A Model of Sustainable Growth with Renewables(Wind, CS, Algae) in Africa Europe Relation

Paunić, Alida

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Paper states that investments in renewable energy - Africa north (Sahara) - contributes to growth, poverty reduction and social economical gain not just for Africa but for Europe too. It brings (wind) long term electricity input stability, price reduction, industry potential growth through cooperation with Africa(CS),input and long term solution (after oil) with algae to obtain biodiesel for car industry.

With renewables in hand many innovation and day to day possibilities increase quality of life (wind supported with PV, magnets to increase efficiency), CS in respect of cooking, solar in transport (train, car), help in education.

Opinion about long term sustainable growth is given as relation of known/unknown long term space matter constant 1 in which only variables are those in relation to person to person, person to positive (God) aspect.

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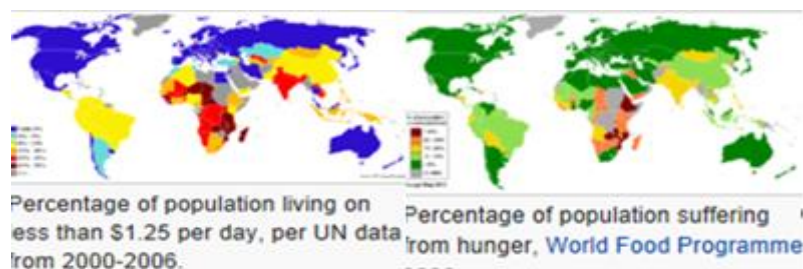
1. INTRODUCTION

As stressed in the first part of Project Africa (PV solution) paper, Earth is a unique place with each human as special and important that tries to mirror God's picture in his journey through time. That fact is recognized by single fingerprints of each person, where breathing of human race is similar to travel of snowflakes from sky to Earth filled with joy but also gathering, dividing and disappearing. Paper stresses the fact that some divine picture is distorted through problems, difficulties and relations that deviate from God's initial picture / intention as well and happens due to distorted overall social, economic, political events.

What is a general characteristic of human is to search further, never give up in thinking of various progress opportunities that can be achieved in a way to cooperate, live with each other, take care of animals and plants, or just to live in a way to maximize benefits for individual and for global purposes. This relation stretches from personal level, companies that with production and way of thinking crossed national borders, state and international social organizations that deal with help, or some economic or other activities.

For Africa the situation is similar as in other Earth's regions: throughout ages people tried to cope with different scenarios of growth imposed by its own people, foreigners, colonial forces or newly corporate way of thinking. The one picture that is tried to be globally solved are targets that would solve Millennium Goals (poverty reduction, increase in educational level, diminish health problems, process of empowering women etc.). By setting a problem itself we have tackled half of a solution but to accomplish these aim real projects need to be done having clear aims, ways of going, and statistical, business results about each land. Plan of economic and social development need to be recognizable and visible on the pages of African Unity, United Nation with further thinking of growth, reduction of poverty throughout regions. Further to note is the importance of Africa to growth in itself, turning to its own divine picture of God and remember that this is the best way- while take over in ownership, credit, other control can further awake sorrowful memory of slavery, colonial time or newly related problems of some modern

and bigger economies such as: bankruptcy. Set of real goals, small steps procedures, community help, social consideration, cooperation between three big nations (Egypt, South Africa, Libya) to help other to growth, inner strength coming from agriculture, good position regarding the renewables, and advances in labor/cost strategy that would bring some of production from China/East Asia to Africa (more clean energy input, CO_2 reduction in China, labor price competitiveness, nearness of European market etc.) are some of market position that can put Africa further on industrial map. The role of African Union in a way is to set a road map for concrete plans and projects, development aims and make possible for Millennium Goals to solve all issues.

Although problems are recognized, slow rate of development is still present (compared with east Asia and Pacific where under 1$ a day in 1990 lived 15, 4% population and in 2004 decreased to 9%, while in Sub Saharan Africa in 1990 46, 07 % of population lived under 1$ a day, while in 2004 41, 09%) so still large and significant share of poor population is present in Sub Sahara. The same is with conflict, or natural catastrophe that induces hunger, and further human tragedies.

Percentage of population living on less than $1.25 per day, per UN data from 2000-2006.

Percentage of population suffering from hunger, World Food Programme

The main aim still is the same no matter of economic picture - to distort God image to less extent as possible. In Africa this is possible through pray, community work, strong relation and social advances, usage of land to achieve some common projects, good cooperation with all continents, and further relation on the scale men to man, men to God.

