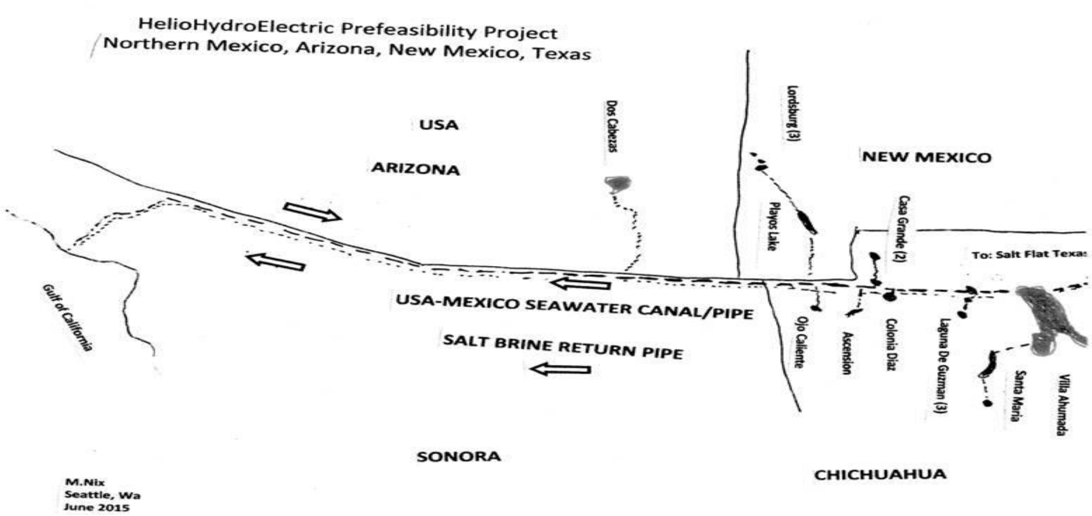
HelioHydroElectric Potential
Prefeasibility Study
California,Nevada,Utah,Arizona,New Mexico,Northern Mexico

Prepared by Martin Nix B.U.S, A.A.S Seattle, WA, June, 2015

ABSTRACT: HelioHydroElectric is a little known solar engineering technology, using salt/sea water and solar power to create evaporation ponds for artificial rain in deserts. The Western United States and Northern Mexico have large HelioHydroElectric resources. Located in the Western North American Continent are dry endorheic salt lakes. These can be flooded with salt/sea water to create clouds from evaporation. The additional rainfall would increase vegetation, thus removing carbon dioxide from the atmosphere. HelioHydroElectric technology is the only technology that can actually remove carbon dioxide from the atmosphere. The additional rainfall in Western USA and Mexico will increase agriculture and provide new living space. Not only can salt/sea water be used, but also underground alkali aquifier water can be used to flood these dry salt lakes. It is proposed that wind and solar power be used, along with energy conservation, for water pumping. Development of HelioHydroElectric has the potential of solving the drought problem in California. 171 sites were evaluated for potential, and it is concluded that it will require approximately 10,000 megawatts to flood these proposed sites, creating approximately 1 billion cubic feet each day of additional rainwater in this desert region. It is hoped this paper will spur conversations and funding for a full feasibility study.

INTRODUCTION: Proposed is the pumping of salt/seawater inland to the Western United States and Northern Mexico for flooding of existing dry salt lakes to create clouds, and thus artificial rain. This technology, known as HelioHydroElectric technology, will create more vegetation in the desert, region and in mountains, thus reversing Global Warming. It will stimulate the economy of the Western United States and Northern Mexico. Solar pumping technology is now very well developed. This Prefeasibility study is mostly to study the potential for construction of such a project. It is hoped that funding for a complete Feasibility study can be located so as to determine the environmental impact, climate impact, and economic impact along with construction plans and cost. Israel, Jordan and Palestine are presently constructing the Red to Dead Sea project, so as to add additional moisture to the region. Egypt has under study the Qattara Depression project. This is being reviewed elsewhere. Iran and Pakistan are considering HelioHydroElectric projects, with HelioHydroElectric Society assistance.

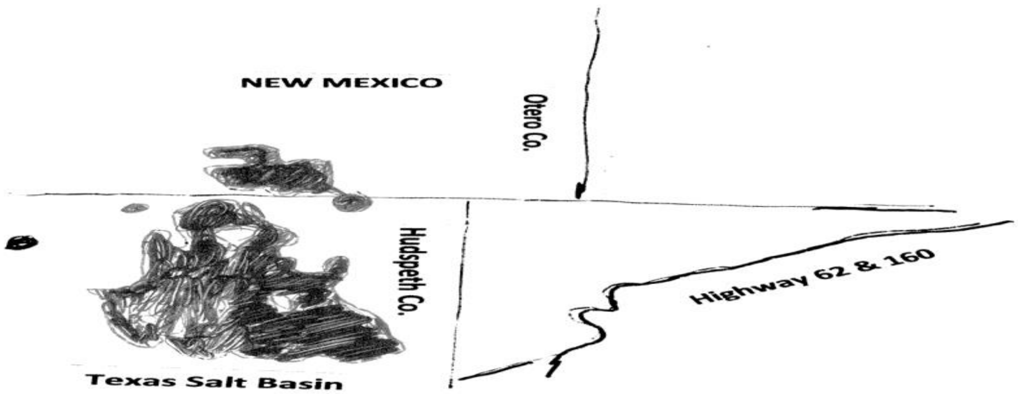
METHODOLOGY: Calculations were conducted to get a general idea of the power consumption required for pumping this large volume of salt/seawater inland. It should be noted that locating geologic information for these sites is difficult. The author found it difficult in some cases to get accurate geologic data, so apologizes for any misspellings of locations. Sites were identified. Surface area of these dry lakes was estimated, along with elevation. The evaporation rate is unknown for these locations; however, it was assumed that 1% of the surface area would evaporate per day. While evaporation rate data is unknown, it was assumed that each square foot of surface of flooded water had 2,000 btus per day of solar energy. Water boils at 212 degrees. The heat of evaporation is 972 btus/lb. Numerous factors are involved with evaporation rate, including reflection from sunlight, altitude, cloud cover, temperature, salinity, and so on. The author would use names and data of nearby geologic features to indicate the location of the evaluated site in information as absent. Calculations were based on surface area and elevation, to obtain foot pounds and then the power consumption for water pumping was calculated. Variations of data are subject to rounding calculator error. Despite the lack of geologic data, still a lot can be determined, and hopefully it will spur further research. (Source of data: Wikipedia)

