Renewable Energy Feasibility Report for **The Kaw Nation**

Presented by

Sustainable Strategies Today

March 14, 2011

Sustainable Strategies Today

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Executive Summary

Sustainable Strategies Today (SST) was commissioned by the Kaw Nation to conduct an environmental scan on the feasibility of implementing a community scaled energy program utilizing energy efficient and renewable energy technologies on tribal land. On January 24, 2011, members from SST visited the Kaw Nation, specifically with the Director and staff of the Kaw Nation Environmental Department. The purpose of the study is to determine whether such a program could achieve the economic goals set by the Kaw Nation, remain economically sustainable, and position the Kaw Nation for its anticipated growth and aspirations.

Following our initial report and subsequent conversations with KAW Nation representatives, SST was asked to revise it recommendations to the following:

1. Demand Side Management Program
2. Four (4) 100 kW wind turbines
3. Eliminate the 2.5MW wind turbine
4. State & Federal Grants

With this modification to our initial scope, below is what SST is now recommending:

Recommendation #1
Demand Side Management Program

The total estimated savings from the Demand Side Management Program (DSM) is a range between $85,000-$125,000 per year depending on which items chose to implement. The total estimated cost to implement the DSM program is $900,000-$1.3M.

Recommendation #2
Four (4) 100 kW turbines

The installation of four (4) 100 kW wind turbines would generate an estimated savings of $75,000-$85,000. The cost for the wind turbines is estimated between $1.9M-$2.5M. The range depends on which company's turbine is used, where it is installed and the site conditions of each site.

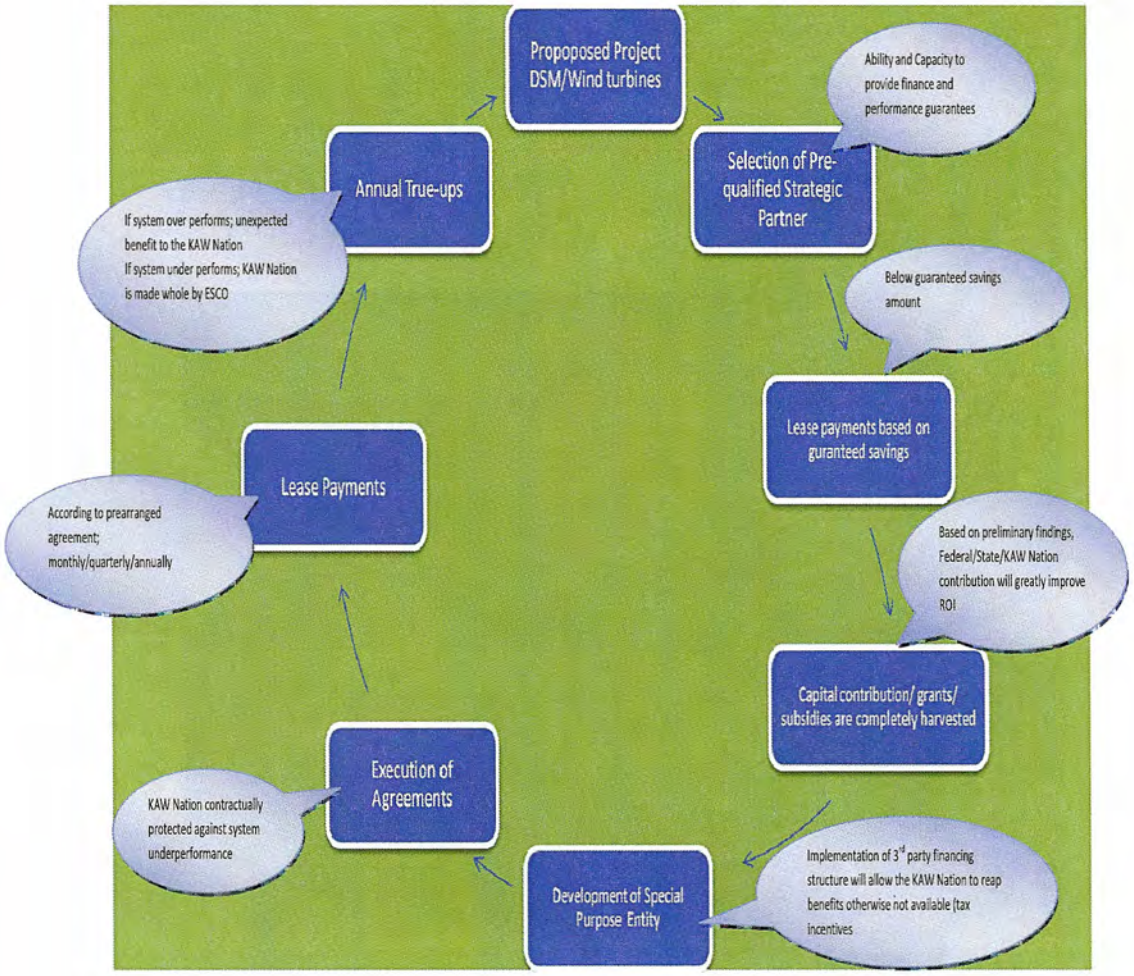
Recommendation #3
Aggressively apply for all State /Federal grants. This will enable the KAW Nation to further offset the cost of any program which it implements. **Exhibit A** lists a number of different programs that may be beneficial to the Kaw Nation.

Chart #1

	Leased Property	Adjustment of Net Equipment Costs	Total Amount Financed	Total Pmts / # of Pmts per year	Cost per kWh	Payment per year
Wind Turbines	$2,500,000.00	$500,000[1]	$2,000,000	Traditional 20-25 year PPA/payments based on production	0.07	$63,000
DSM Projects	$900,000	$200,000[2]	$700,000	1	N/A	$80,000
TOTALS	**$3,400,000**	**$700,000[3]**	**$2,700,000**	-	-	**143,000[4]**

[1] Adjusted net equipment costs pertaining to the wind turbines reflect anticipated savings from a 3rd Party finance partner; capitalization on Federal subsidies (ITC) and depreciation.
[2] Adjusted net equipment costs pertaining to the DSM project reflect capitalization of State and Federal subsidies which would revert back to the cash flows for the project.
[3] Further discounting of project costs could be realized by KAW Nation participation. This will be reviewed once the specific projects have been selected. It may prove advantageous to contribute to further buy-down project costs on selected features of the DSM project such as LED lighting in order for the KAW Nation to realize immediate benefits.
[4] Compare against targeted costs savings; see Chart #10

