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Rural/Urban Energy Farms: Onsite Alternative Energy Production from Wind Rights, and Geothermal and Mineral Rights as Value Added or Potential Cash Flow Sources

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Dr. John S. Baen

Professor of Real Estate
College of Business Administration
University of North Texas
1167 Union Circle, Business 177 (76201)
PO Box 305339
Denton, TX 76203-5339
Tel: (940) 565-3051
Fax: (940) 565-4234
Email: baen@unt.edu

Abstract

This paper explores the present and realistic future value implications of wind rights (air rights or surface access rights), geothermal rights (subsurface rights) and mineral rights (subsurface rights) based on contemporary and potential technology as to their possible positive value implications to urban and rural property values. Rapid advancements in alternative energy related technologies and increased demand/cost of electricity require prudent long-term real estate investors to consider economically viable onsite alternative energy production in their current projects, future real estate developments, building designs, architecture and land planning. Examples and drawings are provided. Contemporary legal and economic topics and issues are discussed as well as current technologies in regard to wind, geothermal and mineral rights. Sample wind lease summaries that are currently in use in western and southwestern U.S. are provided. Practical and theoretical applications and aspects of these unique attributes to a property's "bundle of rights" (wind/geothermal rights) are presented in the paper along with

development of urban energy farms as a part of the urban landscape and skyline. The concept of a dynamic urban skyline is presented in several figures and diagrams.

Key words: Alternative Energy, Wind Farms, Urban Energy Farms, Wind Rights, Oil and Gas Rights, Geothermal Rights, Mineral Rights, and Residual Oil and Gas Well Rights.

Introduction

Energy economics, return on investments and affordable energy production will drive both innovation and implementation of alternative energy sources in terms of locational factors, building designs, and innovative land use, which is more than a quest for "green building" projects or noble ideas for reducing global warming. Real Estate owners can add long-term value/ cash flow potential for their existing and new projects by considering the very real applications offered in this paper. There are commercially successful examples of each alternative form of energy creation currently in operation today.

Recent rapid improvements in alternative energy production technology (wind speeds of 9 mph are viable) when combined with and increasing prices of electricity have caused a surge in energy deals, IPOs and targets by financial markets and investors.

Figure 1. Conceptual Use of 4 acres as an Urban Energy Farm for the Multiple Use of Energy Production from Wind, Oil and Gas, and Geothermal as well as other Uses of the Surface.

Commercially, alternative energy production costs have dropped to the following levels without considering tax credits or other incentives (WSJ 2007) making royalties or direct investment prospects viable for property owners.

Wind	6-9¢ / Kilowatt Hr
Geothermal	6-10¢ / Kilowatt Hr
Natural Gas	3.4-7¢ / Kilowatt Hr
Coal	3.11-3.4¢ / Kilowatt Hr

The difference in wind and geothermal energy production is that there are not costs of “feed stocks” after equipment and installation investments are recovered by the producer as these are from renewable or “perpetual” energy sources… wind and the earth’s heat.

The central hypothesis of this research is to establish that well planned urban energy farms will create an economically viable and environmentally friendly, dynamic skyline of wind turbines, urban oil and gas wells and geothermal energy production which will become an accepted and important part of modern cities. Many real world applications are economically functioning today.

Real estate owners can add value or cash flow to their urban real estate investments by considering development of on-site urban energy farms and can benefit through royalties or direct investment in alternative energy sources of wind, geothermal and oil and gas in excess land, parking lots, and/or existing structures.

Figure 2. Conceptual Designs and Potential Engineering of Urban Elevated Structures for Energy Cash Flow Generation. (JS Baen, etc.)

Urban land, tall buildings and existing structures could be redesigned (Figure land 2) and/or retrofitted to accommodate new important sources of benefits to property owners and will have no more negative impacts or perception than the noises associated with other essential components of urban environments:

- Airports
- Trains
- Freeways/ traffic
- Power plants

- HVAC plants/systems
- Factories/ industrial uses

Water producing windmills, radio and cell phone towers, and high voltage power line towers have become common place in rural and urban areas. So too have large commercial electric generating wind farms in Texas, California, and other states. In Texas alone there are 37,000 miles of high voltage power lines (ERCOT 2007) having 565,000 tall transmission towers. Rural wind generation of electricity and other alternative forms of energy are greatly limited by location relative to economic wind, electric, grid, and grid capacities, which are not generally limitations in urban areas, where most electricity/ energy is utilized and where the electric "grids" merge for consumption.

Currently there are many metropolitan areas which have ongoing urban drilling for oil and gas occurring on 2-5 acre tracts of land in high density areas (Dallas, Fort Worth, Los Angeles, Houston, etc) Alternative energy production and cash flow to property owners can synergistically occur on these sites or elsewhere in urban areas with other land uses co-existing with energy production. Figure 1 indicates parking, however, there are many other uses (industrial storage, open space, etc).

What is Driving the Trend in Alternative Energy?

"Clean," "green," "renewable," "non-global warming" and "environmentally friendly" are terms which are frequently used in the popular press and television news reports. The news generally describes new alternative sources of energy as only being located in remote rural locations. While many of these "eco-friendly" factors are the motivation for a small portion of the initiators and individuals who build personal home wind and solar systems, the stark realties are that sound economics and technology are improving to the point that what once was a novelty, is now a commercially economic business reality for the following reasons:

1) The worldwide costs and demand for electricity is rising due to significant increases in the prices of coal, oil and natural gas. Figure 3.
2) Increasing income streams offered to property owners have become very attractive to those who host sites, either as direct investors in equipment/systems or as lessors/landowners/ royalty owners earning a percentage of gross income without risk or expense. Wind royalties currently range from 6-10 %. Oil and gas royalties range from 12.5 % to 28% of gross revenues generated. There are no references in regard to royalties being paid to private or landowners for geothermal energy production; although, there are several commercial/industrial applications of geothermal energy production that are economical in the western U.S. (see attached wind lease summary, signing bonuses, construction fees and damages from Shell Oil) Figure 9.
3) There has been accelerated research and funding for improved technology by major companies (Shell Oil, BP, General Electric, Mitsubishi, governments, U.S. Department of Energy, Sandia Labs, Small Business Administration) and universities (MIT, Texas A&M, University of Denver, etc.).

4) The lower interest rate environment of 2004-2007, and therefore lower capitalization rates required by investors, have made returns on alternative energy investments more competitive with other investments and have approached financial returns from investments in stocks, bonds, CD's etc.
5) Federal and state tax incentives have been implemented in the form of tax credits, rapid equipment deprecation, cost of drilling "write-offs"(oil and gas/ geothermal wells) and, in particular, tax credits on energy or excess energy produced by any individual or company producing on-site energy/ electricity using "alternative methods of energy production."
6) The economic realities of a national market for any electricity generated anywhere in the U.S. due to federal deregulation, mandated power incentives to producers and the assured market price availability for any power produced (reference: NJCEP.com/srec/trading-statistics.html, Alsever 2007)
7) There appears to be some public "value" or corporate "image building" associated with alternative "green" energy being used or purchased by generators and users.
8) Third world countries and remote towns/ cities having no electricity, are not as concerned about the effective cost of the energy produced or the equipment investment requirement but more with availability of electricity for living! India, Africa, South America and remote homes/ ranches in the U.S. have greatly contributed to both numbers of users as well as innovations in technology and applications in the production of alternative energy.
9) Equipment loans and grants for building or producing alternative energy systems are available. The U.S. government announced on 3-30-07 the availability of $176.5 million in USDA loan guarantees and $11.4 million in competitive grants for equipment purchases for use in alternative/renewable energy systems utilizing wind, solar, biomass,

geothermal or hydrogen sources. Loan guarantees cover up to 50% of a project's cost not to exceed $10 million and equipment grants that range from $250-500 thousand dollars are available. (http://rurdev.usda.gov/tx/# or Jack County Herald 3-30-07 p 2A)

10) Real domestic and geopolitical risks of oil and gas supply interruption and the reality of recent "rolling blackouts" in California (2005) and New York (2004) have occurred due to peak demand and shortages, along with the failures of "backup systems" on the U.S. National Grid and have increased interest in alternative energy production.

11) For individuals and companies that both produce and consume their own electricity on site (individual homes, etc.) there is an element of "free" nontaxable effective income or benefits that are combined with tax credits for the purchase of equipment or sale of excess energy produced (which is taxable but highly sheltered).

Literature Review-Valuation of Alternative Energy as "Other Income" for Property Owners

Very little has been published in regard to income or value impacts of alternative "exotic" energy and income sources that are the topic of this research, which can be best described as "other income." In fact, many oil and gas and wind contract terms are confidential.

Many wind, oil and gas contracts, leases or long term agreements are confidential while with only memoranda are filed for public record (Figure 10). Data and confirmation of terms are treated as "commercial secrets" which create problems for investment analysis and contributes greatly to a general lack of publications while maintaining a very inefficient market for these rights.

However, the appraisal literature does consider the definition and often professional approaches to analyzing "other" income as a secondary source of revenue which are typically "generated as additional income to any real property's primary revenue source, space rental or use." They caution that other income is not uniformly or authoritively presented in appraisal reports but quite often has a major impact on value or positive cash flows.

Anglyn et. a (1992) considers more traditional "other" income sources such as late fees, vending machines, forfeited deposits, application fees, etc. It should be noted that on-site use of generated electricity or other benefits of alternative income streams presented in this paper do not generally reduce rents to tenants as many leases in both the urban and rural real estate markets are "triple net" (tenants pay all expenses, utilities taxes, insurance and maintenance) but increases a property's Net Operating Income (NOI). Therefore, the benefit stream from alternative energy should directly benefit the property owner, whether the additional income stream is from royalties, from outright sale of commodities(electricity, natural gas, or thermal heat) from cost savings from wind generated electricity, geothermal energy (electric or more efficient HVAC Systems) or oil and gas (royalty, use or sale).

Any income stream, service, utility or cost savings from wind rights, geothermal rights, or oil and gas rights that contributes to a higher present value, lower operating costs or higher resale price should be considered positive so long as any negative impacts to the subject property are not greater than the benefits gained. In measuring the positive or "value added" components of the topic of this paper, the measurable and verifiable negative impact, if any, should also be considered in any conclusion of a property's appropriate primary highest and best use, in order to compare the cost benefit analysis of any additional income stream or cost savings, to determine whether or not the opportunity or potential benefits are worth the additional capital cost, to identify loss of any significant land value or other negative impacts to the primary income stream or value components of the subject land/ property.

