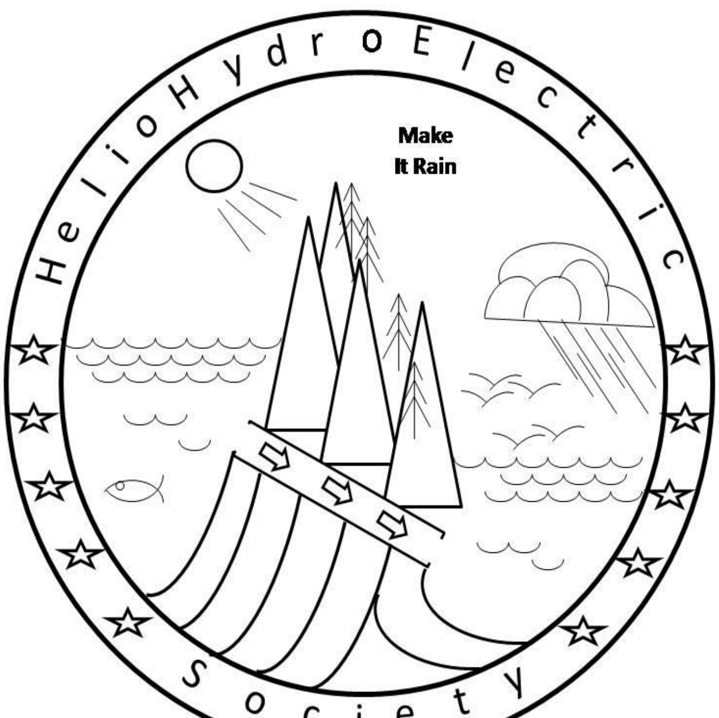
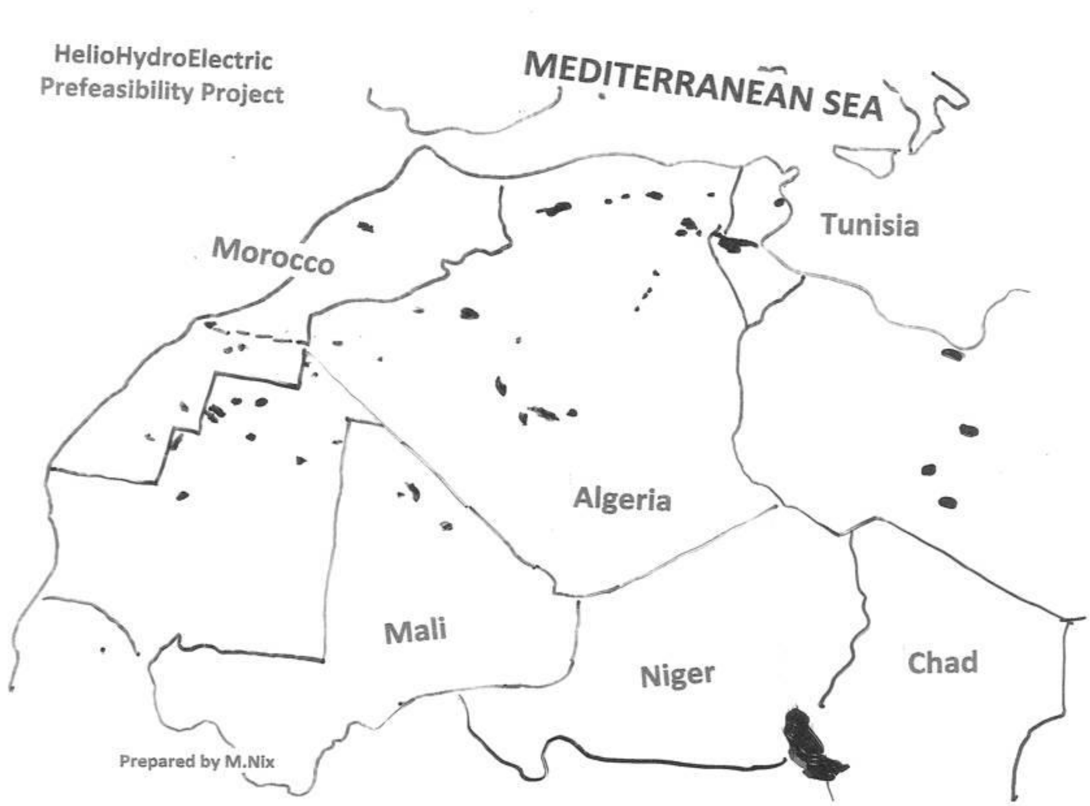
HelioHydroElectric Potential
Prefeasibility Study
AFRICA

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. Africa has large HelioHydroElectric resources. Located in the African 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 Africa it will increase agriculture and provide new living space. Not only can salt/sea water be used, but also underground alkali aquifer 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 Africa. Various sites were graphed for potential. Development of a new water source for Africa will help in economic development of the continent. 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 Continent 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 Africa. 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. Various sites were graphed for potential future study. In many cases data for the various sites was hard to obtain, however, these sites were estimated. It does give a general magnitude of order of the potential.