Chart #2


Propoposed Project DSM/Wind turbines
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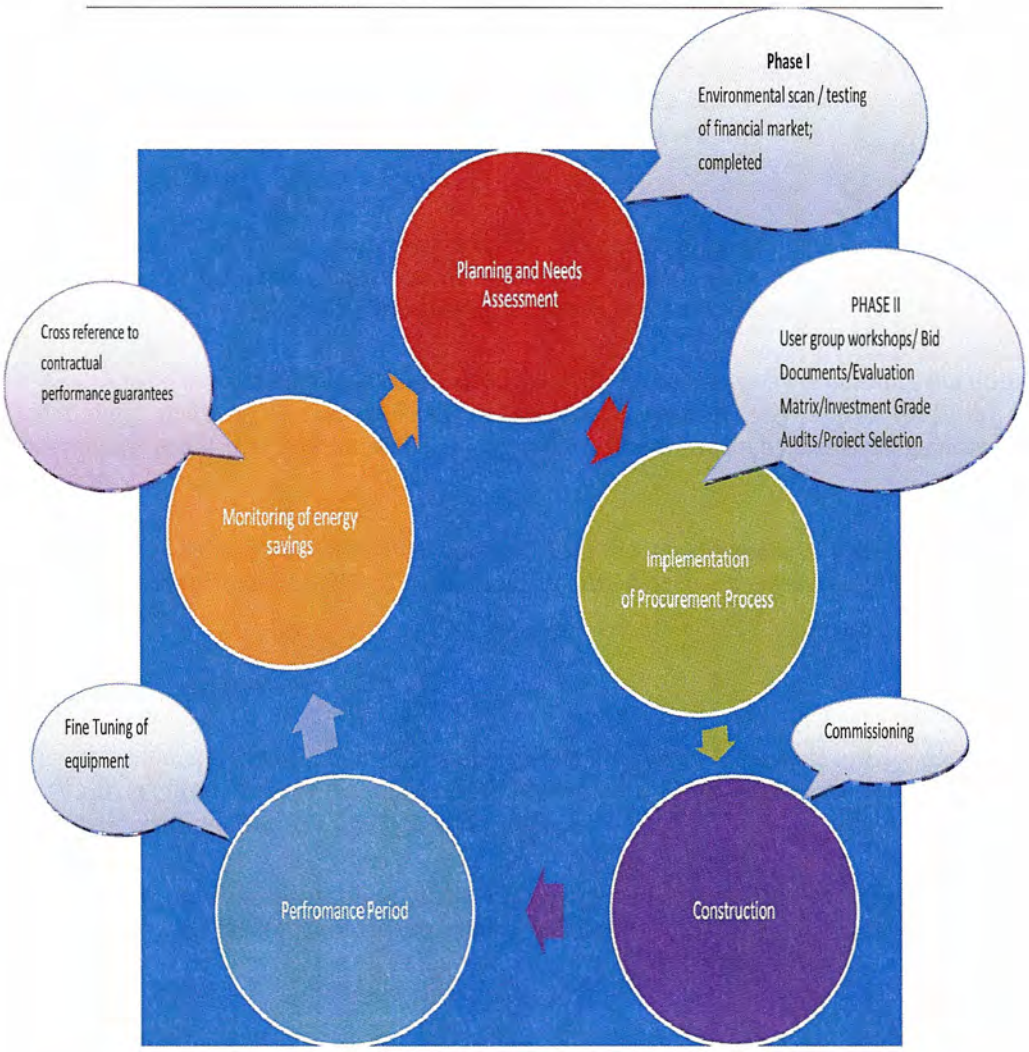
Selection of Pre-qualified Strategic Partner
Below guaranteed savings amount
Lease payments based on guranteed savings
Based on preliminary findings, Federal/State/KAW Nation contribution will greatly improve ROI
Capital contribution/ grants/ subsidies are completely harvested
Implementation of 3rd party financing structure will allow the KAW Nation to reap benefits otherwise not available (tax incentives
Development of Special Purpose Entity
KAW Nation contractually protected against system underperformance
Execution of Agreements
According to prearranged agreement; monthly/quarterly/annually
Lease Payments
If system over performs; unexpected benefit to the KAW Nation
If system under performs; KAW Nation is made whole by ESCO
Annual True-ups

Chart #3

SST has met with several financial institutions to determine if this project is viable and SST has received positive affirmation that it is. The next set of pages provides more detail about SST's recommendations.



Background

Sustainable Strategies Today (SST) was commissioned by the Kaw Nation to conduct an environmental scan on the feasibility of implementing a community scaled energy program utilizing energy efficiency and renewable energy technology on tribal land. On January 24, 2011, members from SST visited the Kaw Nation, specifically with the Director and staff of the Kaw Nation Environmental Department. Following this initial visit, SST submitted an Executive Summary on February 8, 2011, accompanied by a Power Point presentation. The two documents outlined preliminary findings, provided program recommendations and a suggested path forward. Moreover, on February 12, 2011, SST telephonically participated in the presentation of the Executive Summary and Power Point presentation to the Executive Council of the KAW Nation.

Objective of Study

The purpose of the study is to determine whether an energy program could be tailored which would achieve the economic goals desired by the Kaw Nation; remain economically sustainable, and position the Kaw Nation for its anticipated growth and aspirations.

The Kaw Nation is exploring opportunities to diversify its economy by promoting the utilization of technology, realizing cost savings and cost avoidance, appropriately prepare for future capital developments and if practical, establish a long term revenue stream by harnessing energy production.

This feasibility study provides sufficient practices for the development of a thorough business plan that will allow the Kaw Nation to make an informed decision regarding the proposed project as defined herein.

Outline of Objectives

1. Recommend a program utilizing energy efficiency and renewable energy technology to offset current energy demands and thus position the Kaw Nation to realize cost savings and position itself for timely cost avoidance

2. Assess the cost of installing renewable energy and energy efficient technologies to achieve the desired cost savings and avoidance

3. Recommend energy efficiency modifications and renewable energy technologies best suited for the Kaw Nations goals; determine which resources could be harnessed

Demand Side Management

Recommendation #1

Implementation of a Demand Side Management (DSM) Program

By updating or replacing equipment that is old and obsolete with newer, more efficient technologies, the KAW Nation will have higher-quality systems, fewer breakdowns and reduced maintenance. When building occupants experience improved lighting, better air quality and more comfortable room temperatures, they are likely to be happier and more productive.

