



Staff Report

Agenda Item: **CLARKDALE SUSTAINABILITY PARK** – Direction to staff relating to the advancement of the proposal to create a Clarkdale Sustainability Park.

Staff Contact: Gayle Mabery, Town Manager

Meeting Date: October 13, 2009

Background: On Tuesday, September 29th, the Clarkdale Town Council met in Joint Session with the Clarkdale Planning Commission and General Plan Committee. The purpose of the meeting was to discuss the concept of the creation of the Clarkdale Sustainability Park, which is both new and exciting, and will make Clarkdale a model for sustainable communities throughout the country.

While industrial parks have been around for a long time, they have generally been a response to the need to isolate industrial activities from the general population of a city or town. The businesses in these parks have sometimes been interdependent, but usually their sole connection is that their activities are too intense for inclusion among other, less intense commercial businesses. The Clarkdale Sustainability Park (the Park) is an industrial park with a manifest difference in its occupants, its business model and its goals. From the beginning this Park has a distinct social, environmental, cultural and economic goal. That goal is to provide sustainability for the Town of Clarkdale.

“Sustainability” is generally defined as “practices which meet the needs of the present without compromising the ability of future generations to meet their own needs.” Sustainability is more than an environmental concept. It applies equally to resource allocation, economies, and cultural and social evolution. The Park will nurture state-of-the-art industries and act as an incubator of new sustainable businesses.

The heart of the Park, and the facility that will tie all of the tenants together, will be a Plasma Converter. Variants are called Superplasmic Arcs or Plasma Gasifiers. Briefly, a Plasma Converter uses a very high temperature (as high as 30,000° F) plasma stream to vaporize anything fed into it. It functions much the same as a very large plasma torch commonly used in metal shops to cut steel. When a Plasma Converter vaporizes Municipal Solid Waste, medical waste, and other industrial or hazardous wastes, it instantly breaks the materials down to their elemental form. This is not a process of combustion – the waste is not burned, but is converted to gases, a small amount of vitrified slag, and elemental metals. The gas (often called “Syngas” or synthetic gas) can be purified to yield pure hydrogen and other gases, and it can be burned in generators which can supply all the energy requirements of the converter plus about 30% excess electricity to be used by other Park facilities or returned to the electrical grid. Depending upon how the converter is configured, precious metals and even nanocarbons (which are in high demand) can be salable by-products of the process.

Other possible tenants in the Park include:

- Algal fuel facilities, which produce biodiesel fuel from algae
- Waste cooking oil biodiesel plants and equipment manufacturers.
- A wastewater purification system that could produce potable water from municipal wastewater.
- A state-of-the-art recycling center that sorts solid waste to remove economically recyclable materials before the rest is fed to the plasma converter.
- A 100-acre photovoltaic (solar electricity) array that could produce more than enough electricity from the sun to power all of Clarkdale.
- An educational and interpretive center that will serve to educate and foster sustainable projects all over the southwest.
- A nature trail, day use areas and community facilities that will enhance the cultural livelihood of Clarkdale and the Verde Valley.
- Additional occupants which will be synergistic with the other tenants and which fulfill the concepts of promoting sustainability.

The plan outlined in the attached Executive Summary and White Paper is preliminary and conceptual, and must be allowed and expected to adapt to changing conditions and unforeseen opportunities. This process will be as evolutionary as it is revolutionary. The rewards for hard work, good planning and adaptive management of the project cannot be overstated. The Clarkdale Sustainability Park will forever change how Clarkdale functions economically and it will redefine the relationship the Town has with its citizens and its environment. This project will create a new paradigm of municipal governance and become a model for sustainable communities throughout the country.

The most basic necessity for success of The Park will be gaining and maintaining the political will on the part of the Clarkdale Town Council and the citizens of Clarkdale to see that the project reaches fruition. It was persistent and unanimous agreement on the part of the Council that allowed the Town to purchase the water utility several years ago, and the same commitment will be necessary to complete this project.

It was with this reality in mind that the initial meeting on September 29th was held with the Town Council, the Planning Commission and the General Plan Committee. The discussion and questions posed at that meeting were both fruitful and thought provoking. Serious questions obviously still need to be answered, but the underlying opinion of those in attendance seemed to be that Clarkdale could and should move forward with The Park.

