

Wind Energy Development on Reclaimed Mining Sites

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Interwest Energy Alliance

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MINING

THE METAL MARKET.

Questions furnished by Chamberlain
Birmingham Ore Company.

Jan. 28, Silver, 61 1/4,	Lead, 62 1/2,
" 30, " 62,	" 3 1/2,
" 34, " 60 3/4,	" 3 1/2,
" 1, " 60 3/4,	" 3 1/2,
" 2, " 61 1/4,	" 3 1/2,
" 3, " 61 1/4,	" 3 1/2,

The Colorado & Wyoming Development company shipped the sample car of twenty-five tons of zinc ore to the American Zinc and Chemical company at Denver, this week. The shipment is made as an experiment, to enable the American company to determine with what success it can handle the large tonnage of zinc in the Wellington and other claims of Mineral Hill.

Good news comes from the Seneca mine, on North Star mountain, where a drift tunnel is being driven into the mountain with power drills. In driving along the Seneca vein, a "blind" cross-cut eight feet wide was encountered. A goodly portion of the vein will make fair-grade milling products; but the money lies in an 16-inch streak of straight smelting 800 goldores contained in it.

Mr. and Mrs. Edwin Anderson and Omer Spitzer, representatives of the United States Zinc company of Portland, were in town yesterday, to see with their own eyes the tremendous ore bodies which they had heard had been recently exposed on Mineral hill. They convinced themselves that the "Wellington" is a wonder of Summit county.

The friends of Mr. Frank E. Winton will be pleased to learn that the prospects of his getting his money out of the Keeneland property, at Frisco, are exceedingly bright. For several months explanation work has been going on at the mine, resulting in several very flattering disclosures. Several new and heretofore unknown ore bodies have been opened, some of it of a grade that is the best direct to the smelter, without milling. Prices and vicinity will very soon demonstrate to the world that capital invested there will sooner or later return flattering dividends.

The Mine and Smelter Supply company, of Dunbar, has several miners at work on the Silver Wing, at Montezuma, taking out a 50-ton lot of zinc, to test the value thereof. If the product can be marketed at a profit, it is proposed to work the mine vigorously with a full equipment.

The Copper Queen, one of Arizona's premier properties, is coming into the foreground under the intelligent management of the Mary Verna Mining Company. Today, in the breast of the highest tunnel, there is a 38-inch streak of 1000 gold ore in sight that is very good for new eyes. In order to cut the vein at much greater depth, a new crosscut tunnel will be driven from near the base of the mountain, and the surveys of the vein will be cut at a depth of 30 feet and at a point 314 feet from the starting point. Work on this new project will commence this morning. The whole property and proposition is assigned to the company, a number of whom are here, and a town yesterday among these being Mesquite, Pima, Siphon, Sandnes, Kase, Erenett, at 1, 2, and 3, C. P. Prier.

Lease and Bond

Ranch for Sale.
One of the most desirable ranches in the Blue, 267 acres, all patented, well improved and watered, situate six miles north of Dillon, for sale at a bargain.
PERCE, LAYNE, Dillon, Idaho.

THE ABANDONED MINE.

One of Colorado's Richest Assets
Some Old Properties that Have
Been Reworked.

The abandoned mine! What more
speaking illustration of ruin can be con-

The abandoned mine shafts have broken windows, sagging roofs and dripping shots of iron, the caving above has suddenly, often, timed.

Ted the abandoned mine is today a place where rich men are coming to give more attention than even the business new streets, says the Idaho Springs Mining Society.

The abandoned mines are the position sensitive for the huge development projects that are now being carried forward in all parts of the state, particularly where the ore deposits are in places like the townships.

The towns have the solidness of the mining industry, the discovery of the mine that it surface may have discovered the value; but if it were not for the one under water in the flooded shaft or in the reasonable under caving ground in which at one time were not abandoned, the towns would not be driven, the transmission lines stretched over the mountains or the electric transmission lines stretched

There are numbers of veins all over the country that have never been protected thoroughly, and these are fast becoming to be as rich as any of the old times. The limits of the mineral zone are constantly widening by reason of new discoveries, but nevertheless the old mines, many of which are abandoned at the time, are the substantial foundation for the anticipated profits of great investments.

ness is due to playing out of the controls on man, can say of any future venture, "It is over exhausted." The Connecticut State Police played a part in the investigation of the Golden Fleece. The Police Dive Unit set out in the morning when they arrive at the site. The tanks at the head of the list of great mines. As a rule, the abandonment of work in a mine upon a vein like these in the Connecticut Gold Mines, is a result of difficulties which have increased the cost of production above the value of the product in the most common and the most easily recovered cases of suspension. On such cases, the cost of suspension, together with the cost of the water, more mines than all other combined, and these two are now present recovered or renewable. Encountering water in the mine, which both in its volume and its destructive and character has obtained heavy expense.