Chart #1 below is not meant to be a comprehensive approach to Energy Conservation Measures (ECM's) available to the KAW Nation. Rather, it is meant to be a preliminary list of "low hanging fruit" which represents opportunities available to the KAW Nation based on our observations. SST confidently believes that by implementing a Demand Side Energy Program, the KAW Nation can easily conservatively realize a minimum of 14% savings on its electric consumption and thus experience significant cost savings. SST recommends the implementation of a Demand Side Management program within all the building facilities owned by the Kaw Nation.

Chart #3

Category	Estimated Costs
Lighting:	
• Upgrade existing lighting fixtures with new T8 or T5 lighting systems	$40,000 - $55,000
• Incorporate Demand Response Ballasts/ Controls	$55,000 - $70,000
• Upgrade exterior lighting (parking lots) to LED or T5	$40,000 - $80,000
• Add Dual-Mode Integrated Occupancy Motion Sensor Controls	$30,000 - $50,000
Controls:	
• Install new energy management system (EMS) on all KAW Nation buildings	$130,000 - $200,000
• Integrate exterior lighting controls into the EMS control system	$20,000 - $40,000
HVAC:	
• Retro-Commissioning	$35,000 - $45,000
• Occupancy-Based HVAC controls	$52,000 - $71,000

• HVAC Duct and Coil Cleaning	$45,000 - $60,000
• Solar Thermal for Pool	$60,000 - $80,000
• Replace select HVAC systems with ground source heat pump systems	$320,000 - $425,000
Water Conservation:	
• Install Dual Flush Toilet valves and ultra low flush urinal valves	$10,000 - $25,000
• Install low flow sink aerators	$8,000 - $14,000
Other Energy Conservation Measures:	
• Back-up Power Systems for Computer and Fire Systems	$35,000 - $55,000
• Computer Energy Conservation: Integrate DOE's desktop computer and monitor conservation software into KAW Nation networks for unoccupied hours "sleep mode" of computers	$20,000 – $30,000
• **Totals**	**$900,000 to $1,300,000**

Chart #4

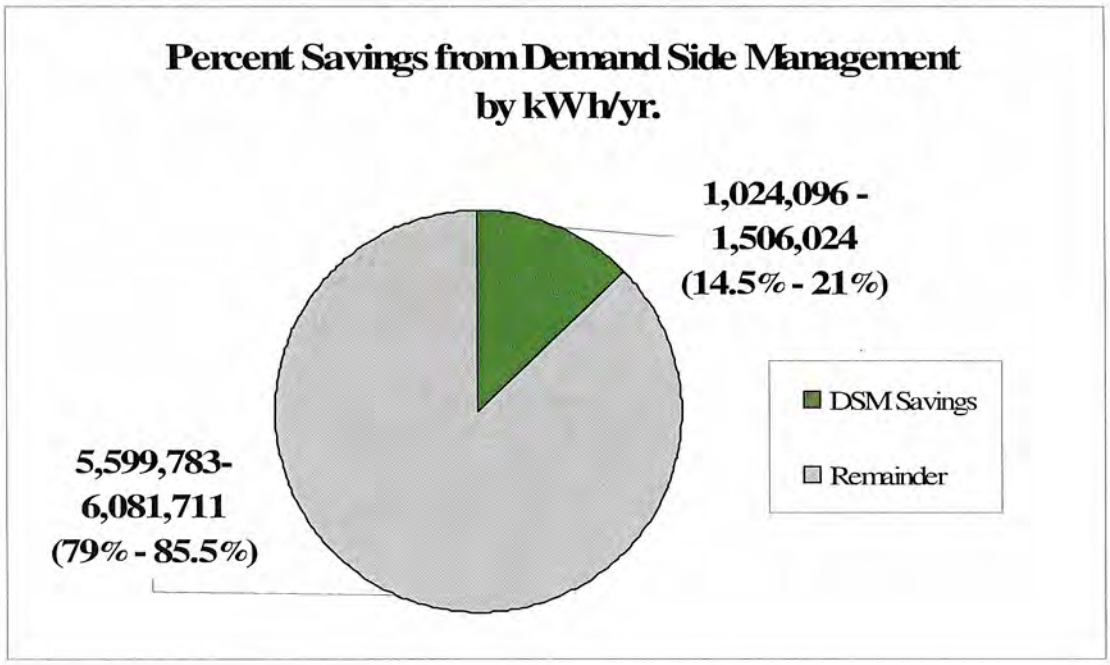
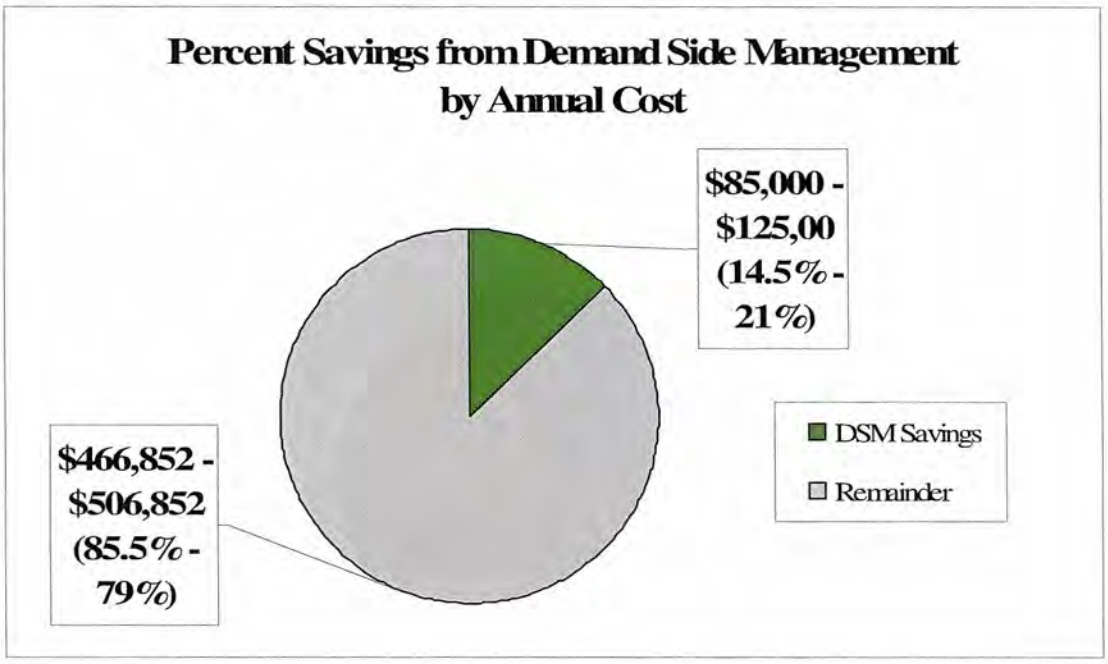


