This presentation will provide an overview of the challenges associated with planning, permitting and developing renewable energy projects from a visual/aesthetic perspective. Topics of discussion include legal and permitting parameters, siting considerations, and principles and strategies for assessing visual impacts. Case studies will be examined from the perspective of an aesthetic expert, wind energy developer, and environmental lawyer.

**LEARNING OBJECTIVES**

- Acquire an understanding of the land planning, community outreach and permitting steps involved in renewable energy development projects.
- Learn about current technologies and methodologies for siting and assessing the aesthetic and community impacts associated with renewable energy projects.
- Understand the challenges posed and solutions proposed in actual case study projects of grid scale wind and solar developments and transmission corridors.
- Benefit from the perspectives of a landscape architect, environmental lawyer and wind energy developer involved in energy projects from inception to operation.

**OVERVIEW OF RENEWABLE ENERGY TYPES**

- **HYDRO**
- **SOLAR**
- **WIND**
- **BIOMASS**

**THE CHALLENGES**

- Climate change and peak oil
- Need to develop distributed energy resources on a local and regional basis
- Disconnect between community support for renewables and actual implementation
- Our demand for energy (and new sources) continues to grow despite conservation initiatives
- Permitting processes vary - can be difficult and costly

**LEGAL & PERMITTING PARAMETERS** *(RELATED TO AESTHETICS)*

**FOR UTILITY SCALE ENERGY FACILITIES**

*The requirements for evaluating a utility project’s impact to scenic resources varies from state to state, for example:*
VERMONT:

All electric transmission facilities, electric generation facilities and certain gas pipelines within Vermont require the approval of the Public Service Board through the Section 248 process, which includes an evaluation of the impact on scenic resources using the 2-step Quechee Test.

MAINE:

Wind power projects must receive approval through either the Department of Environmental Protection (DEP) or the Land Use Regulatory Commission (LURC), which requires an evaluation of aesthetic impacts on resources of state or national significance in accordance with the Wind Energy Act.

MAINE WIND ENERGY ACT - SIX CRITERIA TO DETERMINE VISUAL IMPACT

• Significance of the Resource
• Existing Character of the Surrounding Area
• Typical Viewer Expectations
• Purpose and Context of the Proposed Activity
• Extent, Nature and Duration of Public Use of the Scenic Resource and the Effect of the Development on those Uses
• Scope and Scale of Project Visibility from the Scenic Resource

NEW YORK:

The State Environmental Quality Review (SEQR) process administered by the Department of Environmental Conservation (DEC) requires the evaluation of visual and aesthetic impacts generated from proposed facilities on resources of statewide significance.

NEW HAMPSHIRE:

Proposed projects must comply with NH RSA 162-H of Title XII concerning Energy Facility Evaluation and Siting.

MUNICIPAL PLANS & THE COMMUNITY STANDARD

• Municipal Plans play an important role in energy siting, especially in the Northeast, especially where most communities have adopted plans and land use regulation
• Community goals or “standards” must be clear and concise, indicating a required or mandatory measure or action

PUBLIC ACCEPTANCE

• Viewers’ attitudes towards renewable energy can have an impact on their acceptance of its development
• The working landscapes of Northern New England are changing to reflect new forms of resource use and management
• There is increasing public acceptance and understanding of grid scale renewable energy development and the benefits it provides – clean environment and improved public health and safety
• For example, the results of a recent statewide Deliberative Poll on “Vermont’s Energy Future” indicate strong support for energy obtained from renewable sources to meet Vermont’s future electricity needs, with a quarter coming from hydro, about 18% coming from wind, and a bit under 15% coming from solar, wood, and nuclear, in that order. They wanted almost none of it to come from oil or, especially, coal.
SITING CONSIDERATIONS FROM AESTHETIC/VISUAL PERSPECTIVE

DESIGN PRINCIPLES

A number of design principles can be incorporated in a transmission project to mitigate visual impact, including the following:

- Avoid steep slopes
- Match structure height and type to locale/context
- Co-locate utility lines
- Align parallel structures where possible
- Avoid sky lining or silhouetting
- Reduce straight line effect by employing ‘zig zags’/ alignment changes and feathering vegetation at edge of right-of-way
- Minimize the use of different structure types within the same view (visual clutter, lack of harmony)
- Consider human cone of vision when placing structures at road crossings