the change of the ore from an oxidized to a sulfidized state, which is usually treated to a refractory state. In the past, both at about the same stage of the development of the mine, raised water appeared insuperable obstacles to further operations. The latter of these has been fully obviated by the introduction of pneumatic or chemical processes that have rendered the treatment of the ore

side are even more perfect, all at a cost no greater than the older processes for oxidized ore. The water problem is in line with solution in an effective way by tunnels which are penetrating every important mining section many hundreds of feet below the natural water level. The water problem became serious at the mines at depths varying from 250 to 700 feet, and but few of these were deep enough to sustain operation at greater depths. The tunnels entirely eliminated the water at depths of 3,000 feet and over. Where tunnels have not yet reached, the electrical transmission of power to mines of difficult access is making possible resumption of operations. Inexplicable when fuel had to be transported to the mine for generating the power.

Litigation, incompetent management

But let the difficulty be what it will, the abandoned mine is a known quantity, with enough of essential features known to enable the solution of the difficulty.

the problems. While new mines have come into prominence through the possibilities of profit afforded by better and cheaper facilities of mining, milling and transportation, yet the greatest and richest ore bodies are those of the depths of the old mines. The Old Town mine was an abandoned mine. The Gem was

DU L'ON DOINGS

Joe Warner took a representative of the Denver Live Stock company down to Grand county Wednesday whose business is to buy all the beef cattle and horses that can be found there.

The knowing ones and old-timers are advising everybody to look out for black snakes, as this storm is expected to come for sixty days, more or less.

Mr. Turney, who contracted for the timber's ranch, returned last Sunday last, after having made a deal with Mr. Hatcher for her property, is the man locally.

Commissioner Knorr was in town the first part of the week, doing a little horse trading. He sold as fine a horse as has ever been raised in the Elm valley to the Chinlees brothers, of Kokomo.

All Christian, who has been at work in Breckinridge, finding things more comfortable in a lower altitude, took the stage from the Elm Friday.

For the Studios.

The physics of extreme conditions still awaits satisfactory explanation. The

in violet terms to the physicist, but lost in most cases nests with the eye. We cannot tell. Astrophysics is in some sense situation. Astrophysics knows a little of the distribution of density in the stars or planets or the biological knowledge of the physics of chemistry of high temperatures would be as welcome to them as to us. "Astrophysics is a science of the future."

CATARRH

ELY'S CREAM BALM
This Remedy is a Specific,
Sure to Give Satisfaction.
GIVES RELIEF AT ONCE.

It cleanses, soothes, heals, and protects the diseased membrane. It cures Catarrh, drives away a Cold in the Head, cures Rheumatism, restores the Senses of Taste and Smell. Easy to use. Contains no injurious drugs. Applied into the nostrils and absorbed. **LARGE SIZE, 50 cents at Druggists or by mail; TRIAL SIZE, 10 cents by mail.**
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asthma, weak throats, weak
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the house. We have been
saying this for 60 years, and
so have the doctors.

"I have used Ayer's Cherry Pectoral to my
family for 40 years. In all the various
coughs, colds, and asthma, it has
proved a most valuable remedy."
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Only action of the bowels is necessary
to cure. Aid nature with Ayer's Pile
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many who have testified to the
benefits of Ayer's Cherry Pectoral.

The commonest rock-forming minerals are quartz, feldspar, mica, hornblende and augite, as they are composed of the elements chiefly represented in the earth's crust.

The more important secondary rocks include conglomerate, gill, sandstone, siltstone, shale, slate, limestone, marble and dolomite.

The development of abstract has among the Greek preceded the concrete knowledge of natural phenomena.

All our inductions are incomplete because there is a possibility of some unseen effect that has been omitted. In practice, and in ordinary speculation we are justified in assuming the sufficiency of our knowledge. But the scientific progress is justified in assuming the contrary, *i.e.* places, and, if it specializes on the existence of error, there is always the chance that some unlooked for circumstances may crop up to support him.

G. J. HARTUNG
D. D. S.

WILL BE AT
THE

**DENVER HOTEL,
BRECKENRIDGE,**
Ready for Business in the Dental
Profession,
on
Feb'y 11.

If in Need of Dental Service,
Have this Date in Mind, and
Make Arrangements for
Early Consultation.

It May Suit the Convenience of
Some to Know that the Doctor
Will Arrive in Town on
the Afternoon of
the 31st.