Chart #5



The measures above have been purposely selected because of the ease to implement/install, the ease to maintain the equipment, federal subsidies which discount the rate for installation. Also taken into consideration were the following:

1. Financeability of the proposed projects; achievable penetration of an efficient measure that would be adopted given aggressive funding and by determining the achievable market penetration that would attract the appropriate partner for installation and performance guarantees

2. Realistic penetration of energy efficient measures that are cost-effective according to a calculation of the levelized return on investment.

3. Cost per lifetime kWh saved

4. Projects which are deemed to be technically feasible from an engineering perspective

Project Category and Estimated Project Costs

Upon moving into Phase II, the Kaw Nation will be provided a comprehensive list of suggested projects for implementation by pre-qualified applicants. It is anticipated that the range of initiatives which will be presented for consideration will be between $900,000 and $1.3m. Table 1 below provides a snapshot of projects which could be considered. Depending on the projects

selected by the KAW Nation, anticipated cost savings would range between $85,000 and $125,000 per annum.

Objective of DSM Illustrated

Chart #6

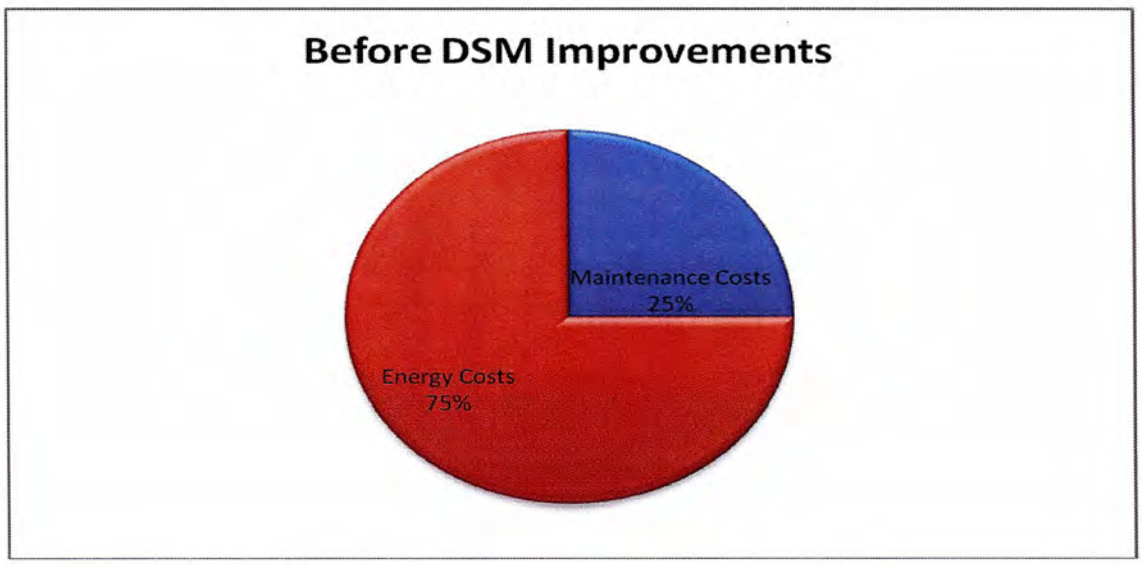
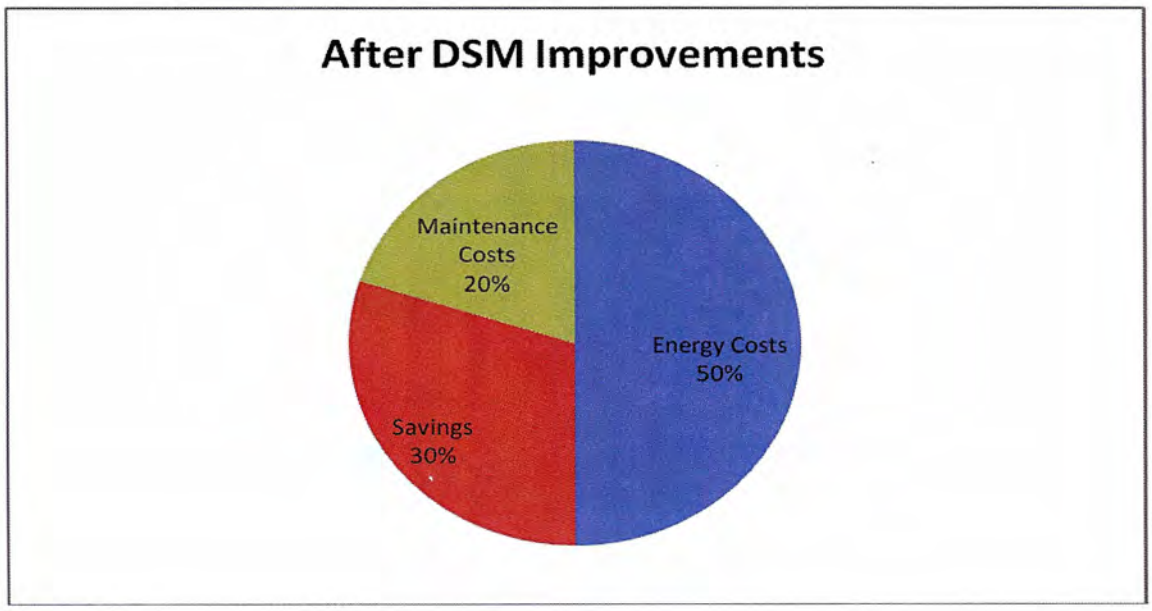


Chart #7



Renewable Energy

Recommendation #2

Incorporation of Renewable Energy/ Sustainability practices in future KAW Nation building projects.