VISUAL IMPACT ASSESSMENT

VIA’s use similar methodologies that have been established by various academic, regulating or management authorities such as:

- Visual Impact Assessment for Highway Projects (U.S. FHA)
- USDA National Forest Service Visual Management System (VMS)
- USDA National Forest Service Landscape Aesthetics
- Bureau of Land Management Visual Resource Management
- State of Vermont Act 250/Section 248 Quechee Analysis
- State of Maine Wind Energy Act
- NY State Environmental Quality Review (SEQR)

PROCESS FOR DEVELOPING A VIA

PHYSICAL CONSIDERATIONS:

- Project context - physical landscape, settlement patterns, local culture and land use practice
- Physiographic characteristics - vegetation and topographic patterns, (intactness, unity/uniqueness, harmony
- Project characteristics - design, form, scale, proximity, dominance/prominence, fit

PERCEPTUAL CONSIDERATIONS:

- Human visual capabilities and characteristics
- Response to changes in noise, odor, visual change
- Social/political/economic perspective
- Relationship to “community” politics
KEY PRINCIPLES (ASSESSING SENSITIVITY TO CHANGE)

ASSESSING THE VALUE OF SCENIC RESOURCES

SCENIC VALUE: Consider state/national significance, level of uniqueness, variety, intactness, etc.

LANDSCAPE AESTHETICS (USFS)

SCENIC ATTRACTIVENESS - POSITIVE COMBINATIONS OF:

- Variety
- Vividness
- Mystery
- Intactness
- Coherence
- Harmony

VISUAL RESOURCE MANAGEMENT (BLM)

SCENIC QUALITY INVENTORY:

- Landform
- Vegetation
- Water
- Color
- Adjacent Scenery
- Scarcity
- Cultural Modifications

VISUAL IMPACT ASSESSMENT (FHWA)

- Vividness: the extent to which the landscape is memorable. This is associated with the distinctiveness, diversity, and contrast of visual elements. A vivid landscape makes an immediate and lasting impression on the viewer.
- Intactness: the integrity of visual order in the landscape and the extent to which the existing landscape is free from non-typical visual intrusions.
- Unity: the extent to which visual intrusions are sensitive to, and in visual harmony with, the existing landscape.

ASSESSING THE VIEWER

- Level of Use: How many people frequent the site or see the view?
- Duration of View: Will a user have a fixed view of a project or more limited exposure?
- Viewer Expectations: What do people expect to see, hear or feel when they visit a site?

LANDSCAPE CHARACTER DRIVES THE ANALYSIS

- Topography and geomorphology
- Scenic overlooks/scenic viewsheds
• Land cover/forest type
• Agricultural lands/open space
• Rivers and streams, lakes and ponds

COMMUNITY CHARACTER PROVIDES CONTEXT AND PERSPECTIVE
• Settlement patterns
• Historic sites and structures
• Cultural and recreational resources
• Vibrant downtown/commercial centers
• Trails, parks, and conserved lands

IDENTIFYING SENSITIVE AREAS
• Identify sensitive areas, scenic resources, public vantage points (also referred to as Key Observation Points - KOPs)

KEY PRINCIPLES (ASSESSING VISIBILITY)

ASSESSING THE IMPACTS TO SCENIC RESOURCES:

EXTENT OF VISIBILITY:
• How much of the project area has visibility?
• How many structures are visible from a particular location
• How far away are the structures?

NATURE OF VISIBILITY:
• Contrast
• Visual dominance: scale, visual absorption, angle of view, etc.
• Visual order: unity, harmony, etc.
• Angle of View

TOOLS & TECHNIQUES
• Viewshed analysis
• Visual simulation
• Line-of-sight section
• 3D Modeling
• Mapping
• Public Opinion or Intercept Surveys
VIEWSHED ANALYSIS

An analysis method that illustrates the area of land that is potentially visible from a particular point of view or views.