In order to induce the first and significant cooperation with middle to high income countries in Europe advances form position and land is called upon. Vast land of Sahara is a treasure that can be exploited in a way to become a home for wind, solar, algae plants and further induce growth to both regions.

That saying we can state that Africa is still the land and continent of large potentials predominately in sun richness with potential in harnessing energy to scale from 400 to 11.000 EJ, and Sub Sahara enjoys potentials of 300-9.500 EJ. While total current energy needs are around 539 EJ this can be a territory that can lead us to Kardashian level I of civilization progress (*World data: solar yearly influx 3.850.000 EJ; Wind 2.250 EJ, biomass potential 20 EJ, Electricity 67 EJ/ EJ=278TWh.*).
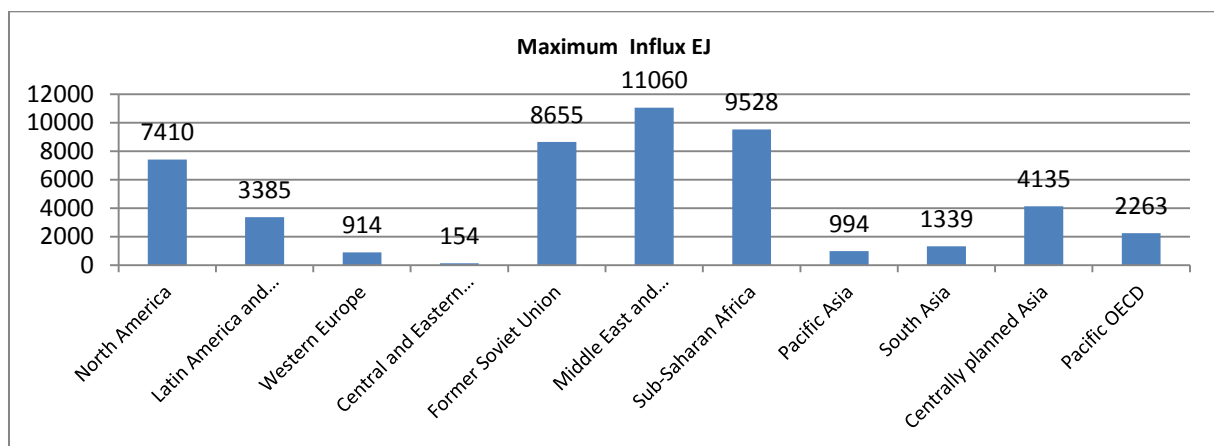
Picture 1: Maximum yearly possible Influx of renewables in EJ

This Africa's potential can induce further growth not just in profit oriented energy sector, but serve as energy security in a long run for both continents (Africa/Europe), induce development of industries, promote clean agricultural production and bring social advances to the level that each child have free educational opportunity, health care is guaranteed, poverty and hunger are related to past, and future achievements are strongly correlated with positive man to man, men to God relations.

2. ECONOMICS AND OTHER DISCIPLINES

The first paper also introduced some interrelations between economy and history, tackling interchange of human activities with energy and economy as whole. Actions, growth, maturity, cycles , success do not solely depend from our own abilities but need to be helped or are impacted by various other fields of human actions. The wide variety of economist also recognized these aspects. In that way through their effort and work we got new knowledge of Engle and Grange (2003) who incorporated math more vividly in our economic considerations and linked time series model with volatility and economical behavior; Kehneman , Smith (2002) pointed out that uncertainty is the strong factor when a person face decision problem; Auman and Schellong (2005) researched game theory and pointed out some solution of conflict and cooperation in process ; Amartya, Sen (1998) brought to our understanding that welfare economics; how economics of incentives is made under asymmetric information process is done by Mirrlees, Vickray (1996) and Stiglitz,Spance, Akerlof (2001).

With this few memorable members of economical science I have only started to move through various dimensions of interrelations. Like putting a brick in the wall and this is just a way to accomplish a house. New knowledge leads us to better understanding of certain individual problem. With having knowledge itself we do not growth without using it properly. This is partly explanation of a process why we after 10 years still wait for more vivid growth in Africa. In that line of thinking I myself tried to observe what is missing link or some basics where to look upon and even Theory of everything in economic sense is called upon. Where are we going? What is a link between the growth of the high income ones and Africa? The world is searching its way through questions about market, socialist economies, trying to find a third way through various transition states and still is lagging for basics - 2008 crises and failed socialist model –two types of economical thinking that comes back in cycles with good and negative sides.