HelioHydroElectric
Prefeasibility Project

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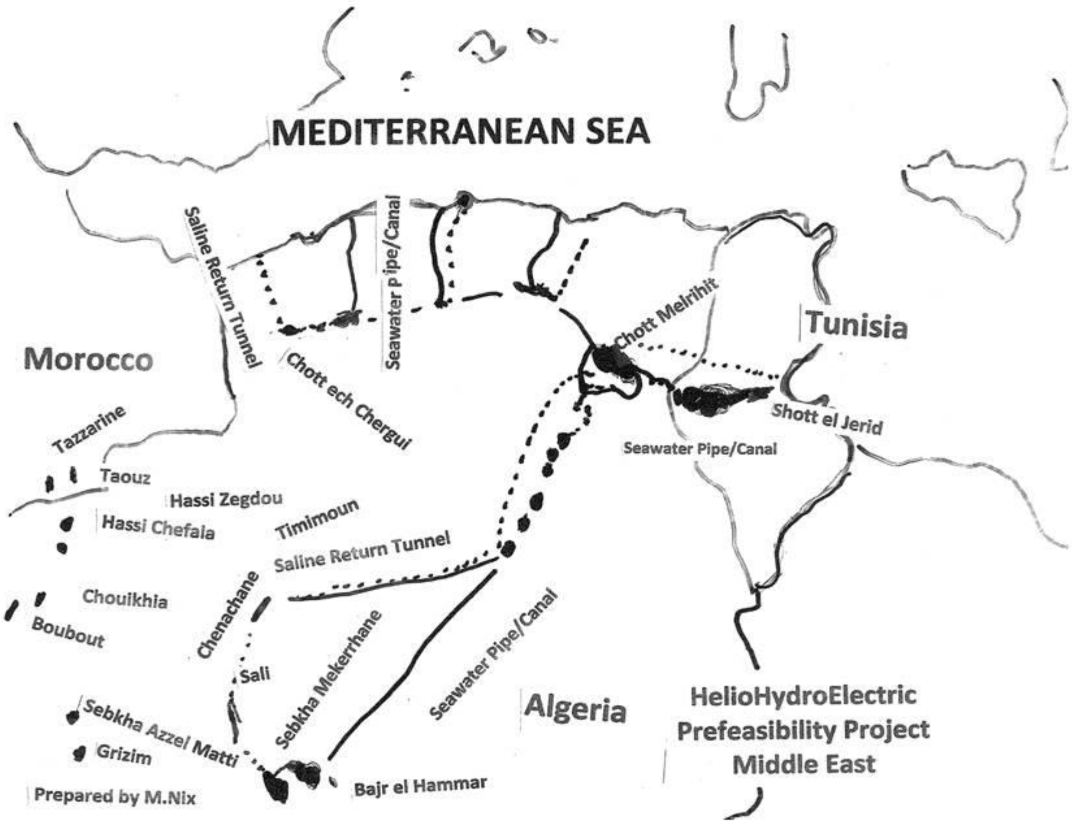
MEDITERRANEAN SEA
Saline Return Tunnel
Seawater pipe/Canal
Morocco
Chott ech Chergui
Chott Melrihit
Tunisia
Shott el Jerid
Seawater Pipe/Canal
Tazzarine
Taouz
Hassi Zegdou
Hassi Chefaia
Timimoun
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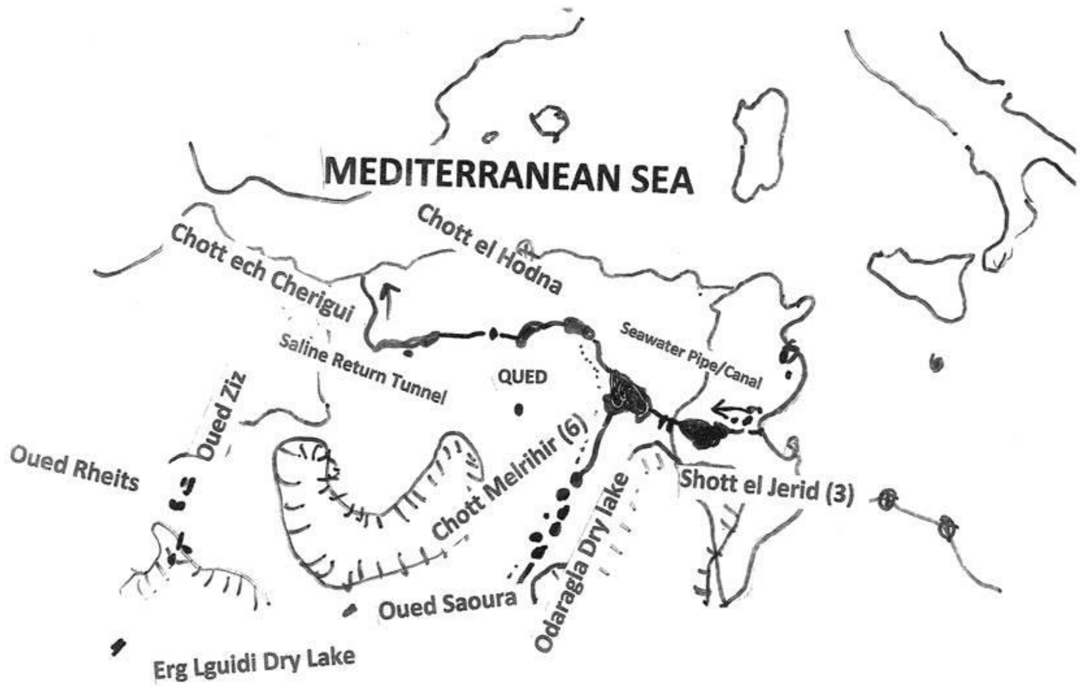
HelioHydroElectric
Prefeasibility Project
Middle East