Wind Turbines

The four (4) -100 kW turbines generate approximately 245,280 kWh per year per turbine. The turbine sizing was selected to create a maximum impact on the current electrical loads of the travel plaza and the Kaw Nation complex. We recommend using two turbines at each location. This type of turbine is suggested due to their compatible size and long term reliability. These sized turbines are able to be inserted into locations where a larger turbine would not be applicable.

Chart #8

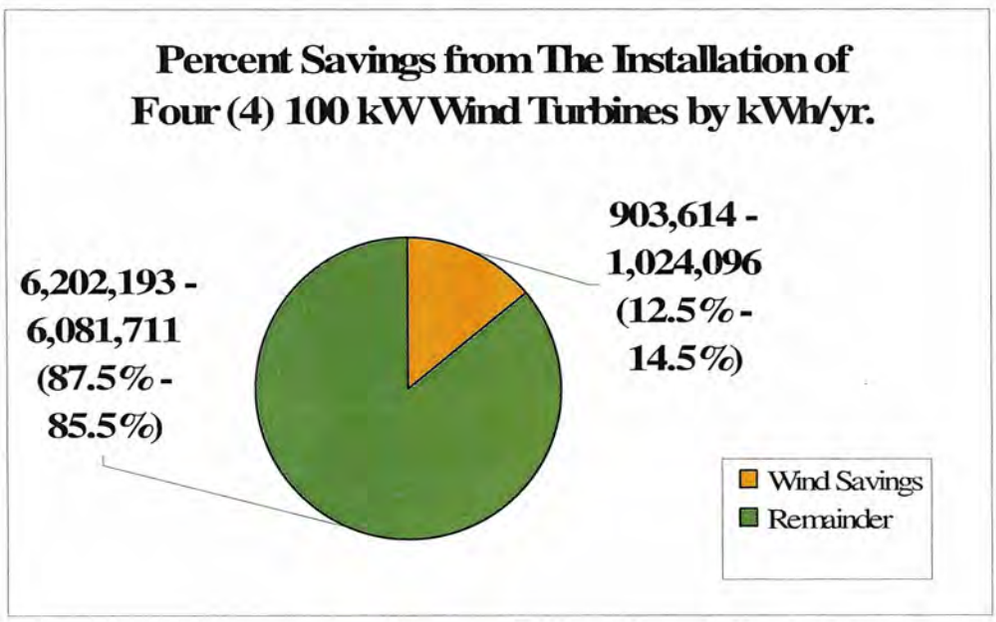
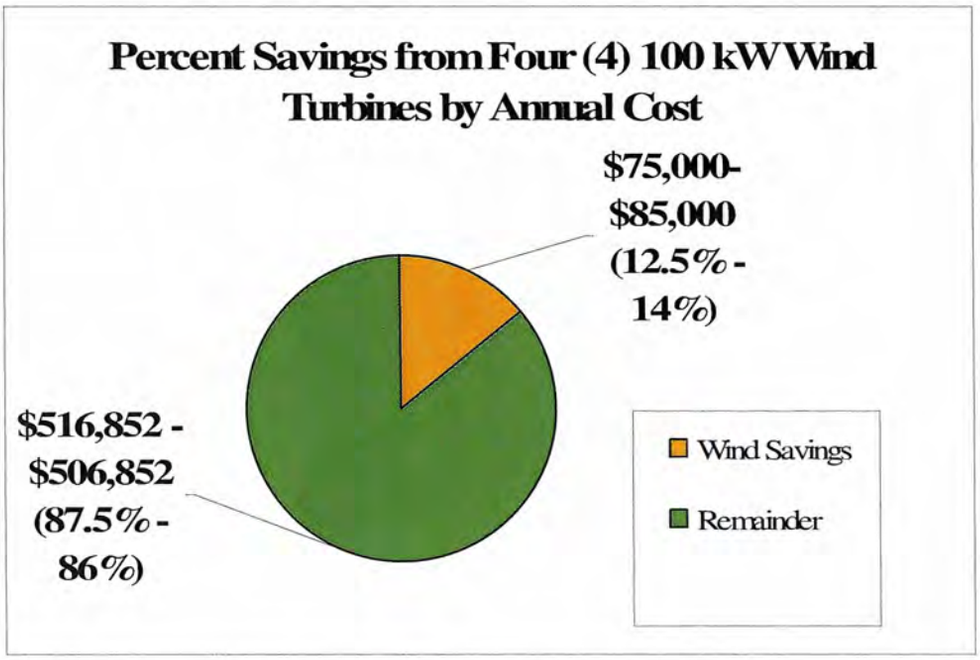


Chart #9



Estimated Project Costs / Funding Structure

Chart #10

Technology	Measure	Quantity	Anticipated Savings	System Cost
DSM Program	See Chart #3	N/A	$85,000 - $125,000	$900,000- $1.3M
Wind Turbines	100 kW	4	$75,000 - $85,000	$1.9M -$2.5M
	TOTAL		**$160,000 - $210,000**	**$2.8M - $3.8M**

The DSM Program, as shown in Chart #3, entails different measures to be implemented. These measures include lighting & HVAC, water conservation, as well as mechanical retrofits & replacement. The cost for these measures range between $900,000 - $1.3M.