Always ahead of the line -- Watson
bites.

If you want an attractive calendar
call at Oakley's Cash Store.

**One of Colorado's Richest Assets —
Some Old Properties that Have
Been Reworked.**

The abandoned mine! What more speaking illustration of ruin can be conceived? The dismantled shaft-house, with broken windows, sagging roof and flapping sheets of iron, the caving shaft and mouldy, rotten timbers!

Yet the abandoned mine is today one of Colorado's richest assets, and is attracting more attention than even the bonanza new strikes, says the Idaho Springs Mining Gazette.

The abandoned mines are the positive incentive for the huge development projects that are now being carried forward, in all parts of the state, particularly where the ore deposits are in fissure veins. The tunnels have the additional

*Summit County Journal, Breckenridge, Colo.,
4 February 1905*

...but an *excellent* idea for today.



Somerset Windfarm, Pennsylvania

Advantages of mine redevelopment with wind energy

- Good transmission often in place
- Reduced environmental sensitivity
- Mines often located near good wind resources
- Strip and deep mines both good for wind redevelopment



Buffalo Mountain windfarm, Tennessee

Challenges in redeveloping mine sites with wind

- Biggest obstacle: foundation system
 - Wind turbine foundations are designed to handle enormous foundation loads
 - Wind turbine foundation systems are not capable of tolerating differential settlements induced from mine subsidence
 - Need to work on conditioning of soil and improving foundations
 - Sites often require a ground improvement technique such as deep dynamic compaction (DDC)
- Estimated added cost: 10% of foundation costs

Other matters relating to mine redevelopment



- Mines located at depths of 200 or more feet are generally considered deep mines.
- Wind turbine foundations have little or no impact over mines greater than 200' below the surface

Other matters relating to mine redevelopment, con't.

- Biggest concern with wind turbines over mines (surface or deep) is due to the potential influence of the mine (i.e. subsidence) on the wind turbine
- Records kept by mining companies of subsurface activities often prove to be valuable development tools



Kilronan windfarm, Ireland

Clipper Wind Power's New Argonaut Project

- 51 MW facility located in Needles, Calif.
- Cooperative relationship with Molycorp -- the turbines will be built in areas where Molycorp has existing mining claims
- Permitting is easier because land use has already been appropriately zoned/designated
- Concerns: no transfer of liability to wind farm from pollution/spill/environmental claims

Who is the Interwest Energy Alliance?

- American Wind Energy Association
- Coalition for Clean, Affordable Energy
- Colorado Farm Bureau
- Environment Colorado
- enXco
- Foresight Energy
- FPL Energy
- GE Wind Energy
- Grand Canyon Trust
- PPM Energy
- SeaWest Windpower
- Stoel Rives LLP
- Utah Clean Energy
- Vestas-American Wind Technology
- Western Resource Advocates

Interwest's approach...



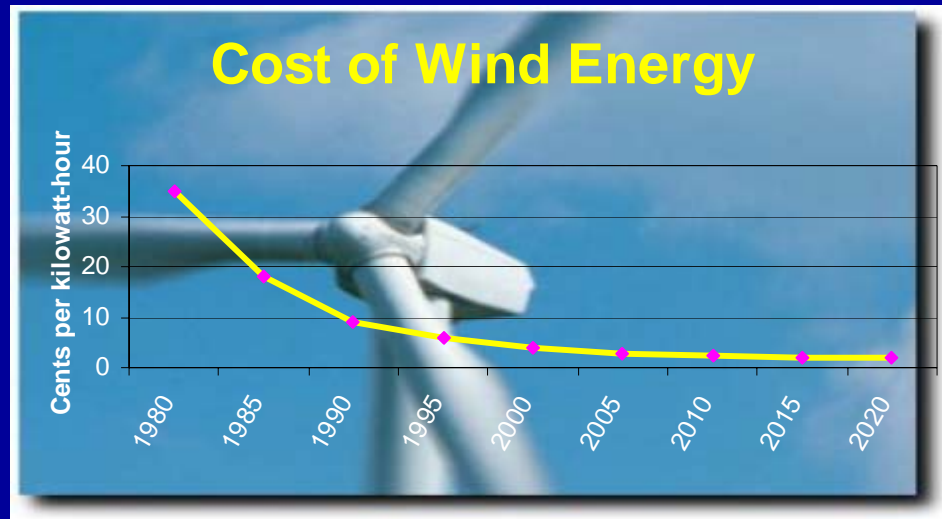
The Interwest Energy Alliance brings together a unique mix of industry and non-governmental advocacy groups to help facilitate a consensus-based approach to project development throughout the West.

