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TOPIC:

“The Oklahoma Wind Energy Development Act, as Amended. The impact of the Amendments;
Comparing and contrasting multiple guidelines and, other persuasive jurisdictions with specific emphasis
to Oklahoma.”

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THE OKLAHOMA WIND ENERGY DEVELOPMENT ACT¹, AS AMENDED.² THE IMPACT OF THE AMENDMENTS; COMPARING AND CONTRASTING MULTIPLE GUIDELINES AND, OTHER PERSUASIVE JURISDICTIONS WITH SPECIFIC EMPHASIS TO OKLAHOMA.

Introduction:

Windmills: A distinction must be made between windmills used to pump water and wind turbines used to generate electricity. Windmills were used in Persia (present-day Iran) as early as 200 BC.³ However, the first known practical windmills were built in Sistan, an Eastern province of Iran, from the 7th Century. These “Panemone” were vertical axle windmills, which had long vertical drive shafts with rectangular blades. Made of six to twelve sails covered in reed matting or cloth material, these windmills were used to grind grain or draw up water, and were used in the gristmilling and sugarcane industries.⁴

Windmills first appeared in Europe during The Middle Ages. The first historical record of their use in England dated the 11th or 12th centuries and there are reports of German crusaders taking their windmill-making skills to Syria around 1190.⁵ By the 14th century, Dutch windmills were in use to drain areas of the Rhine Delta.

The first windmill used for the production of electricity was built in Scotland in July 1887 by Professor James Blyth of Anderson College, Glasgow (the precursor of Strathclyde University)⁶ Blyth 10M high, cloth-sailed wind turbine was installed in the garden of his holiday cottage at Marykirk in Kincardineshire and was used to charge accumulators developed by the Frenchman Camille Alphonse Faure, to power the lighting in the cottage, thus making it the first house in the world to have its electricity supplied by wind power.⁷ Blyth offered the surplus electricity to the people of Marykirk for lighting the main street however, they turned down the offer as they thought electricity was “the work of the devil”. Although he later built a wind turbine to supply emergency power to the local lunatic

¹ 2014 Oklahoma Statutes Title 17. Corporation Commission. 17-160.11. Oklahoma Wind Energy Development Act. Universal Citation: 17 OK Stat 17-160.11 (2014)

² An act relating to Energy; Amending 17 O.S. 2011, Section 160.12, which relates to the Oklahoma Wind Energy Development Act; updating statutory citations; and providing an effective date.

³³ “Part 1 – Early History Through 1875” (<http://www.telosnet.com/wind/early.html>). Retrieved 2008-07-31.

⁴ Donald Routledge Hill, “Mechanical Engineering in the Medieval Near East”, *Scientific American*, May 1991, p.64-69. (cf. Donald Routledge Hill, *Mechanical Engineering* (<http://home.swipnet.se/islam/articles/HistoryofScience.htm>))

⁵ Morthorst, Poul Erick; Redlinger, Robert Y.; Anderson, Per (2002). *Wind Energy in the 21st century: economics, policy, technology and the changing electricity industry*. Houndmills, Basingstoke, Hampshire: Palgrave/UNEP. ISBN 0-333-79248-3.

⁶ Price, Trevor J (3 May2005). “James Blyth – Britain’s first modern wind power engineer” (<http://www.ingentaconnect.com/content/mscp/wind/2005/00000029/0wind> engineering 29(3):191-200.doi:10.1260/030952405774354921(<https://dx.doi.org/10.1260%2F030952405774354921>)).

⁷ Shackleton, Jonathan. “World first for Scotland gives engineering student a history lesson” (<http://www.rqu.ac.uk/pressure/BlythProject.doc>). The Robert Gordon University. Retrieved 20 November 2008.

asylum, infirmary and dispensary of Montrose the invention never really caught on as the technology was not considered to be economically viable.

Across the Atlantic, in Cleveland, Ohio a larger and heavily engineers machine was designed and constructed in the winter of 1887-1888 by Charles F. Brush. This was built by his engineering company at his home and operated from 1886 until 1900. The brush wind turbine had a rotor 17m (56 foot) in diameter and was mounted on an 18m (60 foot) tower. Although larger by today's standards, the machine was only rated at 12 kW. The connected dynamo was used either to charge a bank of batteries or to operate up to 100 incandescent light bulbs, three arc lamps, and various motors in Brush's laboratory.⁸

With the development of electric power, with power found new application in lighting buildings remote from centrally-generated power. Throughout the 20th century parallel paths developed small wind stations suitable for farms or residences, and larger utility-scale wind generators that could be connected to electricity grids for remote use of power. Today wind powered generators operate in every size range between tiny stations for battery charging at isolated residences, up to near-gigawatt sized offshore wind farms that provide electricity to national electrical networks.⁹

Wind power¹⁰ is extracted from air flow using wind turbines or sails to produce mechanical or electrical power. Windmills are used for their mechanical power, wind pumps for water pumping, and sails to propel ships. Wind power as an alternative to fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation, and uses little land.¹¹ It has been found that, the net effects of wind power on the environment are far less problematic than those of nonrenewable power sources.

Wind farms consist of many individual turbines which are connected to the electrical power transmission network. Onshore wind is known to be an inexpensive source of electricity, competitive with, or in many places cheaper than coal or gas plants.¹² It has been found that offshore wind is steadier and stronger than on land, and offshore farms have less visual impact, but construction and maintenance costs are considerably higher. Small onshore wind farms can now feed some energy into the grid or provide electricity to isolate off-grid locations.¹³

A **wind turbine** is a device that converts kinetic energy from the wind into electrical power. The term wind turbine appears to have migrated from parallel hydroelectric technology (rotary propeller). The

⁸ *History of Wind Energy in Cutler J. Cleveland, (ed) Encyclopedia of Energy, Vol.6, Elsevier, ISBN 978-1-60119-433-6, 2007, pp. 421-422.*

⁹ https://en.wikipedia.org/wiki/Wind_power see at Page 2 of 20.

¹⁰ https://en.wikipedia.org/wiki/wind_power

¹¹ Fthenakis, V; Kim, H.C. (2009). "Land use and electricity generation: A life cycle analysis". *Renewable and Sustainable Energy Reviews* 13 (6-7): 1465. Doi: 10.1016/j.rser.2008.09.017 (<https://dx.doi.org/10.1016%2fj.rser.2008.09.017>).

¹² "Wind energy is the cheapest energy, EU analysis finds" (<http://www.theguardian.com/environment/2014/oct/13/wind-power-is-cheapest-energy-unpublished-eu-analysis-finds>). the guardian. Retrieved 15 October 2014.

¹³ Gipe, Paul (1993). "The wind industry's experience with Aesthetic Criticism".

technical description for this type of machine is an *aerofoil-powered generator*.¹⁴ The result of over a millennium of windmill development and modern engineering, today's wind turbines are manufactured in a wide range of vertical and horizontal axis types. The smallest turbines are used for applications such as battery charging for auxiliary power for boats or caravans or to power traffic warning signs. Slight larger turbines can be used for making contributions to a domestic power supply while selling unused power back to the utility supplier via the electric grid. Arrays of large turbines, known as wind farms, are becoming an increasingly important source of renewable energy and are used by many countries as part of a strategy to reduce their reliance on fossil fuels. It is these large turbines that this essay is more concerned about.

The above brief introduction will now lead this discussion to the Wind Energy Development Act. We thus embark on the critical look at the amended Acts.

The wording of the Amended Acts:

Section 92 – [SB 808] – An Act relating to wind energy; amending **17 O.S. 2011, Section 160.15**¹⁵, which related to the **Oklahoma Wind Energy Development Act**; changing the time for the submission of evidence of financial security for wind energy facilities commenced after a certain date; modifying certain types of evidence of financial security; etc.

The amended legislation now reads:

SUBJECT: Wind Energy Facilities.

SECTION 1. AMENDATORY 17 O.S. 2011, Section 160.15, is now amended to read as follows:

Section 160.15 A.

“The owner of a wind energy facility, shall submit to the Oklahoma Corporation Commission evidence of financial security to cover the anticipated costs of decommissioning the wind energy facility. For a wind energy facility or portion thereof which reaches the commercial generation date prior to December 31, 2016, the evidence of financial security shall be submitted after the fifteenth year of operation of the facility. For a wind energy facility or portion thereof which reaches the commercial generation date on or after December 31, 2016 the evidence of financial security shall be submitted by the fifth year of operation of the facility. Evidence of financial security may be in the form of a surety bond, collateral bond, parent guaranty, cash, cashier’s check, certificate of deposit, bank joint custody receipt or other approved negotiable instrument as established in rules promulgated by the commission.”

Issue:

¹⁴ https://en.wikipedia.org/wiki/Wind_turbine

¹⁵ Oklahoma Session Laws – 2015. See Section 92. As cited as 2015 O.S.L. 92. Enrolled Senate Bill No. 808.