The positive cash flow or value added implications of alternative energy income streams can be measured through the three traditional appraisal approaches if data is available. It is much easier to value pure royalty income if a third party energy company pays all the initial capital/equipment costs and shares the gross income stream through some form of revenue sharing, royalty, long term lease (surface site) etc.

The difficulty in valuing the present value of energy produced is due to the volatility of energy prices as indicated in Figure 3 "A Brief History of Pricing Power" (Smith 2007). A discounted cash flow approach of the initial oil and gas bonuses paid and future verifiable income streams were presented by Baen (1988 and 1998) in regard to mineral rights and royalty rights in land appraisals. It seems appropriate that the same approaches and assumptions to value should be used to value wind and geothermal generated electricity rights/benefits or similar income streams with one important exception. The exception would be that while energy prices change over time with a great deal of volatility, oil and gas income streams to property owners generally fall due to the commodity being a depleting asset, according to generally predictable

decline curves of individual well characteristic and performance. Wind and geothermal energy production/benefits are generally “renewable” energy streams limited only by predictable equipment costs, repairs and depreciation born by the operator. Rapid improvements in energy production technologies and noise reduction have made the topic of this paper timely, quite economical and both practically and economically feasible (i.e. wind generation capabilities have dropped from 23-40 mph required to 8 mph). The national public market exchanges for electricity, oil and gas offer a fairly good foundation for establishing a present value (PV) of these property generated energy related “other” income streams.

Wind Energy Potential

According to the on-line Illustrated History of Wind Power, the first use of a large windmill to generate electricity was a system build in the urban setting of Cleveland, Ohio in 1888 by Charles Bush (http://www.culturechange.org/wind_energy.htm). Windmills to produce water were a major advancement which allowed the expansion and settlement of much of the western U.S. since 1870, because otherwise there would not have been water for households, watering cattle or crops.

The rapid international expansion and increase of commercially viable wind turbines for generating electricity is impressive (Figure 6) and is due to important advancements in technology and innovations worldwide. Many parts of the U.S. have more than adequate commercial energy resource potential as indicated in Figure 7 (Wind energy map of U.S.).

There are currently over 2700 commercial wind turbines in Texas and over 37,500 miles of high voltage transmission lines that form the "Texas Grid." Most of the commercial wind farms are in West Texas due to both hilly topography and availability of both transmission lines and capacity to carry produced power.

A typical rural or urban home requiring 10 kilowatts of power will need a system that costs $25,000-35,000 and has a 100 foot mast topped with a 25 foot diameter blade assemblage (http://www.culturechange.org/wind_energy.htm) to produce the needed electricity of 10-18 kilowatts. The "payback" period is dependent on wind speeds but estimates are 5-10 years at variable locations.

Commercial wind generators are 400 feet in height and cost $1.9 million per installation. Most property owners provide "pad-sites" and are paid a royalty of total electricity produced. Royalties of $250 per month ($3,000/year) are not uncommon and minimized payments are often

granted to be less than $10,000 per (see Figures 9& 10 Shell Oil Offering Memorandum). Royalties vary due to the following factors:

1) Amount of wind (variable)
2) Height of wind turbine
3) % royalty negotiated (variable)
4) Price of power produced/ sold (variable)

Assume royalties of $30,000 were paid to an urban commercial shopping center, office building or urban land owner. At prevailing capitalization rates of "6%," the present value (PV) or added value is $500,000 per wind turbine ($30,000/year NOI ÷ .06 CAP =$500,000). Wind rights can be retained on a sale of property and assuming good manufacturing of the equipment is a perpetual royalty and with the high likelihood of a built in inflation protection factor and great likelihood of additional generation and therefore value enhancement to the real estate as technology improves.

There are some differences of opinion about wind turbines as a part of the rural and urban landscapes. Many find them fascinating and others call them "visual pollution." There are many highly visual urban structures that have become part of the sites of cities. Figure 11. It is possible that many of these or future structures could also host wind turbines.

According to recently published studies on noise, wind turbines have little to no impact on noise levels beyond 12000-1500 feet (Sterzinger 2003). Others have indicated noise equivalent to be less than air conditioning noise in the urban environment (Figure 12). Noise maps (Figure 13) are subject to prevailing wind, the type of turbines and other factors. Advances in blade and motor designs offer great promise in further reducing noise. The San Francisco Chronicle is an April 13, 2007 article stated that a cylindrical wind turbine and solar panel combination will power 60% of the total eclectic requirement for a new government building.

Urban Oil and Gas Energy Potential

Urban drilling has been a reality in Los Angeles Texas; and Long Beach, California and Houston, Texas for over fifty years (Baen, 1998). In the last four years, there have been over 5700 deep gas wells (8,000-9,000 feet) drilled in the Dallas/ Fort Worth metropolitan area. The Barnet Shale tight gas blanket shale formation is located directly under the Central Business District of Fort Worth, Texas, and extends into the five surrounding suburban continues and has become the largest gas field is the U.S. Similar shales exists and are being drilled through the U.S. (Pennsylvania, New York, etc). Figure 15.

Very few commercial property owners have invested directly in the development of these wells, which cost between $1-3 million each. However, these few investors enjoy highly significant royalty income streams which are expected to last 15-20 years.

The vertical well bores extend down 8000-9000 feet and then extend horizontally 3000-5000 feet from the urban/ suburban 2-4 acre drilling/ production sites. Commercial and industrial surface owners have found that the cost benefit analysis of a "temporary" loss of land is much less than the present value of lease agreement signing bonus money, overriding royalty, damage monies and royalties received over a number of years (Baen 2004, 2005). The exciting prospect of eventually converting the ultimately depleting gas wells to geothermal wells will be discussed elsewhere in the paper.

At least one 4.2 acre "temporary" urban drill-site has a surface use agreement with an oil company to drill six (6) individual gas wells on the site which will yield million of dollars to the surface estate owner as follows:

1) A $75,000 signing bonus at t^0
2) $50,000 in "damages" per well bore ($50K x 6 = $300,000/ tax deferred, reduces basis)

3) 25% royalty income stream of gas produced from mineral rights owned 15-20 years
4) A 3% overriding royalty interest for well accommodations /site use) on 100% of all gross income sold from all wells over an extended period of time 15-25 years. The host surface site owner participates in wells drilled into mineral rights not owned and can equate to $300 per day per well, initial payment.

After drilling and completion, the site and all equipment shrink to a 1-acre production site which will yield millions of dollars to the urban surface owners over time. There are over 5000 of these sites existing in the DFW area as of April 2007 and lend themselves as perfect Urban energy farms sites in the future. These sites are fenced, graveled, kept neat and clean and could easily host other non-conflict uses such as the following:

1) Wind turbines
2) Geothermal wells by conversion of depleted gas wells (185^{o} degree temperature at 9000 ft.)
3) Gas operated electrical generating plants
4) Urban water wells and water towers needed for geothermal or public water supply.

The application of generating energy from both oil and gas and geothermal wells (depleted oil and gas well conversions rather than plugging them) is a tremendous opportunity in both Texas and many other regions in the U.S.

Figure 1. North Texas 2006 drilling permit map 1st 9 months of 2006.

Figure 16. Texas 2006 drilling permit map 1st 9 months of 2006.

Figure 21. Current Wells and Drilling (4-10-07).

The realistic potential of geothermal energy researched and reported by the MIT/ Dept. of Energy Study (2007) was limited particularly by the initial cost drilling of wells below 5000 feet. The potential of depleted oil and gas well conversions to geothermal energy production overcomes this economic factor and turns a cost center (plugging the wells and abandoning the sites) into a profit center (conversion to geothermal energy production) and continues energy production from a previously disrupted site. Oil and gas leases are generally silent in regard to the geothermal heat; therefore, land owners will need to consider new agreements as the oil companies own the well bore and well casing. It is assumed that geothermal heat is not a mineral and belongs to the surface estate owner as part of the “Bundle of Rights” theory.

Urban Geothermal Energy Potential

A joint MIT and U.S. Department of Energy study (2007) has concluded that mining huge amounts of heat "that reside as stored thermal energy in the Earth's hard rock crust could supply a substantial portion of the electricity the United Sates will need in the future, probably at competitive prices and with minimum environmental impact."

Figure 18. Map of Geothermal Potential in the U.S.

Figure 15. Gas Shale Map of Current Well Drilling Areas

The conclusion of the study is that the high cost of drilling below 5000 feet is a serious limitation; however, there are many commercially operating economic projects located in California, Hawaii, Utah and Nevada, and electricity output exceeds the total amount currently generated by wind and solar (Toksöz 2007).

On-site, the property owner's geothermal energy generating or savings systems do not always generate electricity or royalties but can theoretically contribute to cost savings in the form of "heat pump" HVAC subsurface water circulating systems that capitalize on the heat exchange differentials between surface temperatures and subsurface temperatures (6-8 feet deep is economical in residential application). The greater the temperature difference, the greater the benefits.

Different geothermal designs and construction options are presented by Northcott (2004) which include but are not limited to:

1) Closed horizontal (buried pipe 6-8 feet deep)
2) Closed vertical (deep wells)
3) Closed body of water (under ponds and lakes)

4) Open well systems (pumping subsurface water for HVAC energy conversion, etc. and discharge at the surface)

The Dallas/ Fort Worth metropolitan area has had an oil and gas drilling boom since 2002 which has resulted in over 5700 deep gas wells being drilled in urban and suburban areas at depths below 7000 feet, with thousands of deep wells were permitted in the first 270 days of 2006 (Figure 17 North Texas Oil and Gas Permits and Figure 16 Texas Well Permit.) These 2-4 acre urban and rural drill-sites (Baen 2005) are already generally dedicated to energy production and yield property owners valuable royalties and other benefits. As these oil and gas wells deplete or become uneconomical, they should be converted to geothermal energy production or cost savings assets to property owners (See Note.) Many urban oil and gas areas exist in the U.S. with depleting wells (Houston, LA, etc.) with many new areas of gas being planned and drilled near urban centers in New York State, etc. (see Figure 15).

Note: There are several legal questions as to who owns the potential benefit stream. The surface owner owns the "thermal rights" however the oil and gas company owns the well bore and pipe. Most oil and gas leases do not grant the oil company the rights or benefits of geothermal energy. New agreements will need to be created.