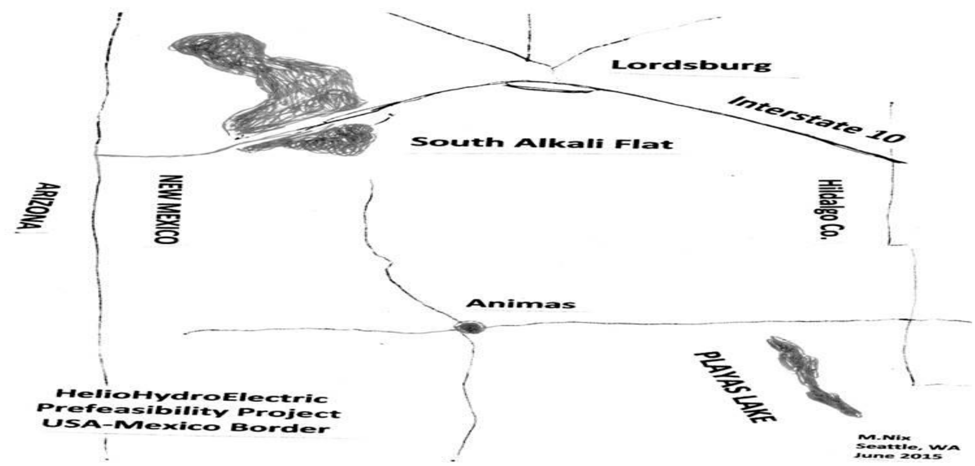


	Northern Mexico		
Name of Site	Evaporation Rate per Day	Evaporation Rate per Second	Power Requirements for Pumping
Santa Maria	5,575,680	64.00	21.00
Laguna De Patos	27,878,400	322.00	105.00
Ojo Caliente	2,787,840	32.00	12.50
Colonia Diaz	278,784	3.20	1.09
Laguna De Guzman	2,787,840	32.20	10.79
Villa Ahumada	836,352	9.68	3.27
Casa Grande	836,352	9.68	3.27
Salton Sea	95,622,912	1106.00	-21.1
El Centro-U.S.Navy	27,878,400	322.00	-2.7
Laguna Salada	83,635,200	968.00	-2.5
Totals	43,769,088 cubic feet/day	504.76 cubic feet/sec	168.52 Megawatts*

*Power requirements do not include inefficiencies, such as transmission loses, pump loses, or friction in water pipes or other conversion loses. Assumes 100% efficiency.

Note: Northern Mexico, especially in Chihuahua, has extensive dry lakes. Of concern is the Samalayauca Dune Fields. This region has unique species that has adopted to the drought. There are numerous ranches in the area, which could use the additional rain water for cattle. The New Mexico Geological Society has done extensive analysis of the geology of the region. The Salton Sea, El Centro, and Laguna De Salada are below sea level.

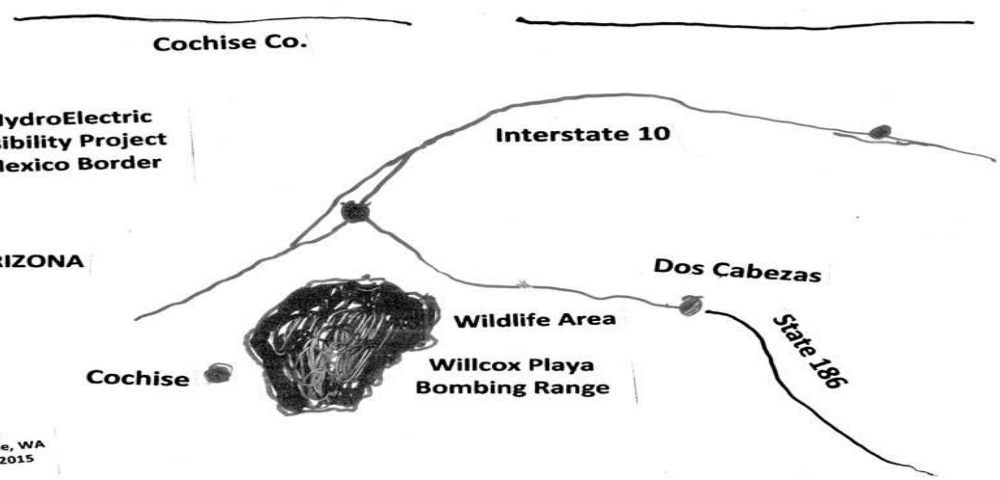




New Mexico (Texas)

