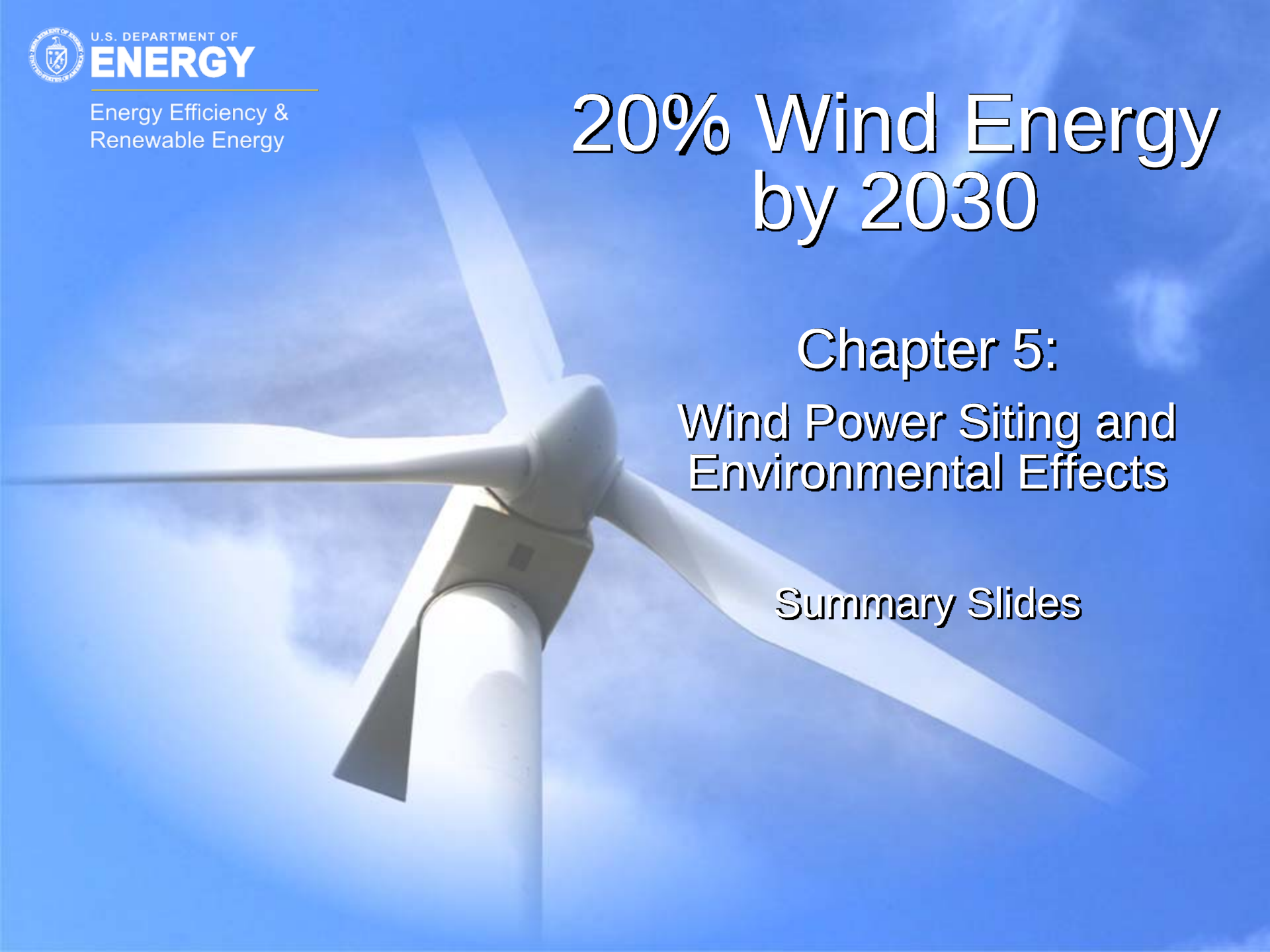
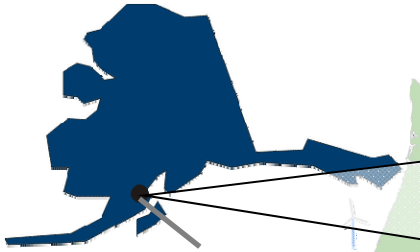