Good communications



- Involve local communities, stakeholder groups, advocacy organizations, utilities, governmental bodies and other players
 - Identify champions
- Try to resolve issues of concern before they make headlines
- Learn from success of other redevelopment projects

Wind energy is cost-competitive and market-ready



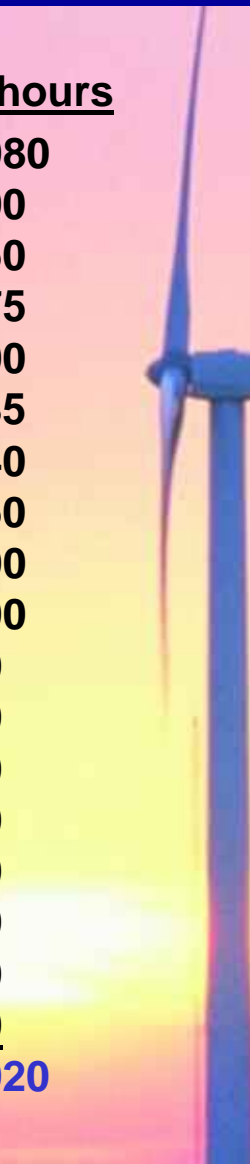
- In a 2001 decision, the Colorado Public Utilities Commission declared that the 162MW Lamar windpower facility will “likely lower the cost of electricity for Colorado’s ratepayers.”
 - Ancillary services deemed not to be a major cost; wind received fair capacity value; new wind energy predicted to cost less than natural gas when gas is above >\$3.50 MMBTu

Xcel Energy Says Wind Energy Will Save Consumers \$4.6 Million

- The new wind farm that Xcel Energy is building near Lamar will save consumers \$4.6 million in their power bills.

*–From Xcel Energy testimony by Ronald Darnell to FERC,
16 June 2003*

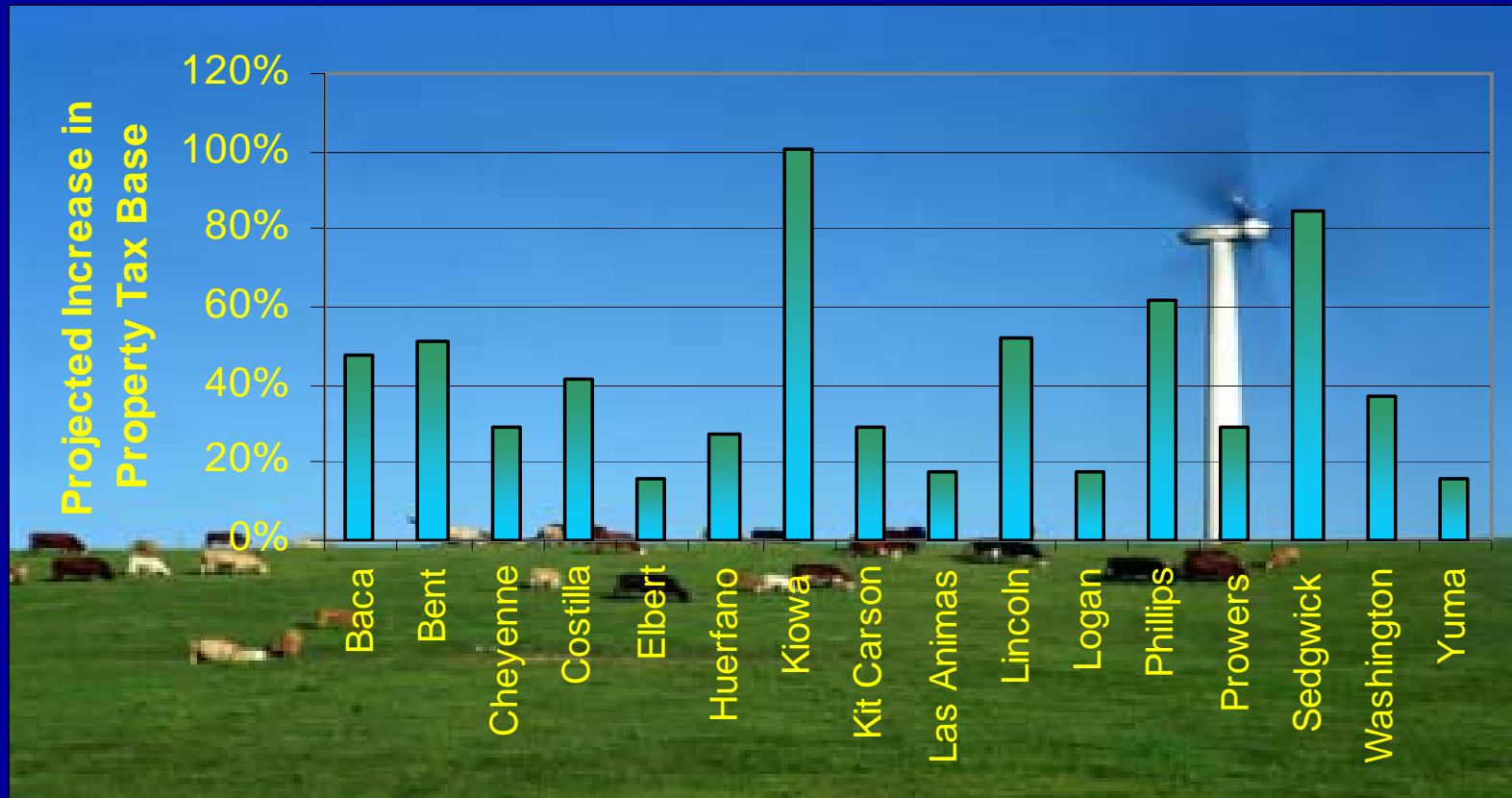
Site Services for a Typical 100MW Windfarm