Individual Real Estate Investor/Owners' Decision/ Option to Generate Alternative Energy On-site

The generation of energy to create cash flow in the form of royalties or lower utility costs from an on-site urban or rural energy farm can be achieved through two (2) basic approaches utilizing available land or buildings.

The first option for a property owner is to create a royalty or royalty "in kind" benefit stream by negotiating a long term on-site location lease or contract with an energy company who invests and pays for all equipments, construction, costs, maintenance and overhead which yield to the property owner/ rights owner, either:

1) Cash flowing royalty or ground lease income attributable to the dedicated site location or subsurface access to rights (geothermal, oil and gas). Wind "leases" are generally for a fixed term of 20-30 years with options to renew and royalties of 4-9%. Many wind and oil and gas lease terms have confidentiality clauses embedded that make comparative analysis of terms impossible because only memoranda of leases are filed of record that acknowledge the existence of a long term contract. Oil and gas and geothermal leases are generally perpetual with royalties that range from 12.5%-25% for as long as operations are "economic" (Baen).
2) Receiving "Royalty In Kind" in a "take or pay option" offer of a percentage of useable energy produced:
    - electricity from wind or geothermal production
    - geothermal produced heat exchange processes that reduce heating air conditioning, or ventilation (HVAC) costs in office buildings, shopping centers, etc.
    - natural gas from oil and gas leases used on-site to generate electricity for HVAC (University of North Texas Lease 2002/Wells drilled on campus).

3) Receiving "Royalty In Kind" and selling the commodity (electricity, heat, oil or gas) in in public markets nationwide using public utility distribution systems (electric line or pipelines) under new federal deregulations mandates (electricity and natural gas interstate distribution and national markets at http://njcep.com/srec/trading-statistics.html (Alsever New York Times 3-1-07 p5)

The second option is for urban and rural property owners to dedicate a portion of their land or building roof tops to energy production and make the direct capital investments in the equipment and an energy producer for a parallel or additional income stream from the property. The high cost of equipment, changing technology, commodity price volatility, financial risk, and difficulty in financing the initial costs, make this option unlikely and beyond the scope of this paper. There are, however, many examples of individuals and companies that have recently invested in direct energy production as an associated real estate cash flow or cost reduction activity.

Examples:

1) The 18,000 acre Alliance multiuse industrial and commercial real estate development in North Fort Worth, Texas (Hillwood/ Perot 2007) has recently started a subsidiary/ associated energy company to drill and produce deep natural gas within the mixed use commercial land development project together with ownership of a gas sale and distribution pipeline system. Comprehensive planning for well-sites in conjunction with industrial and retail sites has recently resulted in over 30 successful wells drilled and no fewer that four (4) drilling rigs currently operating (4-8-2007). The international competitive advantage of having abundant and reliable on-site natural

gas, electricity and potential geothermal energy production options from future depleted gas wells is a huge incentive for multinational industrial firms to locate in the development.

2) Homeowners investing in economic electric wind generators that cost $12,000 - $50,000 and operate economically as low as 9 mph wind, may expect “payback” within 3-5 years after factoring in tax credits, energy credits or selling excess electric @ NJCEP.comsrec/trading-statistics.html (Alsever 2007)

Conclusion

Fee simple real estate ownership is a long term investment with ever expanding components of the "Bundle of Rights" theory that can be reserved, deeded away, leased or developed.

Figure 19. Bundle of Rights

Figure 20. Contemporary Economic Micro-Component of the Bundle of Rights

While ownership and transferability may vary by state laws, new areas of law and questions surround the rights to wind and geothermal heat. Someone once said, "Who can own the wind?" Well, theoretically, one property owner could put up so many turbines that no wind would ever reach a neighboring property. So, is wind a public or private right? Owned by the property while only over his/her land by "rule of capture?" Geothermal rights have similar questions of new law. Property owners should investigate the very real and future cash flow potential that could be realized through rapidly improving technologies and increasing energy prices.

Any increase in income derived from alternative energy development creates a positive value impact for property owners. Real estate investors, planners, engineers and developers should consider short and long-term opportunities for alternative energy sites and structures in their urban and rural development projects. Contingency long term planning which project for "what ifs" could yield big dividends in creating energy on-site with existing and future technology.

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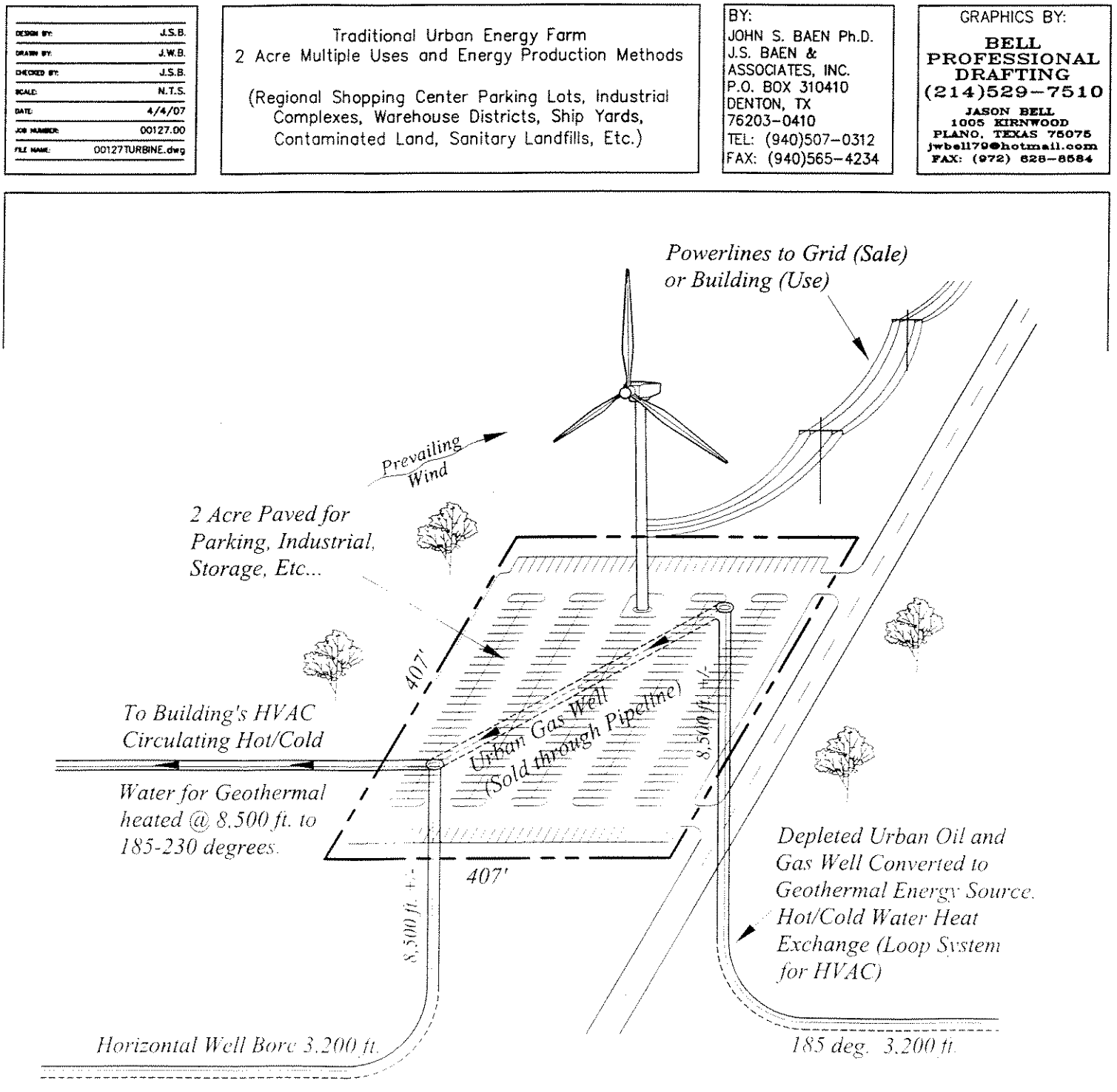
Figure 1. Conceptual Use of 4 acres as an Urban Energy Farm for the Multiple Use of Energy Production from Wind, Oil and Gas, and Geothermal as well as other Uses of the Surface.



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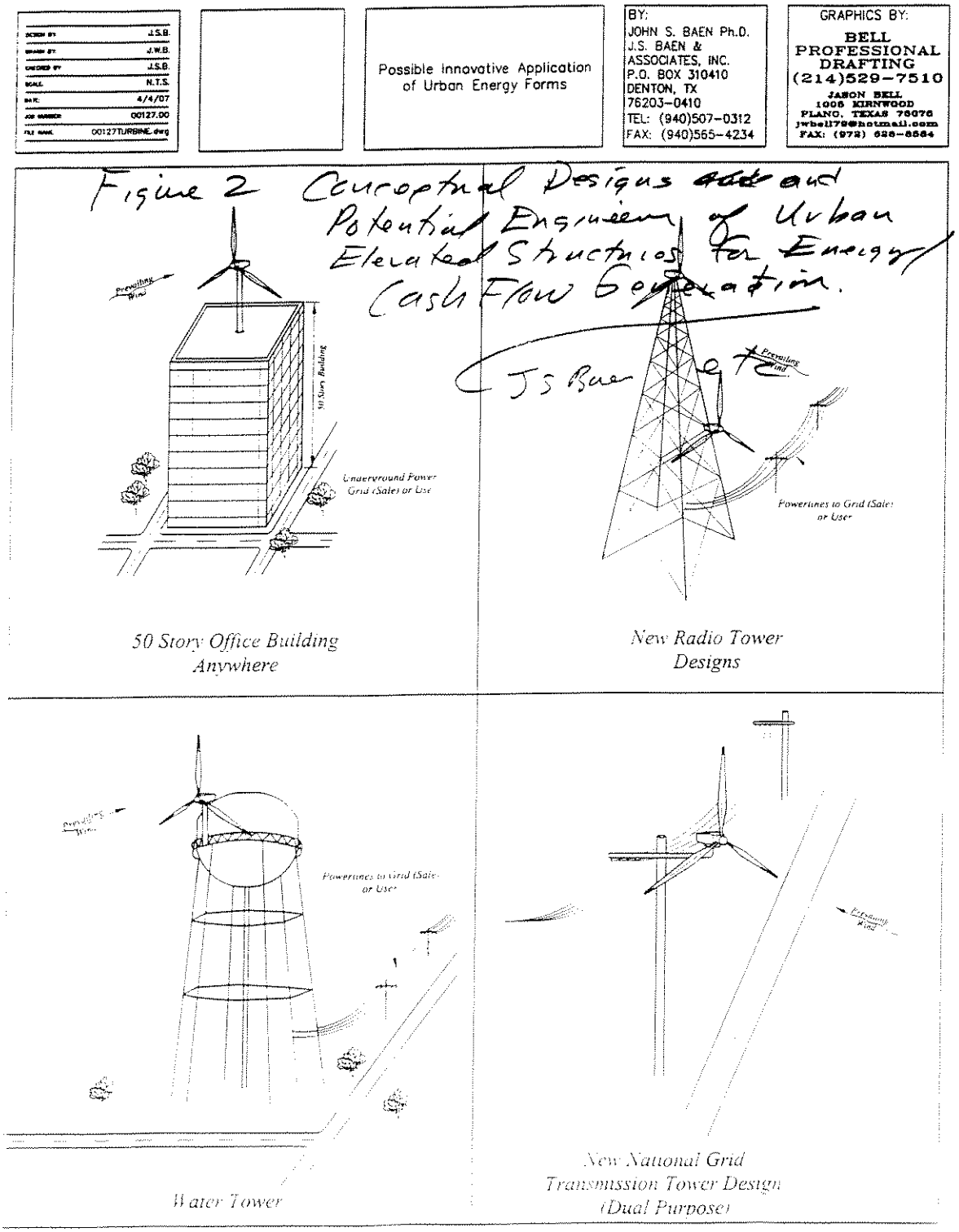