Chart #11

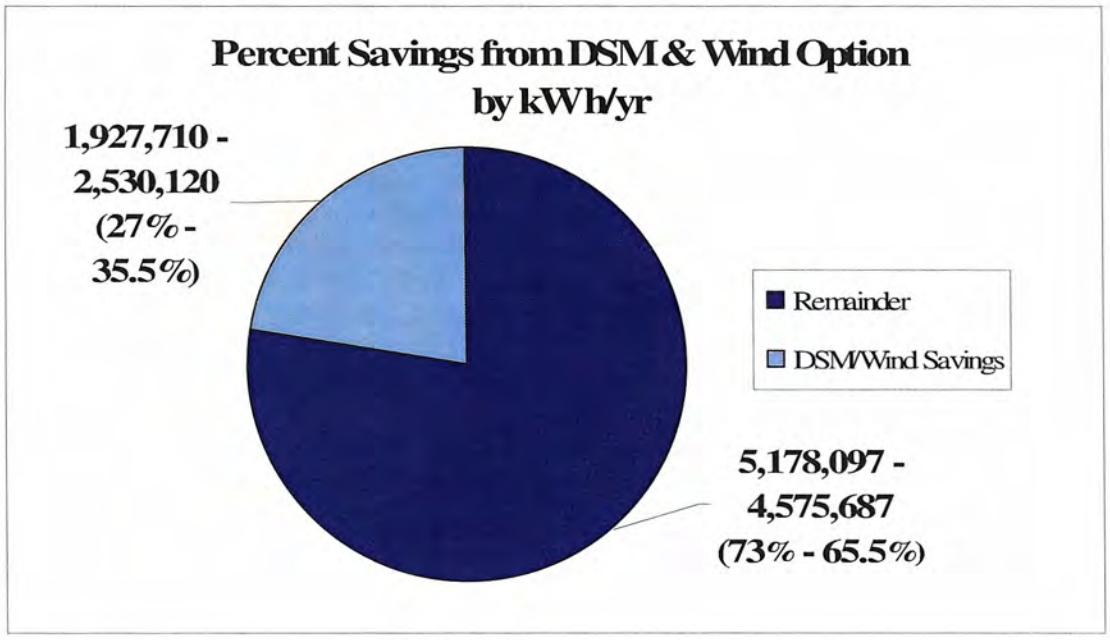
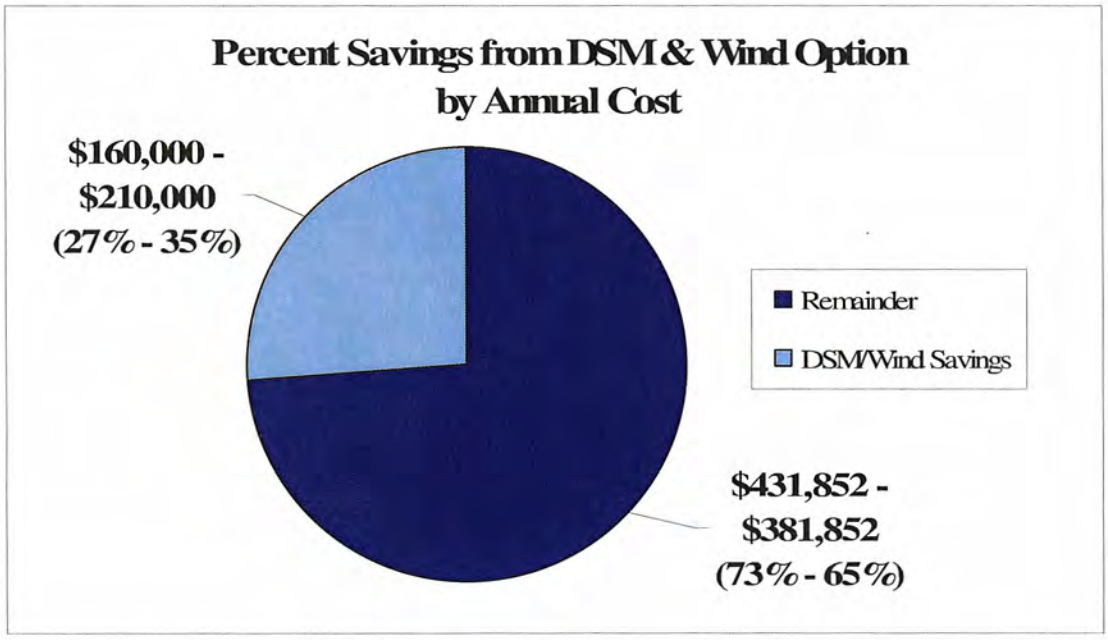


Chart #12



In parallel with all recommendations above, the Kaw Nation should consider incorporating

sustainable design principals into all future projects in order to continue to achieve energy independence. Such potential future projects could include the new casino and the area water distribution system.

Casino

Identify green and sustainable approaches that will not only reduce energy consumption to make future projects more profitable to operate, but which set a standard for the state of Oklahoma and other Tribal communities. For example, building with local materials where possible, recycling demolished materials above the 80% threshold, incorporate water saving measures into existing and future facilities, capture and treat runoff water for reuse as purple pipe water, incorporate a concierge of energy education for the future facilities and for the existing tribes members' homes to optimize decisions regarding questions around conservation recycling and as a resources finder.

Other considerations

- Establish a trademark renewable option like a wind turbine that will make a statement to people unfamiliar with the Kaw Nation as they drive by the new casino on the interstate.

Area Water Distribution

- Complement existing water conservation program throughout the region including low flow faucets and toilets, partial water treatment at some facilities and the use of recycled water to irrigate landscaping.

Financing Options

1. Below are financing options available for the proposed projects: Internal Financing
2. Debt Financing
3. Lease or Lease Purchase

The correct option for the KAW Nation will be based on project size, requirements and necessary financing measures these variables will in turn dictate the financing options available to the KAW Nation.

1. Internal Financing

Internal financing calls for improvements to be made by direct allocation of revenues from the KAW Nation's currently available operating or capital funds. Allocations are usually made for specific projects as a part of an organization's annual budgeting process.

Benefits:

- Simple to administer
- No financing costs
- Internal retention of all savings from increased energy efficiency
- Internal retention of all tax benefits from equipment depreciation
- Resultant savings which:
    - Decrease operating expenses in future years
    - Retain all or a portion of savings in a revolving fund for additional projects

Disadvantages:

- Constrains maximum energy and dollar savings (when only non-comprehensive projects are affordable)
- Competes with other operating and capital investment needs
- Requires in house energy audit, project design, cost estimation, and operation and maintenance skills.

2. Debt Financing

Capital is acquired through simple loans, bonds, or other debt instruments. Debt principal and interest are repaid incrementally over an agreed period, and guaranteed by the full faith and credit of the KAW Nation and or revenues derived from energy-cost savings. All savings from debt-financed efficiency measure are retained internally.

- Loans are usually utilized to finance smaller, short term projects.
- Bonds are more appropriate to raise capital for large single projects or to support a series of smaller projects where the principal amount borrowed is of sufficient size to justify the expense of the bond's issuance and marketing costs.

- Debt financing for small energy-efficiency improvements is relatively uncommon

How it works:

A. KAW Nation would leverage existing or new credit relationship that results in a loan agreement between a single lender and the KAW Nation
B. Debt is issued in the form of bonds for which capital is raised through individual investors, like stocks, these bonds are tradable in a secondary market.