Name of Site	Evaporation Rate per Day	Evaporation Rate per Second	Power Requirements for Pumping
San Agustin	**2,787,840**	**32.20**	**19.40**
Lordsburg	**8,363,520**	**96.80**	**34.40**
White Sands Dry Lake	**1,115,136**	**12.90**	**4.60**
Playas Lake	**2,787,840**	**32.20**	**11.6**
Luna Co.	**2,787,840**	**32.20**	**11.8**
West Texas Salt Basin	**16,727,040**	**193.60**	**6.8**
Totals	**34,569,216 cubic feet/day**	**399.90 cubic feet/sec**	**88.6 Megawatts***

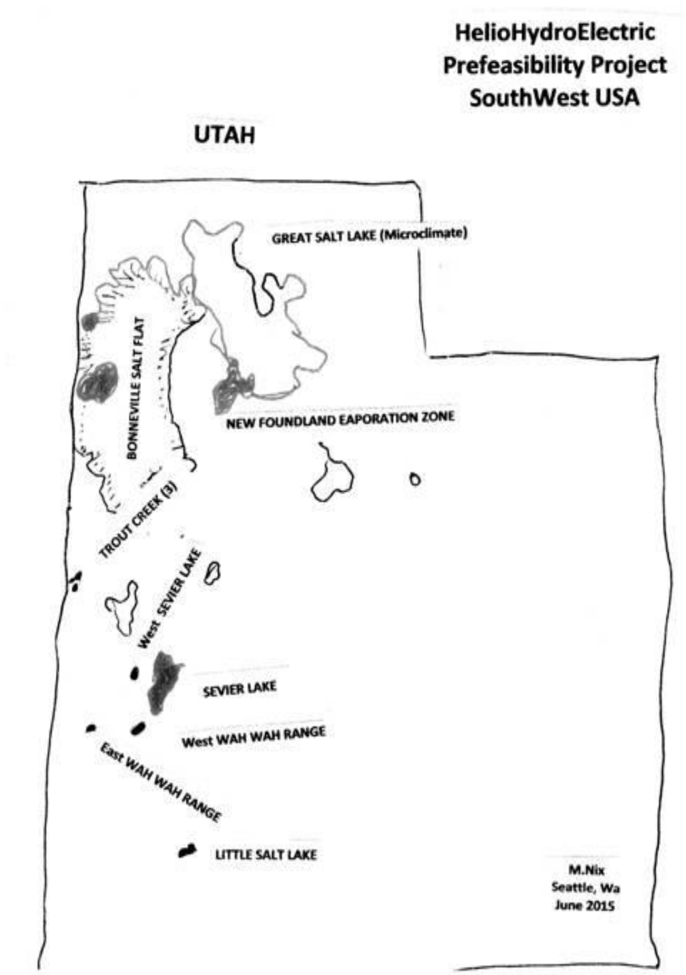
*Power requirements do not include inefficiencies, such as transmission loses, pump loses, or friction in water pipes or other conversion loses. Assumes 100% efficiency.



Name of Site	Evaporation Rate per Day	Arizona Evaporation Rate per Second	Power Requirements for Pumping
Little Captain	278,784	32.20	1.50
Red Lake	6,969,600	80.60	23.2
Beautiful Valley	278,784	3.2	1.38
Oatman	1,393,920	16.13	2.48
Holbrook	2,420,352	28.01	12.04
Navaho Spring Dry Lake	278,284	3.20	1.30
Big Maria	2,187,840	25.32	1.57
Barry Goldwater AFB	27,878,400	322.6	6.71
Wilcox 27,878,400	6,969,600	80.6	29.33
Totals	**48,655,564 cubic feet/day**	**591.86 cubic feet/sec**	**79.51 Megawatts***

*Power requirements do not include inefficiencies, such as transmission loses, pump loses, or friction in water pipes or other conversion loses. Assumes 100% efficiency.