Figure 3. A Brief History of Pricing Power.

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A Brief History of Pricing Power

Yesterday's Utility Buyers Sell High Today, and Consumers Are Likely to Pay

By Rebecca Smith

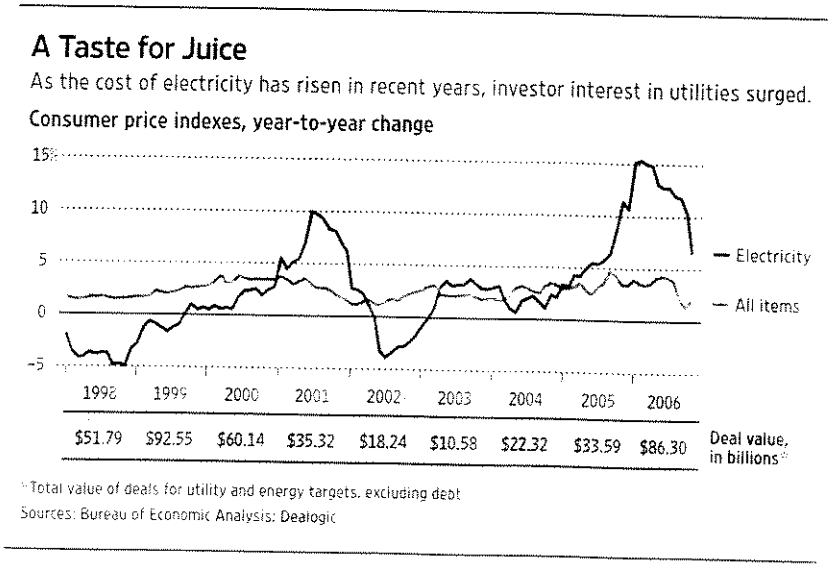
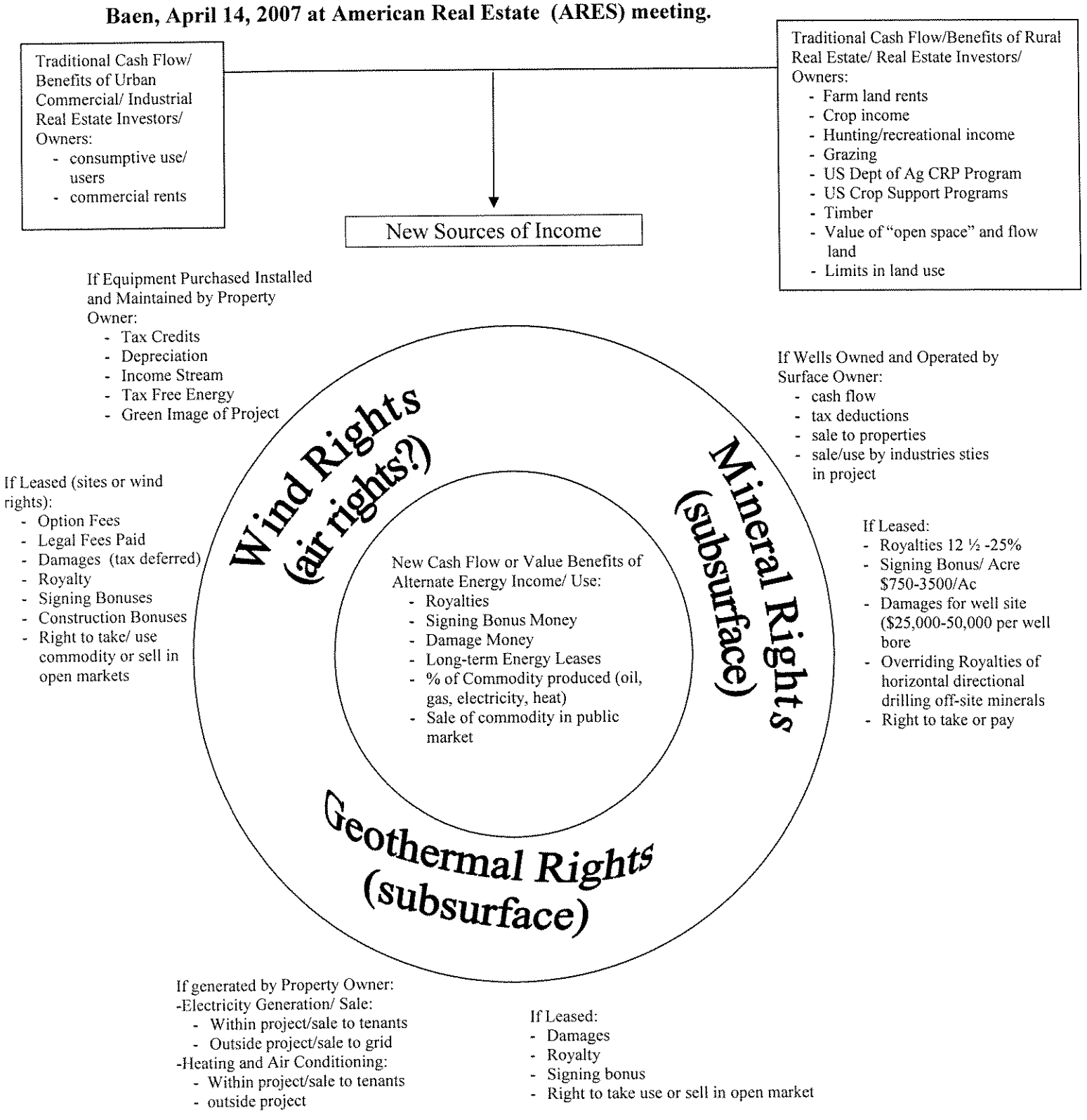


Figure 4. Wind/ Geothermal/Mineral Rights/ Exciting New Alternative Energy Value Added and Potential Cash Flow Sources for Rural/Urban Real Estate Investments which can add value to real estate investments (may vary by state laws and regulation) by John S. Baen, April 14, 2007 at American Real Estate (ARES) meeting.



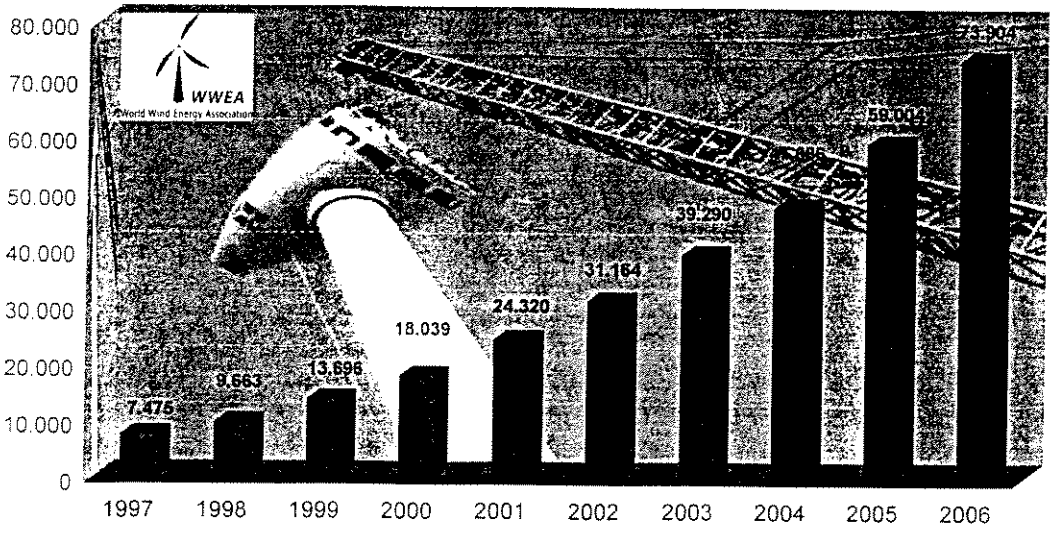
*Existing Urban Oil and Gas Wells Dallas, Ft Worth Houston, Los Angeles, US Gulf Coast, Shreveport LA, and other locations can be converted to alternative energy/ cash flow generation without drilling well water.

Figure 5. World Wide Energy-Total Installed Capacity (MW) 1997-2006

Brazil indicate that the change has already started. The World Wind Energy Conference 2007 in Argentina will take this up and send out a strong signal especially to the Latin American region."

Hermann Oelsner, WWEA Vice President and President of the African Wind Energy Association: "The worldwide wind boom is a ray of hope also for many African countries which suffer from a tremendous lack of accessible and affordable energy. Governments and especially international finance institutions need now to make sure that also the people in Africa can participate in this overall successful global development. We are confident that several major wind farms will be installed in the near future, especially in Southern Africa, where the current shortage of electricity can only be covered by renewable energies – which in most of these countries are the only domestic energy sources."