Financial security to cover the anticipated cost of decommissioning:

Decommissioning is a general term for a formal process of removing something from an active status. Specific instances include: infrastructure, cleaning up of radioactive material and progressive demolition of the plant. In this essay where wind turbines are concerned, we will be meaning the repair, replacement or dismantling of the wind turbine equipment, facilities and the restoration of the land on which the wind turbine once stood.

Why is decommissioning important? Why don't we leave machines that we no longer need to simply rot away, rather than try to salvage them? What are society's feelings towards equipment that we no longer need in the landscape??

It is thought that, there is a common fear among many communities that turbines and towers will not be removed when no longer in use, left to rust on the landscape, and a reminder of a failed project. Many communities address this problem ahead of time by planning for decommissioning. If not decommissioned properly, wind turbines can damage the environment, erode aesthetic features, and devalue property. Some states and countries have used a variety of measures to ensure that wind power sites are decommissioned properly.¹⁶ In Minnesota, Pipestone County adopted a wind power ordinance that provides for decommissioning of wind turbines. In Sharman County, Oregon, local zoning permits wind turbine approvals to be conditioned on decommissioning and removal provisions.¹⁷ It is important to explain the origin of regulations regarding decommissioning measures.

It must be noted that, the regulations on financial security (or bond) to cover the anticipated cost of decommissioning of equipment after their use, has been heavily influenced by Oil and Gas (Petroleum) Law procedure. Petroleum law establishes that, ".....in case of termination of a concession, concessionaire shall, on his own account, remove the equipment and goods that will not be reverted, being liable for any damages arising out of its activities, and obliged to carry out environment recovery imposed by the authorities."¹⁸ This regulation found its way into Wind Law statutes. Oklahoma is not alone on the subject of decommissioning.

The North Dakota Public Service Commission has issued a precedent-setting ruling requiring companies to post bond to cover the cost of restoring wind farm sites to their original state when a facility is retired. The commission stated that under state law, it has authority to decide whether a wind energy project that has been operating for 10 years or more should be required to file some form of financial assurance to cover the cost of decommissioning and reclamation. It noted that this year, four wind projects in the state have hit the ten-year mark, triggering a review of their decommissioning plans. The commission had previously opened an investigation into the adequacy of decommissioning plans for the

¹⁶ Karen W. Scott, *"Tilting at offshore Windmills; Regulating wind Farm Development within the Renewable Energy Zone, 18 J. Env'tl. L. 89, 111 (2006). (United Kingdom's plan for decommissioning wind power sites according to their 2004 Energy Act).*

¹⁷ Sean F. Nolon, *"Negotiating the wind: A framework to engage citizens in siting wind turbines," 12 Cardozo J. Conflict Resol. 327. See at 342.*

¹⁸ Timothy T. West (et al), *"Decommissioning of Oil and Gas Facilities" 2011 No.3 RMMLF-INST Paper No.22. also see :Petroleum Law 3.1. "Art.28, V Par. 2nd.*

Edgeley I and II wind energy projects owned by FPL Energy North Dakota Wind I & II, which are subsidiaries of NextEra Energy. The commission reported that during the enquiry, FPL Energy had estimated a 35-year project life, with the total cost of decommissioning and restoration of the sites expecting to be approximately \$2.23 million for the Edgeley I project and \$1.16 million for the Edgeley II project. The latest ruling would require the company to obtain a corporate guaranty in the full estimated amount for each project.¹⁹

Matthew Municipal Ordinances²⁰ in relation to findings with respect to the construction, operation and maintenance of Wind Turbine Generators, states that, before final permit approval, the applicant must submit to the [name of township] Board of Supervisors a bond which shall be deposited with the municipality of financial security in an amount sufficient to cover the cost of decommissioning all improvements or common amenities including, but not limited to the windmill and appurtenances including the base and footing, storm water detention and/or retention basins and other related drainage facilities, and electrical apparatus and restoration of the land to its original condition including forestry plantings of the type and density as the original. The above legislation is an emphasis on procedure.

When requested by the developer, in order to facilitate financing, the governing body may furnish the developer with a signed copy of a resolution indicating approval of permit contingent upon the developer obtaining a satisfactory financial security and meeting all requirements of this Ordinance and Permit. The resolution or letter of contingent approval shall expire and be deemed to be revoked if the financial security agreement is not executed within ninety (90) days unless a written extension is granted by the township; such extension shall not be unreasonably withheld and shall be placed in writing at the request of the developer.²¹

What then determines the amount that must be posted as security and when it becomes due?

The amount of financial security to be posted for the decommissioning of any improvements shall be equal to 110% of the cost. Annually, the municipality may adjust the required amount of the financial security. Subsequent to said adjustment, the municipality may require the developer to post additional security in order to assure that financial security equals said 110%. Any additional security shall be posted by the developer in accordance with this subsection.²²

It must be noted again here, that the legislations or ordinances do not offer the explanation as to how the monetary amount for the decommissioning task was arrived at. It is also no explanation on what triggers the date time span by which the decommissioning becomes due. How long would a wind turbine last before it may need repair that may result in decommissioning? These questions have not been answered here.

¹⁹ "Wind Turbine Decommissioning" 4189 PUR Util. Reg. News 7. (Case No. PU-13-794).

²⁰ Matthews Municipal Ordinances, Section 36A:7.20 (2d ed.) "Placement and Operation of wind Turbines". See "Bonding: Decommissioning." At pg 12.

²¹ Matthews Municipal Ordinances, Section 36A:7.20 (supra). See "Bonding :Decommissioning". A(2).

²² Matthews Municipal Ordinance (Supra). See "Bonding: Decommissioning" A(6).

Among the explanations offered in arriving at the figures is that, the amount of financial security required shall be based upon an estimate of the cost of decommissioning of any improvement, submitted by an applicant or developer and prepared by a professional engineer licensed as such in this state and certified by such engineer to be a fair and reasonable estimate of such cost. The municipality, upon the recommendation of the municipal engineer, may refuse to accept such estimate for good cause shown. If the applicant or developer and the municipality are unable to agree upon an estimate, then the estimate shall be recalculated and recertified by another professional engineer licensed as such in this state and chosen mutually by the municipality and the applicant or developer. The estimate arrived at, and certified by the third engineer shall be presumed fair and reasonable and shall be the final estimate. In the event that a third engineer is so chosen, fees for the services of said engineer shall be paid equally by the municipality and the applicant or developer.²³

Now we know that, the provisions allow for the cost of decommissioning arrived at, is never final, and can be challenged. What safeguards do wind investors have to receive a fair amount for bonds posted? This question remains unanswered. But it is one of the very questions the *Oklahoma Wind Energy Development Act* needs to address.

However, entities responsible for posting of the decommissioning bond may also be released from posting such bonds. When the developer has completed the decommissioning of all improvements, the developer shall notify the municipal governing body, in writing, by certified or registered mail, of the completion of the aforesaid decommissioning of all improvements and shall send a copy thereof to the municipal engineer. The municipal governing body shall, within ten (10) days after receipt of such notice, direct and authorize the municipal engineer to inspect the site. The municipal engineer, there upon, will file a report in writing with the municipal governing body, and shall promptly mail a copy of the same to the developer by certified or registered mail. The report shall be made and mailed within 30 days after receipt by the municipal engineer of the aforesaid authorization from the governing body. Said report shall be detailed and shall indicate approval or rejection of said decommissioning of all improvements, either in whole or in part, and if said improvements, or any portion thereof, shall not be approved or shall be rejected by the municipal engineer, said report shall contain a statement of reasons for such non-approval or rejection²⁴.

The persuasive ordinance continues to state that, If the municipal governing body or the municipal engineer fails to comply with the time limitation provisions contained herein, all decommissioning of all improvements will be deemed to have been approved and they shall be released from all liability, pursuant to its performance guaranty bond or other security agreement.²⁵

On Remedies to effect completion of Decommissioning of improvements, the above mentioned municipal ordinance goes on to state that, in the event that any decommissioning of improvements which are required have not been completed as provided in this ordinance and permit, the governing body of the municipality is hereby granted the power to enforce any corporate bond, or any other

²³ *Matthews Municipal Ordinance (supra)*. See “Bonding: Decommissioning” A(7).

²⁴ *Mathews Municipal Ordinance (supra)*. See “Release from Decommissioning Bond”. B(1).

²⁵ *Matthews Municipality Ordinance (supra)*. See B(3).

security by appropriate legal equitable remedies. If proceeds of such bond or other security are insufficient to pay the cost of decommissioning of improvements covered by said security, the governing body of the municipality may, at its option, proceed with of decommissioning of all improvements and may institute appropriate legal or equitable action to recover the moneys necessary to complete the remainder of the improvements. All of the proceeds, whether resulting from the security or from any legal or equitable action brought against the developer, or both, shall be used solely for the decommissioning of all improvements covered by such security and not for any other municipal purpose.²⁶

There is no mention of whether there is a particular uniform body set up for the storing of decommissioning funds, or whether every County, municipality, or State handles its own decommissioning account.

“Section 160. 15 (B).