In that respect searching for Theory of everything I have recalled knowledge from physics trying to establish a link about future and present. What is a result

from a physical efford so far is that we still do not know for sure all aspects in micro or macro world and search. The future of large universe is not solved matter, its fate is still disputable, it grows, stretches through opinions and changes with matter that surround us all. Once many million years ago a matter had a significant impact more than 25% , now known elements are in form of 5% (space, is occupied by neutrinos, stars, free energy, hydrogen, helium, compound), dark matter as scientist called 25% of other universe and 70 % is a mysterious unknown element that for known has got a strange and not very nice name: dark energy. With these elements in mind the future of space is looked upon through three possibilities: big crunch, constant growth, big freeze and the ultimate fate for now is strongly related to this unknown energy and its impact ($\Omega=1$; $\Omega>1$; $\Omega<1$; flat, sphere, hyperbolic plain of space time depending upon dark energy).

While in macro world we do search through various states of dark energy, the micro cosmos was occupied for long time with practical findings of Higgs boson, or to solve gravitational particle facing another unknown predicted by theory.

Great Unifying theory Physics(
$\Omega=1;\Omega<1;\Omega>1$; flat,open,closed
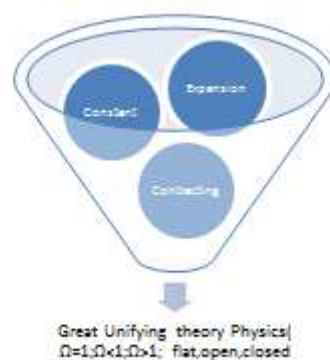
To explore interrelation of physics with our daily economical life we must look a little big deeper into physical relation and tried to remember that our free will impacts to large extend our future. Whether this free will incorporate good thinking, deeds and solutions or lean toward bed economy (aggression, disadvantages, price inequality, labor exploitation etc.) this will determine our common future.

Physical type of model that leads us toward future of global home can serve as one of our steps in economical thinking. In the way that closed universe ($\Omega>1$) in which sum of angles of a triangle exceeds 180° and gravity stops expanding of Universe ending in big crunch, or endless cycle of oscillatory universes. In that model significant amount of dark energy exist but is not enough to continue expansion of space.

In the open type of universe ($\Omega<1$) geometry is open like surface of saddle, hyperbolic in nature, and it expands forever due to dark energy amount. The ultimate fate however is Big Freeze, Big Rip when accretion of dark energy become so strong overwhelms effects of the gravitational, electromagnetic and strong forces in nature.

The third type observed and mentioned in physical community is a position of universe with flat form in which in Euclidean terms speaking sum of angles is 180^0 , dark energy in Universe expands forever but at decelerating rate, with expansion approaching zero. The fate of this type of space matter is same as open universe.

This type of physical thinking I would link to global macroeconomic picture. In that world misbalance, nonlinearity in form, misunderstanding, unequal knowledge and opportunity exist and we are all related to various aspects energy of: Price, Income, Capital, Investment, Ownership, Shareholder structure, Games, Optimization techniques as type of input that determines further solutions.

Open Universe is an economy that grows, have large increase in industry powers, some of goals can be achieved through military forces, and will at and found itself on exit doors due to overwhelming control, spreading without purpose, social or environmental just to say.

Closed Universe is everyday economy , similar fate as open one with propensity to repeat mistakes already learned but not incorporated in real life (environmental and social decision are not valued as should be on world best optimization scale for example).

 Flat Universe is solid type of growth, available to all on Earth, it stretches through Earth energy , economic field rises through Kardashev scale of energy

usage (Kardashev 1 Universe type- all renewables are incorporated and used , Kardashev 2 Universe: can harness energy of the star (antimatter produced on large scale, star is a source of energy as material) or Kardashev 3 Universe (a human can control energy on the scale of its entire host galaxy through supermassive black holes, white holes, gamma bursts ,quasars etc.).But as space itself is lagging of material of known matter is has the same fate as open Universe ending in Big Freeze/Rip context (human cannot sustain space although advanced due to it).

In that way our global economic Theory of everything in economic terms speaking is also lacking a good and solid solution. The one basic link that need to fill space (village, town, region, country, new continent, space I, space II) is linked to quality of growth, and that is represented only in relation of each person toward God, and relation to each other.