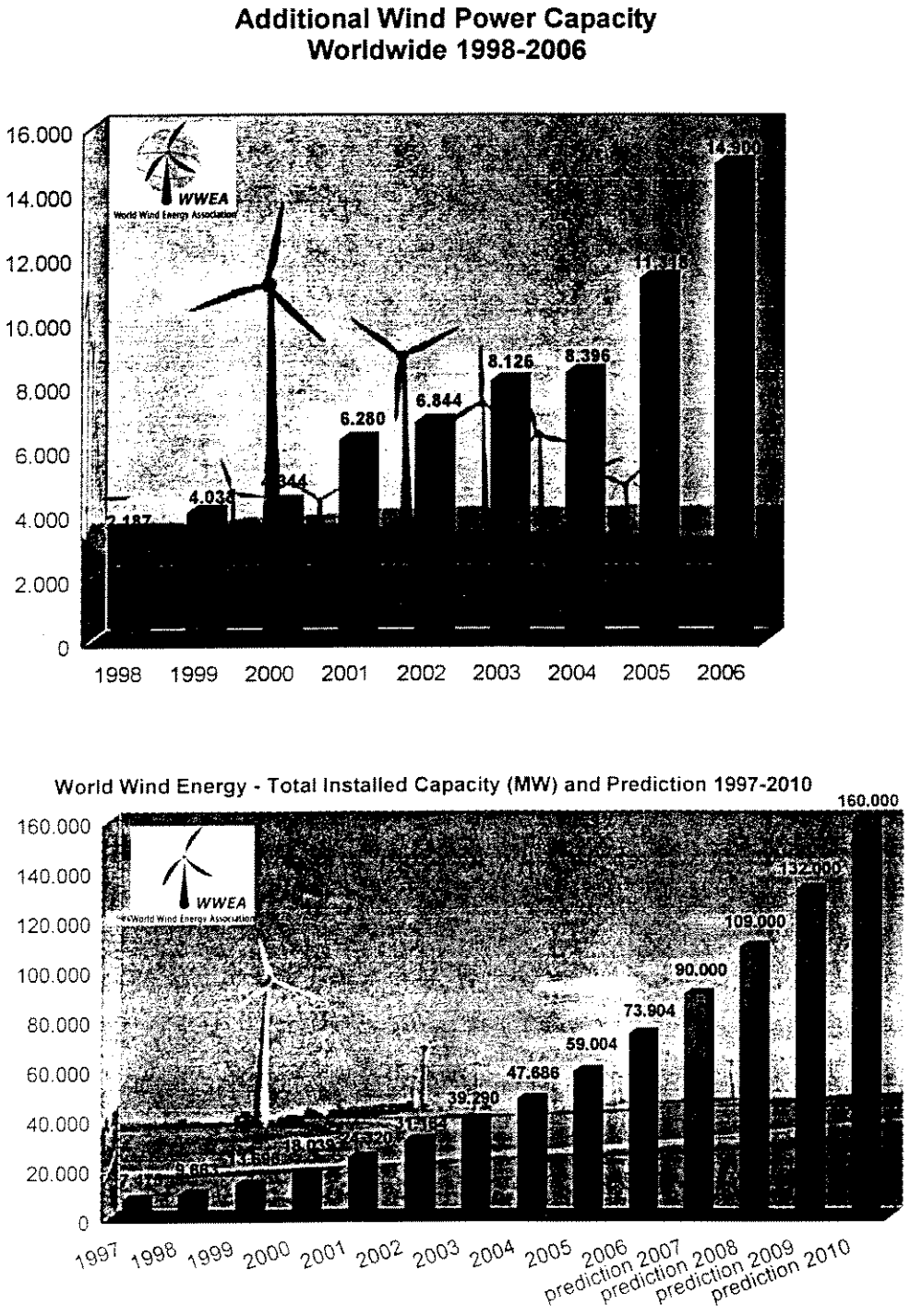
World Wind Energy - Total Installed Capacity (MW) 1997-2006



Ranking total 2006	Country	Additional capacity 2006	Growth rate 2006	Total capacity end 2006	Total capacity end 2005	Ranking total 2005
		[MW]	%	[MW]	[MW]	
1	Germany	2.194	11,9	20.622	18.428	1
2	Spain	1.587	15,8	11.615	10.028	2
3	USA	2.454	26,8	11.603	9.149	3
4	India	1.840	41,5	6.270	4.430	4
5	Denmark	8	0,3	3.136	3.128	5
6	China	1.145	90,9	2.405	1.260	8
7	Italy	405	23,6	2.123	1.718	6
8	United Kingdom	610	45,1	1.963	1.353	7
9	Portugal	628	61,4	1.650	1.022	11
10	France	810	106,9	1.567	757	13
11	Netherlands	336	27,5	1.560	1.224	9
12	Canada	768	112,4	1.451	683	14
13	Japan	354	34,0	1.394	1.040	10
14	Austria	146	17,8	965	819	12
15	Australia	238	41,1	817	579	15
16	Greece	183	31,9	756	573	16
17	Ireland	147	29,6	643	496	18
18	Sweden	54	10,6	564	510	17
19	Norway	55	20,4	325	270	19
20	Brazil	208	729,6	237	29	34
	Rest	730	48,4	2.238	1.508	
TOTAL		**14.900**	**25,3**	**73.904**	**59.004**	

WWEA e.V. – Charles-de-Gaulle-Str. 5 – 53113 Bonn – Germany
Registered at AG Bonn: 20 VR 8163, Tax number: 205/5771/0538
President: Dr. Anil Kane
Secretary General: Stefan Gsänger
Bank account: 340 12 800
GLS Gemeinschaftsbank eG – BLZ 430 609 67
IBAN: DE27430609670034012800
BIC (Swift-Code): GENODEM1GLS

Figure 6. Additional Wind Power Capacity Worldwide 1998-2006.



Source: WWEA member survey and own research.

WWEA will publish in February further information including further analysis of the wind markets around the world.

Figure 7. Wind Energy Resource Potential
Source: http://www1.eere.energy.gov/windandhydro/wind_potential.html

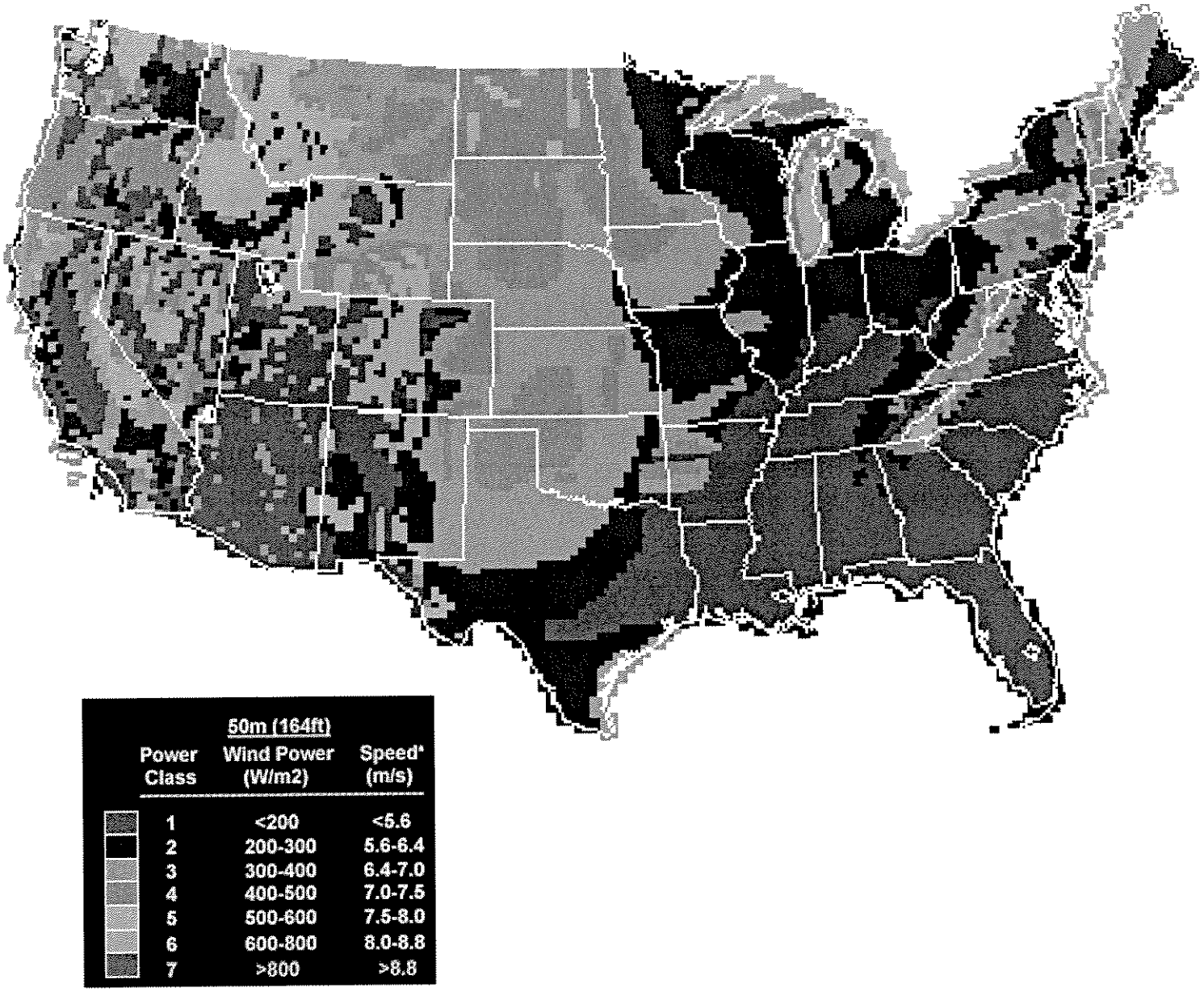


Figure 8. Installed Wind Capacity 1999
Source: www.eere.energy.gov/windandhydro/windpoweringamerica