Visibility will vary from point to point and is subject to:

- the presence of vegetation
- the nature and height of that vegetation
- the size and location of structures and the intervening topography between the viewing point and the subject

Used as a guide only. Provides point of departure for confirming whether or not a project can be seen from any one point in a town or region.

VISUAL SIMULATIONS

An analysis method that creates a visual image of what one would see if a project were constructed for vantage points that are sensitive or for important resources with project visibility.

- Visual simulations help determine the nature of visibility for individual vantage points
- Relatively reliable accuracy when properly conducted

LINE OF SIGHT SECTION

Based on elevation/contour data, a section is cut through the landform between a particular vantage point and a particular structure. This allows one to determine if intervening topography, vegetation, or built forms will partially or completely obscure views of a project from a specific viewing location.

3D MODELING

- Process of developing a three-dimensional representation of a surface and object
- Helps to visualize the impact of proposed projects and plans
- Enhances understanding of spatial relationships between objects within an environment

MAPPING

View from the Road: documents what we see from the “public viewshed” and for how long through field verification

PUBLIC OPINION OR INTERCEPT SURVEYS

- Helps to inventory and identify resources of scenic significance
- Provides a method for valuing scenic resources
- Assesses project impact – how likely are people to return?
ANALYSIS CONCLUSIONS

VISUAL IMPACTS

• What is the project’s effect on the continued use of the scenic resources? Will users return?
• What is the project’s effect on the continued enjoyment of the scenic resources? Will the enjoyment of the resource be significantly compromised?
• Will the project result in an undue or unreasonable visual impact? What is the threshold for acceptable impact?

SYNTHESIS OF INDICATORS & OTHER ANALYSIS

Factors that are evaluated and included in the synthesis that leads to the conclusion of reasonable or unreasonable impacts.

1. Determinations made about visual impact for individual resources (low, medium, high) and overall impact
2. Other factors
   • Mitigation measures
   • Effect on property values
   • Tourism and effect on visitors
   • Precedents from other SEC decisions and comparable projects
   • Cumulative Impacts
   • Each indicator assessment combined into an overall evaluation summary matrix

OPPORTUNITIES & CHALLENGES MOVING FORWARD

• Find a balance between aesthetic and community character, values and community/societal needs and benefits
• The cost of siting and development options need to be balanced with benefits to ratepayers and developers
• Determine thresholds for acceptable visual impacts based on scientifically conducted research and surveys
• Need to explore/accept options for accommodating and understanding the evolving new energy landscape

WIND POWER DEVELOPMENT CONSIDERATIONS
IN THE NORTHEAST

SITE SELECTION

• Commercially viable wind resource
• Access to transmission

COMMUNITY CONSIDERATIONS

• Community Support is essential
• Different Stakeholders often have conflicting interests
PERMITTING CONSIDERATIONS

- Siting Infrastructure in the Northeast is always challenging
- All infrastructure has impacts of some kind

COMMUNITY ENGAGEMENT: THE BOWERS PROJECT

THE ENGAGEMENT PROCESS

- Town Meetings
- Informal Meetings
- Shoe Leather and Coffee

CUSTOMIZED LOCAL BENEFITS

- Energy Funds
- Conservation and Deer Funds
- Recreational Tourism Fund
- Ride the Wind Snowmobile Trail
- Turbine Curtailment for Tribal Ceremonies

RESULTING SUPPORT

- Host Communities
- Leading Environmental Groups
- Leading Outdoor Recreational Groups
- Local and Statewide Economic Development Groups

PERMITTING REQUIREMENTS

- Detailed Wind Resource Assessment
- Aerial Photogrammetric and Topographic Mapping
- Botanical Resources Surveys
- Wildlife Habitat Assessment
- Avian and Bat Studies
- Wildlife Literature Review, Consultations, and Field Assessments
- Endangered and Threatened Species Assessments
- Wetland and Vernal Pool Delineation and Assessment
- Soils Mapping
- Archaeological Assessment
- Sound Assessment
- Visual Impact Analysis
- Groundwater Impact Assessment
- Erosion and Sedimentation Control Plan
• Cultural Resources Assessment
• Stormwater Pollution Prevention Plan
• Geotechnical Studies
• Broadcast and Communications Interference Studies
• FAA and Military Aviation Safety and Lighting Planning