Criteria

- Projects must be of sufficient size to be considered debt-worthy
- Requires a guarantee of repayments that is acceptable to a lender

Advantages

- Retain all savings internally, fewer transaction and financing costs
- Avoids reliance on scarce internal operating or capital budgets
- Repays financing costs from energy savings
- Allows debt repayment to be structured to attain a break-even or positive cash flow

Disadvantages

- Precludes smaller projects
- Varies financing costs according to credit worthiness
- Incurs debt that is reflect on the KAW Nation balance sheet

3. Lease or Lease Purchase

Equipment and improvements are acquired from a private vendor who may finance them internally or through a third party. Up-front outlays would not be required from the KAW Nation. The vendors' costs are repaid in installments over the term of the lease through the energy-cost savings from the project.

A. Operating Lease

Bank retains ownership of the equipment. At the end of the lease period the KAW Nation can:

- Negotiate an extension of the lease
- Buy the equipment at fair market value
- Return the equipment

Under this structure, the lease value and payments are not considered debt liabilities on the KAW Nation balance sheet

B. Capital Lease

Under this structure, the KAW Nation would pay for the equipment in equal monthly installments over the period of the lease.

- Payments are generally higher than an operating lease but the equipment is purchased at the end of the lease term for $1.00.

Under this structure, a capital lease would be considered a form of debt on the KAW Nation balance sheet.

C. Guaranteed Savings Lease

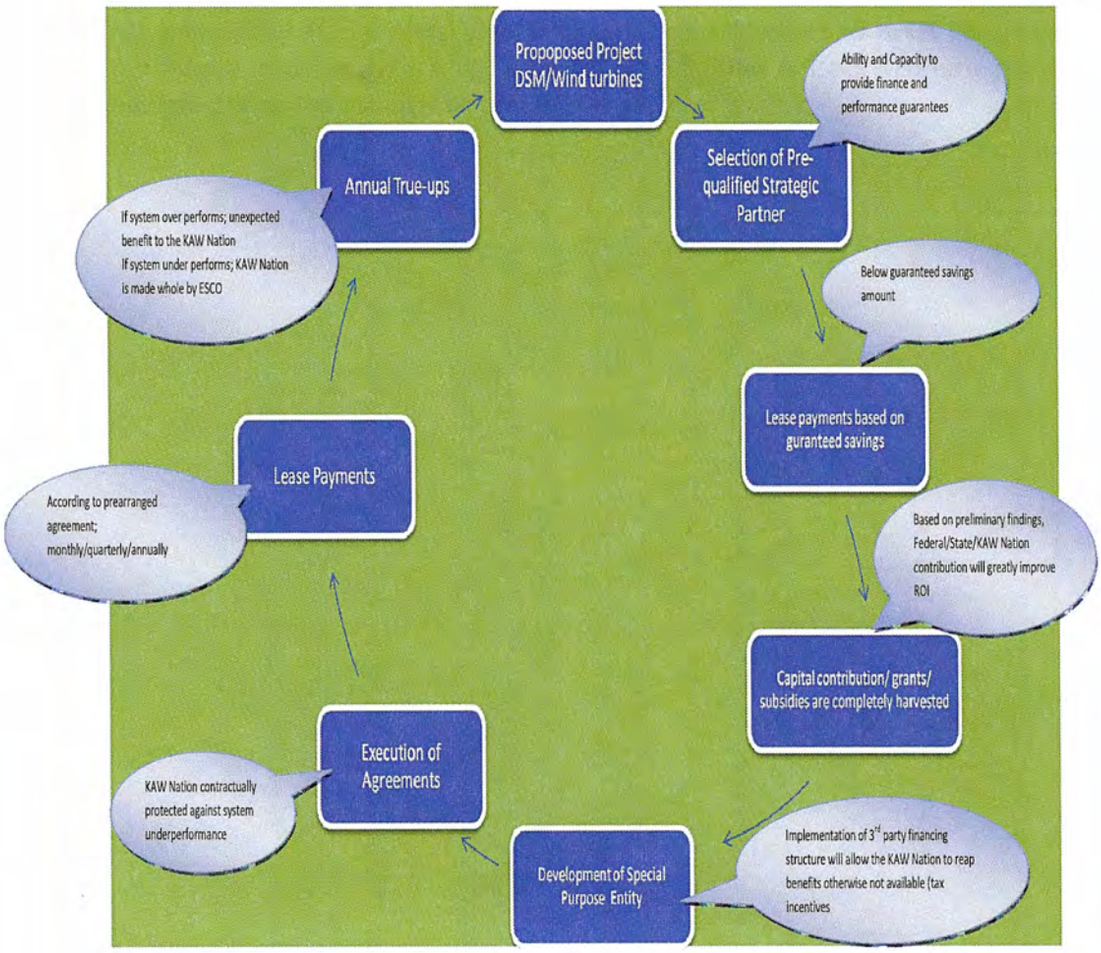
Many types of building improvements can be funded through your existing budgets—new lighting technologies, boilers and chillers, energy management controls and swimming pool covers, are examples of eligible projects.

Energy performance contracting will allow the KAW Nation to divert funds that would be spent on energy bills into investments in its buildings. This means that existing budgets can be utilized for other purposes. Furthermore, modern and efficient energy systems can increase your property value and improve marketability of your buildings.

After selecting a private energy service company (ESCO) to work with and identify the projects which the KAW Nation would like to implement, the KAW Nation would enter into an agreement with the ESCO.

- The ESCO will guarantee that savings meet or exceed annual payments to cover all project costs—usually over a contract term of seven to 10 years.
- If savings don't materialize, the ESCO pays the difference, not the KAW Nation
- To ensure savings, the ESCO offers staff training and long-term maintenance services