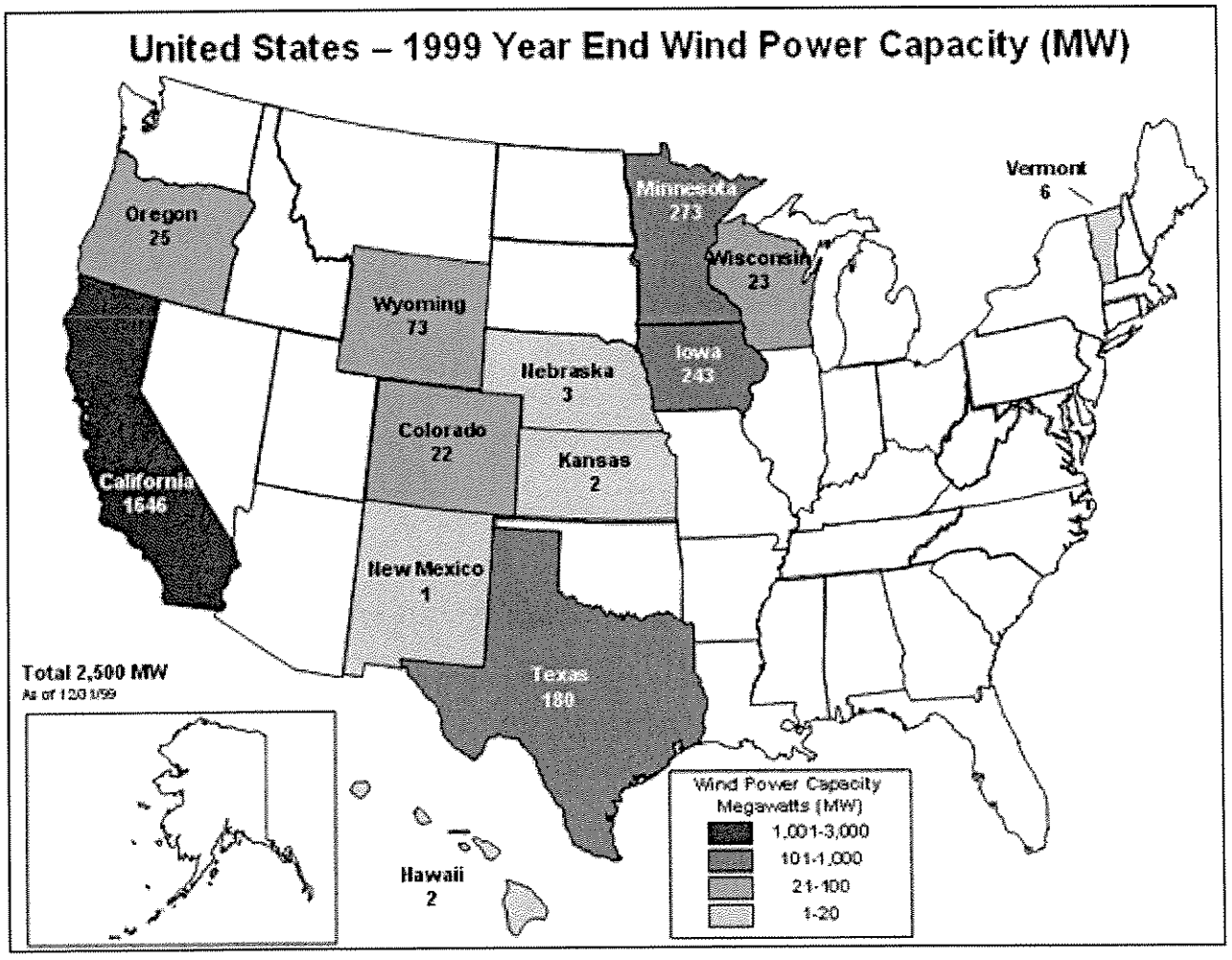
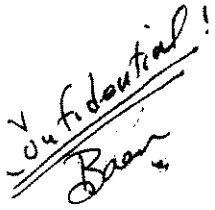


Figure 9. Sample Wind Lease Terms Sheet.

Shell Wind Energy Inc

PRIVATE AND CONFIDENTIAL



Term Sheet

Option and Lease Agreement

Briscoe / Floyd Counties, Texas

Option Agreement:

Option Fee	If total acreage is: (1) equal to or more than 640 acres, then the greater of $60/acre or $100,000, or (2) less than 640 acres, then $80/acre Option Fee to be paid 50% upon execution of the Agreement, and 50% by January 15, 2007 (other deferred payment options will be considered at landowner discretion)
Option Period	7 years
Other Payments	$5,000 for reimbursement of costs for any legal review of the agreements

Lease Agreement:

Lease Term	30 years with option to extend an additional 30 years
Royalty Rate	6% fixed royalty payment to be paid as a percent of gross revenue from each turbine on the property. Royalty to be adjusted to "market" rate if option to extend is exercised
Minimum Annual Lease Payment	$10,000 per turbine
Construction Bonus	$10,000 per turbine, plus $0.50/linear foot of road will be paid when construction begins

If you have any questions, please feel free to call me at 713-241-3160.

Sincerely,

Figure 10. Sample Wind Lease Memorandum of Lease Agreements. (Confidential lease are not public information cause problems in analyzing cost benefit/ valuation of leases for property owners.)

SCHEDULE VIII

MEMORANDUM OF LEASE AGREEMENT

STATE OF TEXAS §
§
COUNTY OF BRISCOE §

This MEMORANDUM OF LEASE ("**Memorandum**") is made and executed to be effective as of _____, 200__ by and among **[Owner]** (together with their successors and assigns hereunder, "**Owner**"), and **[Shell WindEnergy Inc.]**, a Delaware corporation (together with its successors and assigns hereunder, "**Tenant**").

RECITALS:

A. Owner is the owner of _____ acres of land (the "**Land**") situated in Briscoe County, Texas, described in Schedule I attached to and made a part of this Memorandum, together with all and singular (i) the wind and air rights on or pertaining to the Land (the "**Wind Rights**") and (ii) all other rights, interests, privileges and appurtenances pertaining to the Land, including any easements and other rights as may be necessary for ingress, egress and maintenance of the Land and any and all right, title and interest of Owner in and to adjacent roads, streets, alleys or rights-of-way (such items in clause (ii) collectively, the "**Other Appurtenances**"). The Land, Wind Rights and Other Appurtenances are collectively referred to herein as the "**Leased Property**".

B. On _____, 200__ (the "**Effective Date**"), Owner and Tenant entered into a Lease Agreement (the "**Lease**") pursuant to which Owner leased to Tenant and Tenant leased from Owner the Leased Property.

C. Owner and Tenant desire to execute this Memorandum to provide constructive notice of Tenant's rights under the Lease to all third parties.

NOW, THEREFORE, for and in consideration of the mutual covenants and benefits herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Owner and Tenant hereby agree as follows:

Section 1. **Purpose of Memorandum**. The purpose of this Memorandum is to give record notice of the Lease, and of the rights created thereby, all of which are hereby confirmed. The parties, however, advise all parties acquiring interests subsequent to the date of this Memorandum, that the Lease and any and all documents executed in connection therewith, may be amended from and after the date hereof with the consent of the parties thereto, **and without amendment of this Memorandum**. Without limiting the generality of the foregoing, the Lease,

Figure 11
Above Ground/ Airspace and land uses related to energy and communication transmission which currently alters both rural and urban vistas in most areas of the U.S. these uses are similar to wind generating turbines and could perhaps be redesigned to host high tech wind turbines.

1) High Voltage Electric Transmission Lines (the grid)
2) Low Voltage above ground Electric transmission lines (many homes and business)
3) Cell Phone Towers
4) Radio Transmission Towers
5) Windmills that produce water for agriculture
6) Lighthouses
7) Flagpoles
8) Oil and Gas Production Towers (some or permanent derricks are located in various parts of the U.S.)
9) Urban skylines from distant view (office building/towers, etc, etc)
10) Water Storage Towers (rural/ urban elevated tanks)
11) Passenger and Military Aircraft over private land above 2500 feet (reserved for public/ commercial uses by deferral law above 2500ft)
12) Satellite Dish /Hardware Applications
13) Wind Generating Towers

*Note 1: These uses are similar to wind turbine towers and could perhaps be redesigned in the future to host high tech wind turbines.

*Note 2 : There are currently 37,000 miles of high voltage electric line in Texas with approximately 445,000 towers with no visual damages award to adjoining property owners during condemnation or negotiated settlement.

Figure 12. Noise Levels.
Source: FFA Report on Airport Noise (March 1988).

Sound Element	**dBA**
Rustling leaves	20
Room in a quiet dwelling at midnight	32
Soft whispers at 5 feet	34
Noise level of Wind Turbine (at 1200 feet)	40
Noise level of Wind Turbine (at 600 feet)	50
Window air conditioner	55
Conversational speech	60
Busy restaurant	65
Vacuum cleaner in a private residence (at 10 feet)	69
Ringing alarm clock (at 2 feet)	80
Beginning of hearing damage if prolonged exposure over 85 dBA	
Printing press plant	86
Heavy diesel-propelled vehicle (about 25 feet away)	92
Home lawn mower	98
Air hammer	107
Jet airliner (500 feet overhead)	115

Options to reduce noise levels of wind turbines:

1) Location Factors (distance)
2) Trees/ Landscape
3) Noise Mufflers of Mechanical Systems
4) New Technology (forthcoming)
5) Sound Proofing buildings

Figure 13. Example of Noise Levels and Limits due to Turbines Noise and Wind Direction.
Source: http://www.wwindea.org/technology/ch02/en/2_1.html