- 1. For a wind energy facility which reaches the commercial generation date prior to December 31, 2016, the evidence of financial security shall be accompanied by an estimate of the total cost of decommissioning, minus the salvage value of the equipment, prepared by a professional engineer licensed in this (Oklahoma) state. The amount of the evidence of financial security shall be either: or.....***

b. One Hundred twenty-five percent (125%) of the estimate of the total cost of decommissioning which shall be submitted to the commission in the fifteenth year of the project”.

Issue:

For a wind energy facility which reaches the commercial generation date *Prior to December 31, 2016...*

The question to be asked is:

Why is this above mentioned date development important? Should we assume it is the time span by which major repairs become due? This question cannot be answered absent a fair estimation (in the Act) of the life span of a newly installed wind turbine.

It must be noted that, this Act is silent on the dates suggested here above.

Section 2. NEW LAW. A new section of law to be codified in the Oklahoma Statutes as **Section 160.20 of Title 17**, unless there is created a duplication in numbering, reads as follows:

²⁶ *Matthews Municipality (supra)*. See B(7)(C): “Remedies to Effect Completion of Decommissioning of Improvements”.

- A. *"After the effective date of this act, no wind energy facility may be constructed if the base of any tower is located at a distance of less than:*
1. *One and one-half (1 ½) nautical miles from the center line of any Runway located on:*
 - a. *A public-use airport as defined in Section 120.2 of Title 3 of the Oklahoma Statute,*
 - b. *A private-use airport as defined in Section 157.2 of Title 14 of the Code of Federal Regulations for which:*
 - (1) *A notice to the Federal Aviation Administration (FAA) has been filed under Section 157.3 of Title 14 of the Code of Federal Regulations prior to the notification of intent to build a facility with the Corporation Commission pursuant to subsection A of Section 3 of this act, and*
 - (2) *An airport determination has been issued by the FAA with a determination of no objection or a conditional determination or the airport determination remains pending, or*
 - c. *An airport owned by a municipality;*
 2. *One and one-half (1 ½) nautical miles from any public school which is part of a public school district; or*
 3. *One and one-half (1 ½) nautical miles from a hospital.*
- B. *Attestation of compliance with the setback requirements in this section shall be included in any reports required by the Corporation Commission. Disputes arising under this section shall fall under the exclusive jurisdiction of the district courts."*

SECTION 3. NEW LAW *A new section of law to be codified in the Oklahoma Statutes as Section 160.21 of Title 17, unless there is created a duplication in numbering, reads as following:*

- A. *"The owner of a wind energy facility shall submit notification of intent to build a facility to the Corporation Commission within six (6) months of the initial filing pertaining to commencement of construction with the Federal Aviation Administration (FAA) of an FAA Form 7460-1 (Notice of Proposed Construction or Alteration) or any subsection form required by the FAA for evaluating the impact a proposed wind energy facility will have on air commerce safety and the preservation of navigable airspace. The commission shall prescribe the form and submittal requirements of the notification; provided, the information required on the notification form shall include at least the same information required on the FAA form. The owner of the wind energy facility shall submit copies of the notification with the board of county commissioners of every county in which all or portion of the wind energy facility to be located within twenty-four (24) hours of filing with the commission. If all or a portion of the wind energy facility is to be located within the incorporated area of a municipality, copies of the notification shall also be submitted to the governing body of the municipality within twenty-four (24) hours of filing with the Commission."*

Issue:

What constitutes an Airport?; The concern about Airports.

The literature relating to Oklahoma Wind Energy Development Act does not define an Airport, a hospital or a school. All we see here are concerns about wind energy enterprises. So, what is the concern about Wind energy to the Federal Aviation Authority and Airports?

The understanding on how wind turbines relate to airports cannot be understood fully, without the explanation of the scenario occurrence at the Travis Air Force Base, in California, in an article by the military base officials that follows bellow.

On 12 December 2006, air traffic controllers at Travis Air Force Base (AFB), California, saw more than they expected when they switched on their Air Surveillance Radar 8 (ASR-8) system. During recent radar system upgrades, the older ASR-8 analog system was digitized to enhance system compatibility, which would allow for data to be fed from a digital radar system located in nearby Mill Valley. However, the digital upgrade, a temporary measure to enhance compatibility until the more modern digital ASR-11 radar system replaced the legacy ASR-8, resulted in some unusual radar returns. For instance, Travis controllers began observing persistent but non-existent weather cells. More concerning, the controllers saw the tracks of aircraft they were following disappear and then reappear. According to controllers, these phenomena did not occur with the analog version of the ASR-8. The disturbing returns appear to be associated with the 700-plus electricity-generating wind turbines in the Montezuma Hills area Southeast of the base²⁷.

To better understand the situation as it arose at Travis Air Force base, wrote Lasco and Collick, one must first have some understanding of how radar systems work. Air traffic control radar such as the ASR-8 and ASR-11 are a combination of radar systems. The concave bottom portion is the Primary Surveillance Radar (PSR), while the rectangular top component is the Secondary Surveillance Radar (SSR)²⁸. Both systems emit energy pulses as the apparatus rotates. The PSR sends out high-frequency radio waves that bounce off or “illuminate” the target and returns to the radar²⁹. By interpreting returns from successive pulses (known as primary returns), the radar is able to determine the range, bearing and altitude of objects in the radar’s beam. Return pulses are much weaker than the initial energy beams. The low-energy returns are susceptible to interference caused by ground objects (clutter), which can degrade the PSR’s ability to provide range and altitude information. The SSR, on the other hand, uses frequencies different from the PSR to send out a pulse that can be received by aircraft equipment with a transponder. Transponder equipped aircraft reacts to the SSR pulse by generating a relatively strong return signal containing the plane’s location and altitude rather than relying on a low-energy reflection.

²⁷ Felix A. Lasco and Thomas F. Collick, “When wind, wind turbines, and radar mix – A case study”, 68 A.F.L. Rev. 235. See “Unexpected storms and wind turbines,” at 236.

²⁸ Airport Surveillance Radar (ASR-11), US Fed. Aviation Admin., http://www.faa.gov/air_traffic/technology/asr-11/

²⁹ See quoted by Lasco and Collick: “The effect of windmill farms on military readiness”, 17 (2006), see at <http://www.defense.gov/pubs/pdfs/windfarmreport.pdf>. the report provides an excellent description of radar fundamentals.

The stronger SSR return means that it is easier to receive and is less susceptible to interference caused by clutter³⁰.

As it pertains to Travis, experts found the PSR problem occurred only in areas that had both wind turbines and heavy traffic along a nearby highway. It was observed that, the apparent “weather cell” changed fluidly based on the quantity and type of wind turbines that were rotating. This area also overlapped with the area of dropped targets, wrote Lasco and Collick. Experts also noted a difference between radar return from the PSR and the SSR, finding that the secondary radar was not affected by WRA. Fortunately, most planes have transponders and would be detectable; however, those planes without transponders still remain a concern today, said Lasco and Collick³¹.

Through a case study of events occurring at Travis, this article, by Lasco and Collick, hopes to familiarize legal professionals with the legal, operational, environmental and political issues that can arise when wind turbines and operational air space collide. Their article demonstrate the utility of early engagement with potential foes and highlights one tool to enhance collaborative efforts to fully understand and possibly resolve highly technological problem associated with civilian activities that could impact military or national security operation.

Lasco and Collick noted that wind-turbine development had been growing in the Montezuma Hills area since 1985. Both the wind turbines and the base area in Solano County, and in 1987, county officials designated a sixty-eight-square-mile area as a Wind Resource Area, or WRA³². The turbines range in height from 91 to 351 feet, with the closest one located 4.8 nautical miles from the base. Over time, the WRA has developed into an important renewable energy resource for the citizens of Solano and neighboring counties and the state of California.

Wind turbines as seen from perimeter fence at Travis Air Force Base.

It is reported that, even though the digital ASR-11 was scheduled to replace the ASR-8 way back in 2008, Travis officials feared the same problem would impact the new radar. The pending switch to the ASR-11 was part of a long-term Air Force and Federal Aviation Administration (FAA) plan to replace legacy systems such as the ASR-8 with more modern and efficient digital systems. It is observed that, leaders at Travis AFB and their parent command, Air Mobility Command, AMC, were concerned about the impact of this development on flight safety. The Travis AFB controllers believed there was an immediate and daunting air safety issue over the WRA.

Lasco and Collick opine that, had the air traffic situation been as the controllers believed it to be--and knowing the turbine-generated anomaly decreased the ability of the ASR-8 to interpret the PSR's returns over this Air Force Base area--the safety concern would have been far more substantial. Specifically,

³⁰ Lasco and Collick, (*supra*) at 237.

³¹ Lasco and Collick (*supra*).

³² E-mail from Geoffrey Blackman, Westslope Consulting, LLC, to the author (July 19, 2010, 09:36 AM)(on file with authors - Lasco and Collick).

controllers expressed concern about maintaining safe separation distances between the IFR aircraft or providing all aviators timely safety alerts. For these reasons, the controllers felt it was important to let affected pilots know of the reduced service over the WRA.