HelioHydroElectric
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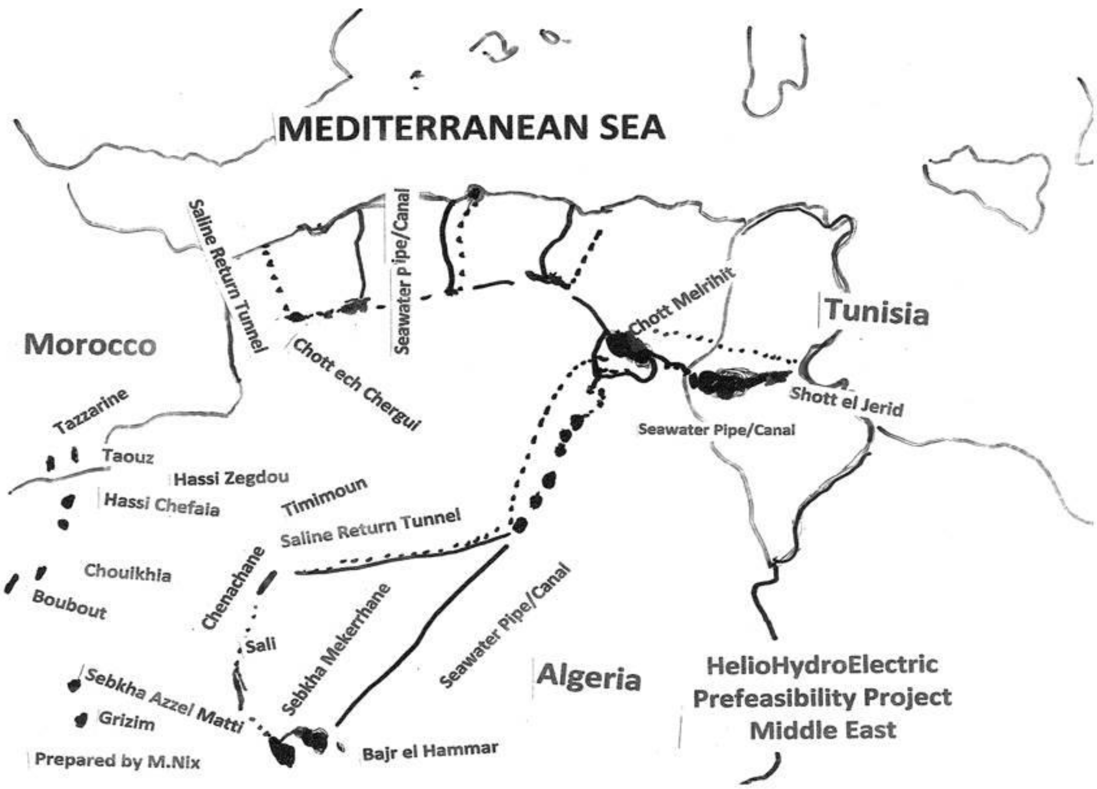
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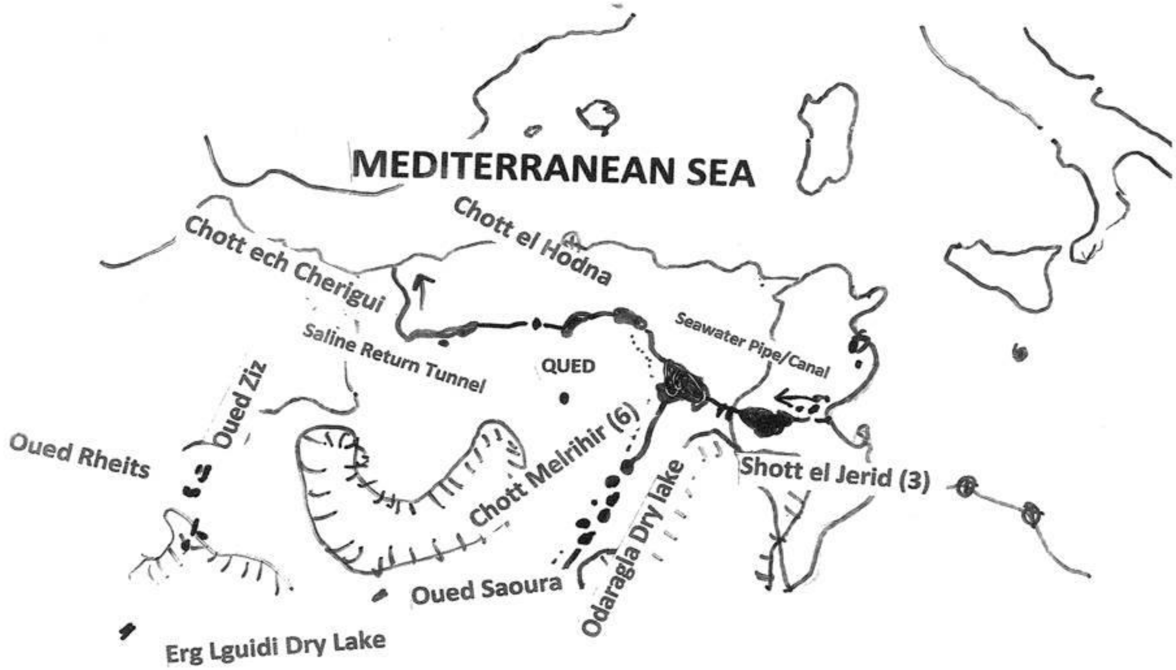

