MMR ENERGY COMMITTEE MEETING MINUTES

Date: 14 Mar 2012

Time: 2-3:30 pm

Location: Bldg 322, East Inner Road

Agenda:

MassCEC Acoustic Field Studies – Peter McPhee, MassCEC

MMR Solar Projects Update – Col Mullen and Carter Hunt

Update on MMR projects:

USCG - Elizabeth KirkPatrick
ANG - Bob Blair, Col Mullen
MAARNG-CFMO - Jim Oliveto
MAARNG-ERC - Paul Nixon
PAVE PAWS - Steve Mellin
AFCEE - Rose Forbes
VA - Greg Boehm
USDA - David Mills
Mass Development - Carter Hunt
EMC - Mark Begley

Next Meeting

Attendees: See attached distribution list (Atch 1)

1. MassCEC Acoustic Field Studies. Peter McPhee from the Massachusetts Clean Energy Center (MassCEC) discussed a proposal to conduct an acoustic study of the AFCEE wind turbines at MMR. He reviewed a presentation related to the project and also provided additional detail via letter describing the scope of the work and the participants' roles (see attachments). The Committee members asked a number of questions related to the proposed equipment to be used (i.e. sodar), necessary permits (i.e. FAA), if any hazardous materials were going to be used, how big of a research area is necessary, etc. Peter answered the questions verbally and said he would follow up with more detail if MassCEC selects the MMR wind turbines for the case studies.

2. MMR Solar Project Updates – Col Mullen provided an update on the solar array at the base landfill. He mentioned the real estate issues and the concern over whether it is acceptable for Cape and Vineyard Electric Cooperative (CVEC) to contract a solar project on the government's behalf. He indicated the decision was made for Defense Logistics Agency (DLA) to contract out the solar project. The contract will likely be a developer-based power purchase agreement.

Carter Hunt did not have an update for any solar projects.

3. Update on MMR projects: There was not enough time for the agencies to discuss their energy related projects.

4. Next Energy Committee meeting was not scheduled. Rose said she would schedule the next meeting depending on future agenda items.

6. Please contact Rose Forbes at 508-968-4670 x 5613 (rose.forbes@us.af.mil) if you have any questions, comments, or suggestions about these minutes, ideas for the next meeting's agenda, or the MMR Energy Committee.

2 Attachments:
1. Distribution/Attendee Lists from 14 Mar 2012 Meeting
2. MassCEC handouts

14 MAR 2012 MMR ENERGY COMMITTEE MEETING SIGN IN SHEET

NAME	ORGANIZATION	PHONE	EMAIL ADDRESS	Present?
Capt John Carney	Camp Edwards FE	508-968-5837	Jonathan.w.carney@us.army.mil	N
Mark Begley	Env Mgmt Comm	508-968-5127	Mark.begley@state.ma.us	Y
Robert Blair	102 IW/CE	508-968-4238	Robert.blair@ang.af.mil	Y
Greg Boehm	VA		Gregory.Boehm@va.gov	N
Kurt Carlson	USCG Air Station	508-968-6673	Kurt.a.carlson@uscg.mil	Y
T. Robert Deane	102 IW	508968-4671	Thurman.deane@ang.af.mil	N
MAJ Christopher Dugre	AASF1	508-968-5216	Christopher.dugre@us.army.mil	N
Rose Forbes	AFCEE	508-968-4670 x 5613	rose.forbes@us.af.mil	Y
Paul Garbacik	BCCF	508-563-4460	pgarbacik@bsheriff.net	N
Carter Hunt	MassDevelopment	508-563-2785	chunt@massdevelopment.com	Y
Elizabeth Kirkpatrick	USCG	508-968-6696	Elizabeth.L.Kirkpatrick@uscg.mil	N
Paul McFarland	VA Cemetery			N
Steve Mellin	6 SWS/MA	508-968-3213	stephen.mellin@capecod.af.mil	N
David Mills	USDA	508-563-9303x256	David.Mills@aphis.usda.gov	Y
Col Tim Mullen	102 IW		Timothy.mullen@ang.af.mil	Y
Arthur W. Neill	Sr. Environ. Corps	508-968-5125	arthur.neill@escci.org	N
Michael Netto	102 IW/CE	508-968-4781	michael.netto@ ang.af.mil	N
Manny Neves	102 IW/CE		Manuel.neves@ang.af.mil	N
Paul Nixon	E&RC	508-968-5620	paul.nixon@us.army.mil	Y
Jim Oliveto	DFE, CPEDUS	508-968-5163	James.oliveto@us.army.mil	N
John Silva	102 ANG	508-968-4405	John.silva@ang.af.mil	N
Jerry Spencer	PAVE PAWS			
Bill Sullivan	E&RC		william.g.sullivan@us.army.mil	N
Sky Wires	102 IW LRS/VM	508-968-4739	Schuyler.wires@ang.af.mil	Y
Dave Hill	IAGWSP	508-968-5621	David.l.hill2@us.army.mil	Y
GUEST				
Peter McPhee	MassCEC	617-315-9343	PMcPhee@MassCEC.com	Y

