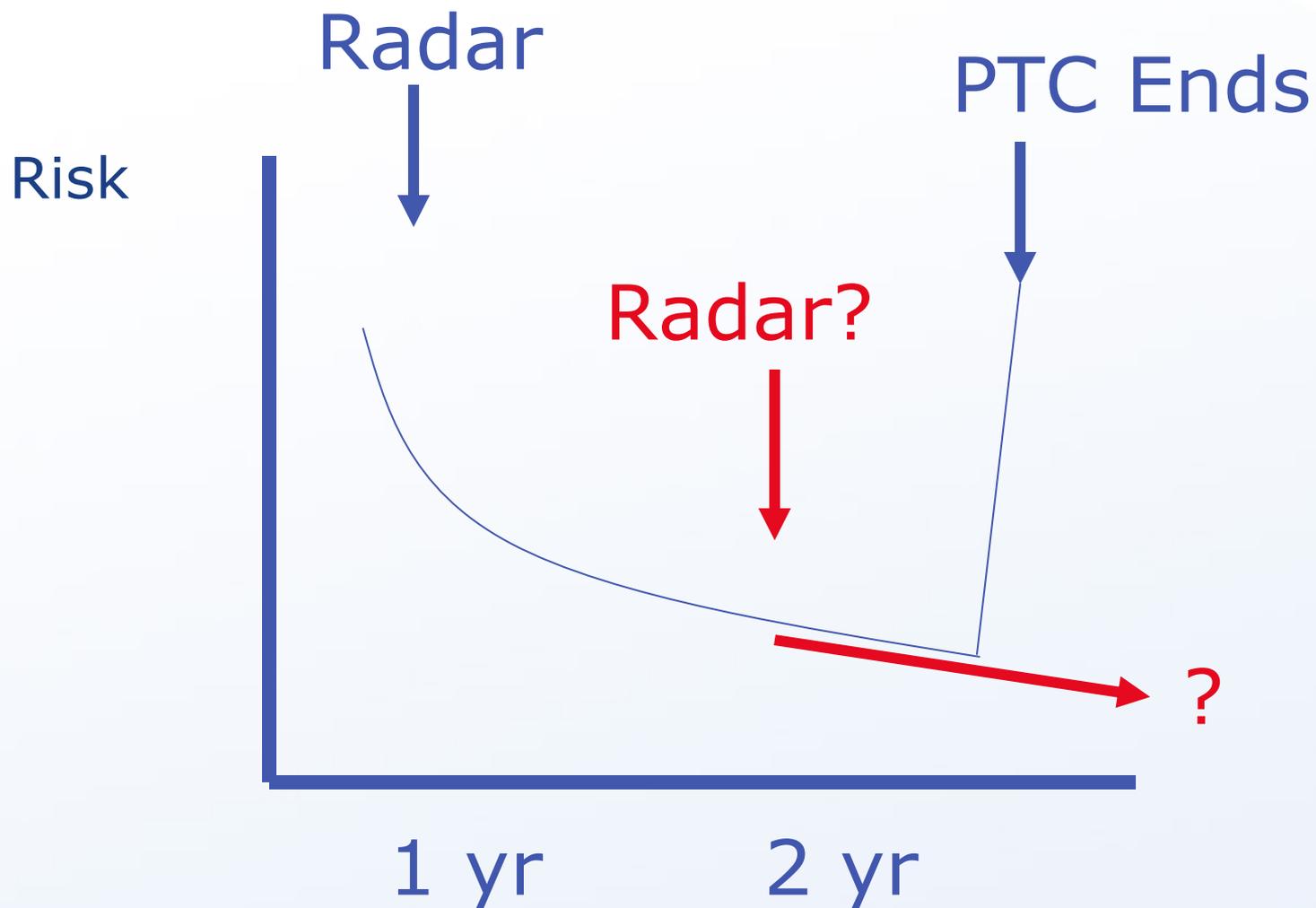
# Marine Radar Study Cost

- Two season study
  - 45 days in Spring, 60 days in Fall
  - Total cost approximately \$450,000
  - Equipment cost \$2500-2700/day + labor, travel, etc.
  - At simple sites, two seasons of radar alone can increase development costs 50% or more
  - Or: each radar study reduces project portfolio, raises portfolio risk
- Multiple year studies mean many fewer sites studied
- Higher study cost → larger project size and larger developers