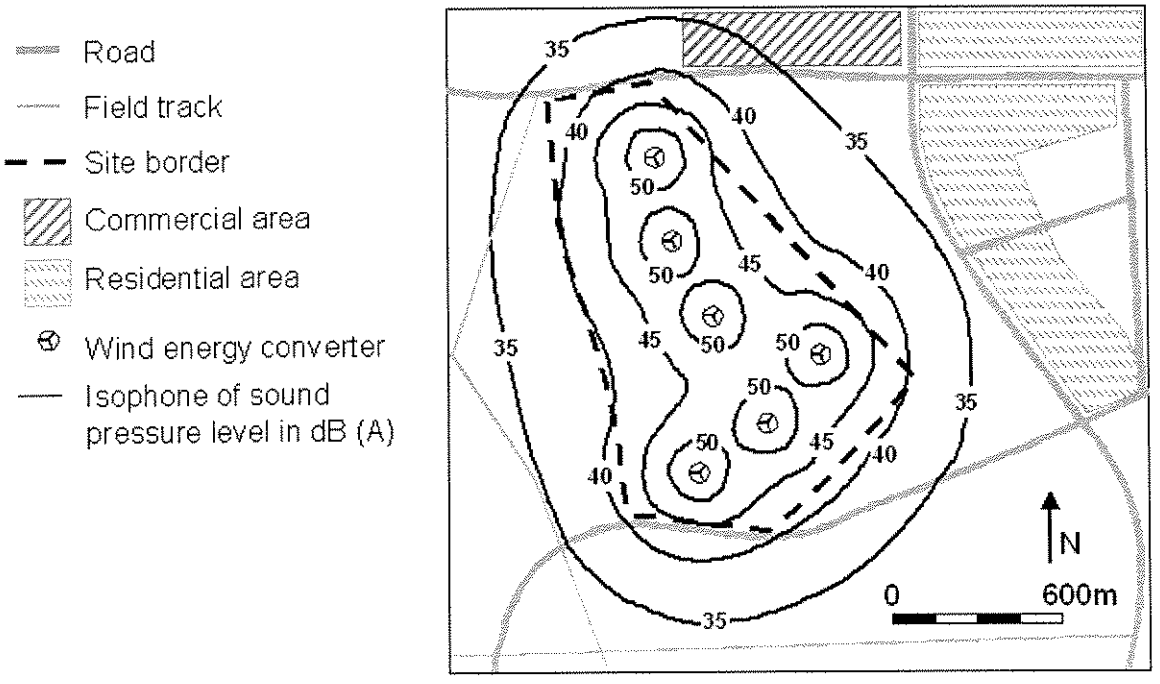


Figure 14. Innovative Urban/ Rural Potential applications of Wind Turbines and Towers in Potential Location/ Structure to host turbines subject to structural integration or design of new:

1) New dynamics office towers and dynamic skylines designed and with applications of current highest possible noise reduction technology
   - extra insulation in walls of host building
   - double/ triple payne windows
   - vibration reduction by structural and design engineers (general Electric, Toshiba,etc)
   - motor shielding and motor insulation

2) High voltage pipeline towers redesigned to also host turbine as part of grid and grid extension in areas without connections to the national grid system. Grow or extend the grid with new towers having wind turbines.

3) Stand alone Turbine Towers with multiple uses designed into the project
   - Electric Transmission Lines (turbines on one side electric line on the opposite side which could be both transmission and electricity collection, dual purpose structure.
   - Radio towers on top of wind turbine towers
   - Cell phone towers on top/side
   - Airport runway lights/ strobbing effect however (serious concerns with FAA and Radar malfunctioning)

4) Oil and Gas existing production and drilling platforms (onshore and offshore applications) redesigned to also hosts wind turbines.

Figure 15. Current Drilling Areas for Deep Gas Drilling in the U.S. (Oil and Gas with Potential for Geothermal Energy after Depletion)

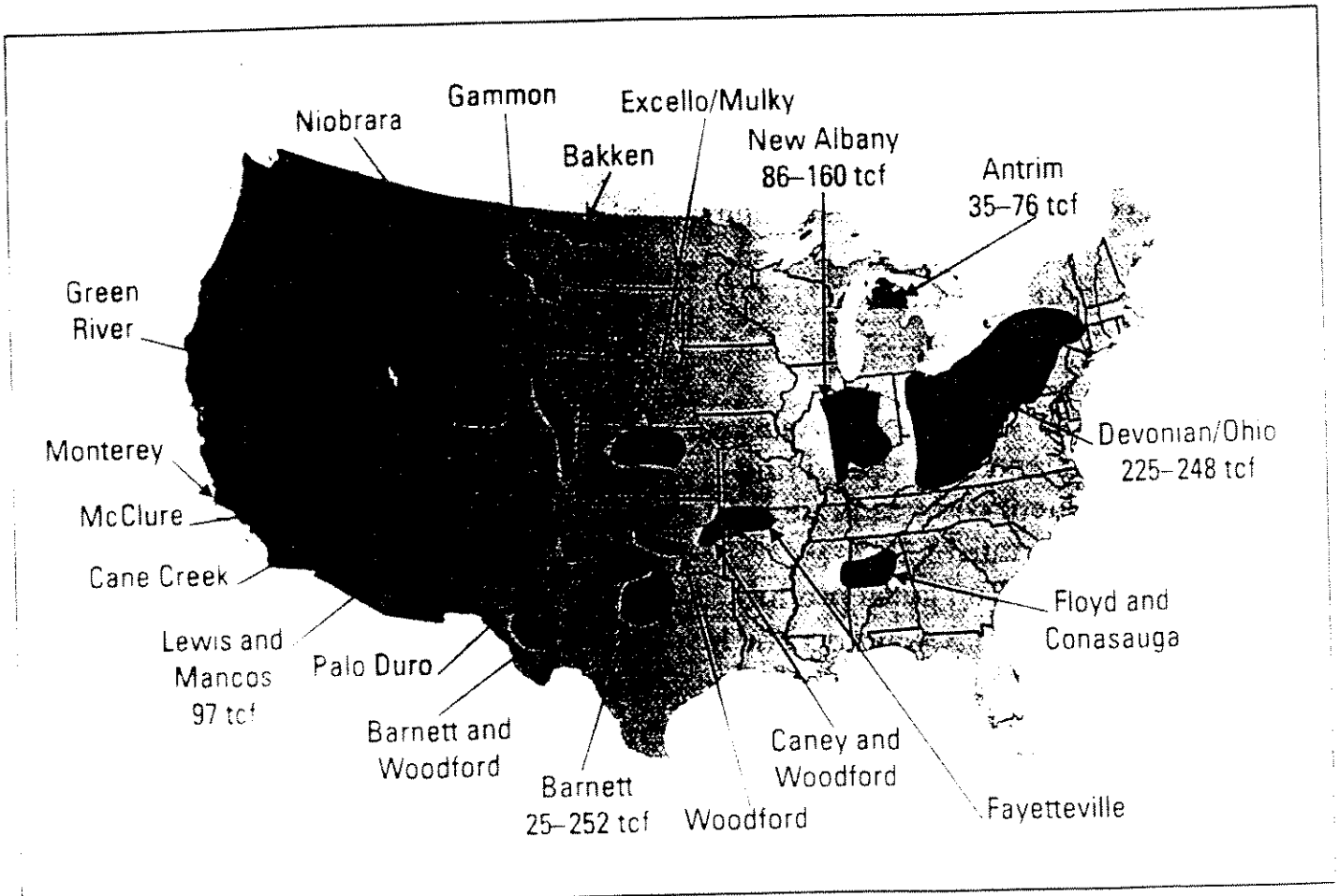
Shale gas plays expand

March 2007 | E&P | 77

Operators collect land for major gas programs.

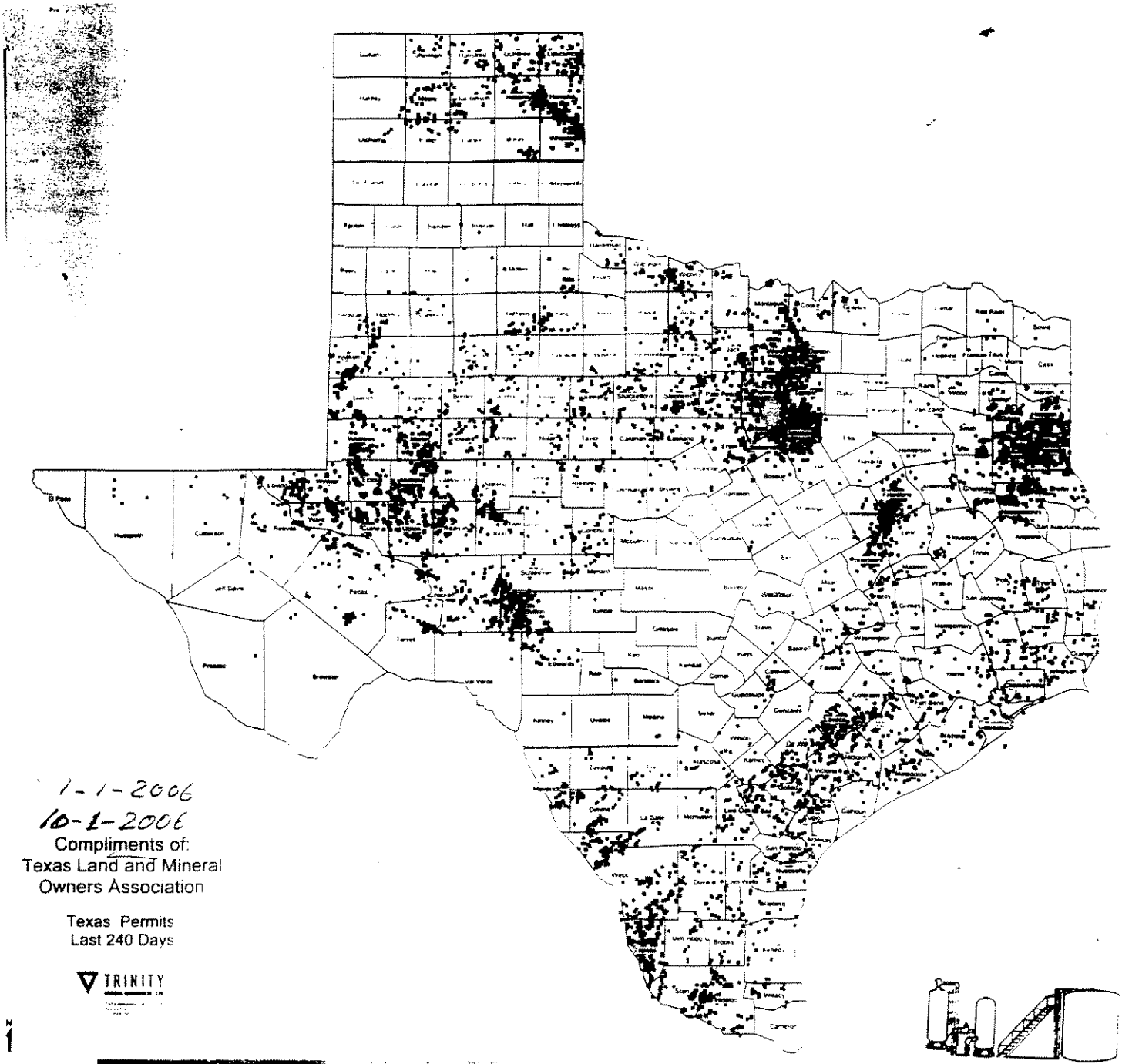
By DON LYLE, Executive Editor

www.eandp.info



Gas shale deposits appear in basins from the east to the west coast across the United States. Although recovery percentages are low, total volumes are high. (Map courtesy of Schlumberger

Figure 16. Texas Oil and Gas Permits for the First 270 Days of 2006. (Note: Urban Drilling in Dallas/Ft. Worth, Houston, and Shreveport, LA.)