“Moving forward” is no small undertaking and should not be taken lightly. A significant commitment of time and talents will be necessary from the staff, the Council and other volunteers. Securing outside funding to undertake a thorough Feasibility Study is a critical early step. With an expected cost around \$150-200,000, we would like to pursue an economic

development grant from the U.S. Department of Commerce. The study will provide the answers to many of the questions we all have and will provide a framework and guide to development of the Park.

Other early steps that are critical in the advancement of The Park from a concept to a reality include:

- ✓ Development of a Scope of Work for the Feasibility Study
- ✓ Making Presentations to Key Stakeholders (legislators, land owners, potential tenants and/or investors, the media, educational and other civic and business institutions, etc.)
- ✓ Developing Presentation and Outreach Materials (on-line and print)
- ✓ Working With Property Owners to Identify Land Acquisition Alternatives

At this early stage, it is important for the staff to have solid instruction from the Town Council that Clarkdale's political will is truly behind this effort. The first steps outlined above will take a high level of dedicated staff time, and that time should not and will not be committed unless the Council is solidly behind moving forward with this effort. Progress reports and updates to the Town Council will be an important part of the process as it moves forward. Reports should include updates on time and resources dedicated on activities that have been undertaken, as well as projections of resources necessary to continue to move the project forward, and where those resources might be developed.

Recommendation: The staff is seeking direction from the Council with regard to advancing the proposal for The Clarkdale Sustainability Park.

Clarkdale Sustainability Park Executive Summary

Updated: 8/17/09

The Clarkdale Sustainability Park is a concept that is new and exciting, and the rewards for success are massive. This concept will fundamentally change the way our municipalities are financed, the services they provide their citizens and how those services are delivered. This project will forever change the dominant paradigm of municipal governance and become a model for sustainable communities throughout the country.

In 2007, the leadership and staff of the Town of Clarkdale came to a remarkable conclusion: the way municipalities would sustain themselves — financially, environmentally, and culturally — was about to change forever. The U.S. economy was on the brink of the most serious recession since the Great Depression of 1929. Arizona's economy was in even worse condition, owing to its dependence on new housing starts and a *de facto* economic base of population growth. This economic paradigm was about to come into conflict with the realities of resource depletion and cultural degradations concomitant with an overheated real estate market and reliance upon unsustainable practices. In short, Clarkdale felt that it was about to enter the era of a “new economy.” At the same time, traditional municipal funding sources began to dry up. Revenues from sales taxes, gasoline taxes, and enterprise funds began to shrink, yet demand for services and the cost of those services continued to climb. Complicating this were shrinking and increasingly unstable and unreliable revenue streams from the State of Arizona, such as Urban Revenue Sharing, Highway User Revenue Funds (HURF) and others. In 2007, Clarkdale began to look for new ways to fund its municipal services while continuing to provide a high quality of life for its citizens.

For the last several years, people have increasingly begun to realize that many of the practices that brought our country and our state great economic prosperity were unsustainable. The environmental, social, economic and cultural costs of depleting resources and polluting our planet were simply too high and had to change drastically if we were to survive in a way that we would find acceptable. We believe we have found one possible path to a new economy that is sustainable, and in fact, enhances the quality and richness of our lives while also improving the health of our environment. We believe that the plan outlined below will migrate to other communities throughout the state and the nation and could provide a practical model for a “new economy” for other local governments.

THE CONCEPT

While industrial parks have been around for a long time, they have generally been a response to the need to isolate industrial activities from the general population of a city or town. The businesses in these parks have sometimes been interdependent, but usually their sole connection is that their activities are too intense for inclusion among other, less

intense commercial businesses. The Clarkdale Sustainability Park (the Park) is an industrial park with a manifest difference in its occupants, its business model and its goals. From the beginning this Park has a distinct social, environmental, cultural and economic goal. That goal is to provide sustainability for the Town of Clarkdale.

“Sustainability” is generally defined as “practices which meet the needs of the present without compromising the ability of future generations to meet their own needs.” Sustainability is more than an environmental concept. It applies equally to resource allocation, economies, and cultural and social evolution. The Park will nurture state-of-the-art industries and act as an incubator of new sustainable businesses.

