



Comprehensive Report for Oklahoma Wind Power Activities & Products **Funded by U. S. Department of Energy**

Activities & Products Report for Oklahoma Wind Power Initiative
July 2000 to September 2002

Prepared by:

Tim Hughes, OWPI Director and OREC President
Troy Simonsen, OWPI Assistant Director
Steve Stadler, OWPI-Oklahoma State University

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A CD-ROM with products (when electronic versions exist) is available to accompany this report.

Executive Summary: Major Achievements of Oklahoma Wind Power Initiative as Result of 2000-2002 DOE/SEP/NREL Funding

Wind Resource Assessment

- ⊗ Maps of Oklahoma's wind resource and critical infrastructure components (roads, transmission lines, etc.), developed to aid in locating the optimal locations for wind turbines.
- ⊗ One 40-meter (131-foot) wind-measuring tower installed near Buffalo, OK.
- ⊗ Wind instruments installed up to 100 meters (328 feet) on existing tower near Hobart. Plains Organization for Wind Energy Resources (POWER) provided Oklahoma with wind-monitoring equipment at no charge, largely due to OWPI's presence.
- ⊗ Three 20-meter (66-foot) wind assessment towers installed on OK tribal lands
- ⊗ One 20-meter wind assessment tower installation expected September '02 at Langston University.
- ⊗ Wind climatology products developed for over 40 Oklahoma Mesonet site locations to yield baseline data crucial to wind power developers.
- ⊗ Assessment assistance to an Oklahoma energy company, Chermac Energy Corp.
- ⊗ Assisted Federal Correctional Facility in El Reno in placement of 20-meter tower.

Outreach

- ⊗ Educational materials developed (wind power brochure, tutorials, landowner information, etc.).
- ⊗ Four OWPI investigators took lead roles in program development and fund raising (~\$40K) for the May 3rd conference "Oklahoma Wind Power: Emerging Opportunities" (attendance ~375). This work was repeated for April 11, 2002 conference: "Wind Power and Bioenergy: Oklahoma Crops of the 21st Century", and for wind power tutorial workshop held on April 10.
- ⊗ OWPI members took leadership roles in establishing Oklahoma Renewable Energy Council; OWPI Director Hughes has served as OREC interim chair and president from May 2001 to present.
- ⊗ Web sites established to aid in OWPI outreach (www.seic.okstate.edu/owpai) and outreach for OK Renewable Energy Council (www.seic.okstate.edu/orec).
- ⊗ "Oklahoma WinCharger" (newsletter for Oklahoma wind stakeholders) established to share timely industry and policy information - 12 issues printed since September '01.
- ⊗ Posters/papers/presentations produced for national conferences.
- ⊗ OWPI personnel have given over 40 presentations and/or exhibits at town meetings, conferences, workshops, and events for civic, advocacy, technical/professional and other Oklahoma groups.

Economic and Policy Assessment

- ⊗ Brief produced using wind resource map to estimate scope and economics of OK wind farms.
- ⊗ Review of other states' policies to encourage wind power development - briefs produced.
- ⊗ Wind power information distributed to legislators, staffers and other key persons.

External (to DOE) Funding/Benefits Acquired

- ⊗ OWPI took lead in garnering over \$60,000 in non-federal funds to support 2001 and 2002 state conferences.
- ⊗ Oklahoma State Senate provided \$50K for continued assessment and outreach January to June '02.
- ⊗ OU and OSU have offered \$64K in combined cost-share against potential DOE/SEP grant for continued OWPI work in FY03.

Related Progress through DOE/WPA Funding for OWPI/OREC Efforts

1. 2001 Oklahoma wind power conference (held on May 3, 2001)

Hughes served as chair for planning committee. Significant accomplishments include:

- over \$40,000 raised for event (over \$30K from non-federal sources)
- 25 cash and in-kind contributors
- 25 speakers
- 17 exhibitors
- 374 in attendance

2. 2002 Oklahoma wind power and bioenergy conference (held on April 11, 2002)

Hughes served as chair for planning committee. Significant accomplishments include:

- over \$40,000 raised for event (over \$30K from non-federal sources)
- 33 cash and in-kind contributors
- 40 presenters
- 23 exhibitors
- over 300 in attendance
- An expanded agenda (over 2001 conference) included tracks on large wind, small wind, bioenergy; breakout sessions were held for Native American and African American issues relating to wind power.
- A pre-conference wind power tutorial workshop was held April 10, 2002. Over 50 in attendance.