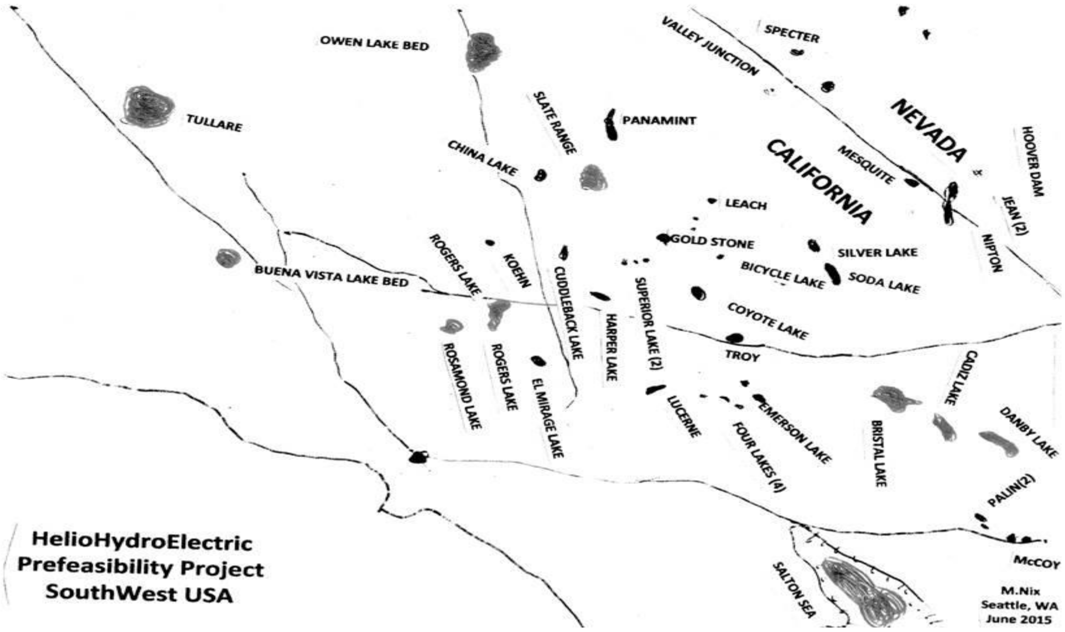
Note: Of special interest is Red Lake, south of Lake Mead. This area has extensive underground salt water resources. Holbrook also has extensive salt water resources. Often the endorheic lakes are associated with a basin that is larger in area that can be flooded. However, there is often existing development in place. Of interest also is the Wilcox dry lake. This is a national historic site, in that it has a significant amount of ancient pollen. With development of HelioHydroElectric, fresh water can be restored to this lake. It should be noted that with HelioHydroElectric it will put fresh water into existing hydroelectric reservoirs, such as Lake Mead. The Barry Goldwater Air Force Base has large potential. It should be noted also that there are sites on Navaho Tribal Lands, the tribe should consider this as part of their future economic development plans. HelioHydroElectric would put additional rainfall in the area, thus increasing vegetation for sheep, and agriculture.



Name of Site	Utah Evaporation Rate per Day	Evaporation Rate per Second	Power Requirements for Pumping
Great Salt Lake Desert	357,568,000	4138.00	2,293.00
Bonneville Salt Flat	11,151,360	129.00	45.89
Great Salt Lake Dry Lake	338,724	3.90	1.30
Dugway	338,724	3.90	1.39
Cedar Valley Sink	1,393,920	32.20	10.79
Snake Valley Dry Lake	2,787,840	32.20	18.20
Fish Spring Flat	2,787,840	32.20	18.00
Tule Valley	2,787,840	32.20	18.00
Sevier Dry Lake (I)	278,784	3.20	1.80
Clear Lake	6,969,600	80.60	32.09
Sevier Desert Lake (II)	1,115,136	12.90	5.13
Wah Wah Valley	1,393,920	16.13	6.69
Sevier Lake (III)	27,878,400	322.60	133.85
Pine Valley	836,352	9.68	34.0
Totals	417,626,440 cubic feet/day	4829 cubic feet/sec	2,585 Megawatts*

***Power requirements do not include inefficiencies, such as transmission loses, pump loses, or friction in water pipes or other conversion loses. Assumes 100% efficiency**

Note: The military bases near Salt Lake City have extensive HelioHydroElectric resources. Of interest is the New Foundland Evaporation Area. When Salt Lake City is flooded, pumps divert flood water to this area for evaporation. This is the nation's only operational HelioHydroElectric project, though not seen as such. The Great Salt Lake Desert has huge potential for development.