The heart of the Park, and the facility that will tie all of the tenants together, will be a Plasma Converter. Variants are called Superplasmic Arcs or Plasma Gasifiers. Briefly, a Plasma Converter uses a very high temperature (as high as 30,000° F) plasma stream to vaporize anything fed into it. It functions much the same as a very large plasma torch commonly used in metal shops to cut steel. When a Plasma Converter vaporizes Municipal Solid Waste, medical waste, and other industrial or hazardous wastes, it instantly breaks the materials down to their elemental form. This is not a process of combustion – the waste is not burned, but is converted to gases, a small amount of vitrified slag, and elemental metals. The gas (often called “Syngas” or synthetic gas) can be purified to yield pure hydrogen and other gases, and it can be burned in generators which can supply all the energy requirements of the converter plus about 30% excess electricity to be used by other Park facilities or returned to the electrical grid. Depending upon how the converter is configured, precious metals and even nanocarbons (which are in high demand) can be salable by-products of the process.

Other possible tenants in the Park include:

- Algal fuel facilities, which produce biodiesel fuel from algae
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- Additional occupants which will be synergistic with the other tenants and which fulfill the concepts of promoting sustainability.

The Park will occupy about 500 acres of land, and will be master planned to fit the concepts described above.

FINANCING

The first step in this project will be to secure property. Several parcels in and around Clarkdale may fit the requirements, but the one that stands out for many reasons is the area around Peck's Lake, currently owned by Freeport McMoRan Copper and Gold, an international mining company with roots in Clarkdale. Acquisition of the land may be funded in part by Industrial Development Bonds.

When land has been secured, the next step will be a feasibility study, expected to cost around \$150,000. The costs of this study will likely be paid by an economic development grant from the U.S. Department of Commerce. The study will provide the answers to many of the questions we all have and will provide a framework and guide to development of the Park.

Additional funding for initial operating expenses and staffing will likely come from grants and/or bonding.

BENEFITS TO CLARKDALE

The Clarkdale Sustainability Park will change the way the Town of Clarkdale is financed, where it gets its electricity, how its water and wastewater are supplied and treated, and will help ensure economic and environmental sustainability for our Town. It will, to a great extent, insulate the Town's economy from drastic economic cycles in Arizona, thus allowing a stable, continuous path of economic and cultural growth and prosperity. Treated wastewater could help the town delay or eliminate the need for expensive new water resource acquisition. Town revenues from operation of the plasma converter, as well as rents from tenant facilities, transaction privilege taxes, franchise fees and general economic development are expected to net between \$500,000 and \$1 million per year.

CONCLUSION

The plan outlined above is preliminary and conceptual, and must be allowed and expected to adapt to changing conditions and unforeseen opportunities. This process will be as evolutionary as it is revolutionary. The rewards for hard work, good planning and adaptive management of the project cannot be overstated. The Clarkdale Sustainability Park will forever change how Clarkdale functions economically and it will redefine the relationship the Town has with its citizens and its environment. This project will create a new paradigm of municipal governance and become a model for sustainable communities throughout the country.

For a more detailed discussion of the project, please refer to the Clarkdale Sustainability Park White Paper, or talk to the Town Manager, Gayle Mabery (Gayle.Mabery@clarkdale.az.gov), Community Development Director Sherry Bailey (Sherry.Bailey@clarkdale.az.gov) or Mayor Doug Von Gausig (dougvg@commspeed.net).



A Plan for the Future of Our Town

White Paper

Dated October 1, 2009

Clarkdale Sustainability Park White Paper

Last Update: 10/1/09

PROLOGUE

The Clarkdale Sustainability Park is a concept that is new and exciting, and the rewards for success are massive. This concept will fundamentally change the way we see our cities and towns, and the way our municipalities are financed, the services they provide their citizens and how they are delivered. This project will forever change the dominant paradigm of municipal governance and become a model for communities throughout the country. Clarkdale began life as a model community, built and nurtured by a spirit of determination to succeed and a drive to create new economic opportunities. Clarkdale once again has an opportunity to realize new horizons. It is fortuitous that the company that founded Clarkdale is once again in a position to help move our Town into that new economic reality. But the possibilities exceed economic development. They will extend to new sustainable practices in energy generation, water use and reuse, and even political stability gained by a robust and growing economic base. This plan provides all that and so much more, and the potential benefits to Clarkdale, the Verde Valley and the State of Arizona, are vast. In this concept we have the opportunity to do something great - to change our world for the better.