3. OREC meeting history

- **May 3, 2001 conference follow-up meeting to organize stakeholders.** A 3-hour breakfast meeting was held May 4th to organize stakeholders. Monthly meetings have been held since that date, resulting in the formation of the "Oklahoma Renewable Energy Council". With 23 committed members, OREC meeting participants total over 60, including:
 - District Director for Congressman Frank Lucas
 - OK Secretary of the Environment Brian Griffin
 - State Representative James Covey
 - OK Department of Commerce
 - US Environmental Protection Agency
 - US Department of Energy
 - Williams Co. (energy trading co.)
 - Oklahoma Gas and Electric Co. (large OK based IOU)
 - AEP/PSO (large Ohio based IOU)
 - Two OK Rural Electric Coops
 - Utility-scale wind farm developers
 - Bergey Windpower Co.
 - University participants from OU, OSU, and SWOSU
 - Sierra Club

2001 OREC Meeting Summary

- May 4, inaugural meeting at Westin Hotel in OKC, approximately 35 in attendance, including wind farm developers, a wind turbine manufacturer, state government officials, university researchers, interested landowners, and more.
- June 13, at Oklahoma Department of Commerce in OKC, 22 in attendance.
- July 11, SW Oklahoma State University, Weatherford, 25 in attendance.
- August 15, Forum at OU, 38 in attendance
- September 20, State Capitol, 24 in attendance.
- October 10, State Capitol, 21 in attendance.

- November 8, Norman - OREC hosted Interim Study on green energy for Oklahoma House Committee on Energy and Utility Regulation; attended by 14 OK House Representatives, 4 House staff, ~10 OREC members, and ~10 media and others.
- November 14, Weatherford, 13 in attendance.
- December 12, State Capitol, 22 in attendance

2002 OREC Meeting Summary

- January 16, State Capitol, 24 in attendance
- February 13, State Capitol, 16 in attendance
- March 13, OSU Tulsa Extension, 13 in attendance
- April 17, Oklahoma Department of Commerce, 11 in attendance
- May 8, State Capitol, 6 in attendance
- June 19, State Capitol, 20 in attendance
- July 17, Southwest Oklahoma State University (Weatherford), 19 in attendance
- August 14, State Capitol, 10 in attendance

Other OREC developments and information

- OWPI Director Hughes served as Interim Chair from May 4, 2001 to January 2002 - elected president January '02.
- Bylaws finalized January 2002 (posted on OREC web site and included on CD).
- Officers selected in January; Board of Directors finalized in February (positions listed on web site).
- OREC overview developed.
- OREC web pages developed by OSU OWPI (www.seic.okstate.edu/orec). Meeting agendas and notes are available at this site, as well as calendar for coming meetings and related events.
- OREC Action Plan developed for FY2003 - posted on web site.

4. OWPI Presentations

Town Meetings

The first four Oklahoma town meetings listed were coordinated to immediately follow town meetings by US Congressman Frank Lucas.

2001

- **Aug. 20** - Woodward (attendance ~65)
- **Aug. 21** - Guymon (attendance ~35)
- **Aug. 27** - Weatherford (attendance ~18)
- **Aug. 28** - Hobart (attendance ~17)
- **Nov. 26** - Fay (attendance ~35); brief background on OWPI, shared materials
- **Dec. 17** - meeting with 4 Hobart town officials about wind power and instrument install.
- **Dec. 17** - meeting with 3 Cordell town officials about wind power/ distributed generation

Other Significant meetings and workshop/conference presentations

Note: Unless noted otherwise, presentations are on wind power and/or OWPI research. OWPI prepared PowerPoint and/or overhead transparencies for most of these presentations. The presentations were often customized for the audience, but the material is often similar. Therefore, it is not worthwhile to include .PPT files for all presentations, but a select few can be found on the accompanying CD, to give an idea. These presentations are denoted below with red, italicized font.