THE ROLE AND VALUE OF THE VISUAL EXPERT

THE ROLE OF THE VISUAL EXPERT

• Pre-Development Site Selection and Analysis
• Stakeholder Support Information

PREPARING THE APPLICATION

• Data Collection and Presentation
• Photo-simulations
• Viewshed Mapping
• Providing An Overarching Expert Evaluation of Visual Impacts

TESTIMONY AT PUBLIC HEARINGS

• Educating and Simplifying

THE VALUE OF THE VISUAL EXPERT

• Provides a rational and objective approach to an otherwise potentially subjective decision

REGULATORY CHALLENGES IN DRAFTING AND APPLYING A SCENIC IMPACT STANDARD

• Tension between quantitative vs. qualitative standards
• Constitutional considerations
  • Sufficient specificity so as to limit the exercise of discretion
  • Ability of people to understand what the standard requires
  • Protect against arbitrary or discriminatory application/enforcement of the standard

MAINE’S EXPERIENCE IN DEVELOPING AND APPLYING A WIND SPECIFIC STANDARD

• “Harmonious fit” standard replaced with wind power specific standard
• Does the development “significantly compromise views” from designated scenic resources such that it has an
  • “Unreasonable adverse effect” on scenic character or existing uses related to scenic character
SIX SPECIFIC EVALUATION CRITERIA TO CONSIDER IN APPLYING MODIFIED TEST

- Role of experts in developing metrics for the review criteria
- Effort to provide objective metrics for assessing scenic impacts
- Has it worked?
  - Controversy over scenic impacts remains
  - Regulatory uncertainty w/r/t application of the standard persists
- Process is robust and more objective, but challenges remain

WHO HAS EXPERTISE TO MAKE JUDGMENTS ON REASONABLENESS OF IMPACTS

- Experts
- Laypeople
- Agencies

DECISIONS ON THE ACCEPTABILITY OF SCENIC IMPACTS OF WIND PROJECTS

- Legislative (zoning) Decision?
- Permitting Decision?

PRESENTER BIOS

DAVID RAPHAEL, PRINCIPAL AND REGISTERED LANDSCAPE ARCHITECT AT LANDWORKS

David Raphael has served as an aesthetic expert and conducted numerous visual impact assessments for a range of renewable energy projects throughout New England. David founded LandWorks in 1986 after ten years of professional work as a Landscape Architect and Planner for the public and private sector. He is a graduate, with honors, of Tufts University and the School of the Museum of Fine Arts in Boston, where he studied English, ecology and graphic design. He attended Harvard University Graduate School of Design with a Crocker Scholarship and graduated with a Masters in Landscape Architecture.

Mr. Raphael has been an Associate Professor in the Graduate Program in Urban and Environmental Policy at Tufts University, on the faculty of Middlebury College, and is currently a Lecturer in the University of Vermont Rubenstein School of Environment and Natural Resources, where he has been teaching courses in aesthetics, environmental design, and landscape architecture since 1982. Mr. Raphael is also a member of the Vermont Urban and Community Forestry Council and the American Society of Landscape Architects.

NEIL J. KIELY, FIRST WIND

Neil J. Kiely currently serves as Director, Development--New England at First Wind, LLC, a national wind energy company. Neil is responsible for all aspects of the development of wind energy facilities including site identification, real estate acquisition, civil design, permitting and pre-construction planning. Prior to joining First Wind, Neil practiced law in Washington, DC and Maine before founding and operating companies in the real estate development and commercial financing industries.

JULIET T. BROWNE, VERRILL DANA ATTORNEYS AT LAW

As chair of the firm’s Environmental Law Group, Juliet assists clients in all aspects of environmental law, including project permitting and compliance under federal, state and local laws, litigation of environmental matters in state and federal courts, redevelopment of contaminated properties, and a wide variety of natural/resources-based transactional matters. She served on the Governor’s Wind Power Task Force, which developed recommendations on how Maine could become a leader in wind power development, while protecting Maine’s quality of place and natural resources, and delivering meaningful benefits to the state’s economy, environment, and people.