Chart #13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Annual True-ups

State Incentives for Renewables & Efficiency

Recommendation #3

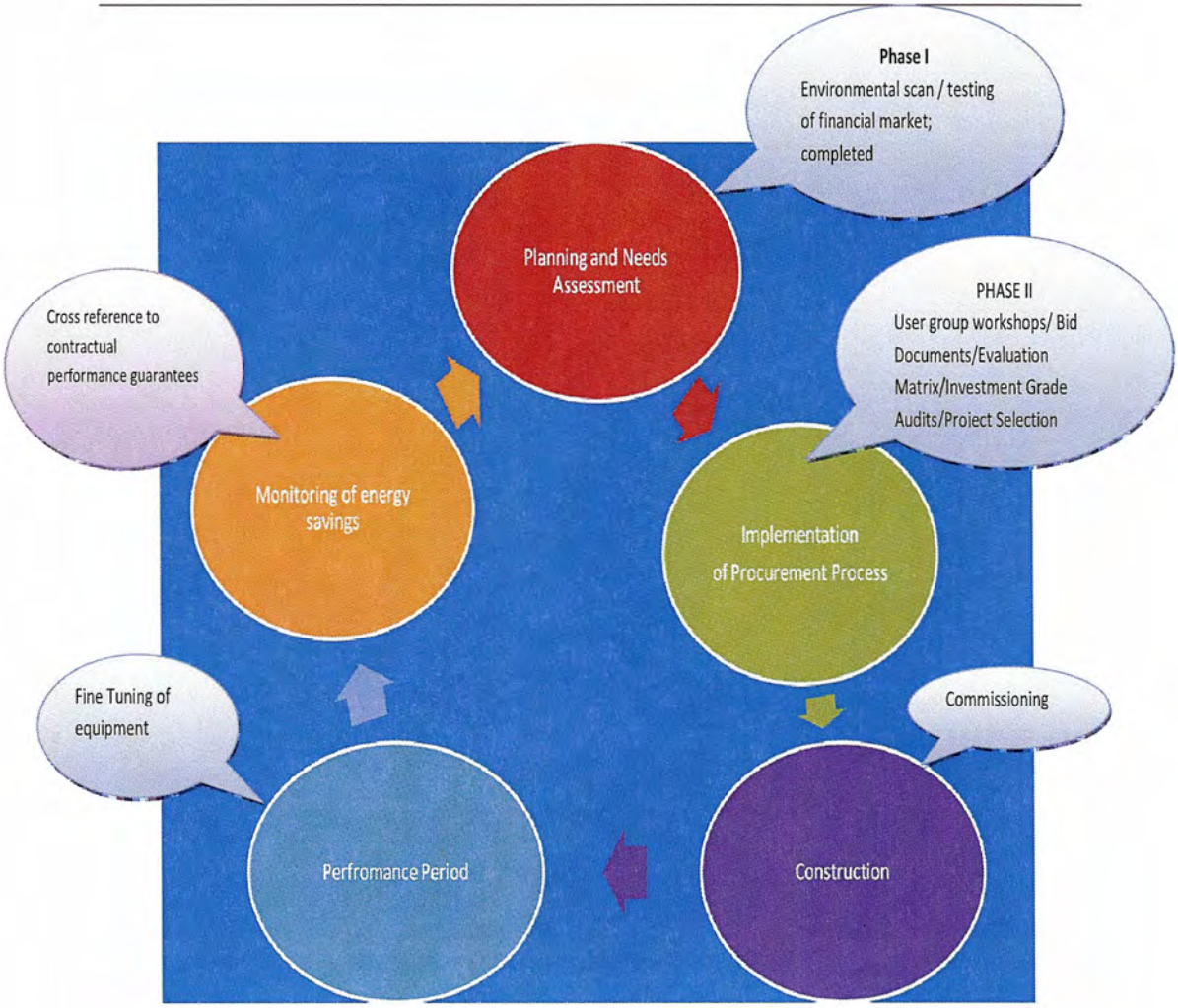
Aggressively apply for all State /Federal grant programs. This will enable the KAW Nation to further offset the cost of any program which it implements. **Exhibit A** lists a website to review a number of different programs that may be beneficial to the Kaw Nation.

Road Map/Next Steps

Chart #14

Phase	Planning	Implementation	Performance Period
Sub-Tasks	1. Technology Research 2. Needs Assessment 3. Packaged Approach 4. Tribal Approach	1. Tribal Workshop 2. Physical Surveys 3. Bid Documents 4. Installation & Commissioning	1. Data Collection and Validation 2. Benchmarking and Data Analysis 3. Filtering and Prioritization 4. Communication and Training
Summary	**Technology Research** incoporates research and review of technology options for energy measurement, data collection and data analysis. **Needs Assessment** is a review to determine what needs are necessary such as energy type, energy consumption, building types & sizes, etc. **Packaged Approach** includes describing the needs that will help identify different packaged solutions for various installations. This may include different packages for different buildings/facilities, central plants and other renewables. **Tribal Approach** includes development of a centralized data collection & analysis approach. This may be data management at property(ies) which allows for improved optimization and prioritization.	**Tribal Workshop** is important to ensure propert communication/understanding of the benefits, scope and costs. **Physical Surveys** will need to be conducted to determine the specific metering requirements, location and scope of work. **Bid Documents** will need to be developed that will entail product specifications and finance options that will help enable the selection of a contractor for the project. **Installation & Commissioning** should initiate on the larger energy consumption locations to reap the largest benefit first.	**Data Collection and Validation** is an energy analysis performed by a qualified consultant to further analyze and identify energy savings. **Benchmarking and Data Analysis** will provide a basline for ongoing improvements and comparison amongst the different building types. It will also identify energy using trends from which energy efficiency improvements can be identified. **Filtering and Prioritization** is based on the results of the Tribal workshops and physical surveys. Bid documents will need to be developed which will enbable selection of a contractor(s) for installation. **Communication and Training** will be an important requirement for ensuring ongoing monitoring and capturing savings opportunities for the Kaw Nation.
Duration	**90 days** Time to contact vendors, review needs of each property and develop a plan to implement. Tribe will need to be involved in decision-making process.	**30 days** The Tribe or its assigned members who will be involved on a regular basis need to be informed about the energy program.	**6 months** The data collection process will be ongoing, but can take about 4-12 months before the initial data can be thoroughly analyzed.

Chart #15


Phase I
Environmental scan / testing of financial market; completed
Planning and Needs Assessment
PHASE II
User group workshops/ Bid Documents/Evaluation Matrix/Investment Grade Audits/Project Selection
Implementation of Procurement Process
Commissioning
Construction
Perfromance Period
Fine Tuning of equipment
Monitoring of energy savings
Cross reference to contractual performance guarantees

Conclusion

We are confident, along with the Kaw Nation's commitment and dedication, that there is a unique opportunity for the Kaw Nation to satisfy its renewable energy objectives. We look forward to furthering our relationship with the Kaw Nation.

Exhibit A

State Incentives for Renewables & Efficiency

The document is 28 pages in length, therefore, rather than adding 28 more pages to this document, below is the link to the website for your review.

http://www.dsireusa.org/incentives