2001 OWPI Meeting/Presentation Summary

- **January 7** - Mayflower Congregational Church; ~20 in attendance
- **January 19** - Information breakfast organized for state legislators and staff ; ~50 in attendance
- **January 24** - Wind briefing meeting with State Senator Kevin Easley and staff
- **February 6** - Presentation for National Weather Center Directors' meeting at OU; ~20 in attendance
- **February 9** - Presentation for 'Tech Day' (technology workshop for teachers), on how wind assessment uses GIS software; ~10 in attendance
- **March 29** - Met with OUr Earth(OU student environmental advocacy group) - previewed Earth Day presentation
- **April 12** - One-hour meeting with Oklahoma Secretary of State to discuss wind related matters
- **April 17** - Earth Day presentation at OU Earth Day event; 12 in attendance
- **May 3** - Oklahoma Wind Power conference in Oklahoma City; 374 in attendance
- **May 11** - First Friday Future's Forum(F4), Cordell; ~40 economic development folks in attendance
- **May 16-17** - Attended NREL sponsored wind assessment workshop in Boulder
- **May 21** - Green Party, Oklahoma City; ~12 in attendance
- **May 25** - Met with officials at Oklahoma Department of Agriculture to discuss promotion of wind power
- **June 1** - Attended F4 meeting in Hobart (no formal presentation, but wind power issues discussed)
- **June 3-7** - Poster presentation at AWEA National Wind Power Conference, Washington D.C.; ~1200 attended
- **June 10** - NASA's Mission to Planet Earth teachers' workshop; 12 in attendance
- **June 21** - Presentation for Oklahoma Building Owners and Managers Assn.; ~40 in attendance.
- **July 26** - Met with Western Delaware Tribal official to discuss wind power and scout site for placement of 20-meter tower
- **August 23** - Meeting and brief presentation for President of Cameron University, Lawton
- **September 1** - Black Farmers and Agriculturalists Assn; over 300 in attendance
- **September 7** - Presentation to Oklahoma GIS Council; ~30 in attendance
- **September 18** - Presentation to Association of Central Oklahoma Governments, Clean Cities Program, Oklahoma City; ~30 in attendance
- **September 24** - Meeting and brief presentation to Kaw Nation Tribe, Kaw City; 7 in attendance
- **September 26** - USDA/NRCS Native American workshop; ~ 30 in attendance
- **September 27** - Presentation to Tulsa chapter of Sierra Club; ~22 in attendance (*PowerPoint presentation SierraClub.ppt included on CD*)
- **October 16** - Presentation for OK Power and Communications Assn., OKC; ~25 in attendance
- **October 29** - Presented paper, Frontiers of Power Conference, Oklahoma State University; ~25 in attendance
- **November 8** - Presented on OWPI and OPEC, took lead on coordinating Green Energy Interim Study for House Committee on Energy and Utility Reg.; 12 committee members, 2 other state representatives, and 4 house staff in attendance; approximately 20 others in attendance.
- **November 9** - Presentation for OU College of Geosciences Board of Visitors; ~ 15 in audience
- **December 5** - Presented and exhibited at Oklahoma Institute of Indian Heritage's "Economic Development Workshop", Downtown Oklahoma City; ~40 in audience from Oklahoma and other state tribes. (*PowerPoint presentation OKNA.ppt included on CD*)

2002 OWPI Meeting/Presentation Summary

- **January 9** - Presented and exhibited materials at NREL sponsored Native American Wind Workshop, Tulsa University, Tulsa; ~40 in attendance
- **February 7** - Meeting with and presentation to State Senator Robert M. Kerr and constituents to discuss wind power development in their area; 4 in attendance (*PowerPoint presentation Kerr_SWOK.ppt included on CD - note zoom to their parts of state and overlay of existing towers with potential for instrumentation*)
- **February 12** - Presentation to Weather News International as part of their fact-finding tour on services offered by members of OU's National Weather Center; 5 in attendance (*PowerPoint presentation WNI.ppt included on CD - note this is one of our most comprehensive presentations when it comes to covering the development of our wind resource products*)

- **February 16** - exhibited at "The 20th Anniversary of the Cancellation of Black Fox Nuclear Plant" Event; Hope Unitarian Church, Tulsa; ~ 75 in attendance
- **March 12** - exhibited at USDA sponsored "Regional Bioenergy Workshop", El Reno; ~60 in attendance
- **March 20** - presented at Cooperatives Conference sponsored by OSU Oklahoma Cooperative Extension Service, Clarion Hotel, Oklahoma City; ~ 75 in attendance
- **March 21** - presented and exhibited at Panhandle Region Wind Energy Conference, Texas County Activity Center, Guymon; ~ 230 in attendance; also interviewed by local radio station
- **April 11** - presented and exhibited at "Wind Power and Bioenergy: Oklahoma Crops of the 21st Century" conference, Oklahoma City; over 300 in attendance. (*PowerPoint presentation Hughes_Apr11_conference.ppt included on CD*)
- **April 23** - exhibited at "8th Annual GIS Day at the State Capitol", Oklahoma City, open to all who were at the Capitol on that day (~ 30-50 visitors to OWPI booth, plus many more passersby)
- **May 10** - exhibited at Oklahoma Sustainability Network Conference: "Sustainable Solutions – Envisioning Oklahoma's Future", Oklahoma State University-OKC Campus, Student Center, Oklahoma City; ~ 100 in attendance
- **June 2-5** - Poster presentation at AWEA National Wind Power Conference, Portland, OR; ~2000 in attendance
- **June 6** - Presentation at DOE/WPA sponsored meeting of multiple-state wind working groups; ~50 in attendance
- **July 15-16** - exhibited and presented at "USDA Rural Conservation and Development: Oklahoma Summit", Woodward; ~150 in attendance (*PowerPoint presentation Woodward_summit.ppt included on CD*)
- **July 31** - Keynote speaker at the Rotary Club of Edmond Central, University of Central Oklahoma, Student Center, Edmond; ~ 40 in attendance
- **August 7** - Keynote speaker at "Energy and Water Conservation Fair", Mike Monroney Aeronautical Center, Oklahoma City, ~80 in attendance (*PowerPoint presentation Mike_Monroney.ppt included on CD*)
- **August 29** - Met with El Reno Federal Correctional Facility to discuss wind power and scout locations for 20-m tower