THE CONCEPT

The concept, at first glance, is a traditional master-planned industrial and commercial park. What makes this plan unique is the component facilities' interdependence and synergy. The impact and benefits of the Park's individual components will be greater than the sum of their parts. This Park will be occupied by a mix of private and public interdependent enterprises all of which have one overarching principal: a dedication to environmental, energy, economic and social independence and sustainability. The Park will become the economic and social engine of the Town of Clarkdale. It will provide enough electrical power to supply the entire Town and then some. It will become a major enterprise fund for the citizens of Clarkdale. It will change the way we dispose of municipal wastes, hazardous wastes, and industrial pollutants. Rather than burying our trash, thereby polluting our land, air, and aquifers, we will turn it into profitable products, not the least of which is energy. The Clarkdale Sustainability Park will also be an educational opportunity for the other governments interested in sustainability for their citizens.

In keeping with today's accepted definition of sustainability, which is "practices which meet the needs of the present without compromising the ability of future generations to meet their own needs," this Park will be a shining example of how one town might meet that ideal.

While we endorse individual efforts to reduce greenhouse gasses and decrease energy demand by changing light bulbs and improving insulation, we realize that these efforts are probably too little and too late. We believe a more efficient and much faster solution is to handle these things on a community-wide basis. Our plan is to do just that.

PREFERRED PROPERTY LOCATION

The Clarkdale Sustainability Park (called the “Park” hereafter) would fit well in the area in the middle of the Peck’s Lake oxbow, including the area of tailings recently remediated by Freeport McMoRan Copper and Gold. Freeport McMoRan is also the current property owner. The total area, including the lake, covers approximately 520 acres. A map of the area and preliminary layout of the components of the Park is in Attachment A.

This area is currently subject to a development agreement originally written between the Town of Clarkdale and Phelps Dodge Mining Corp. Under that agreement Phelps Dodge and its successor, Freeport McMoRan, could place roughly 900 homes on the 977 acres of land as well as commercial properties. Originally the area included a golf course, but that has been removed from the plan.

As a condition of the agreement, Phelps Dodge consented to install a new wastewater treatment plant for Clarkdale on the property. The plant’s initial improvements were put in place, but the plant was never completed. Part of that installation included a wastewater pipeline under the Verde River, terminating on the northeast part of the property near the site of the future wastewater facility. To our knowledge, that pipeline is still a usable conveyance for wastewater or potable water.

The eastern edge of the property is adjacent to Tavasci Marsh, which is now owned by the National Park Service and administered by Tuzigoot National Monument.

Peck’s Lake, the dominant feature of this property is a shallow man-made lake which receives the bulk of its water from the Verde River through Brewer’s tunnel at the northwest corner of the property. The diversion for that water can be seen just downstream from the Clarkdale Metals slag pile. Currently more water is flowing from the river through the lake than is needed to replace loss due to percolation and evapo-transpiration. The excess flow continues through a weir at the east end of Peck’s Lake, thence through Tavasci Marsh. The National Park Service is exploring ways to divert or stop this excess flow, as it is considered to be highly detrimental to the natural health and diversity of the marsh. The lake is shallow, generally less than 10 feet deep, and thus, is choked with various invasive and noxious aquatic vegetation, most notably Eurasian Milfoil and two species of water lilies.

Peck's lake is in the process of eutrophication, which is a biological and chemical process that inevitably produces a wet meadow instead of a lake. In order to stop and reverse this eutrophication, the lake would need to be dredged or otherwise deepened and the noxious weeds removed. The lake is also home to many non-native fish, including Northern Pike, Yellow Perch, Smallmouth Bass and several species of sunfish, such as Bluegill, Pumpkinseed, Green Sunfish and others. There are no known native fish breeding in Peck's Lake.

The lake area was originally built as a source of process water for the smelter and as a recreational facility for the people of Clarkdale. In addition to the lake, the area included a 9-hole golf course, lake, dance hall, clubhouse, and picnic areas. Until 2003 the lake and surrounding property were leased to the Town of Clarkdale and continuously used for recreation, nature watching, fishing, etc. In 2003 the Town's lease expired and was not renewed, and in December of that year, Phelps Dodge closed the property to the public and it has remained closed since then. The lake has continued to degrade over the years to the point that diversity of waterfowl and other birds is now less than half of what it was only 10 years ago.