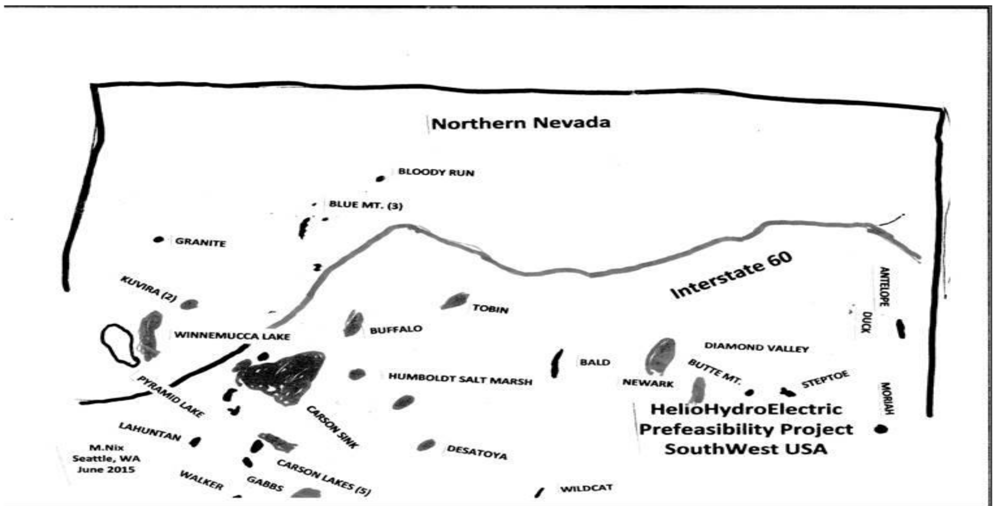


Name of Site	Evaporation Rate per Day	California Evaporation Rate per Second	Power Requirements for Pumping
Owl Lake	278,784	3.20	0.45
Trana Alkali Flat	1,151,360	129.06	19.11
Servies Valley	2,787,840	32.20	4.49
Mesquite Lake	5,575,680	64.53	9.61
Rogers Lake	22,302,720	258.10	53.87
Superior Lakes (3)	836,352	9.68	2.45
Harper Lake	11,513,360	129.06	22.11
Koehn Salt Dale	2,509,056	29.04	4.72
Cuddelback	4,181,760	48.4	10.45
Langford (Fort Irwin)	2,787,840	32.20	4.61
Coyote Lake	6,690,826	77.40	11.07
Silver Lake	836,352	9.68	0.76
Soda Lake (Mojave)	15,581,304	180.00	29.00
Bicycle Lake	6,690,816	77.44	15.37
Drinkwater Lake	1,393,920	16.13	5.58
Nelson Lake	557,568	6.4	1.67
McLean Lake	278,284	3.2	0.62
Ivanpah Lake	10,036,224	116.60	25.64
Rosamond Lake	7,805,452	90.34	17.03
Buckhorn Lake	11,151,360	129.06	24.32
Upper Johnson Valley	1,393,920	16.10	2.18
Galway	557,568	6.45	0.87
Soggy Lake	1,115,136	12.90	1.74
Bagdad Dry Lake	1,115,136	12.90	0.82

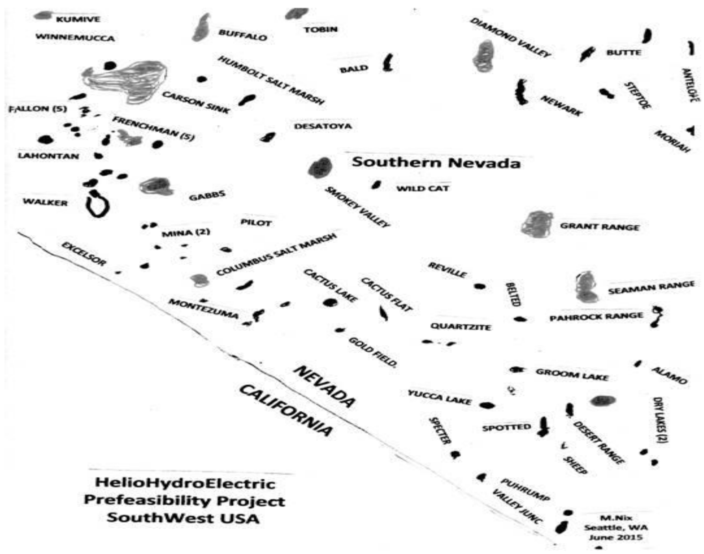
Bristol Lake	**27,878,400**	**322.60**	**16.39**
Cadiz Lake (I)	**2,509,056**	**29.04**	**1.94**
Danby	**836,352**	**9.68**	**0.64**
Trilobite	**1,672,704**	**19.30**	**1.29**
Ward Valley	**278,784**	**3.20**	**0.82**
Upper Surprise Valley	**8,363,520**	**96.80**	**36.87**
Middle Surprise Valley	**5,575,680**	**64.53**	**24.57**
Forty Nine Dry Lake	**4,181,760**	**48.40**	**18.43**
Long Valley Dry Lake	**2,782,840**	**32.20**	**12.26**
Lower Surprise Valley	**3,345,408**	**38.72**	**14.74**
Red Rock	**278,784**	**3.20**	**1.22**
Boot Lake	**278,784**	**3.20**	**1.24**
Grasshopper Valley	**2,787,840**	**32.20**	**12.29**
Little Mud Flat	**278,784**	**3.20**	**1.00**
Duck Lake	**278,784**	**3.20**	**1.00**
Honey Lake	**20,351,232**	**235.50**	**77.70**
Deep Spring Lake	**557,568**	**6.20**	**2.80**
Thibald Pond (Duck)	**278,784**	**3.20**	**1.00**
Airport Lake	**836,352**	**9.68**	**1.80**
China Lake	**2,787,840**	**32.20**	**6.18**
Owens Lake	**48,787,200**	**564.60**	**169.93**
Sheephole	**2,787,840**	**32.20**	**5.46**
Danby Lake	**5,018,112**	**58.08**	**6.59**
Cadiz Lake (II)	**6,969,600**	**80.86**	**9.18**
Bushdale	**557,568**	**6.40**	**1.00**
Palen Valley	**2,787,840**	**32.20**	**5.34**
Cactus Plain	**2,787,840**	**32.20**	**2.73**
Rice Valley	**2,787,840**	**32.20**	**2.27**
Totals	**290,439,544 cubic feet/day**	**3356 cubic feet/sec**	**706.94 Megawatts***

***Power requirements do not include inefficiencies, such as transmission loses, pump loses, or friction in water pipes or other conversion loses. Assumes 100% efficiency**

Note: Of special interest is Lake Owens. This particular lake has the most severe dust pollution of any lake in the United States. Residents constantly complain of irritation from the dust. There have been failed attempts to restore the lake's habitat. By flushing salt/alkali water through this lake, it will solve the dust pollution, but also add moisture to the region. The Paiutes of Big Pine, CA claim this area as their ancestral home. The tribe should be allowed to develop Lake Owens, as part of their economic planning. Ward Valley has special significance to Native Americans. Ward Valley is the home of the desert Tortoise, a protected species. Any HelioHydroElectric projects will need to be sensitive to these concerns. Many of the other sites already have economic development in place, such as airports. However, there are ways of integrating evaporation projects, so as to co-exist. It is not the intent to pump seawater inland to Death Valley National Park, or other environmentally sensitive areas.