Coming attractions:

- **September 26 - October 6** - Exhibit on wind energy as part of "Caring for Planet Earth" exhibits at Tulsa State Fair - 20,000 expected to pass through "Caring for Planet Earth" exhibits
- **November 15-16** - Present and exhibit at Kerr Center for Sustainable Agriculture's "Future Farms 2002", a 2-day workshop on new and innovative farm business practices; ~500 expected to attend.

2000-2 Interviews for TV, radio, newspaper

OWPI personnel were interviewed for, or involved in some way with the following media stories:

- **December 1, 2000:** Daily Oklahoman, Business section, "Blowin' in the Wind: Researchers say turbines can serve new generation"
- **January 18, 2001:** Tulsa World, Business section, "Wind Power Potential in Oklahoma Studied"
- **March 22, 2001:** Daily Oklahoman, Business section, "Workshop on Wind Power Giving Rise to 'Cash Crop'"
- **August 31, 2001:** interview with KSCB radio (Wichita, KS); interview same day with OK News Network radio, on potential for economic development through wind power
- **November 27, 2001:** Daily Oklahoman, Science and Health section, "Energy Answer Blowing in the Wind"
- **December 8, 2001:** Daily Oklahoman, "Two state tribes hope wind will produce energy, income"
- **December 20, 2001:** Hobart Democrat-Chief, "Hobart is a test site to harness wind's energy"
- **April 23, 2002:** Daily Oklahoman, Editorials section, "Aeolian Harp: Windswept State Lags in Exploiting Air" (An interesting side note: the Oklahoman is a very conservative paper, but this editorial asks why Oklahoma is behind in wind power development - and it cites the success of the April 11 wind/bioenergy conference)
- **June 20, 2002** - PBS affiliate OETA aired program "Stateline: Fields of Dreams", 15-minute segment on potential wind power and bioenergy contributions to the new farm economy in Oklahoma. Included in program were interviews with state and federal officials and private sector interests, conducted at the April 11, 2002 Wind power and bioenergy conference in Oklahoma City.

- **July 11, 2002** - Oklahoma Gazette story in Environment section: "Blowin' in the Wind: Is Oklahoma losing the race to capture the economic advantages of wind?"

5. Literature produced/updated by OWPI

- Initial printing of "Windpower for Oklahoma" brochure, December 2000; 2000 copies printed.
- Revised, second printing of "Windpower for Oklahoma" brochure, July 2001; 2000 copies printed.
- Revised, third printing of "Windpower for Oklahoma" brochure, September 2002; 4000 copies printed.
- Initial printing of "Oklahoma Wind Power Initiative" brochure (summarizes products and services provided by OWPI), April 2002; 2000 copies printed.
- Revised, second printing of "Oklahoma Wind Power Initiative" brochure, September 2002; 4000 copies printed.
- Initial printing of "Oklahoma Wind Power" (tornado/turbine) promotional posters, with OWPI contact info; 2000 copies printed March 2002.
- WinCharger newsletter series, monthly issues September 2001 to June 2002; bimonthly issues July/August and September/October 2002. Available at www.seic.okstate.edu/owpi Shared by mail and email distribution to stakeholders in OWPI database.
- EERC and POWER's document "Harvesting the Wind: What landowners need to know about attracting wind energy..." modified for use in Oklahoma: 500 copies printed and shared. Available at www.seic.okstate.edu/owpi
- Briefs produced for policy makers and stakeholders. (www.seic.okstate.edu/owpi/policymakerinformation.htm)
- Wind Energy Glossary (provided courtesy of EERC)
- State Wind Resource Maps, 2 pages; 1000 copies printed
- "A Solar and Wind Energy Assessment of Oklahoma", 115 pages (PDF available on CD and on web site) - draft version included - final version due October 2002