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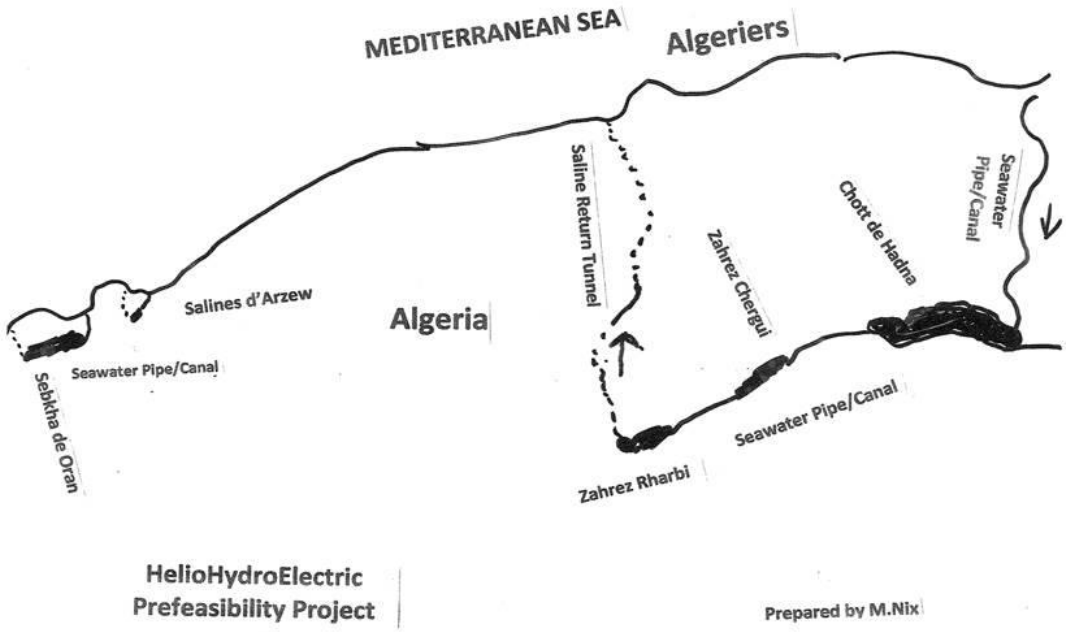
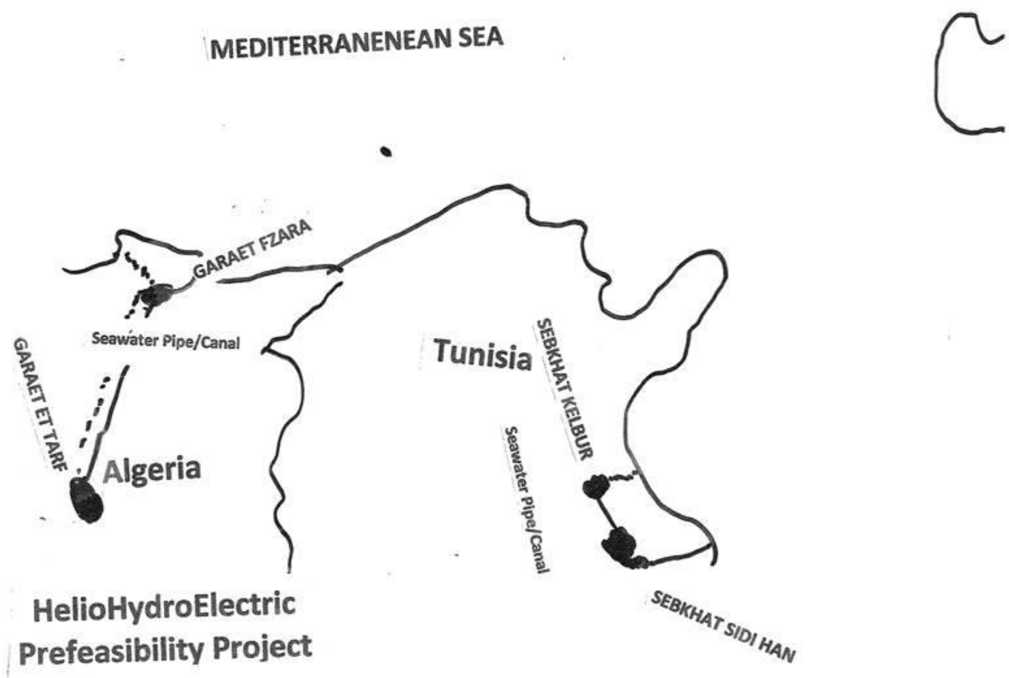


ALGERIA

Location	Square Mile Area	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Chott Ech Chergui	**772**	**215,221,248**	**2,490**	**710**
Chott Hodna	**293**	**80,847,360**	**945**	**103**
Ouargla Dry Lakes	**400**	**111,513,600**	**1,290**	**78**
ErglGuidi Dry Lakes	**100**	**27,878,400**	**322**	**54**
Qued	**100**	**27,878,400**	**322**	**54**
Oued Rherts	**100**	**27,878,400**	**322**	**54**
Oued Soura	**100**	**27,878,400**	**322**	**54**
Salinas D'Arzew	**100**	**27,878,400**	**322**	**54**
Sebkhade Onan	**100**	**27,878,400**	**322**	**54**
Zahrez Rharbi	**300**	**83,635,200**	**968**	**968**
Zahrez Chergui	**100**	**27,878,400**	**322**	**54**
Misc.Sites	**1,000**	**278,784,000**	**3,226**	**273**
Total:	**2,765**	**965,150,208 cu/ft/day**	**11,173 cu/ft/s**	**2,564 Megawatts**