# Timing & Cost of Studies



# Timing & Cost of Studies



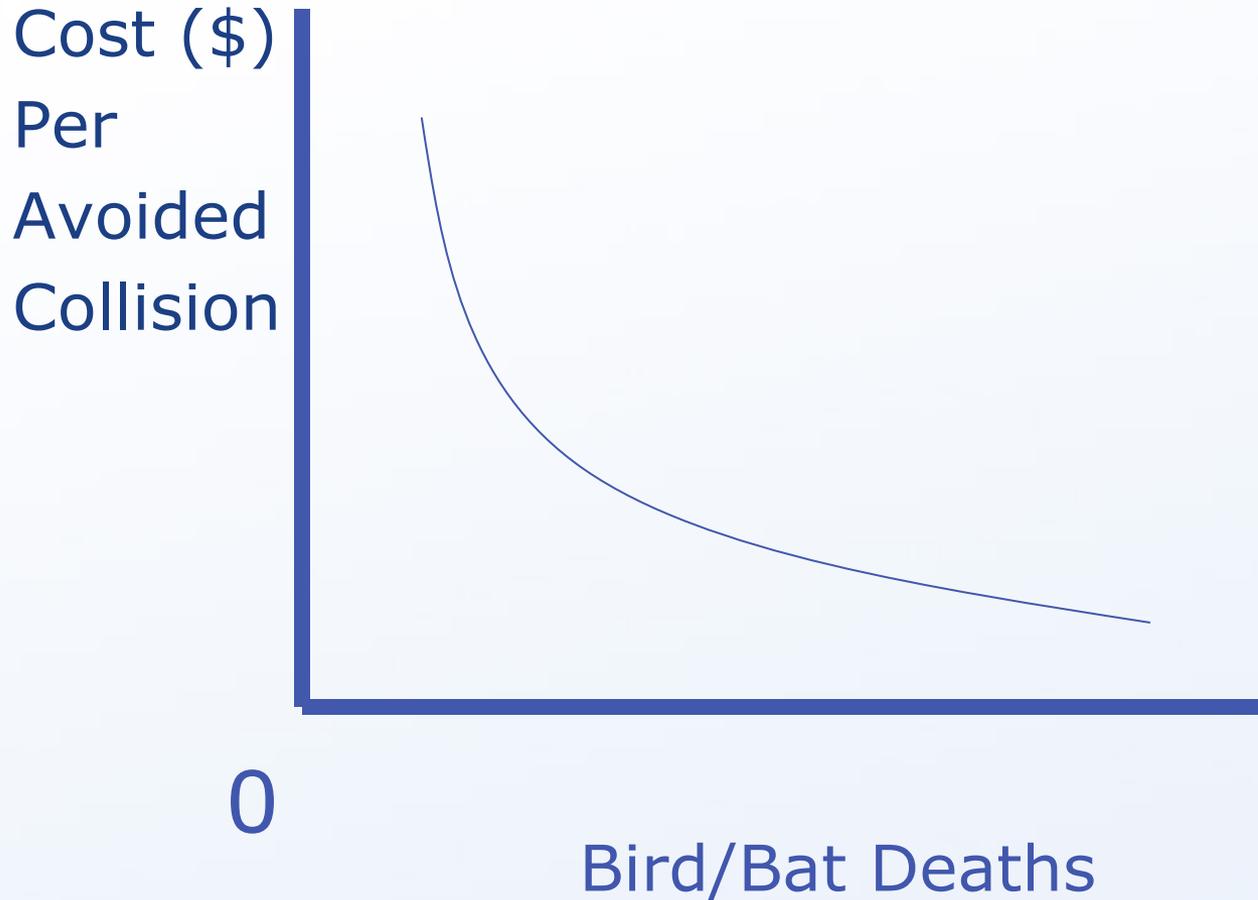
# Unspoken Truths

- Fossil fuels have massive impacts on humans, wildlife and habitat but are not asked to “count their dead”
  - I call this a subsidy to our competitors
  - Suggests that indirect impacts, no matter how large (particulates, acid rain, etc.), are “better” than direct (collision) impacts
  - Wind industry feels singled out among energy sources on wildlife impacts
- If goal is improving bird/bat population viability, conservation may be better solution than extensive studies or mitigation in some cases
  - Wind industry could be a great force for conservation

# “Subtext” of Wind/Wildlife Dialogue

- Regulators and many wildlife scientists look at absolute impacts while industry, energy regulators, investors and general public look at relative impacts
- Biological significance
  - Some have thrown up hands but still central to discussion
  - Disconnect between legal standards and other perceptions of significance
    - Birding community, wildlife regulators, wind industry, general public
  - Inability to balance impacts vs benefits
- Legal liability works both for & against wildlife goals
  - Easier access to safe harbor needed to encourage studies

# Cost of reducing mortality



# Moving Beyond Point/Counterpoint

- Starting point is that industry believes our impacts are low relative to other sources
  - Need to recognize benefits as well as cost
- Additional scope of studies will need to be co-funded by non-industry sources (as in Europe)
  - > Funding structure is important
    - Need to lower \$ risk of studies in early stages
    - Initial public funding can be “paid back” by successful projects in revolving fund
    - Unsuccessful projects do not need to repay
- Provide easier access to safe harbor from legal liability
  - USFWS/IRS comparison

# Summary

## **Avoid high impact/sensitive sites**

- High concentrations, food base, recirculating patterns, other behaviors that put birds at risk
- Broad front migration is not nec a problem
- Requires an understanding about level of acceptable impacts—when add'l studies are truly warranted

## **Mitigate impacts where feasible**

- Minimize habitat impacts, avoid most sensitive habitats
- Minimize lighting, use reasonable setbacks, insulate nacelles (sound), etc.

## **Conduct research on existing and new projects**

- incorporate findings into new project design
- No new projects means no ability to measure value of promising modifications, approaches

# Summary

## **Reduce impacts through technology**

- Turbine modifications (e.g., FAA lighting color or flash method, turbine operation during low wind speeds, acoustic emissions)
- Deterrence technologies

## **Compensate where appropriate**

- Through conservation or other methods to improve habitat or populations of affected wildlife

## **Require other energy sources to study and mitigate wildlife impacts**

- **Despite large impacts from smog, mercury, acid rain, MTR, coal is not required to conduct mortality counts (even of humans)**
- **Even asking coal industry to study its impacts is “political suicide”**



Thank You