The area identified in Exhibit A has several advantageous attributes that make it a very good candidate for the Park project. The old remediated tailings cannot be used for commercial or residential property without extensive additional remediation, but they may be suitable for such things as a photovoltaic array with its minimal traffic. The area adjacent to Tavasci Marsh was used as a barrow, or topsoil source, to cap the tailings, and that area is now practically unusable for anything but industrial applications. The south end of the lake is a dead appendix, since the inflow to the lake is near the midpoint of the oxbow, and could easily be cut off from the rest of the lake to be filled in or used as it is for an algal fuel operation or other sustainable energy project. Since there is already a pipeline running from the current Clarkdale Wastewater Facility to the barrow area, that area could conceivably serve as a center for water purification and potable or non-potable reuse facilities. The land between the arms of the oxbow would be well suited to house the heart of the Park, the Plasma Converter and associated activities.

PARK COMPONENT FACILITIES

Plasma Converter/Recycling Center

The heart of the Park will be a Plasma Converter, also known as a Plasma Gasifier. This technology is relatively new and uses a very high temperature plasma stream (similar to the plasma torches commonly used to cut metals) to literally vaporize almost any material that is introduced into it. The equipment is manufactured by such companies as Westinghouse (<http://www.westinghouse-plasma.com/>), Startech Environmental (<http://www.startech.net/>), Plasco Energy Group (<http://www.plascoenergygroup.com/>) and others. In essence, the Plasma Converter will break down municipal solid waste (MSW), hazardous wastes, medical wastes, and practically anything else into their elemental components. The bulk of the product from this treatment comes off as "Syngas" or synthetic gas. Syngas is very high in hydrogen, and is normally burned in

generators which will power the converter itself. Additionally, the generators produce an average of about 30% excess electrical energy that can be used by other facilities on the property, or fed back to the electrical grid. The converter also produces heat which can be used as energy for various other operations in the Park, such as the water purification facility. These converters normally run 24 hours a day, 7 days a week, and can easily be maintained and parts changed while the units are operating.

In addition to heat and electricity, Plasma Converters can be configured to produce valuable metals from the waste, as well as nanocarbons that are in very high demand for use in new battery technologies and other high-tech applications. The Plasma Converter facility would include a modern recycling operation stationed at the front end of the process. In this operation, easily recyclable materials would be sorted out of the waste stream for recycling and the remaining waste shredded and fed into the Converter.

The Plasma Converter will primarily be fed municipal solid waste as “feedstock,” but any other waste material, such as construction waste, hazardous materials, medical waste, and industrial wastes can also be used. The Verde Valley generates between 130 and 200 tons of solid waste per day, enough to feed an efficiently operating plasma converter.

Appendix A shows a 70-acre tract reserved for the Plasma Converter and an additional 50 acres for feedstock preparation and recycling center. The actual area used will likely be less than half this.

Photobioreactor/Algal Fuel Facility

The emerging field of algal and photobioreactor fuel holds great promise as a way to help wean us from fossil fuels by creating a biodiesel from algae. Typically, the algae are grown in highly efficient, closed systems (systems not open to the environment). Algae grown in the facility will produce oils that can be converted easily to fuel oil. Typical yields are around 5,000-15,000 gallons of fuel per acre, per year, but recent advances in these photobioreactors may take yields much higher. This operation could occupy the area that was the south end of Peck’s Lake, the area adjacent to the tailings and slurry dam. This area covers around 33 acres.

Photovoltaic/Solar Concentrator Array

A solar energy array would occupy the area that has been reclaimed from the old tailing fields west of Tuzigoot National Monument. The array could hold approximately 100 acres of solar panels, and could yield between 10 and 25 megawatts (MW) of electricity. Ten megawatts is enough to power about 1,800 homes, or a town of around 4,000-5,000 people, which is slightly larger than Clarkdale’s current population of 4,000. Photovoltaic cells do not require water as a heat conveyance, so will not deplete an already-stressed groundwater supply. Solar concentrating systems are generally much more efficient, but can use large quantities of water, depending on the systems used.