It was observed here that, base authorities acted promptly after discovering this issue. To address immediate safety needs, the base issued a Notice to Airmen (NOTAM), which provides pilots general information deemed essential for the safe and efficient operation of airplanes³³. The NOTAM advised pilots flying in aircraft without transponders that Travis AFB's ability to provide air traffic control over the WRA is limited³⁴. Additionally, the FAA placed this information on charts pilots used to navigate through this area³⁵. It is added that, further, Travis AFB officials briefed this newly discovered condition to pilots at the nearby civilian airports. It is confirmed by Lasco and Collick that, as a result, on 8 March 2007, the wing commander formally notified the Solano County Department of Resource Management about the wind turbines' impact on Travis AFB radar. Hoping to forestall additional wind turbine construction in the WRA, the wing commander described the potential impact additional wind turbines could have on the new digital radar:

"Following the above observations, it is confirmed that, at the time, the three largest wind farm developers in the Montezuma Hills area, enXco, Florida Power and Light (FPL) and the Sacramento Municipal Utility District (SMUD), each had pending construction projects. Each agreed to halt construction of additional turbines until the radar issue was resolved to the satisfaction of Travis officials"³⁶.

It was said that, EnXco keenly felt the impact of the above mentioned decision, as the company was within one week of obtaining final approval for "Shiloh II," a \$350 million project to build about seventy-five turbines³⁷. For at least two years, it was observed that, the company had been working to complete the lengthy process of obtaining the necessary governmental approvals to build the wind turbines. This included technical siting studies, lease negotiations with land owners, an environmental review and electrical system network transmission upgrade activities. Travis AFB officials were made aware of enXco's plans in November 2006, during the Shiloh II Draft Environmental Impact Report (EIR) public comments period. It is said that the company had already submitted its plans to the FAA, which issued a "Determination of No Hazard," (DNH) for each of the seventy-five turbines. In its amended EIR, enXco

³³ *Joint Chiefs of Staff, Joint Pub. 1-02, Department of Defense Dictionary of military and associated terms 233 (2010)*, available at http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf

³⁴ Quoted in Lasco and Collick (*supra*) see at 240. Also see: This caution is maintained in the current NOTAM regarding radar coverage over the WRA at M0817/11 NOTAMR M0672/11 issued on 28 December 2011.

³⁵ *San Francisco VFR sectional chart*, note 26. The *San Francisco Visual Flight Rules sectional aviation chart* provided the following cautions: Numerous windmills reaching a height of 645 feet above mean sea level. Radar is limited south east of Travis AFB. Traffic advisory may not be available to non-transponder-equipped aircraft.

³⁶ Lasco and Collick (*supra*) at 240-243. Also see: Solano County, Dept of Res. Mgmt., Amendment to Final Environmental Impact Report, Shiloh II Wind Plant Project 4-35 (2007) available at http://www.co.solano.ca.us/resources/ResourceManagement/3_Exhibit%20B_Shiloh%2011%C20FEIR%Amendment_April%202007.pdf.

, (Oct. 30, 2007)(on file with authors – Lasco and Collick). Also see Lasco and Collick (*supra*) at ³⁷ Letter from Joseph B. Fahrendorf, Vice President, enXco, Escondido, Ca, to General (Gen) Lichte, Commander, Air Mobility Command 241.

observed that the FAA consulted the DOD before making its decision and that the FAA represented the interest of the Air Force in this matter. Finally, enXco added, “The FAA determination of no Hazard to Air Navigation is the final conclusion about whether a project would or would not have an adverse effect on the aeronautical safety”

Lasco and Collick wrote that, despite the foregoing, the Solano County Airport Land Use Commission determined that enXco’s project was inconsistent with the Commission’s Travis Airport Land Use Compatibility Plan,³⁸ concluded that the final EIR did not adequately address the impact of the proposed development on Travis AFB’s digital radar. At a subsequent meeting of the Solano County Planning Commission, both FPL and enXco requested six-month continuances for the Montezuma Wind and Shiloh II projects respectively, which the commission granted, Lasco and Collick noted³⁹. Yet another occurrence of this nature in Oregon was to attract congressional interest.

Long-Range Radar Problem in Oregon Generate Congressional Interest in FAA Process

As with the situation at Travis AFB, the controversy in Oregon involved the potential impact of a wind farm developer’s plan to add new turbines to an area already congested with them. The Shepherds Flat area, near Fossil, contained approximately 1800 wind turbines.⁴⁰ To this number, the developer, Caithness Energy, planned to add 338. Like the developers around Travis, Caithness Energy notified Air force Officials about the proposal, to which officials responded they had no objection to the proposed development. Believing this local endorsement indicated Air Force-wide approval for the project, the company continued expensive site preparation. When this work was complete and Caithness was ready to begin construction, the company gave the FAA the required thirty-day notice.

As part of the FAA evaluation process, Air Force officials first considered the possibility the new turbine project could negatively impact their radars. Specifically, the Air Force worried that the additional turbines could degrade the ability of the radars at Whidbey Island Naval Air Station, Wash., and Mountain Home AFB, Idaho, to track aircraft. In addition, it was observed, the North American Aerospace Defense Command (NORAD) and the U.S. Northern Command (NORTHCOM) were particularly concerned about the proposed development’s effect on the long-range Air Surveillance

³⁸ *The Airport Land Use Commission reviews development projects for consistency with Travis AFB’s “maximum mission) as defined in the Travis Airport Land Use Compatibility Plan.*

³⁹ *Lasco and Collick, (supra)see at 241.*

⁴⁰ *See: Impact of Wind Farms on Military Readiness: Hearing Before the Subcomm. On Readiness of the H. Comm. on Armed Servs., 111th cong., at 43(2010)(statement of Dr.Dorothy Robyn, Deputy Under Secretary of Defen, (Oct. 30, 2007)(on file with authors – Lasco and Collick). Also see Lasco and Collick (supra) at ⁴⁰ Letter from Joseph B. Fahrendorf, Vice President, enXco, Escondido, Ca, to General (Gen) Lichte, Commander, Air Mobility Command 241.*

⁴⁰ *The Airport Land Use Commission reviews development projects for consistency with Travis AFB’s “maximum mission) as defined in the Travis Airport Land Use Compatibility Plan.*

⁴⁰ *Lasco and Collick, (supra)see at 241.*

⁴⁰ *See: Impact of Wind Farms on Military Readiness: Hearing Before the Subcomm. On Readiness of the H. Comm. se For Installation and Environment). Available at <http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg61770/pdf/CHRG-111hhrg61770.pdf>*

Route radar at Fossil. Lasco and Collick, noted that, NORAD relies on this site to provide detection and tracking information that allows the command to decide whether to deploy fighter aircraft in response to a threat⁴¹.

Like their counterparts at Travis AFB, it is noted that, the DOD radar experts had no way to assess the impact, if any, the additional turbines would have on their radar. Declining to accept the unknown level of degradation risk this set of turbines posed, Air Force officials advised the FAA of their concerns⁴². Based on the Air Force objections, the FAA issued a “Notice of Presumed Hazard” on 1 March 2010 – devastating news for Caithness Energy. Not anticipating an issue at this late stage of the project, Caithness Energy had to cancel long standing plans to begin turbine construction in May 2010. The FAA decision and the resulting \$2 billion Caithness’ project cancellation attracted significant Senate and media attention, Lasco and Collick confirmed.

Ultimately, Lasco and Collick observed, the Caithness Energy turbine project was approved. As with the wind turbines in Solano County’s WRA, DOD’s further study of Caithness Energy’s proposed turbine project revealed new turbine would have less impact than initially thought⁴³. In late April 2010, the DOD commissioned a sixty-day study by the Massachusetts Institute of Technology to develop mitigation measures. The study suggested two near-term mitigation measures – an adjustment of the radar settings for optimal performance at the Fossil radar and adding software to essentially edit out false targets.⁴⁴ Based on the DOD study and the expected mitigation measures, the Air Force withdrew its objection to the project on 30 April 2010. Lasco and Collick conclude here that, approximately one year later, deliveries of the first large turbines begun in May 2011, with construction of the 338-turbine site scheduled for completion in 2012⁴⁵.

⁴¹ Lasco and Collick (*supra*). See: “Long Range Radar Problem in Oregon Generate Congressional Interest in FAA Process”, at 258.

⁴² Scott Learn, “Air Force Concerns About Radar Interference Stall Huge Oregon Wind Energy Farm,” OREGONLIVE.COM, April 14, 2010, http://www.oregonlive.com/environment/index.ssf/2010/04/air_force_concerns_about_radar.html

⁴³ Press Release, Office of the Deputy Under Secretary of Defense – Installations and the environment, Department of Defense notifies Federal Aviation Administration – wind turbines development plans in Northern Oregon and Southern Washington pose no additional risk to national security (1 Oct. 2010), available at <http://www.acq.osd.mil/ie/download/20101001-turbines.pdf>.

⁴⁴ The DOD has since implemented some of these measures.

⁴⁵ Lasco and Collick (*supra*) at 258. Also see: Caleb Denison, “Big Wind”⁴⁵ Lasco and Collick (*supra*). See: “Long Range Radar Problem in Oregon Generate Congressional Interest in FAA Process”, at 258.