U.S. DEPARTMENT OF
ENERGY
Energy Efficiency &
Renewable Energy
20% Wind Energy by 2030
Chapter 5:
Wind Power Siting and Environmental Effects
Summary Slides

Environment and siting overview

- 10-25% of proposed wind energy projects are delayed or not built due to environmental concerns
- Most facilities pose only minor risks to human and environmental sectors when sited properly
- Uncertainties regarding wildlife and habitat remain
- Effective siting approaches must be developed to gain public trust
- Significant environmental benefits of wind need to be quantified

While land requirements are extensive, actual footprint is small (allowing for multiple land uses)



Anchorage, AK
1,961 mi^2

Actual footprint only

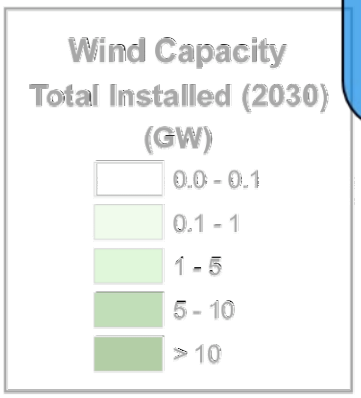
2-5% of area,

~ 618,000 acres: slightly less than area of Rhode Island or

half the size of Anchorage, Alaska

Total area required:

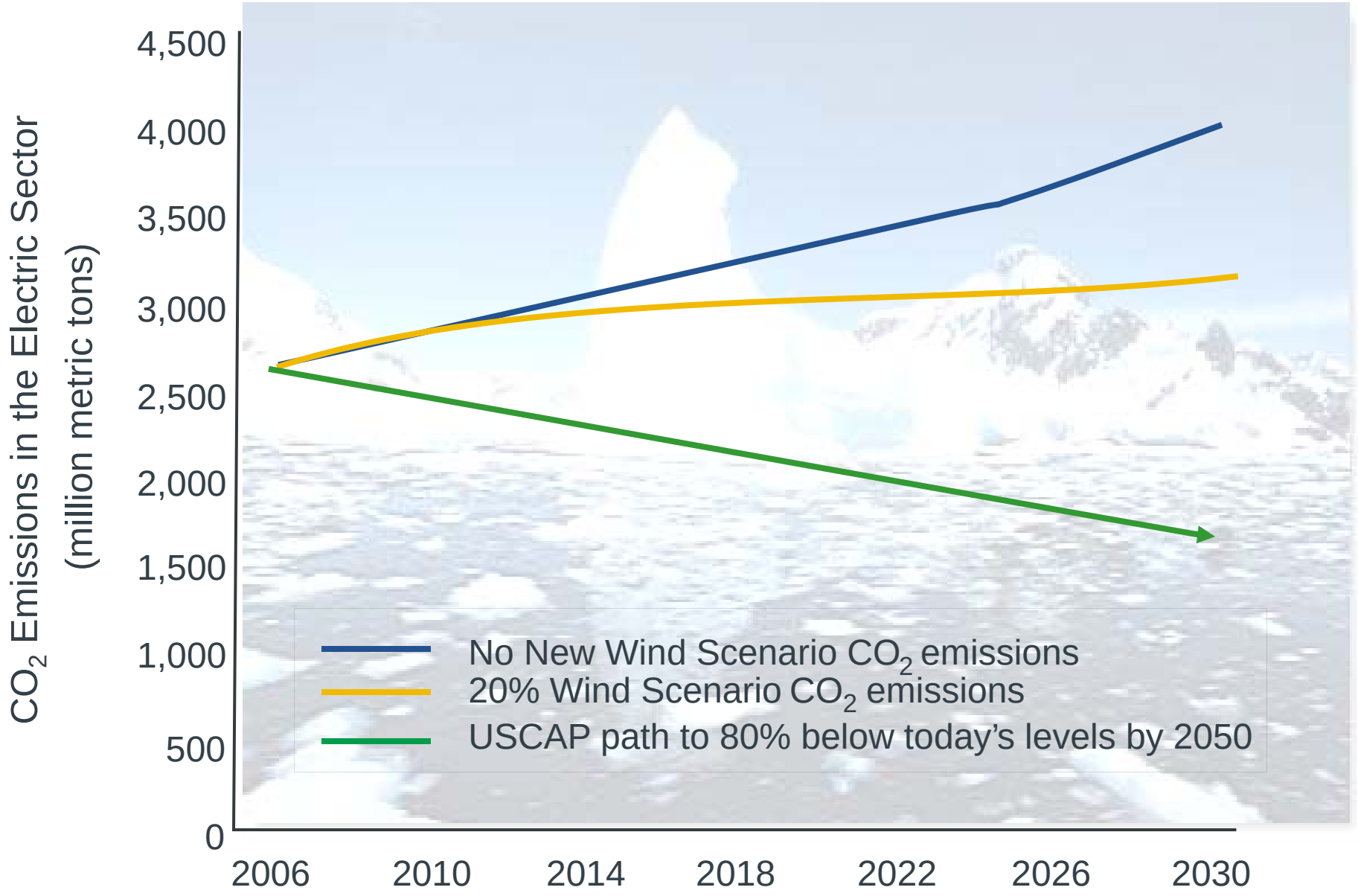
15 million acres



Includes offshore wind.

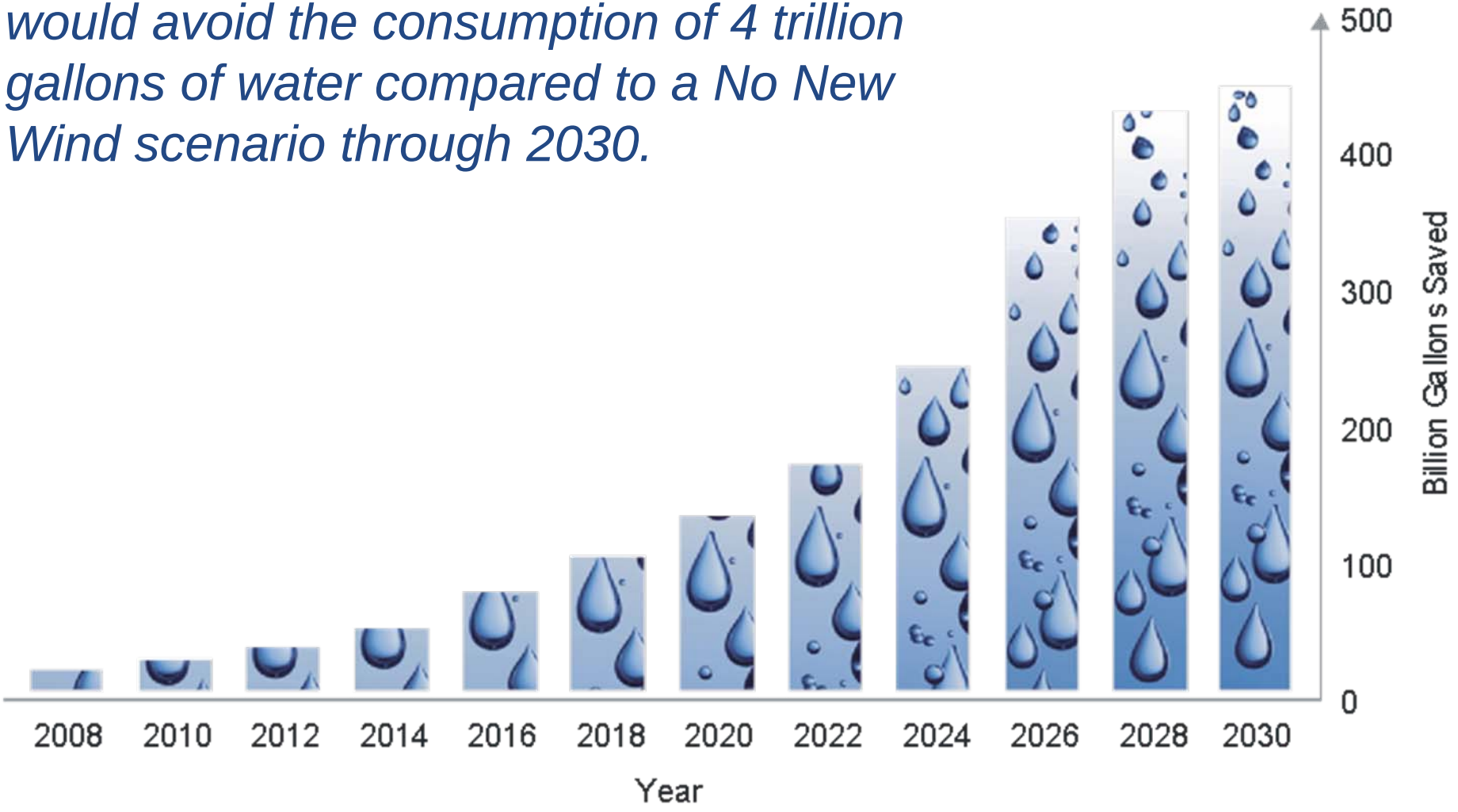
The black open square in the center of a state represents the land area needed for a single wind farm to produce the projected installed capacity in that state. The brown square represents the actual land area that would be dedicated to the wind turbines (2% of the black open square).