Wind Project Acoustic Field Study

Participant Overview

Draft Scope

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Massachusetts It's all here.

Background for Acoustic Field Studies

- MA has over 40 operating wind turbines from 100 kW to 2.0 MW
  - Some projects have elicited strenuous objections to noise
  - Other projects have not had these objections
- Concerns raised about acoustic impacts vary. Concerns range from:
  - Audible sound levels
  - Specific frequency content
  - Modulation of noise (swishing of turbine)
  - Inaudible acoustics
- Acoustics is highly technical
  - Limited scientific studies on real-world acoustics of operating projects

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Introduction of Acoustic Field Study

- If undertaken, the Acoustic Field Study would consist of:
  - Detailed acoustic, wind, and turbine monitoring at sites in MA
  - Detailed analysis of turbine acoustic characteristics and their causes
- Specific analysis would be done on:
  - Amplitude of sound (in relation to wind speed, shear, turbulence, etc.)
  - Frequency of sound
  - Sound quality (i.e. swishing/modulation)
- Factors that contribute to acoustics would also be evaluated:
  - Wind conditions
  - Atmospheric conditions
  - Terrain

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Goals of Acoustic Field Study

- The Acoustic Field Study would help inform:
  - MassCEC
  - Other MA state agencies (potentially for policy making)
  - Local decision-makers/local bylaws
  - Project developers
  - The general public
  - Project owners
- The Acoustic Field Study will culminate in:
  - A public report making conclusions from summary data (amount of detail to be determined)
  - *Potentially:* Case study analyses of projects
  - *Potentially:* Raw data sets for projects

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Investigations of Acoustic Field Study

- Acoustic parameters to be measured include:
  - Amplitude (weighted and unweighted)
  - Frequency content
  - Sound quality
- Wind parameters to be measured include:
  - Wind speed
  - Wind shear
  - Turbulence
  - Direction

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Investigations of Acoustic Field Study

- Turbine operational parameters to be measured include:
  - Power output
  - Perceived wind speed
  - Yaw
  - Blade pitch
- The project would lend insight into:
  - The basic acoustic impact of operating wind projects
  - How different turbine sizes and technologies influence acoustics
  - How different wind regimes influence acoustics
  - How characteristics of different locations influence acoustics
  - Validation of pre-construction and post-construction noise evaluations

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Requests for Study Participants

- MassCEC would like your voluntary participation in the Field Study
- Specific responsibilities of participants are:
  - Allowing MassCEC and/or consultants to install and operate acoustic monitoring on-site over a ~3 week period
  - Cooperation with shutting turbine(s) down for approximately 6 – 12 hrs
  - Sharing turbine operational data
  - Coordination of wind monitoring on-site (existing or new)
  - Data sharing
- Confidentiality concerns
  - As a public entity, MassCEC is subject to Public Records Laws

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Role of MassCEC and Participants