⁴⁵ Scott Learn, “Air Force Concerns About Radar Interference Stall Huge Oregon Wind Energy Farm,” OREGONLIVE.COM, April 14, 2010, http://www.oregonlive.com/environment/index.ssf/2010/04/air_force_concerns_about_radar.html

⁴⁵ Press Release, Office of the Deputy Under Secretary of Defense – Installations and the environment, Department of Defense notifies Federal Aviation Administration – wind turbines development plans in Northern Oregon and Southern Washington pose no additional risk to national security (1 Oct. 2010), available at <http://www.acq.osd.mil/ie/download/20101001-turbines.pdf>.

⁴⁵ The DOD has since implemented some of these measures.

Firm Gets Big Wind Turbine Delivery,” EARTHTECHLING (May 31, 2011), <http://www.earthtechling.com/2011/05/big-wind-farm-gets-big-turbine-delivery/>.

Lasco and Collick observe in their conclusion here that, the wind turbine-induced radar issue was as unexpected as it was difficult to fully resolve. It demonstrated how one technological change—receiving a new radar feed—exposed an operational vulnerability base officials could not have foreseen, they say. They went on to observe that, in such cases, it is difficult to be proactive and get ahead of such a technological puzzle. With wind energy as an important and first growing resource to this nation, the Air Force is becoming a proactive partner in promoting safe, responsible wind energy development. In time, working through the relatively newly established “executive agent” and continuing to bring bright, talented people to bear should solve this problem will be solved. Equally important, and perhaps for an unforeseen technology of tomorrow, this difficult situation showed the benefits that can accrue to all parties where there is a willingness to try new ideas and cooperate with each other (versus litigate) toward a common goal, Lasco and Collick concluded, where wind Turbines and airports are concerned.⁴⁶.

Schools and Hospitals - The concerns:

SECTION 2. NEW LAW (Continued)

“160.20 of Title 17, unless there is created a duplication in numbering, reads as follows:

A. After the effective date of this act, no wind energy facility may be constructed if the base of any tower is located at a distance of less than:

A(2)2:

One and one-half (1 ½) nautical miles from any public school which is part of a public school district; or

A(2)3:

One and one-half (1 ½) nautical miles from a hospital.”

Here again it must be noted that, like with airports, the *Oklahoma Wind Energy Development Act* as Amended, does not define a school or a hospital, just as it did not define what an airport is, where this setback is concerned. A “setback” is the free distance between an operating wind turbine and any (habitable) structure.

The question then becomes, while we know it hinges on the safety of schools and hospitals, what does this distance symbolize? What is the determinant factor in suggesting these specified distances? Would it make any difference if a different distance was suggested instead?

The Act remains silent in answering the above question.

⁴⁶ Lasco and Collick (*supra*), see “VIII. Conclusions,” at 268.

Setbacks:

Oklahoma has had no literature explaining the reasons for the specified setbacks distances from wind turbines. The Matthews Municipal Ordinances goes further on this subject. It lays down that, the wind turbine generators shall comply with the following setbacks: Civil Structures. Each wind turbine generator shall be set back from the nearest existing (at the time of the building permit issuance) school, hospital, church or public library, a distance of no less than 2,500 feet.⁴⁷

For participating residences, for existing (at the time of the building permit issuance or notice from the building code enforcement officer that no building permit is required) participating primary occupied residences, the setback distance from a wind turbine generator shall be at least 1,000 feet. In the event that a lesser distance is desired, the Developer/Permitee shall request a waiver for this provision pursuant to the requirements of this Ordinance. In no event shall the setback distance be less than 1.1 times the total height of the wind turbine generator (measured at the highest point of the blade tip)⁴⁸.

Here no explanation is given on how the distances suggested for the setback were arrived at.

For non-participating residences, for existing (at the time of the building permit issuance or not from the building code enforcement officer that no building permit is required) non-participating primary occupied residences, the setback distance from a wind turbine generator shall be at least 2,500 feet.

Definition of Participating and Non-participating: For purposes of this Ordinance, the ordinance suggest that, "Participating" shall mean a property owner or property (including a residence) that is subject to an agreement or lease with Developer/Permitee. "Non-participating" shall mean all property owners or properties (including a residence) which are not participating property owners or property⁴⁹.

Where property lines are concerned, it is suggested that, each wind turbine generator shall be set back from the nearest property line a distance of no less than 1,000 feet⁵⁰.

From public roads, it is suggested that, each wind turbine generator shall be set back from the nearest public road a distance of no less than 1,000 feet, determined at the nearest boundary of the right-of-way for such public road. Unless conclusive evidence exists to the contrary, the public road right-of-way is presumed to be 66 feet⁵¹.

From communication and electric lines, each wind turbine generator shall be set back from the nearest above-ground public electric power line or public telephone line a distance of no less than 1,000 feet⁵².

⁴⁷ 36A:7.20. "Placement and Operation of Wind Turbines," 1B Matthews Municipal Ordinances, 36A:7.20 (2.d ed.), see "Civil Structures," 5(a).

⁴⁸ Placement and Operation of Wind Turbines, (supra) see "Participating Residences," 5(b).

⁴⁹ Placement and Operation of Wind Turbines, (supra) see "Non-participating Residences," 5(c).

⁵⁰ Placement and Operation of Wind Turbines, (supra) see "Property Lines," 5(d).

⁵¹ Placement and Operation of Wind Turbines, (supra) see "Public Roads," 5(e).

⁵² Placement and Operation of Wind Turbines, (supra) see "Communication and Electric Lines," 5(f).

From natural resources and historic sites and structures, each wind turbine generator shall be set back a distance of no less than 2,500 feet from the nearest existing critical and irreplaceable natural and cultural resource area of the Township (at the time of the building permit issuance)⁵³.

Noise and Shadow Flicker⁵⁴:

The Oklahoma Wind Energy Development Act seems to be silent of the issue of “noise and shadow flicker.” We can assume that it has left this as claims to be remedied under other nuisance statutes, ordinances, or case law. Where noise and shadow flicker is concerned, it is stated that, a developer/permittee shall comply with the following noise standards:

A Developer/Permittee shall make a good faith effort to maintain a noise level attributable to the wind turbine generators of not more than 45dbC within a reasonable margin of error as measured from the property line of existing non-participating residences. The parties acknowledge that the projects construction will be the source of intermittent noise. Developer/permittee shall require all contractors to incorporate reasonable noise reduction measures in order to mitigate the amount of noise generated during the construction phase. The Facility Owner and Operator shall make every reasonable effort to minimize shadow flicker to any Occupied Building on a Nonparticipating Land owner’s property⁵⁵.

The legislation from New York, regarding noise concerns is very persuasive in Oklahoma. New York suggests “buffering” to address noise concerns⁵⁶. Buffering means some kind of invention to shield cushion, lessen, or insulate the noise, will be employed to reduce the noise emitted by the turbine. Opponents of wind projects have raised concerns regarding the noise generated by wind turbines. Salkin and Donohue have observed that, apart from the noise associated with constructing a wind turbine, the facilities operating will produce two types of sound: noise from the mechanical equipment, such as the generator or cooling fans; and the sound of the blades while they rotate, or aerodynamics noise.⁵⁷ It is thought that, these noise levels are “considerably different in level and nature than that generated by most power plants, which are typically large industrial facilities. Salkin and Donohue gave the example that, a 300 kilowatt turbine typically produces less noise at 400 feet than does light traffic 100 feet away. They found that, a large portion of this noise will be covered by the “ambient of background noise of the wind itself” and increases in technology, such as more efficient airfoils, has reduced noise in newer model turbines. However, even with all the advancements in technology wind turbines will still

⁵³ *Placement and Operation of Wind Turbines, (supra) see “Natural Resources and Historic Sites and Structures,” 5(g).*

⁵⁴ *Placement and Operation of Wind Turbines, (supra) see “XIV. Noise and Shadow Flicker”.*

⁵⁵ *Supra.*

⁵⁶ *Patricia Salkin and Michael Donohue, “Planning and Zoning for Wind Power in New York,” 6 NO. 2 New York Zoning Law and Practice Report 1, September/ October 2005, see “Buffering to Address Noise Concerns,”*

⁵⁷ *American Wind Energy Association, Permitting Small Wind Turbines: A Handbook Learning From the California Experience, available at <http://www.awea.org/smallwind/document/permitting.pdf> the level of noise produced by turbines depend on a number of factors such as: wind speed; wind direction; turbulence levels, site topography; vegetation; and atmospheric conditions such as boundary layers, temperature gradients, and air absorption. (quoted from Salkin and Donohue (supra)).*

produce a certain amount of noise, because the mechanical components, such as the breaking equipment and electronics “can create noise even in a well-designed turbine⁵⁸.”