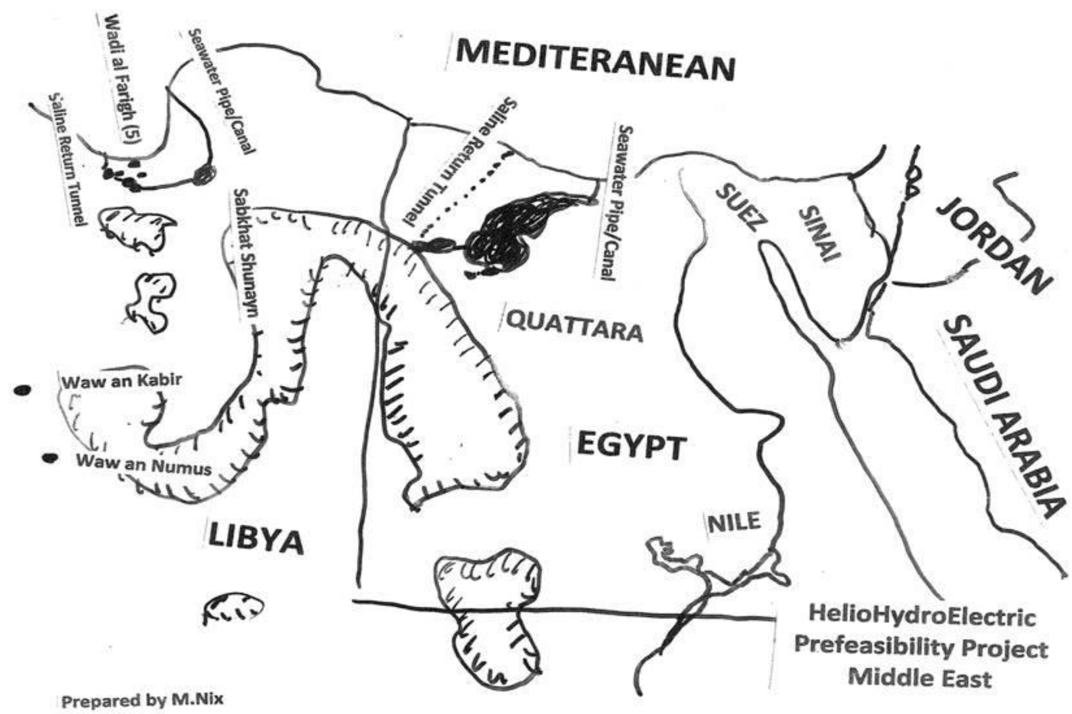
Algeria (Below Sea Level)

Location	Square Mile Area	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Chott Melvhir	2,600	724,838,400	8,389	-92
Sebkha Azzel Matti	100	27,878,400	322	-2
Tidikelt	100	27,878,400	322	-2
	2,800	780,595,200 cu/	9,033 cu/ft/s	-96 Megawatts



TUNISIA

Location	Square Mile Area	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Chott Dierd	2,296	6,402,274,560	7,408	18(MW)
Chott Gharsa	1,000	2,787,840,000	3,226	8
	3,296	9,190,114,560	10,634	26 Megawatts



LIBYA

Location	Square Miles	Evaporation/Day	Evaporation/Second	Power (Megawatts)
Misc.Sites	1,000	278,878,000	3,226	546 (MW)

LIBYA (Below Sea Level)

Location	Square Miles	Evaporation/Day	Evaporation/Second	Power (Megawatts)
Sebkhet Te-N-Dghaneda	100	27,878,400	322	-27(MW)
Sabkhet Ghuzhauyyil	100	27,878,400	322	-41
	200	55,756,800	644	-68 Megawatts

MALI

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	278,878,000	3,226	546 (MW)

MAURITANIA

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	278,878,000	3,226	546 (MW)

WESTERN SAHARA

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	278,878,000	3,226	546 (MW)

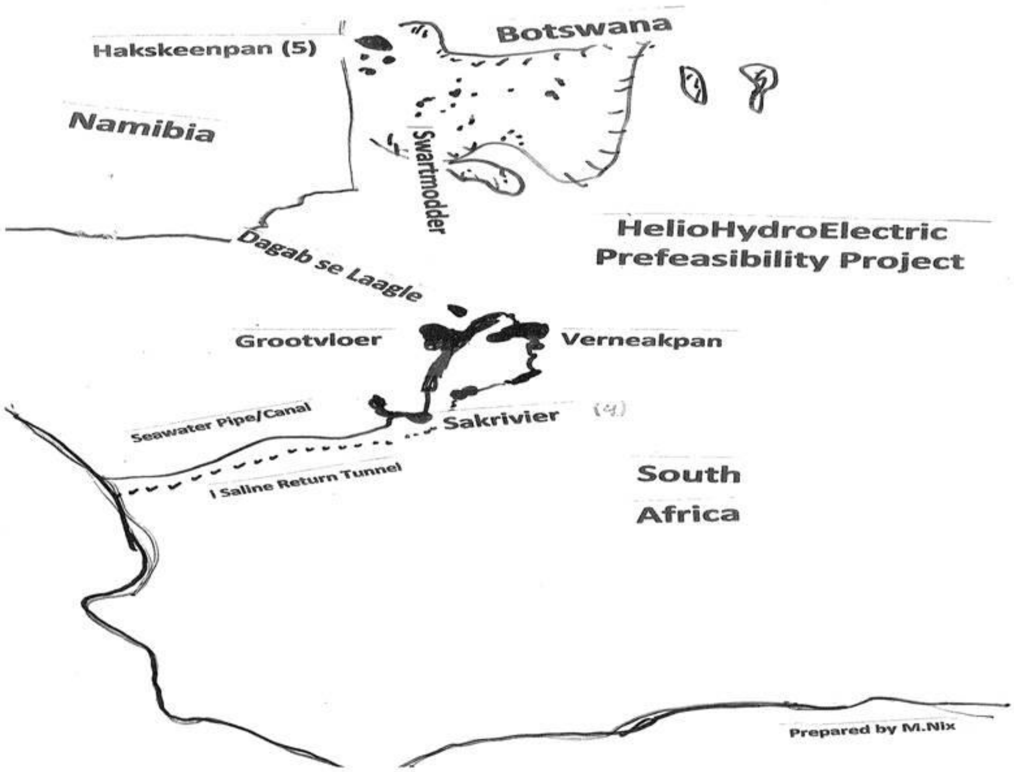
WESTERN SAHARA (Below Sea Level)