- The Acoustic Field Study does not constitute any type of regulatory or compliance evaluation
  - MassCEC is not a regulatory authority
  - Analysis will not be done at locations that could be used for compliance tests by regulatory entities
- Other state/federal agencies might have an advisory role, such as MassDEP, Energy and Environmental Affairs, national labs
- Vast majority of the field monitoring and analysis will be completed by private acoustic consultants
- MassCEC would like feedback on
  - Whether or not you would be willing to participate
  - Concerns

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February 17, 2012

Re: Wind Project Acoustic Field Study Participation

Dear Massachusetts Wind Project Operator:

We recently contacted you regarding a study under consideration by MassCEC to conduct acoustic field studies for wind projects in Massachusetts - the "Wind Project Acoustic Field Study". We feel that this study will provide substantial benefit to the public, the agencies of the Commonwealth, and the wind industry and will enhance the scientific understanding of wind turbine operation and acoustics. This letter is being sent to provide greater detail about what participation in this project would entail.

Please review the Parties and Roles and the Scope of Participation below. We are particularly interested to learn if you have any concerns with participating, such as confidentiality issues or revenue loss.

Parties and Roles

MassCEC anticipates that it will direct the study. However, MassCEC may also coordinate with other state or national agencies, such as the National Renewable Energy Laboratory, the Massachusetts Executive Office of Energy and Environmental Affairs, the Massachusetts Department of Environmental Protection, and the Massachusetts Clean Energy Results Program in the management of this study. MassCEC will likely coordinate the study methodology with other state agencies, such as the Department of Environmental Protection.

The technical monitoring and analysis will be conducted by professional consultants under contract to and managed by MassCEC. Both MassCEC and the consulting teams will interact directly with the wind plant owner/operator to coordinate site monitoring and access to necessary technical data. MassCEC will likely coordinate an external review team to review the data collected and the analysis completed.

It is important to note that the study would not constitute any type of acoustic compliance test, but rather, would be completed as a way to inform MassCEC and other interested stakeholders about acoustic characteristics of wind turbines and potentially serve to inform state programs and regulations in the future.

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All study activities will be conducted by consultants or public officials and no direct expenses will be charged to you. We also do not expect that this will require a substantial amount of your time during the course of the study.

Scope of Participation:

There are two primary aspects of participating in this study that would have implications to you: 1) Field Monitoring and 2) Data Sharing. MassCEC would need you to participate in both parts for your project to be included in this study. These parts are explained below:

Part 1: Field Monitoring

Field Monitoring will consist of approximately two weeks of acoustic monitoring and wind monitoring in the vicinity of your wind project. Also, it might require a few additional days for mobilization and demobilization of equipment. The field monitoring and data analysis will not be conducted at locations that would be applicable to triggering regulatory compliance.

Up to six acoustic monitoring stations could be deployed. These monitoring stations would likely be located at distances of approximately 750, 1500, and 3000 feet from the wind turbine, if feasible. Under some circumstances, MassCEC will specify that two sets of these acoustic monitors be deployed, with three devices oriented in each of two directions.

These devices are typically small battery operated digital sound meters mounted on a tripod of approximately 5 to 6 feet height. Installation of each of these devices will likely take under three hours and, aside from the 6 to 12 hours of attended monitoring, will be unattended over their two week monitoring period.

During the data collection period, the monitoring will also require 6 to 12 short wind turbine shutdowns of approximately 1 hour each, totaling 6 to 12 hours of downtime. These shutdowns would be done during periods of both low and high wind speeds. During these periods, acoustic consultants would be onsite to attend the monitoring. The consultants would need to be able to coordinate with the wind turbine operator to shut down and later restart the wind turbine.

If no existing meteorological assessment equipment is currently located at or near the site (such as a met tower), MassCEC will likely have meteorological assessment equipment temporarily installed near the turbine, if feasible. This equipment could consist of:

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- remote sensing technologies (such as SODAR or LIDAR) which are ground-based units typically under eight feet tall. They emit either acoustic or laser signals to determine wind conditions above.
- a temporary meteorological tower (either trailer-based or tripod based) which would consist of an actual tower which would measure wind conditions at or near hub height. These towers could vary substantially in height, but would ideally be at least one half the total height of the wind turbine.
- a blimp or balloon suspended meteorological device, which would likely be floating at a height as high as the wind turbine.