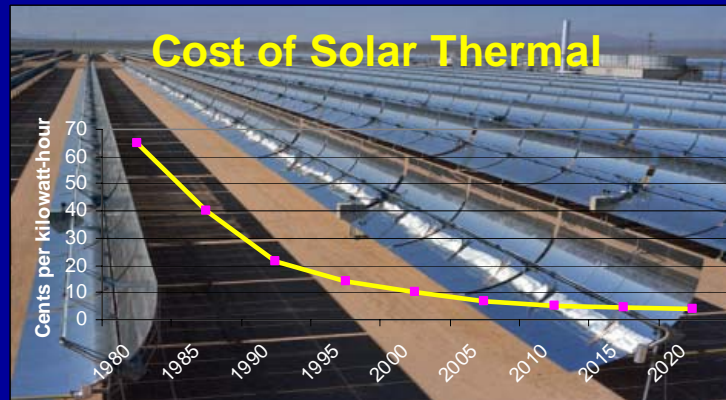
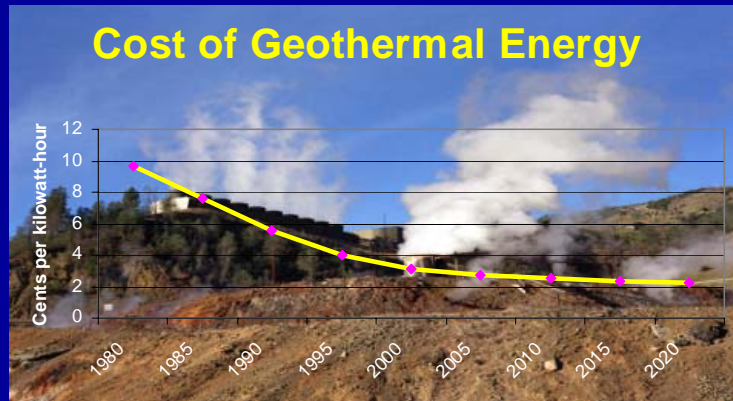
	<u>Man-hours</u>
Turbine & Tower Installation Svcs.	121,080
Concrete Construction Services	72,000
Equipment Transportation Services	42,650
Project Management Services	36,775
Engineering & Surveying Services	25,300
Vendor Field Services	20,535
Road Building Services	18,940
Underground Cable Installation Svc.	17,250
General Labor Services	15,000
Local Material Delivery Services	12,500
Electrical Installation Services	8,770
Concrete Services	6,800
Equipment Repair & Fueling Svc.	6,000
Inspection & Testing Services	5,000
Food Preparation & Delivery Svcs.	3,500
Housing & Lodging Services	3,000
Real Estate & Legal Services	2,800
Communication System Services	<u>1,120</u>
	419,020

The total site services required for construction of a typical 100MW windfarm is about 419,020 man-hours—equivalent to approximately 53,377 days of work at the site.

Projected Tax-base Increases of a 162MW Windfarm in Some Colorado Counties



Other renewable technologies also experiencing plunges in cost



Source: NREL Energy Analysis Office. These graphs are reflections of historical cost trends, not precise annual historical data.

Thank you!

Craig Cox

Interwest Energy Alliance

www.interwest.org

303-679-9331

Buffalo Mountain windfarm, Tennessee