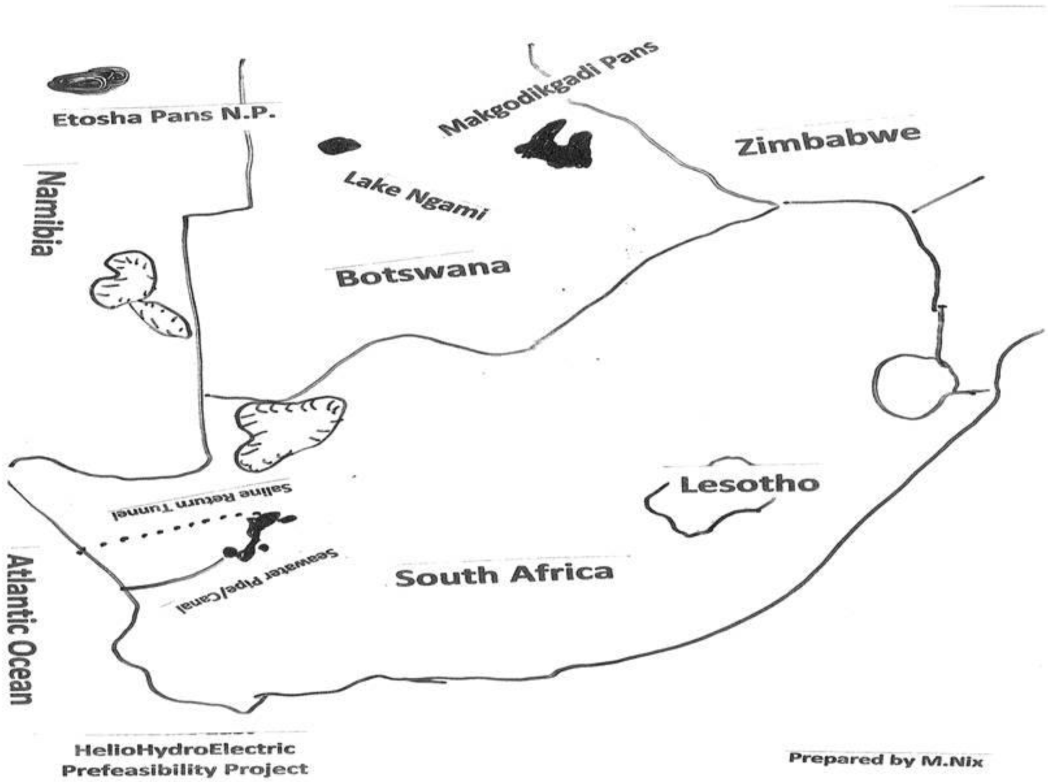
Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Sebkhat Tan	100	27,878,400	322	-5(MW)

MOROCCO

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	278,780,000	3,226	546 (MW)

Note: Data difficult to come by. Estimated.





BOTSWANA

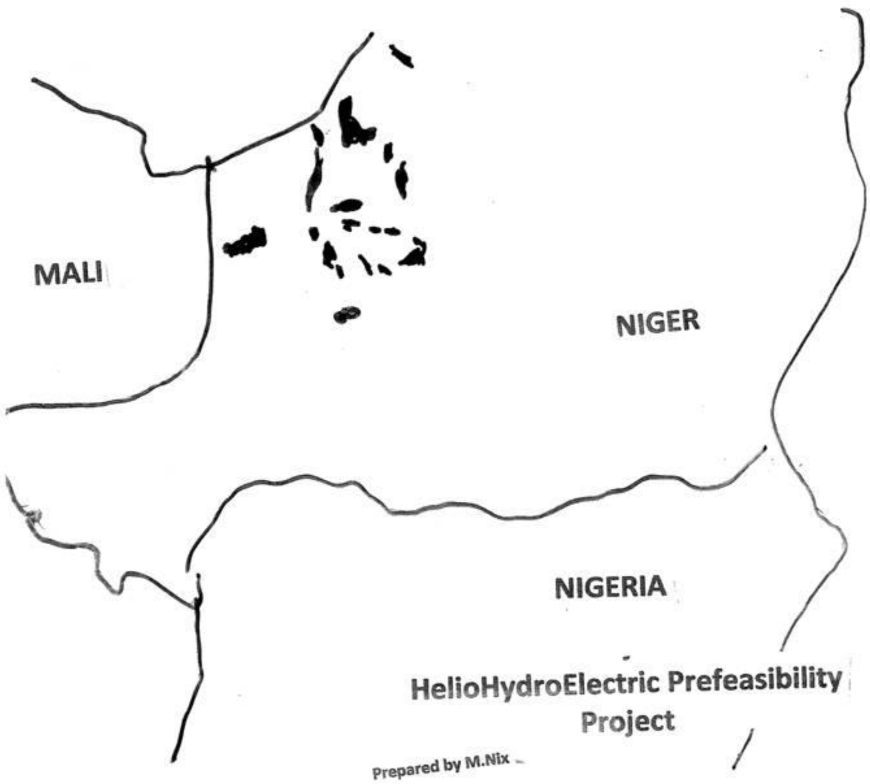
Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Makgadikgadi Pans	6,200	1,728,460,000	20,005	4,944

NAMBIA

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Etosha Pan	1,840	512,962,560	5,937	1,507

SOUTH AFRICA

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Hakskeen Pan	1,000	278,784,000	3,226	546
Verneak Pan	300	83,635,200	968	163
Sakrivier	100	27,878,400	322	54
Grootviver	1,000	278,784,000	3,226	546
Dagab se Lagle	100	27,878,400	322	54
	2,500	696,960,200	8,064	1,363