Northern Nevada
BLOODY RUN
BLUE MT. (3)
GRANITE
KUVIRA (2)
WINNEMUCCA LAKE
PYRAMID LAKE
LAHUNTAN
M.Nix
Seattle, WA
June 2015
WALKER
GABBS
CARSON LAKES (5)
CARSON SINK
BUFFALO
TOBIN
HUMBOLDT SALT MARSH
DESATOYA
WILDCAT
BALD
Interstate 60
NEWARK
DIAMOND VALLEY
BUTTE MT.
STEPTOE
ANTELOPE
DUCK
MORIAH
HelioHydroElectric
Prefeasibility Project
SouthWest USA


WINNEMUCCA
CARSON SINK
WILD CAT
WALKER
COLUMBUS
SALT MARSH
NEVADA
RAILROAD VALLEY
COAL VALLEY
DELAMAR
PAPOSE
PAHRUMP
INDIAN SPRINGS
CALIFORNIA
SALTON SEA



Nevada

Name of Site	Evaporation Rate per Day	Evaporation Rate per Second	Power Requirements for Pumping
Pahroc Dry Lake	5,575,680	64.53	33.87
Seaman	6,696,600	80.60	40.97
Delamar	1,672,704	19.36	10.23
Frenchman Lake	1,115,136	12.90	4.43
Indian Spring Valley	2,787,840	32.20	8.63
Moapa Dry Lake	278,784	3.20	0.32
Arrow Canyon Dry Lake	278,784	3.20	0.32
Dogbone Lake	2,787,840	32.20	6.82
Sheep Desert Lake	8,363,520	96.80	20.40
Pahrump Valley	1,672,704	19.36	4.40
Pahrump Dry Lake	278,784	3.20	0.73
Bonnie Claire	2,787,840	32.20	5.46
Death Valley Junction	557,568	6.40	1.10
Railroad Valley	2,787,840	32.60	13.60
Cave Valley	5,575,680	64.52	33.62
Clayton Valley	8,363,520	96.80	35.41
Silver Peak Alkali Lake	1,115,136	12.90	4.72
Mud Lake (Nellis AFB)	5,575,680	64.53	31.08
Antelope Lake (Cactus Flat)	557,568	6.45	2.73
Railroad Valley (Reveille)	1,951,488	22.50	13.38
Groom Lake (Nellis AFB)	557,568	6.40	2.43
Kavich Valley	1,393,920	16.10	6.82
Buena Vista Valley	5,575,680	64.53	28.51
Carson Sink	1,393,920	161.33	54.22
Humbolt Salt Marsh	1,393,920	16.13	4.70

Grass Valley	4,181,760	48.40	10.24
Diamond Valley Alkali Flat	20,908,800	242.00	133.17
Ruby Valley	6,969,600	80.60	41.51
Goshute Lake	4,181,760	48.40	23.97
Butte Valley	6,969,600	80.60	40.29
Jean Dry Lake	557,568	8.40	1.50
Sarcobatus Flat	8,375,680	96.90	40.12
Amargosa Valley	278,784	3.20	0.72
Big Smokey Valley (Toiyable)	5,575,680	64.50	34.97
Dead Horse	2,787,840	32.20	10.92
Desatoya	6,969,600	80.6	41.29
Labou Flat	557,568	6.45	2.10
Bean Flat	557,568	6.40	3.20
Little Smokey Valley (II)	557,568	6.40	32.0
Newark Lake	836,352	9.68	4.70
Spring Valley	5,575,680	64.50	12.86
Soda Spring Valley	278,784	3.20	1.10
Rhodes Salt Marsh	836,352	9.68	3.50
Columbus Salt Marsh	6,969,600	80.60	30.80
King Desert Valley	6,969,600	80.66	30.04
Gallaher Flat	8,363,520	96.80	36.10
Sob/Burnt/Willow/Garden Lake	1,115,136	12.90	7.86
Black Rock	557,568	6.40	2.18
Smoke Creek (Empire)	27,787,400	322.60	105.22
Blue Mountain Desert Valley	5,575,680	64.50	21.85
Rockland Flat	6,969,600	80.66	37.56
Snow Water Lake	557,568	6.40	3.03
Dry Lake Flat	278,784	3.20	1.50
Double Check	3,624,192	41.94	13.84
Blue Wing Flat	3,363,530	96.80	32.42
Kurnlua Valley	1,115,136	12.90	4.37
Ferney Sink	557,568	6.45	2.18
Middle Lake	557,568	6.40	3.00
Forty Nine Lake	278,784	3.20	1.50
Alkali Flat Lake	1,393,920	16.2	7.64
Mud Lake (Washow)	278,784	3.20	1.51
Cow Lake	278,784	3.20	1.51
Calcutta Lake	278,784	3.20	1.51
Central Lake	278,784	3.20	1.51
Swan Lake	557,568	6.40	2.68
Mosquito Lake	1,393,920	16.10	7.77
Westlake (2)	836,352	9.68	5.10
Massacre Lake	1,115,136	12.90	6.05
Fatty Martin Lake	278,784	3.20	1.70
Boulder Dry Lake	178,784	3.20	1.50
Totals	**235,027,072 cubic feet/day**	**2863 cubic feet/sec**	**1150.0 Megawatts***

Note: Nevada (and Utah) has a higher altitude than California, thus has higher energy requirements for pumping. The state has numerous small sites that can be exploited.