In addition to the data collected in the field, MassCEC would also like to collect operational data from the wind turbine, such as power output, yaw direction, blade feathering angle, and rotational speed. This data would be collected from the turbine's data acquisition system during the period of monitoring. This data might be available through a computer-based interface. If not, it might be available through the turbine's operational system. We will request that this information be made available to the consultants.

Part 2: Data Sharing

The goal of the Data Sharing is to consolidate acoustic data, wind speeds, and turbine operational data for use in both a project specific data analysis and an analysis in conjunction with other data collected in Massachusetts. The data from participating projects will be shared with the consulting team and necessary project managers and analyzed in regard to the following goals:

- Understand wind project sound levels at different distances from turbines compared to existing ambient sound levels by quantifying both:
  - the ambient acoustic levels without the turbine operating; and
  - the basic acoustic levels with the turbine operating.
- Understand qualities of sound impact from different turbines under different conditions:
  - Are there characteristics of wind turbine noise that are significantly different than those in the existing environment (frequency spectrum, amplitude modulation, etc.)?
  - Are there characteristics of the Massachusetts environment that particularly influence wind turbine acoustics (wind shear, atmospheric conditions, land cover, topography, etc.)?
  - How do the acoustic emissions vary with respect to wind turbine technology (power capacity, power regulation, tower type, etc.)?

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  - How do impacts vary with respect to distance, direction, and ambient environment (rural or suburban)?
- Understand the correlation between predictive acoustic modeling and actual acoustic impact.
- Potentially inform design guidelines for wind siting:
  - How do different measurement methodologies quantify wind turbine noise differently?
  - Is there a more appropriate methodology to quantify noise impacts of wind turbines?

The ultimate intention of the Wind Project Acoustic Field Study is to complete a detailed analysis summarizing various aspects of the acoustics of operating wind projects in Massachusetts. The detailed field monitoring results will likely be shared with:

- the project consulting team;
- the management team (MassCEC and possibly other state or federal agencies); and
- other interested agencies (such as MassDEP, Executive Office of Energy and Environmental Affairs, etc.).

The detailed field monitoring results will possibly also be shared with other associated researchers, such as academic institutions, national laboratories, etc. The final report summarizing the analyses will likely be made available to the public.

Please note that Massachusetts agencies, such as MassCEC, are subject to Public Records Laws. **Any information provided to MassCEC could potentially be requested by and provided to members of the public.** Any information provided by the consulting firms to MassCEC will also be subject to these laws. Please contact us if you have any questions about these rules and how they may apply to data in the study.

We would first like to understand if you are willing to participate in the Field Monitoring part of this study. We would also like to understand your willingness to share data on your project in each of the following ways:

- Option 1: All data collected on site, including both raw data and consolidated data, will be provided to MassCEC. The identity of the project associated with that data will also be provided to MassCEC.

- Option 2: All data collected on site, including both raw data and consolidated data, will be provided to MassCEC. The identity of the project will not be provided to MassCEC.

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- Option 3: Only consolidated data will be provided to MassCEC. The identity of the project will not be provided to MassCEC.

We feel that this study will provide substantial benefit to the public, the agencies of the Commonwealth, the wind industry, and the scientific understanding of wind turbine operation and acoustics. Once complete, MassCEC and/or the consulting teams will be happy to share the results of the study with you.

If you are willing to participate in this project, please contact me at the number below. We would like to have responses by **Friday, February 24** if possible. Also, please identify any restrictions or concerns that you might have. Upon agreeing to participation, we will send a Participant's Agreement to you that will confirm your participation in this study.

Thank you for your consideration and please let me know if you have any questions.

Sincerely,

Peter McPhee

Peter McPhee
Project Manager
Massachusetts Clean Energy Center
Tel: 617-315-9343