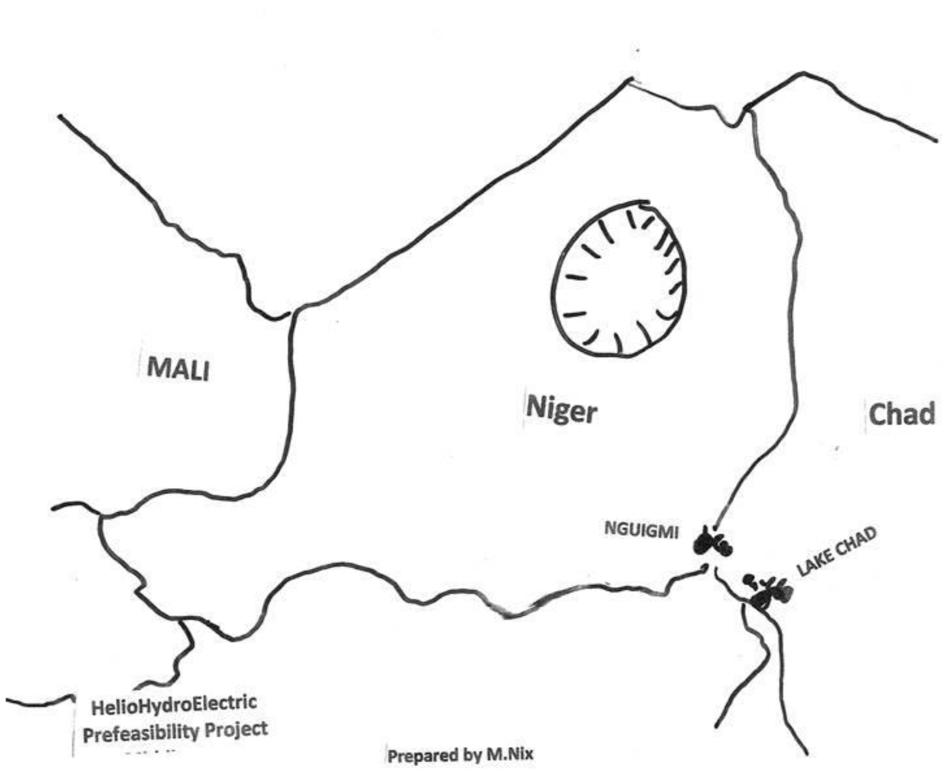
NIGER

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	27,878,000	3,226	546 (MW)

CAMEROON

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	27,878,000	3,226	546 (MW)

Note: Data difficult to come by.



CHAD

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Lake Chad	1,000	27,878,400	3,226	246 (MW)

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ANCIENT LAKE CHAD***

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Ancient Chad	940,000	262,056,960,000	3,033,060	256,719 (MW)

*** In ancient times, there was a giant lake in the middle of Africa. Done for reference of the maximum potential.

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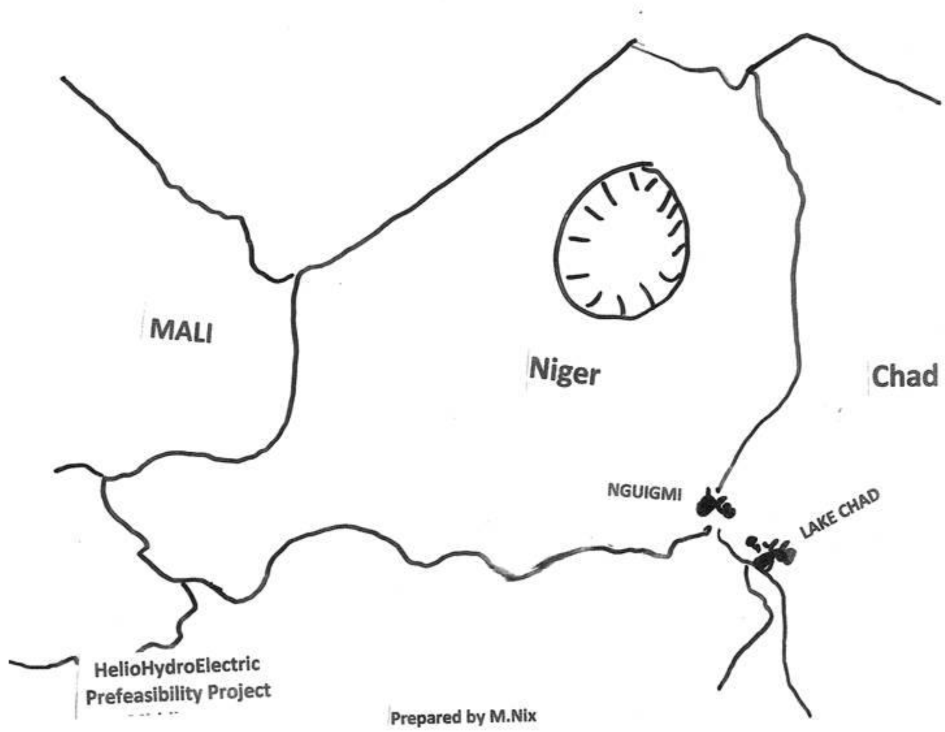
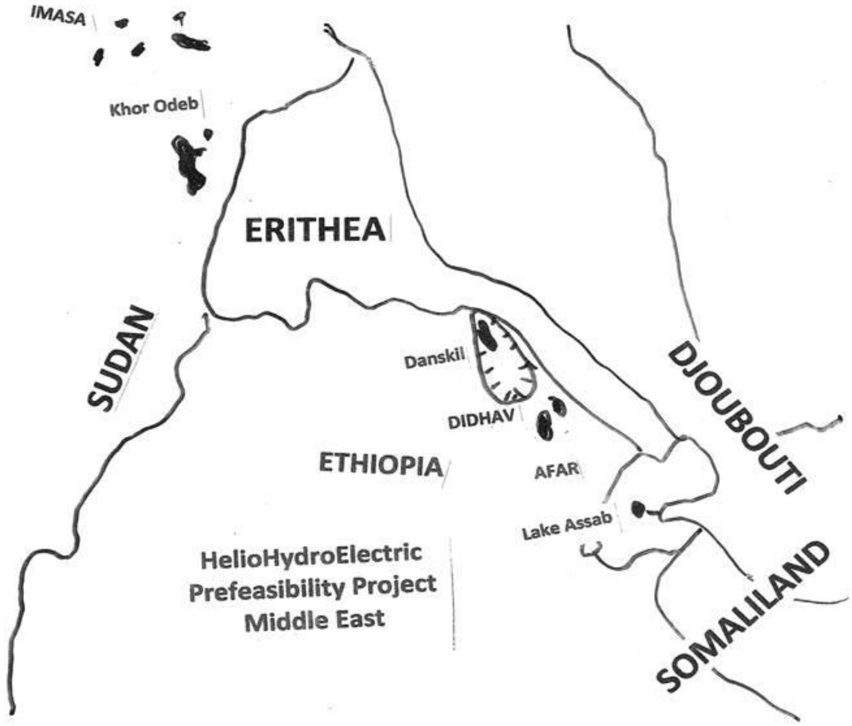