It is thought that, zoning provisions may also address maximum allowable decibel sounds. It is found that, a typical turbine operating between 75-100 decibels will provide a reading between 45-65 decibels 100 feet away. Salkin and Donohue went on to say that, establishing new buffer zone will allow the sound to diminish before it can reach a new receiver. The suggested distance for a commercial turbine is between 1,000 feet and half a mile with an exception provided for the turbine owner. In Perm Springs, California, for example, it is observed that, no wind turbine may be located closer than 1,200 feet from any residence, hotel, hospital, school, library, or convalescent home, except where topography would permit an exemption to be made⁵⁹.

The above California distance suggestion may be persuasive for Oklahoma too. So now we know that the suggested setback distances have to do with, the distance the noise will travel and fade away before it reaches any residential or habitable dwelling.

Predicting the amount of noise that will be produced before construction is a difficult task owing to the wide variety of factors that will go into the transfer of sound, and measurements taken from one site, might not be representative of noise emissions by the same turbine at another site, Salkin and Donohue observed. It is thought that, this is not to say that noise predictions are impossible.

Permitting agencies may require a noise analysis to estimate: whether the facilities can be constructed and operated in compliance with any and all applicable guidelines or local ordinances; whether any potentially significant noise impacts may result from the construction and operation of the facility; and if so, the extent that mitigation measures can be used to reduce noise from the construction and operation of the facility, wrote Salkin and Donohue⁶⁰. It is thought that, these provisions should be carefully drafted to avoid a void-for-vagueness challenge, like in *People v. New York Trap Rock Corp.*⁶¹ The provisions should include a set decibel level and identify a location to take sounds measurements from, any set premise such as a nearby dwelling or property line. In the *People v. New York Trap Rock Corporation* case, where the defendant which operated a quarry in the Town of Poughkeepsie, was found guilty for violating the town’s “Unnecessary Noise Control Ordinance”. On convicting the defendant of violating a town noise control ordinance, a local law which was fashioned along guidelines provided by the State’s Department of Environmental Conservation, the Court held that, the town’s noise control ordinance was not preemptive of or inconsistent with state law, and the ordinance was unconstitutionally void-for-vagueness, since the vagueness of the definitions of the conduct prohibited therein failed to provide a defendant with adequate warning of what the law required and rendered the ordinances susceptible to arbitrary and discriminatory enforcement.

⁵⁸ Salkin and Donohue (*supra*).

⁵⁹ National Wind Coordinating Committee, “Wind Energy Environmental Issues,” (Jan. 1997). Available at <http://www.nationalwind.org/publicactions/wes/wes02.htm> (see Quoted by Salkin and Donohue (*supra*)).

⁶⁰ Salkin and Donohue (*supra*).

⁶¹ *People v. New York Trap Rock Corp.*, 57 N.Y. 2d 371, 456 N.Y.S.2d 711, 442 N.E. 2d 1222 (1982).

The most common noise level throughout the Country is said to be 50 decibels, which can be measured from a property line, residence, school, hospital, or library depending on the nature and the characteristics of the community⁶². Salkin and Donohue opine that, the ordinance need not necessarily set an inflexible decibel level, and that, the ordinance may provide levels that may be adjusted for nighttime with exceptions for windstorms.

It is further observed that, setback requirements have other benefits as well. Winter weather can lead to ice buildup on turbine rotors. It is observed that, as ice thaws, or as rotors move, large pieces of ice can fall from the turbines. The areas directly beneath the turbines can therefore be dangerous during parts of the winter. Therefore, establishing a setback requirement will help protect the public from the ice.

Salkin and Donohue wrote that, for the most part, there have been only few cases involving noise complaints from wind turbines,⁶³ and they involved only personal wind turbines, which are usually thought to be smaller and louder than their commercial counterparts⁶⁴, Salkin and Donohue thought.

In conclusion this exercise is fruitless if we do not point out damages that may arise here, due to wind technology. Without discussing the causes of action that may arise in wind technology, defenses, and remedies to cure them, this essay would not be complete.

Causes of Action and Defenses:

Nuisance⁶⁵:

Nuisance as a cause of action requires a “prima facie” case be made. In order to prevail in a private-Nuisance suit, the following element of nuisance must be established by the plaintiff:

1. The plaintiff had a private interest in land;
2. The defendant (wind company interest) interfered with or invaded the plaintiff’s interest by conduct that was (a) negligent, or (b) intentional and unreasonable, or (c) abnormal and out of place in its surroundings;
3. The defendant’s conduct resulted in a condition that substantially interfered with the plaintiff’s private use and enjoyment of the land; and
4. The nuisance (by the wind equipment) caused injury to the plaintiff.

⁶² *Draft Model Wind Ordinance Reference Guide*. See at: http://www.doa.state.wi.us/docs_view2.asp?docid=2870

⁶³ *Rassier v. Houim*, 488 N.W. 2d 635 N.D. (1992); *Rose v. Chalkin*, 187 N.J. Super. 210, 453 A. 2d 1378, 36 A.L.R. 4th 1148 (Ch. Div. 1982).

⁶⁴ *Salkin and Donohue (supra)*, see “Buffering to Address Noise Concerns”; Also see: American Wind Energy Association, “Facts about Wind Energy and Noise,” at: http://www.awea.org/pubs/factsheets/WE_Noise.pdf. Smaller turbines generate more noise because the speed the blades rotate at is higher and smaller turbines are not as well developed, since the majority of research and funding has been spent on larger turbines, (Quoted by Salkin and Donohue).

⁶⁵ Eric M. Larsson, “Cause of Action to Challenge Development of Wind Energy Turbine or Wind Energy Farm,” 50 *Causes of Action* 2d 1 (Updated September 2015), see: “Prima Facie Case—Nuisance.”

It is stated that, in nuisance litigation that challenge the construction or operation of wind energy turbines or wind farms, the focus is almost entirely on the third and fourth elements listed above.

Nuisance in wind turbine cases have been listed in the following categories: Noise and vibrations, aesthetics (blockage of enjoyment of view), thrown ice from blades, emotional harm, and diminished property values.

While more commonly plaintiffs have asserted nuisance claims based on harm to the plaintiffs caused by noise and vibration, it is noted that, in rare occasions causes of action have arisen based on aesthetic concerns. By definition “aesthetics” are a set of principles concerned with the nature and appreciation of beauty, view, scenery, or art. It is noted that courts generally have been reluctant to recognize private nuisance claims based on aesthetic considerations. In *Rankin v. FPL Energy, LLC*,⁶⁶ it was stated that, Texas courts have not found nuisance merely because of aesthetical-based complaints. However, such claims have been recognized, and that, that recognition have been extended to actions against wind energy developments, at least when accompanied by claims of other alleged nuisances, wrote Larsson.⁶⁷

However, the court in *Rankin v. FPL Energy, LLC*,⁶⁸ held that Texas law did not support a nuisance action based on the impacts to aesthetics caused by a wind farm. The case arose when the trial court granted the wind farm developers motion for summary judgment of the landowners’ claims of private and public nuisance based on aesthetic impact by the wind farm’s activities. In response to the motion for summary judgment, the landowners presented affidavits showing that the wind turbines had diminished the area’s scenic beauty. The Texas Court of Appeals characterized the land owner’s nuisance claims as an emotional response based on the loss of view because of wind turbines. Although the court found that there was president for a nuisance claim based on an emotional reaction, the court rejected the landowner’s claim, saying that just characterizing the wind turbines as “abnormal and out of place” in their surroundings was not enough to allow a nuisance action based on an emotional reaction to the turbines. However, noted Larsson, that the court did hint that based on the evidence of property devaluation caused by the turbines, the wind farm developer’s actions “could be characterized as a condemnation without obligation to pay damages.” Concluding that nothing in Texas Law allowed for a nuisance action based on “aesthetic” impact, the court affirmed the decision of the trial court⁶⁹.

Plaintiffs have also brought nuisance claims that included allegations of the danger of ice thrown from the blades of the turbines. In *Rassier v. Houim*,⁷⁰ although plaintiff described one instance when she found a large ice chunk in her yard that she suspected was thrown from the wind generator, court found that the tower supporting the generator was engineered for a larger model, and safety features eliminated the danger of blades or ice being thrown from the generator; But in *Burch v. Nedpower*

⁶⁶ *Rankin v. FPL Energy, LLC*, 266 SW 3d 506 (Tex. App. Eastland 2008), review denied, (Apr. 17, 2009).

⁶⁷ Larsson (*supra*) see: “17 Harm to Plaintiff—Aesthetics”

⁶⁸ *Rankin v. FPL Energy, LLC* (*supra*).

⁶⁹ Larsson (*supra*).

⁷⁰ *Rassier v. Houim*, 488 NW 2d 635 (ND 1992).

*Mount Storm, LLC*⁷¹ the allegation in landowner's nuisance complaint that included danger of ice throw were found to be legally sufficient to state a claim.