20% Wind Scenario reduces CO_2 emissions from the electricity sector



20% Wind Scenario cuts electric sector water consumption by 17% in 2030

Cumulatively, the 20% Wind Scenario would avoid the consumption of 4 trillion gallons of water compared to a No New Wind scenario through 2030.



Complex regulatory framework presents siting challenges

- Wind energy projects are governed by a complex set of laws
  - Different permitting regulations apply in different parts of the country
  - Usually permitted locally, similar to other land use decisions
  - Some states review projects in the PUC or equivalent
  - State agencies, such as wildlife agencies, are consulted informally in most reviews
  - Federal permits or reviews required, such as Federal Aviation Administration (FAA) review of structures more than 200 feet above ground level
  - Projects on federally-managed land trigger NEPA
- Increased uniformity of regulatory requirements across regions would greatly facilitate the increased deployment of wind projects

Community acceptance is major siting challenge

- Sound
  - When standing closer than 350 meters, the wind plant noise is typically 35 to 45 decibels, equivalent to a kitchen refrigerator running
  - Turbines have become quieter
  - Modern wind farms are designed with noise in mind
- Land value
  - No statistically significant changes to property values found in studies
- Visual and aesthetics
  - The visual impacts of wind energy projects may be a factor in gauging site acceptability
  - Visual simulations from specific vantage points and a map of theoretical visibility across an affected community can be produced by developers
  - Proposed wind projects may be reviewed by FAA due to height concerns