1-1-2006
10-1-2006
Compliments of:
Texas Land and Mineral Owners Association

Texas Permits
Last 240 Days

TRINITY

UNT UNIVERSITY OF NORTH TEXAS

John S. Baen, Ph.D.
Professor of Real Estate
Department of Finance, Insurance, Real Estate and Law
P.O. Box 310410
Denton, TX 76203-0410

J. S. BAEN & Associates
Independent Oil and Gas Consultants
John S. Baen, Ph.D.
P. O. Box 310410
Denton, Texas 76203
Cell: 940-507-0312
Fax: 940-565-4234
www.coba.unt.edu/firel/baen
baen@unt.edu

Figure 17. DFW Metropolitan Area Drilling Permits for Gas Wells >8000 feet. (Urban Gas Wells with Geothermal Potential after Depletion.)

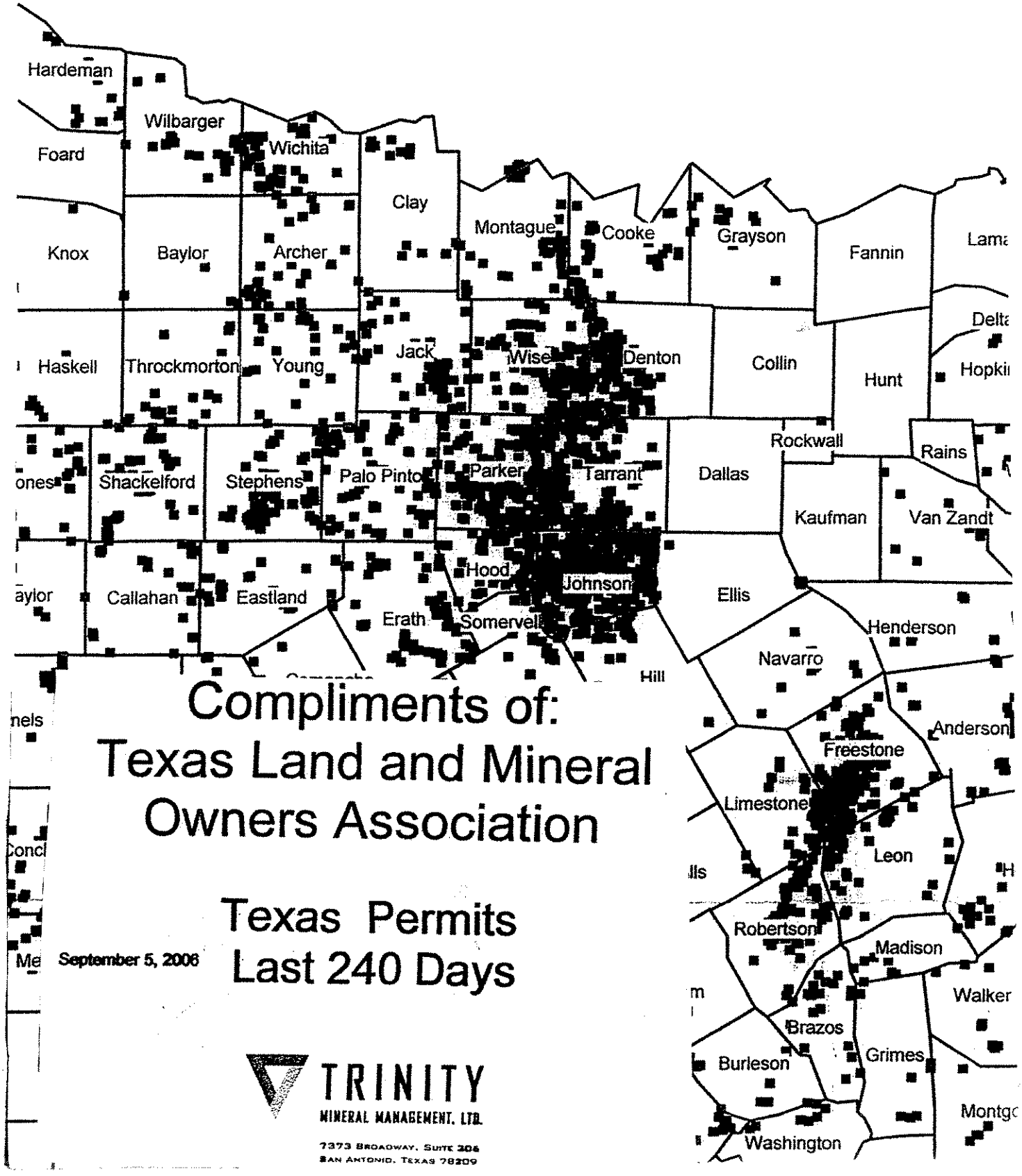


Figure 18. Geothermal Energy Potential in the U.S. (To be Overlapped with Current Oil and Gas Urban Drilling Maps).

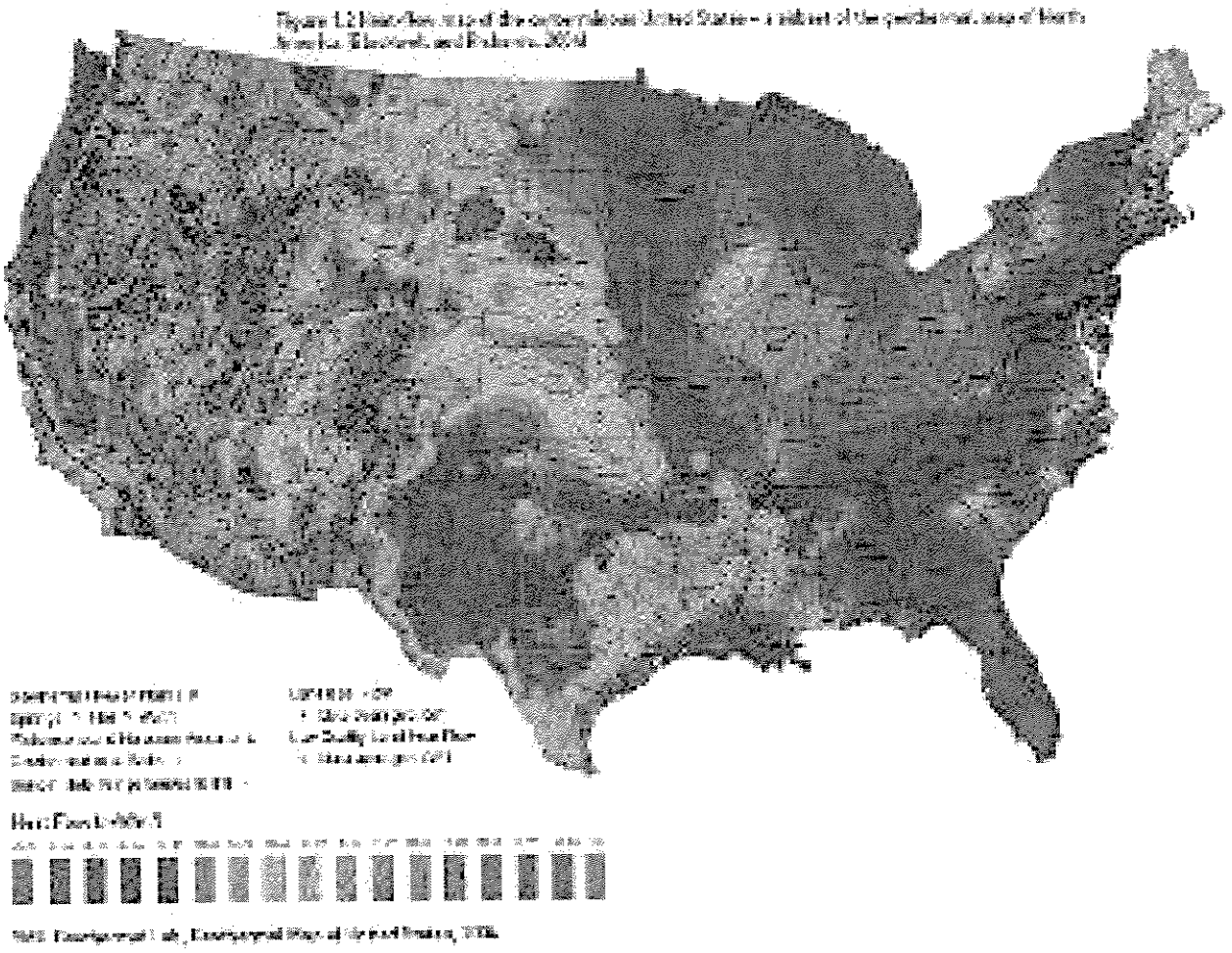


Figure 19. Traditional and Theoretical Components of the Fee Simple "Bundle of Rights Theory" concepts that may be separated, deeded, lease, or retained at sale.

Traditional

1) Occupy and Use

2) Build

3) Grant Easement

4) Mortgage

5) Mine, Drill, Farm

6) Restrict Use

7) Covenant

8) Exclude Others

9) Sell

10) Refuse to Sell

11) Give Away, Abandon

12) License

13) Devise by Will

Figure 20. Contemporary Micro-Components of the Fee Simple "Bundle of Rights" Concept that May be Severed or Deeded away of severed Long-term from Real Estate.

Surface Estate Components

1) Future Development Rights (Permanent Deeds)

2) Buildings separated from the land/ surface by permanent deeds, agreements, or long-term ground leases.

3) Reservation for waiver of certain surface uses by private parties.

   - permanent surface use waivers for various activities
   - deed restrictions that run with the land

4) ? Wind Generating Pad-sites

Subsurface Estate Components

1) Oil and Gas Rights (deeds or reservations in deeds)

2) Subsurface water rights (deeds)

3) Coal and lignite rights (deeds and reservations)

4) Sand, Gravel, Clay , etc (deeds or reservations)

5) ? Geothermal rights

6) ? Geothermal Residual Rights from depleted Oil and Gas Wells (deed)

Air or Above Ground Estate Component

1) Air rights for buildings (air deeds or long-term ground lease)

2) Avigation rights (deed or easement)

3) Sign rights (deed or long-term Lease)

4) Scenic easements(deed or easement)

5) ? Wind Rights/ or access from surface (air rights deed, easement, or reservation of wind form surface estate access?)