Attempts to establish nuisance claims against wind energy developments based on emotional harm have not been successful. For example, in *Rankin v. FPL Energy, LLC*,⁷² neighbors brought an action against wind farm operators, asserting claims for private and public nuisance and seeking injunctive relief, arguing that the wind farm was out of place and that their emotional response to the loss of their view due to the presence of numerous wind turbines constituted a nuisance. Here, the court noted that, the focus on emotional harm appears to have been in response to a recognition that Texas courts had never found a nuisance merely because aesthetic complaints. When the case reached summary judgement, the court noted that if the wind farm was a nuisance, it was because the plaintiffs' "emotional response to the loss of their view due to the presence of numerous wind turbines substantially interferes with the use and enjoyment of their property." Thus, the court said, it is noted that, the determinative issue was whether the plaintiffs' emotional response was sufficient to establish a cause of action. The courts ruled that the plaintiffs' allegations were clearly insufficient to establish a cause of action for nuisance per se because the wind farm was a lawful use of property. It was observed here that, the court recognized the significance of views to a land owner but said that Texas case law recognized few restrictions on the lawful use of property. This president could be persuasive to Oklahoma as well. The court further observed in the Rankin case that, if plaintiffs had the right to bring a nuisance action because a neighbor's lawful activity substantially interfered with their view, then, they could have, "in effect, the right to zone the surrounding property." The court said that Texas law balanced these conflicting interests by limiting a nuisance action when the challenged activity is lawful to instances in which the activity results in some invasion of the plaintiff's property and by not allowing recovery for emotional reaction alone. It is observed here that, the court reasoned that to alter this balance by recognizing a new cause of action for aesthetic impacts causing an emotional injury was beyond the purview of an intermediate appellate court and that allowing the plaintiffs to include aesthetics as a condition in connection with other forms of interference was a distinction without a difference.

Courts have noted that, if a plaintiff can link other harms to diminished property values, then the claim may have greater chances of success, where "diminished property values" is in issue.

In *Burch v. Nedpower Mount Storm, LLC*,⁷³ the court held that a nuisance that diminished the value to neighboring properties can be abated by a court, and the affected landowners can seek compensation for the losses in property values. The case arose when neighboring homeowners brought an action for nuisance against a neighboring wind farm project; it is noted that, among the plaintiff's claims was the assertion that the project's activities diminished their properties' values. During examination of nuisance presidents, the court found that a claim relying solely on a diminution of property values had rarely succeeded. However, it was found, the court determined that such a claim might be sustained when

⁷¹ *Burch v. Nedpower Mount Storm, LLC*, 220 W. Va. 443, 647 SE 2d 879 (2007).

⁷² *Rankin v. FPL Energy, LLC*, (*supra*).

⁷³ *Burch v. Nedpower Mount Storm, LLC*, (*supra*); see also: *Larsson (supra)*: "19. Harm to Plaintiff—Diminished Property Values."

included with other nuisance claims. The court concluded that because the plaintiff home owners had presented nuisance claims of noise and unsightliness along with their claims regarding decreased property values, they could seek compensation for any diminution in value of their properties caused by the wind farm.

Larsson notes in the above case that, indeed, the facts of *Burch v. Nedpower Mount Storm, LLC*,⁷⁴ suggest that the cumulative effect of a variety of alleged harms may prove most compelling, he says. He went on to point out that, the court found that, the plaintiff landowners, who lived between one-half mile and two miles from a proposed wind farm of 200 turbines with towers 210 to 450 feet in height, and blades approximately 115 feet in length, had established a legally sufficient claim for nuisance based on their allegations that the turbines would produce a “flicker” or “strobe effect” when the sun was near the horizon; that the turbines would pose a significant danger from broken blades, ice throws, and collapsing towers; and that the facility would cause a reduction in their property values, the court observed⁷⁵.

The discussion of causes of actions that may be raised by plaintiffs in the Wind Turbine industry is not complete, short of the discussion on the defenses that defendants may use in rebutting such claims. The series of defenses are therefore inexhaustive as we shall discuss here below.

Nuisance Defenses⁷⁶:

Eric Larsson points out that, because a great variety of ordinances, regulations, statutes and procedures that may be involved in even a single cause of action challenging the development of a wind energy turbine or wind farm, there is a potential for a correspondingly broad range of defenses. However even with those limitations, says Larsson, it is not possible to discuss all the possible variations in a single essay.

However, says Larsson, it is easy to point out the list of prominent defenses that are most discussed in court opinions:

Where the plaintiff’s action is based on the allegation that there was a violation of an applicable zoning or permit ordinance, statute, or procedure, then the defendant will seek to show that they complied with the applicable ordinance, regulation, statute or procedure or the absence of a violation. This defense may be comprised of two parts: the defendant may show that his actions were not in violation.

⁷⁴ *Burch v. Nedpower Mount Storm, LLC*, (*supra*).

⁷⁵ *Burch v. Nedpower Mount Storm, LLC*, (*Supra*); also see Larsson (*supra*): “19. Harm to Plaintiff—Diminished Property Values.”

⁷⁶ Eric M. Larsson, “Causes of Action to Challenge Development of Wind Energy Turbine or Wind Energy Farm,” 50 *Causes of Action* 2d 1., see: “20 Defenses.”

Secondly, the defendant may show in the alternative, that the board or administrative body did not err in applying the relevant ordinance, regulation, statute, or procedure⁷⁷.

Where the plaintiffs challenge is based on the alleged deficiencies in the permit application, the defendant will need to show that the application was complete, and that the zoning body was correct in finding it to be complete, or that the zoning body was incorrect in finding it deficient⁷⁸. Where the plaintiff is challenging the validity of the ordinance itself, the defendant may show that the ordinance or regulation itself was valid where its validity was at issue.⁷⁹

Where the ordinance operates to prevent the construction of a wind energy turbine, the defendant may seek to show that the ordinance itself is invalid. In *Ecker Bros v. Calumet County*,⁸⁰ property owners who sought to construct additional wind turbines on their property so that they could sell power back to the utility company, were able to successfully challenge a county ordinance restricting the construction of wind energy turbines on grounds that the ordinance was ultra vires.

Where nuisance is at issue, the defendant may be able to avoid liability in a nuisance suit by showing that there was no nuisance. This defense will mean showing that the plaintiffs have failed to prove sufficient facts to establish a viable nuisance claim. Alternatively, or in addition, the defendant may show that the plaintiff failed to state an actionable claim for nuisance⁸¹.

The plaintiff may also be able to avoid liability in a nuisance suit by showing that the plaintiff came (moved in nearer) to the nuisance. In *Rassier v. Houim*,⁸² the supreme court of North Dakota upheld the trial court's conclusion that a wind power generator did not unreasonably interfere with a neighboring landowner's use of her property, determining that the result was supported by evidence that the neighboring landowner "came to the nuisance" by moving to the property adjoining the lot with the wind generator and waiting a further two years before bringing her action.

Where the plaintiff anticipates nuisance in the future, the defendant may be able to defend against the challenge to the construction of a wind energy turbine or wind farm by establishing that the plaintiff's claim was not filed within the time limits prescribed by the applicable statute, rule, or ordinance or by establishing that the plaintiff's claim was not ripe for adjudication. In *Muscarello v. Ogle County Bd. Of Com'rs*,⁸³ landowner's claim that the county's approval of permits for construction of windmills constituted a "taking" was not ripe for adjudication because she had not exhausted state administrative remedies; claims for trespass and nuisance were not ripe where windmills had not (yet) been built⁸⁴. It

⁷⁷ *Piccolella v. Lycoming County Zoning Hearing Bd.*, 984 A.2d 1046 (Pa Commw. Ct 2009) the company's permit application was sufficiently complete to satisfy the applicable zoning ordinance requirements.

⁷⁸ *Piccolella v. Lycoming County Zoning* (supra).

⁷⁹ *Piccolella v. Lycoming* (supra).

⁸⁰ *Ecker Bros v. Calumet County*, 321 Wis. 2d 51, 2009 Wi App 112, 772 NW 2d 240 (Ct. App. 2009), review denied, 2010 Wi 5, 322 Wis. 2d 123, 779 NW 2d 178 (2009).

⁸¹ *Larssons* (supra) see: "22 Absence of Nuisance."

⁸² *Rassier v. Houim*, 488 N.W. 2d 635 (N.D. 1992).

⁸³ *Muscarello v. Ogle County Bd. Of Com'rs.*, 610 F. 3d 416 (7th Cir. 2010), Cert. denied, 131 S. Ct. 1045, 178 L. Ed. 2d 865 (2011).

⁸⁴ *Piccolella v. Lycoming County Zoning* (supra).

is added here that the lack of ripeness may prevent a wind energy project developer, as well as the plaintiff, from seeking a judicial determination.

Where the right to sue is at issue, the plaintiff seeking to challenge the development of a wind energy development of a wind energy turbine or wind farm may face a significant obstacle in establishing standing to pursue a claim. The defendant may be able to assert that the plaintiff lacks standing, which will serve to remove the potential claim from the court's jurisdiction. This will depend on the nature of the plaintiff's challenge. In permitting challenges, the plaintiff must show that he is a party or person in interest in order to mount a subsequent judicial challenge. The defendant may show that the plaintiff lacked standing by demonstrating, for example, that he or she did not participate or intervene in the public administrative process. In *Clipper Windpower, Inc v. Sprenger*,⁸⁵ where the plaintiff is a group of association, its standing will often depend on the standing of its individual members, and the defendant may successfully challenge an association's standing on the lack of standing of its individual members.