SUMMARY OF RESULTS

Name of Site	**Evaporation Rate Cubic Feet per Day**	**Evaporation Rate Cubic Feet per Second**	**Power Requirements for Pumping Megawatts**
USA-Mexico Border	**43,769,088**	**504.76**	**168.52**
New Mexico	**34,569,216**	**399.90**	**88.60**
Arizona	**48,655,564**	**591.00**	**79.51**
Utah	**417,626,440**	**4829.00**	**2585.00**
California	**290,439,544**	**3356.00**	**706.95**
Nevada	**235,027,072**	**2863.00**	**1150.00**
GRAND TOTAL	**1,070,086,924 cubic feet/day**	**12,542.00 cubic feet/sec**	**4778.58 MegaWatts***

***Power requirements do not include inefficiencies, such as transmission loses, pump loses, or friction in water pipes or other conversion loses. Assumes 100% efficiency.**

SOLAR PONDS: One source for small ranches and farms for HelioHydroElectric are Solar Ponds. These are small salt lakes. These can be covered optionally by a greenhouse, which can distill water from condensation. The graduate heat difference between the bottom and top of the salt lake can generate small but significant amounts of electricity, using heat transfer fluids. Furthermore, these can grow algae for farm fuels. These can add small but significant moisture to a local ranch.

SOURCES OF SALT WATER: There are two major sources of water for evaporation lakes. The first is the ocean itself. Pipes and canals can be constructed, perhaps paralleling highways. One proposed route is along the USA- Mexico border. (Good borders make for good neighbors). Another source of salt water is underground aquifers. Underneath Arizona, Utah and Nevada is a huge underground ocean of alkali water. This geologic aquifer is so huge, it is rumored the US Navy has been exploring with submarines. Using solar and wind power pumps, this underground alkali water can be pumped to the surface. It should be noted that the chemical makeup of ocean water is different from underground alkali water. Underground alkali water is ancient water, with the chemical makeup of oceans many centuries ago.

FLUSHING SALT BRINE: It is proposed that an underground tunnel pipes be built, using either cut-and-cover technology, or deep bore tunneling. The construction of these Salt Brine Tunnels will flush salt from the evaporation lakes, thus extending their useful lives. Thus, returning the salt from evaporation back to the ocean. This makes these evaporation sites sustainable in the future. The ocean is approximately 3% salt. Concentrated salt brine (i.e. 27%) can then be piped back to the ocean. These Salt Brine Tunnels would parallel the planned canal/pipes, and would be smaller diameter, since their major purpose is transportation of concentrated salt. The constant flushing of these evaporation lakes will help in control of algae, and make the lakes more habitable for wildlife.

MICROCLIMATE EFFECT: It should be noted that once these salt dry lakes are flooded with salt water, the evaporation from rain water builds up in the surrounding mountains and plains. Fresh rain water is locked up in plants, fresh water lakes, and underground aquifers. Plants and trees also add moisture to the air. Each year, the evaporation is cumulative. The first year, for example, one cubic mile of fresh rain water is added to the environment, the next year another cubic mile, the year following another cubic mile. Gradually moisture builds up in the local environment. Of note, the Great Salt Lakes in Utah has its own microclimate effect that can be used as a model of other HelioHydroElectric projects. Still, conservation efforts, such as water retention, soil control and also rain barrel water storage on homes and buildings should be implemented. Evaporation from farms, algae farming, salt evaporators, forest, fresh water lakes, and so on, add additional rainfall. As a general rule, evaporation from lower desert regions travel to mountain tops for rain. Due to the jet stream, weather travels primarily from the west to the east.

IMPACT ON GLOBAL WARMING: The additional rainfall in the desert should increase the amount of vegetation. The vegetation will remove carbon dioxide from the atmosphere. With the upcoming treaty conference in Paris, in December, a HelioHydroElectric Treaty can be proposed by the United States, so as to offset carbon dioxide emission. Development of HelioHydroElectric projects, will increase the amount of moisture in deserts, replenish underground fresh water aquifers, and increase the amount of snow pack in mountains. It is estimated that these will restore water in the Colorado and Rio Grande rivers. This should be of special interest to the Interstate Compact states of Utah, New Mexico, California, Nevada, Colorado, Arizona, and Wyoming.

POWER REQUIREMENTS: The power requirements to pump this large volume of seawater inland are huge. However, this is not impossible. While it is beyond the scope of this Prefeasibility study, it is believed by the author that with rapid development of solar energy, and with energy conservation, it would make this electrical power available for salt water pumping. There are numerous technologies that can be implemented, including Photovoltaic panels on residential and commercial buildings. (These make the meter run backwards.) The list is nearly endless in solar technologies that can be implemented to achieve electricity conservation: solar hot water, solar cooking, solar salt water distillation, solar lighting, micro wind turbines, paddle wheel systems on canals, solar greenhouses, rain barrels, solar smelters, solar water pumping, solar powered air conditioning, night sky radiation refrigeration, biomass conversion, biofuels, energy efficient appliances and so on. This technology would employ people, and would be a new export industry. A lot of the problem of electrical supply is lack of capacity in the distribution and transmission lines. With better load management, energy self-production, and conservation, it would make electricity available for the HelioHydroElectric projects. The goal would be to have people “make their own energy”. Good models to follow are the efforts of Denmark, Netherlands, and Germany.