NIGER

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	27,878,000	3,226	546 (MW)



ETHIOPIA (Below Sea Level)

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
AFAR Region	460	128,240,640	1,484	-51

ETHIOPA

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	278,784,000	3,226	546 (MW)
Chamo	213	59,380,492	687	235
Zway	187	21,326,080	603	273
Shala	127	35,405,680	409	176
Langano	97	27,042,048	312	137
Abijatia	79	22,023,936	254	110
Awasa	50	13,939,200	161	68
	1,753	457,901,436	5,652	1,545

ERITHEA

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	27,878,000	3,226	546 (MW)

SPAIN

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	27,878,000	3,226	546 (MW)

KENYA

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Turkana	2,473	689,432,830	7,979	243(MW)
Baringo	80	22,302,720	258	69
Bogoria	60	16,727,040	193	53
Nakura	17	4,739,328	54	26
Elmenteita	10	2,787,840	32	14
Naivasha	61	17,005,824	196	102
Magdi	38	10,543,792	122	51
Natron	350	97,574,400	1,129	191
	3,089	861,113,774	9,963	749

DJIBOUTI (Below Sea Level)

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Lake Assal	2,050	571,507,200	6,614	-210(MW)

SUDAN

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Khorodeb	200	55,756,800	645	109 (MW)
Misc.Sites	1,000	278,784,000	3,226	546
	1,200	335,540,800	3,871	655

SOUTH SUDAN

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Misc.Sites	1,000	278,784,000	3,226	546

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SUMMARY

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AFRICA (Below Sea Level)

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Africa	5,610	1,563,978,240	18,097	-420 Megawatts

AFRICA (Above Sea Level)

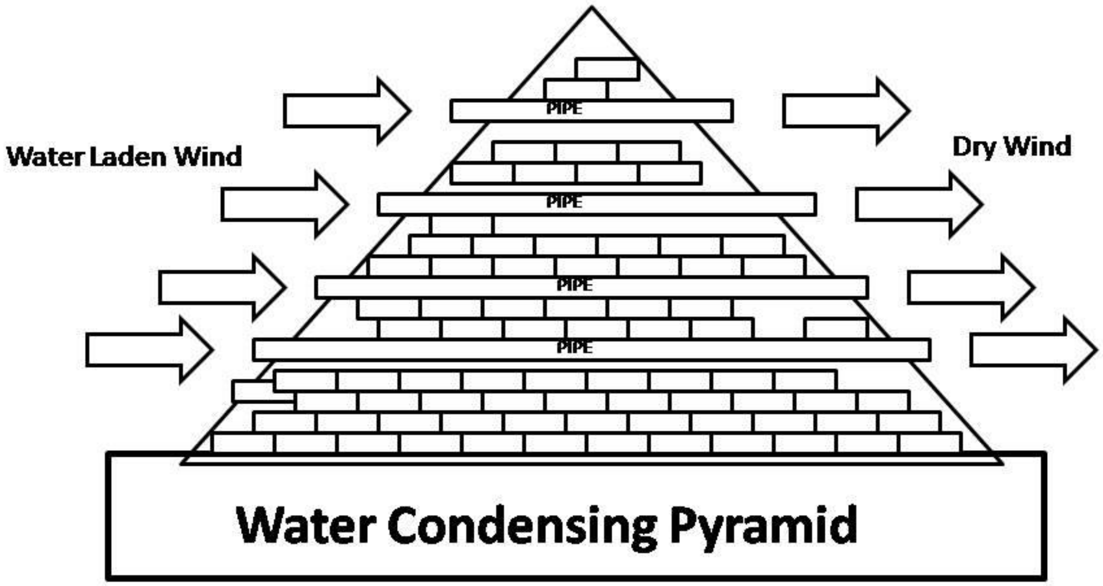
Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
Africa	34,703	16,367,139,540	85,229	19,703 Megawatts

AFRICA (Above and Below Sea Level)

Location	Square Miles	Evaporation Rate/Day	Evaporation Rate/Second	Power (Megawatts)
TOTAL:	40,313	17,931,117,780*	103,326*	19,703-420= 19,283**

*Assumes 100% efficiency.

** Assumes 1% evaporation rate per day per surface area.



SOMALIA: Used in Ancient Somalia, brick pyramids were built to condense water from the atmosphere, thus creating fresh water for gardens and vegetation. These pyramids can again be built throughout desert coastal regions, to condense fresh water from the atmosphere. The cool bricks remove water from the hot air, much like condensation on a cold glass of ice water. This is a lost ancient technology.

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