Biodiesel Facility

The Park would have ample space for a Biodiesel production facility. Biodiesel is normally made from used cooking oil and other waste vegetable oils. This facility could be a perfect adjunct to the algal/photobioreactor fuel operation, converting not only waste cooking oil, but also the oils produced in those facilities. Appendix A shows about 45 acres reserved for biodiesel, but this is likely very generous, and 5-10 acres may be sufficient.

Potable Reuse Facility

The Potable Reuse Facility will be a state-of-the-art water treatment facility which will ultimately produce pure, potable water from wastewater. The Plasma Converter could supply necessary electrical power to this facility and possibly also supply heat that could be used in a distillation process. The treatment facility could receive treated effluent from the Clarkdale wastewater treatment plant across the river through the existing pipeline, or wastewater could be piped directly to the facility for primary, secondary and tertiary treatment, the product of which would be drinkable water. A potable reuse facility could increase Clarkdale's water portfolio enough to avoid or forestall expensive new water resource acquisition for many years. The potable reuse facility in Appendix A sits on 70 acres, but actually only about 25 acres will probably be needed.

Nature and Sustainability Interpretive Center/Day Use/Nature Trails

The land to the north and west of the lake could be a premier natural area, hosting a nature observation trail, picnic areas, interpretive center, and other civic and art facilities. A trail system through that area would be one of the finest birding trails in the Verde Valley, and it is actually inside the first Audubon Society "Important Bird Area" (IBA) in the state, the Tuzigoot IBA. This IBA lists more than 200 species of birds and untold other diversity within its boundaries, which stretch from Dead Horse Ranch State Park to Tapco, just upstream from the lake. It may be possible to remediate the lake from the Brewer's Tunnel inlet to the east end sufficiently to return it to an excellent habitat for waterfowl and other birds and native fish.

A modern interpretive and educational center would provide the public with learning opportunities centered on sustainability as well as local nature and history. The facility could house a small conference area and learning facility, as well as a traditional interpretive center, or museum. This facility could be a wonderful adjunct to the Tuzigoot museum, and could host seminars on sustainable energy, economies, etc. The facility might occupy the end of the peninsula between the arms of the oxbow, as well as the areas on the other side of the lake, to the west, north and east of the lake. Not only could this facility provide public learning and recreational opportunities, but also enhance the local tourist economy.

About 75 acres have been identified for these various uses.

Commercially Zoned Areas

The Park plan provides for approximately 100 acres of commercially zoned property. This commercial area might house businesses that are complimentary to the other facilities in the Park, such as supply and equipment houses, hotel/motels, restaurants, and various retail operations.

Other Possible Occupancies

We are certainly not limited to the components described in this paper. There will be unforeseen opportunities that we cannot imagine at this juncture and we will need to keep our minds open to these new possibilities. A Park like this can add other community and sustainability-related projects, such as a biomass-to-energy plant, community gardens, hydroponic and vertical hydroponic agriculture, dog park, outdoor event venue, and various demonstration or proof-of-concept operations.

Of the 977 acres included in the original development agreement, the Park covers only about 520, leaving another 450 acres available for other types of development. Much of this property is higher and overlooks the property from north of the lake.

Future Expandability

Appendix A shows most of the land used by the above Park component facilities, however, the areas reserved for most of these are extremely generous. The actual space used may actually be less than half of the area assigned in Appendix A. There should be around 250 acres available for additional projects and for expansion of existing facilities.

Alternate Locations

While the Peck's Lake area seems optimal for this project, there are several other locations in or adjacent to Clarkdale that could be suitable. The area to the south and west of Yavapai College, part of which is owned by the Yavapai College Foundation, part by Verde Exploration and the US Forest Service might serve well, as might the land currently owned by Verde Exploration to the west of town (southwest of the Phoenix Cement plant). Depending upon several factors, the land currently owned by Clarkdale Metals in the industrial area north of Town Hall may also be suitable.

BENEFITS TO THE TOWN OF CLARKDALE

Depending upon exactly how the ownership of the land and the various components is realized, the Town of Clarkdale stands to gain tremendous benefits from this project. The Town would probably be the owner of the Park, and therefore the landlord. Rents would be charged on the various private enterprises operating in the Park. Franchise fees on electrical generation and sales could bring in additional revenue. Assuming the Town retains ownership and operation of the Plasma Converter, tipping fees and other waste disposal fees would be a revenue source, as would sale of the syngas or hydrogen,

nanocarbons, precious metals, and other by-products of plasma conversion. Facility rental fees would provide a small amount of revenue. Sales and use taxes on new commercial businesses associated with the Park would be substantial. In total, estimates are that the Park could net approximately \$500,000-\$1 million per year. Add to this the additional effects of increased employment and synergies created with other industrial and tourist operations in the Town, such as Clarkdale Metals and the Verde Canyon Railroad, and the benefits to Clarkdale's citizens become huge.