Where a challenge to a zoning decision is at issue, standing to pursue a legal challenge to a zoning decision requires proof of aggrievement. Where the plaintiff is relying on a particular environmental or zoning statute, his or her standing may be challenged where the defendant can show that the statute does not create a private right of action. In *Coastal Habitat Alliance v. Patterson*,⁸⁶ the court observed that Coastal Zone Management Act did not create private procedural rights for plaintiffs to bring action, and thus, the plaintiffs did not have standing.

The plaintiff in an action challenging a wind energy turbine or farm may be an individual landowner or a group or association of landowners or concerned citizens.⁸⁷ The defendant in a legal challenge to a wind energy turbine or wind farm is usually the owner or developer of the project of the municipal or regulatory body granting a permit for the project, like in *Rassier v. Houim*⁸⁸, where an individual landowner constructed wind energy turbine on property.

Where noise or vibration is at issue, nuisance law has long recognized private-nuisance actions based on noise or vibration that result in harm⁸⁹. Courts have recognized private-nuisance actions based on the alleged noise and vibration caused by a wind energy development. In *Rose v. Chaikin*⁹⁰, neighbors to a

⁸⁴ *Piccolella v. Lycoming* (*supra*).

⁸⁴ *Ecker Bros v. Calumet County*, 321 Wis. 2d 51, 2009 Wi App 112, 772 NW 2d 240 (Ct. App. 2009), review denied, 2010 Wi 5, 322 Wis. 2d 123, 779 NW 2d 178 (2009).

⁸⁴ *Larssons* (*supra*) see: "22 Absence of Nuisance."

⁸⁴ *Rassier v. Houim*, 488 N.W. 2d 635 (N.D. 1992).

⁸⁴ *Muscarello v. Ogle County Bd. Of Com'rs.*, 610 F. 3d 416 (7th Cir. 2010), *Cert. denied*, 131 S. Ct. 1045, 178 L. Ed. 2d 865 (2011).

Larssons (*supra*) see: "23 Plaintiff's Claim neither timely nor ripe."

⁸⁵ *Clipper Windpower, Inc v. Sprenger*, 399 Md. 539, 924 A. 2d 1160 (2007).

⁸⁶ *Coastal Habitat Alliance v. Patterson*, 385 Fed. Appx. 358, 72 Env't. Rep. Cas. (BNA) 1599 (5th Cir. 2010)

⁸⁷ *Rose v. Chaikin*, (*supra*); also see: *Larsson* (*supra*) "Parties - 25. Potential Plaintiffs."

⁸⁸ *Rassier v Houim* (*supra*).

⁸⁹ See: *Restatement Second, Tort section 821D; Cause of Action for Private Nuisance Caused by Noise, light, or odours emanating from neighboring property*, 26 *Causes of Action* 2d 277.

⁹⁰ *Rose v. Chaikin*, 187 N.J. Super. 210, 453 A.2d 1378, 36 ALR 4th 1148 (Ch. Div. 1982).

wind turbine brought a private nuisance action based on the noise levels emitted by the wind turbine. The neighbors offered evidence that the turbine exceeded decibel levels allowed by city ordinances, presented proof that the turbine ran constantly, and adduced expert testimony to support allegations that the noise adversely affected plaintiff's health. The court rejected arguments by the wind turbine's owner that the noise alone could not constitute a private nuisance. The court found ample support that noise alone could be a private nuisance when it had impacts on the health and comfort of ordinary people in the vicinity. The noise, the court found, was one that was alien to a residential neighborhood and was constant throughout the day and night, causing it to affect the sleep and health of the neighbors⁹¹.

This brings me to the conclusion that wind law is still in its infancy, with most of its legislation borrowed from oil and gas law and legislation. It is yet to evolve to maturity.

Conclusion:

This essay has attempted to compare the newly amended Oklahoma Wind Development Act with legislation of other persuasive jurisdictions. Wind technology is still a relatively new trade in the world today. In Oklahoma, and indeed, the United States, wind turbine development is an on land (onshore) activity, while in Europe it is spread on land as well as at sea (offshore). In the United States, it brings with it the challenges of acquisition of land on which turbines are to be set, given that, even land that belongs to no owner, is still Federal Government owned land.

Wind Law is also still evolving. Where the law has no legal literature, causes of action, defenses and ultimate remedy, may be sought from other areas of law. In the United States most of Wind Law is borrowed from Oil and Gas Law.

In causes of actions yet to arise, and the defenses and remedies that will result therefrom, wind law practice is yet to borrow from other areas of law. It will require much understanding.

But it must be pointed out that, wind technology is here for us to embrace. The world is yet to see wind technology increasingly replacing fossil fuel dependence and dominance.

In conclusion, Lasco and Collick observe that, the wind turbine-induced radar issue was as unexpected as it was difficult to fully resolve. It demonstrated how one technological change—receiving a new radar feed—exposed an operational vulnerability base officials could not have foreseen. They went on to observe that, in such cases, it is difficult to be proactive and get ahead of such a technological puzzle. With wind energy as an important and first growing resource to this nation, the Air Force is becoming a proactive partner in promoting safe, responsible wind energy development. In time, working through the relatively newly established “executive agent” and continuing to bring bright, talented people to bear should solve this problem will be solved. Equally important, and perhaps for an unforeseen technology of tomorrow, this difficult situation showed the benefits that can accrue to all parties where

⁹¹ See Larsson (*supra*) “16. Harm to Plaintiff – Noise and Vibration.”

there is a willingness to try new ideas and cooperate with each other (versus litigate) toward a common goal, Lasco and Collick concluded where wind Turbines and airports are concerned.⁹².

In not too distant future to come, another author who will take on this same topic, will most probably conclude it differently—with more wind law literature—probably for the better, because of the changing and hopefully, improving nature of the wind business.

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Note:

Author would be happy to receive feedback, suggestions, and inputs from readers regarding this work.

Thank you.

Robert.

⁹² *Lasco and Collick (supra), see “VIII. Conclusions,” at 268.*

Bibliography:

1. Sean F. Nolon: "Negotiating the wind: A framework to engage citizens in siting wind turbines", 12 Cardozo J. Conflict Resol. 327.
2. "Wind turbine decommissioning", 4189 PUR Util. Reg. News 7. Pur Utility Regulatory News, September 26, 2014. (Case No. PU-13-794).
3. David R. Green: "Earth and wind industries playing with fire: the concurrent rights of wind farm operators, oil and gas developers, and landowners in Kansas". 61 U. Kan. L. Rev. 1089.
4. "Placement and operation of wind turbines", 1B Matthews Municipal Ordinance. Section 36A:7.20(2d ed.)
5. Karen N. Scott, Tilting at Offshore Windmills: Regulating Wind Farm Development Within the Renewable Energy Zone. 18 J. Envtl. L. 89, 111 (2006)(speaking specifically to the United Kingdom's plan for decommissioning wind power sites according to their 2004 Energy Act).
6. Katherine B. Daniel, "Winds of change: Competitive renewable energy zones and the emerging regulatory structure of Texas wind energy". 42 Tex. Tech. L. Rev. 157.
7. Minnesota Administrative Rules. Chapter 7854, Site Permit; Large Wind Energy System (Public Utilities Commission)(<https://revisor.mn.gov/rules/?id=7854&view=chapter>)
8. John Shelton, "Who, what, how, & wind: The Texas energy market's future relationship with wind energy and whether it will be enough to meet the state needs", 11 Tex. Tech. Admin. L.J. 401.
9. John E. Bulman (et al), "Harnessing your client's wind power rights", 59-DEC R.I.B.J. 5.
10. Wind Energy Developments and Natura 2000. Guidance Document. (EU Guidance on wind energy development in accordance with the EU Natura Legislation.
11. Wind Power in the United Kingdom. https://en.wikipedia.org/wiki/wind_power_in_the_United_Kingdom
12. Wind Power https://en.wikipedia.org/wiki/Wind_power
13. Wind Turbine https://en.wikipedia.org/wiki/Wind_turbine

14. Felix A. Lasco, Thomas F. Collick, "When wind, wind turbines, and radar mix – A case study", 68 A.F.L. Rev. 235.
15. Eric M. Larsson, "Cause of Action to Challenge Development of Wind Energy Turbine or Wind Energy Farm," 50 Causes of Action 2d 1 (originally published in 2011), Causes of Action Second Series.
16. 36A:7.20. "Placement and Operation of Wind Turbines," Chapter 36A. Environmental Protection. I. Energy Conservation; 1B Matthews Municipal Ordinances 36A:7.20 (2d ed.)
17. Patricia E. Salkin and Michael Donohue, "Planning & Zoning for Wind Power in New York," 6 No. 2 New York Zoning Law and Practice Report 1, September/ October 2005.
18. Keewatin Windpower Corp. (Public Availability Date: August 24, 2006). Accession Number: 0000000000-05-049369.