6. Publication/Conference papers

Hughes, T. W., S. J. Stadler, P. G. Earls, M. Shafer, T. Simonsen, J. Traurig, 2001. **"A Detailed Oklahoma Wind Power Assessment Using Two Methods."** 34th Annual Frontiers of Power Conference (Oklahoma State University), 29-30 October 2001, Stillwater, OK

Hughes, T. W., M. Shafer, T. Simonsen, J. Traurig, N. Mirsky, S. J. Stadler, and P. G. Earls, 2002. **"Using environmental data to attract development: the Oklahoma Wind Power Assessment"** 3rd Symposium on Environmental Applications, AMS Annual Meeting, 13-17 January 2002, Orlando, FL.

Hughes, T. W., T. Simonsen, J. Traurig, N. Mirsky, S. J. Stadler, and P. G. Earls, 2002. **"Development of Two Wind-Power Models for Oklahoma: Mass Consistent and Neural Network."** WindPower 2002 Conference & Exhibition, AWEA Annual Meeting, 2-5 June 2002, Portland, OR.

Stadler, S. J., T. Hughes, P. Earls, T. Simonsen, J. Traurig, 2002, **"A Mesoscale Statewide Wind Power Assessment for Oklahoma."** Applied Climatology: Architecture, Agriculture and Energy, AAG Annual Meeting, Los Angeles, CA.

7. Summary of Products (electronic versions provided - hardcopies available upon request)

- May 3, 2001 notice flyer (conference program and registration brochure only available in hardcopy form)
- April 11, 2002 wind power and bioenergy conference program, registration brochure, notice flyer, and "cosponsor letter of invite"
- ["About OREC"](#) information sheet

- OREC Bylaws
- OREC Action Plan for July 1, 2002 to June 30, 2003
- "Oklahoma Wind Power" - first printing of small promotional poster.
- "Wind Power for Oklahoma" brochure - from third printing
- "Oklahoma Wind Power Initiative" brochure - from second printing
- "The Oklahoma WinCharger" newsletter for Oklahoma stakeholders - September '01 through Sept/Oct '02 issues
- "Harvesting the Wind: What landowners need to know about attracting wind energy..." - EERC and POWER's document modified for use in Oklahoma
- Briefing papers (5)
- Tutorials (3)
- "OWPI's Wind Assessment for Oklahoma" - 10-page report summarizing model development and results
- State Wind Resource Maps, 2 pages
- "Review of States' Policy Incentives for the Development of Wind Energy Facilities" - OWPI's 36-page summary
- "A Solar and Wind Energy Assessment of Oklahoma", 115 pages (draft version only - final version due Oct. 2002)
- Wind Climatology Products for 40 Oklahoma Mesonet weather stations (7 years, 10-meter winds)
- Wind Resource Monthly Summary Reports for:
 - South Buffalo 40-meter tower (February 2001 to present)
 - Hobart tower, data up to 100 meters (April 2002 to present)
- Tribal Towers Site Reports (for three 20-meter towers installed on tribal lands in Oklahoma) - *PowerPoint presentations included on CD for all three.*
- Tribal Towers data summary reports
- OWPI web site: www.seic.okstate.edu/owpi
- OREC web site: www.seic.okstate.edu/orec

8. OWPI Funding History

- "Communities of Color Anemometer Tower Installation", funded by National Renewable Energy Laboratory: **\$9,676** 9/02 – 6/03
- "OREC Activities & Purchase of 20-m Towers for Communities of Color", funded by US Department of Energy: **\$17,495** 9/02 – 6/03
- "FY03 Continued work by Oklahoma Wind Power Initiative", funded by US/DOE and Oklahoma Department of Commerce: **\$154,239 (pending)** 7/02 – 6/03
- "Continued Wind power community outreach and education", funded by US Department of Energy: **\$17,995** 3/02 – 9/02
- "Continued work by OK Wind Power Initiative", bridge funding from The Oklahoma State Senate: **\$50,000** 1/02 - 9/02
- "Native American Anemometer Tower Installation", funded by National Renewable Energy Laboratory: **\$9,812** 11/01 - 12/02
- "Wind power community outreach and education", funded by US Department of Energy: **\$25,000** 5/01 – 12/01
- "Assistance for Oklahoma wind power conference", funded by US Department of Energy: **\$4,884** 9/00 - 5/01
- "Oklahoma Wind Power Assessment Initiative", funded by US/DOE and Oklahoma Department of Commerce: **\$199,711** 7/00 – 6/02