The Clarkdale Sustainability Park will change the way the Town of Clarkdale is financed, where it gets its electricity, how its water and wastewater are supplied and treated, and will help ensure economic and environmental sustainability for our Town. It will, to a great extent, insulate the Town's economy from drastic economic cycles in Arizona, thus allowing a stable, continuous path of economic and cultural growth and prosperity.

CHALLENGES

The challenges to success of the Park concept are significant, but manageable. Perhaps the most basic necessity for success will be gaining and maintaining the political will on the part of the Clarkdale Town Council and the citizens of Clarkdale to see that the project reaches fruition. It was persistent and unanimous agreement on the part of the Council that allowed the Town to purchase the water utility several years ago, and the same commitment will be necessary to complete this project.

Another significant challenge will be acquisition of the land needed for the Park. The Peck's Lake land is currently owned by Freeport McMoRan Copper and Gold, an international mining corporation with headquarters in Phoenix. Freeport acquired this property when they purchased the Phelps Dodge Mining Corporation several years ago. There is a significant possibility that the Town of Clarkdale and Freeport can reach agreement on a sales price for the necessary property that may include zoning changes beneficial to Freeport and other in-kind contributions. The remaining costs of the land acquisition may be provided by Industrial Development Bonds, public-private partnerships (PPP), or other traditional financing.

Permitting presents some unique and interesting challenges. These will be handled as all permitting is, with both the permitting agency and the Town recognizing that there will be new considerations and situations which may require creative thought. There will be vast benefits to that creativity.

Changes in the dominant paradigm are always challenging, but will be required for success. Close coordination with waste haulers in the area will be necessary to meet their requirements, and to convert them to using the Plasma Converter facility rather than traditional landfills. The benefits of tipping in Clarkdale, rather than at the Gray Wolf facility near Cherry, should be obvious. There may be a possibility of reclaiming and remediating the Gray Wolf facility and bringing the waste located there to the Clarkdale processing plant, thereby freeing up private land for future development by the owners.

Changes in how the residents of the Verde Valley see their place in the environment will be a necessary and natural consequence to the Park.

Transportation into and out of the Park area, especially in the Peck's Lake tract, are problematic. Currently there is only a single entrance and exit from the area, over the 2-lane Tuzigoot Bridge off Broadway. Additional industrial traffic, including municipal solid waste deliveries and additional commercial traffic may require changes to Clarkdale's circulation plan. It is notable that during the Phelps Dodge tailings remediation, traffic was well managed and had minimal impact on the rest of the Town.

A project of this size and potential impact will have numerous unforeseen roadblocks to success. The Town Council and the Town's management team will need to remain completely committed to the goals of sustainability and economic independence in order to meet and solve each of these new challenges as they arise. Creativity and a willingness to turn apparent problems into opportunities will be essential. With that in mind, it will be absolutely imperative that the Town place the right people in the right positions to guide this process to completion. Staff, Council, and Clarkdale's citizens will be presented with many difficult decisions throughout the creation of the Park, and they must have the enthusiasm and drive to make these decisions in thoughtful and productive ways.

Education of the residents of Clarkdale, the Verde Valley and the political leaders in State and Federal government will be a major component of the project's success. Citizens and leaders must be given all the facts and must fully understand both the challenges and benefits to this Park, as their support and approval will be essential. Each of the components of this Park is relatively new technology, so education about each of these will be an urgent and time-consuming job for our staff and Council. The public and political leaders must be engaged in the process for the project to succeed. The Council will be called upon to work even harder than it did during the acquisition of the Water Utility.