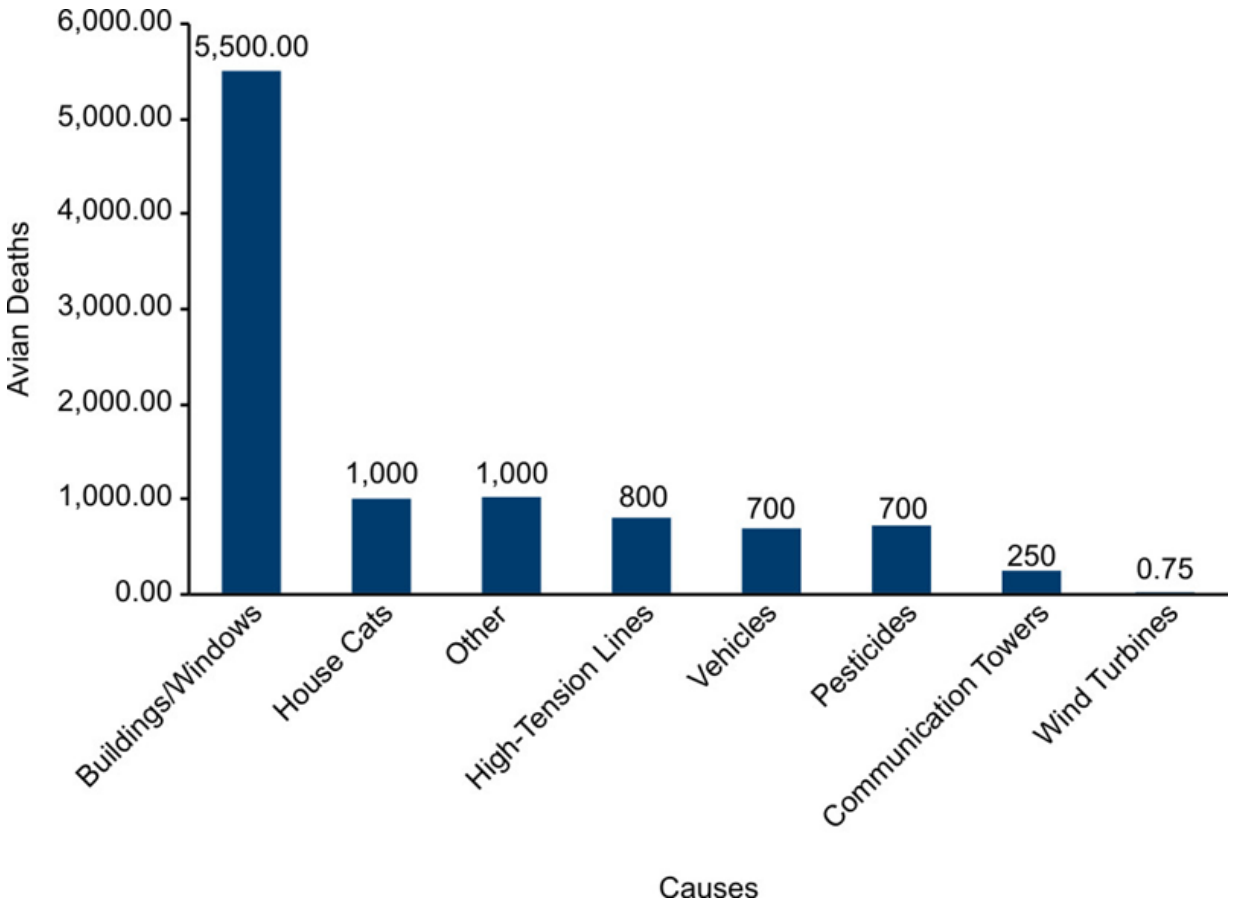
Proposed View Cape Wind Project, Cape Wind Associates

Siting issues: gaps in knowledge

- States, collaborative groups, and the National Academy of Sciences have identified gaps in the knowledge base about wind energy and its risks. Knowledge gaps are framed in questions such as:
  - Can bats be deterred from turbines?
  - How high do night-migrating songbirds fly over ridgelines?
  - What are the relative environmental effects of wind and other power generation options?
- Public-private partnerships should be expanded
- Risks and uncertainty frameworks are needed
- Several research collaboratives have already been formed that include various stakeholders

Wildlife risks: wind turbines are not a major cause of avian deaths, but concern is warranted

- Wildlife collisions and habitat
  - National Research Council Report (2007) concluded that current wind generation is responsible for 0.003% of human-caused avian mortality
  - Bat mortality has been higher than expected
  - To date, no significant impacts on local or total bird and bat populations have been demonstrated



A look ahead: siting actions