BIOFUEL PRODUCTION: These flooded salt lakes also have another gift: algae. Algae can be converted to biofuels. Thus creating a new energy source. The airlines are exceptionally interested in BioJet fuels made from algae. Calculations for the potential of biofuels was not done, but can be done as part of the feasibility study, thus offsetting the cost of construction. The amount of carbon dioxide removed from HelioHydroElectric development has not been calculated, but can be.

NATURAL GAS OPTION FOR SEAWATER PUMPING: Natural gas is often used for irrigation pumping. There are sufficient natural gas supplies in the region. Often times it is a waste product from oil production, where natural gas is flared. Natural gas can be used for pumping seawater for the HelioHydroElectric project. The goal is to make this project sustainable from generation to generation in the future. If natural gas is utilized, plans should be implemented for eventual conversion to solar and wind energy. This can be done. For example, solar energy can break down water to hydrogen. It is feasible to convert coal power plants, natural power plants (and even nuclear power plants) to be powered by solar energy. The technology exists. It is unknown if the amount of carbon dioxide generated by natural gas combustion would be offset by the additional vegetation grown, but this can be determined. It will be necessary to use natural gas for construction materials for the project. Concrete for pipes and canals would be need natural gas to power the factories. It should be noted that the heat of exhaust (as from a natural gas generator) or steam from a cooling tower, can evaporate salt water so that it adds additional rainfall to the region. Natural gas when combusted, creates water vapor and carbon dioxide. Natural gas is an option.

BETTER LOAD MANAGEMENT OF EXISTING ELECTRICAL SYSTEM: It will be impossible to achieve electrical stability with traditional “flat rates”, where everyone pays the same. All electrical power does not cost the same to generate. Nuclear power being the most expensive, while hydro power is often the lowest. Often times the various energy sources for generation for electrical power is averaged, mixing the cost together. By going to a “the more you use, the more you pay” rate structure, it will encourage “mega wasters” to conserve. For example, the first 500 Kilowatts would be 3 cents per Kilowatt; the second 500 Kilowatts would be 6 cents, the next 500 Kilowatts 9 cents, and so on. A low income grandmother, for example, who only uses a small amount for a light and a refrigerator, would only pay a few dollars a month. However, someone with a large mansion, who consumes nearly 100,000 Kilowatts, would pay on upwards to $1000 a month. It would give the mansion owner an incentive to install solar panels, or implement conservation measures. It would employ people installing the equipment. Another option for business would be Time of Day Metering, where in day, when there are shortages of electrical power; a business would pay say, 50 cents per Kilowatt. But at night when electrical is very available, the business could pay only 5 cents per Kilowatt. This gives business a financial incentive to implement conservation and energy self production. It is beyond the scope of this Prefeasibility study to discuss load management, but this could be a method to make electricity available for the large amount of electricity required for pumping for the HelioHydroElectric project.

TRANSPORTATION ISSUES: Transportation is one of the biggest consumers of energy. It is encouraged that more efficient, and less carbon intensive forms of transportation be implemented. Over dependency on Single Occupancy Vehicles is very wasteful and costly. The cost of highways and parking and related infrastructure is huge. However, by implementing different forms of transportation, such as a national bicycle trail system next to every federal and state highway, better rural transit, and alternative fuels, it will reduce the cost of living, thus allowing for better financing of construction of HelioHydroElectric. Driverless cars, and postal service delivery via drones flying over highways, adds a futuristic dimension. Construction of HelioHydroElectric sites will put a demand on the transportation system.

MILITARY INVOLVEMENT: What we need is a Declaration of War on Global Warming, not “nation vs. nation”. It is ironic to think that the battle front line is on the military bases, but U.S. military bases do have extensive HelioHydroElectric sites. The military can construct these projects, as part of the capital budget plans.

CONCLUSION: To sum, if HelioHydroElectric was fully developed in the Southwest United States (and Northern Mexico) it should generate nearly 1 billion cubic feet each day of rainwater. To put that in perspective, the Colorado River has a maximum recorded flow rate of 384,000 cubic feet/second, and a minimum flow rate of 422 cubic feet/second. One billion additional cubic feet of rain water would provide the Colorado River with an addition 11,574 cubic feet/second of rain water. The average flow rate for discharge is 22,500 cubic feet per second. The power requirements for water pumping are not outlandish as is commonly believed. It is estimated the pumping requirements including inefficiency to be about 10,000 Megawatts. To put this in perspective, California has an installed capacity of 202,444,000 Megawatts. It should be noted also this is not the maximum potential for HelioHydroElectric. Additional sites can be developed, such as West Texas. This is not the upper limit of capacity. With the production of 364 Billion cubic feet per year of HelioHydroElectric produced rain water, this is the equivalent of 8,356,290 acre feet, or about 20% of the total water usage of the state. Development of HelioHydroElectric would match the current demand for Municipal usage. To illustrate the potential, 364 billion cubic feet each year of rain water would cover 130,567 square miles with 12 inches of rain each year. Or generate 24 cubic miles of rain water each year.

State governors should seriously consider appointing a Blue Ribbon Commission to develop construction plans. The potential for HelioHydroElectric development is huge, it is encouraged that further analysis be done, and projects implemented.

ABOUT THE AUTHOR: Martin Nix is the founding secretary of Solar Washington, a group dedicated to promotion of solar technology in the State of Washington, USA. He has 9 U.S. patents in solar technology. He is a graduate of the University of New Mexico, and North Seattle Community College. He attended the School of Regional Planning and Architecture at UNM, and also the School of Engineering at NMSU. B.U.S., A.A.S.

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