CONCLUSION

The core concept of the Sustainability Park is to produce energy, water and economies with as little environmental impact as is possible today. The Plasma Converter actually cleans up landfills, reduces atmospheric carbon, and eliminates hazardous environmental pollutants. The other facilities in the Park will all be chosen to fulfill sustainability principals. The result will be that a major industrial center in Clarkdale can produce energy, municipal revenue, and local economic development, as well as a world-class nature center, all with a carbon footprint as low as possible. Each facility in the Park should have a relationship, either synergistic, dependent, or as a supplier to one or more of the other facilities in the Park. The Clarkdale Sustainability Park will be a model for municipal operations that will teach sustainability and enhance America's energy and economic independence.

The reduction of greenhouse gases through reduced carbon footprint is a primary global goal, and one that cannot wait any longer. While individual efforts to reduce household energy consumption are appropriate and necessary, this plan will tackle that problem on a community-wide basis. In essence, when the Park is complete, it will have the same environmental benefits as if every house in Clarkdale had solar panels on the roof, everyone converted to compact fluorescent light bulbs, and we all drove hybrid vehicles!

It will be absolutely critical to the success of this project that we keep our minds open to new possibilities to enhance the way Clarkdale, and indeed all American cities and towns, operate. The plan outlined above is preliminary and conceptual, and must be expected and allowed to adapt to changing conditions and unforeseen opportunities. This process will be as evolutionary as it is revolutionary. The rewards for hard work and adaptive management of the project cannot be overstated.

Stakeholders

The list of stakeholders below is certainly not complete. Every citizen of Clarkdale, and indeed the Verde Valley, is a stakeholder in this major, cutting edge project.

The Town of Clarkdale
Freeport McMoRan Copper and Gold
Yavapai College
The City of Cottonwood
Yavapai County
Waste Haulers in the Verde Valley
Verde Exploration
Arizona State Parks
National Park Service (Tuzigoot NM)
Verde Valley Medical Center (medical waste)
Arizona Public Service
Clarkdale Metals
Salt River Materials Group
The Yavapai-Apache Nation
U.S. Fish and Wildlife Service
U.S. Bureau of Reclamation
U.S. Forest Service
Arizona Dept. of Environmental Quality
Arizona Game & Fish Department
Northern Arizona Audubon Society
Verde Watershed Association
Adjacent Homeowners
The Nature Conservancy
Salt River Project
Yavapai College Foundation

References/Resources

Plasma Conversion

Westinghouse Plasma Corporation : <http://www.westinghouse-plasma.com/>
Startech Environmental: <http://www.startech.net/>
Plasco Energy Group: <http://www.plascoenergygroup.com/>
St. Lucie County, Florida's Plasma Converter:
<http://www.tcpalm.com/news/2007/nov/10/30trash-zapper-gets-shot-in-arm-from-crist/>
Scientific American's article on Plasma Conversion:
http://www.scientificamerican.com/article.cfm?id=plasma-turns-garbage-into-gas&ec=su_garbagegas
Recovered Energy's web site on Plasma Conversion:
<http://www.recoveredenergy.com/index.html>
Plasma Conversion (Cont'd)

Advanced Plasma Power's web site: <http://www.advancedplasmapower.com/>
Biomass Magazine's article on Plasma Conversion:
http://www.biomassmagazine.com/article.jsp?article_id=1294&q=landfill
Wikipedia article on Plasma Arc Waste Disposal:
http://en.wikipedia.org/wiki/Plasma_arc_waste_disposal
Gasification Technology Council web site: <http://www.gasification.org/>

Photovoltaics

Wikipedia's article: <http://en.wikipedia.org/wiki/Photovoltaics>
The National Renewable Energy Laboratory's web site: <http://www.nrel.gov/pv/>

Algal Fuel

Wikipedia's article: http://en.wikipedia.org/wiki/Algae_fuel
The Oilgae site: <http://www.oilgae.com/>
East Valley Tribune article: <http://www.eastvalleytribune.com/story/134878>
Bill Gates invests in Algal Fuel: http://news.cnet.com/8301-11128_3-10043996-54.html

Biodiesel

Verde Biotrailors: <http://www.verdebiotrailors.com/index.html>
Wikipedia's article: <http://en.wikipedia.org/wiki/Biodiesel>
National Biodiesel Board's web site: <http://www.biodiesel.org/>

Important Bird Areas

Audubon IBA web site: <http://www.audubon.org/bird/IBA/>

Sustainability

EPA web site on sustainability: <http://www.epa.gov/Sustainability/>
Wikipedia's article: <http://en.wikipedia.org/wiki/Sustainability>

CONTACTS

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