When a new space is conquered several solutions are given: strong GDP at stronger ones, negative impact to weaker ounces and the future can be seen only in equalizing social, economic, way of future in respect toward divine picture in each . Since we are barely stranded in time space matter surrounding our impact and interrelation that is subject to our own bounded rationality can be induced further through positive relation toward divine picture. From this relation to one given to the one that we with our actions influence we build all set of different economic theories, relation to other disciplines, and harvest the result at the end.

To conclude basic growth in economy is often related to equation of total income, GDP, or income/capita GDP/ capita Y=G+I+C+(X-M) ;through Expenditure approach Final Consumption (gross fixed capital formation, change in inventories, export of goods and services , import of goods and services);Compensation of employees =f(gross operating surplus, other tax on product, other subsidies on product, taxes on product, import duties, subsidies);Gross domestic product market price f(gross value added, tax on product, import duties, subsidies on produces). But this classical picture is now added with non-monetary terms as: education level, culture, religion beliefs, intergeneration way of thinking, global advances, lack of hard core as military or force usage, etc.

$$Y_{total} = Y_{monetary\ non\text{-}monetary} + e$$

And as recognized from physics that can further lead us in positive or negative end relation. Further aspects of growth are: in material, energy, conscious and subconscious picture of humanity:

$$Y_{total} = a_1 + \sum a_2 (Y_{monetary} + Y_{non\ monetary} + e)_{positive} + a_3 + \sum a_4 * (Y_{monetary} + Y_{non\ monetary})_{negative} + e$$
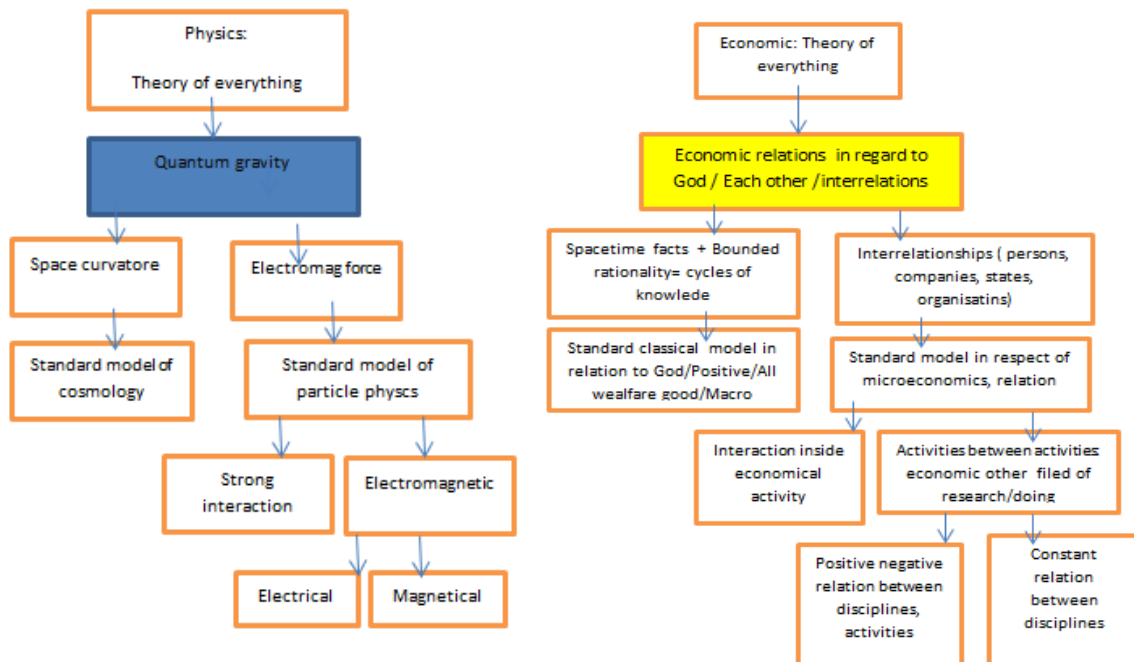
Positive relation is often seen as the one that positively impacts majority, have a message, lead to saving ,sharing, cooperation while negative influence other humans, animals, nature on negative level inducing harm, bringing sense of no hope, lack of purpose, etc. This both can be recognized but are also vaguely mirrored at daily activities to sense that each activity can be measured and recognized in that sense. Although this positive and negative relation bring me to the level that hunger, poverty, lack of educational opportunities still exist and humans did not brought knowledge of small steps procedures and understandings in that respect. So, we had to turn from large macro physics to small particle physics in order to find solution to basics.

To induce growth through projects some basic steps small step need to be taken. In physics particle colliders in the world   are the way to move forward. Each particle has certain characteristics, (spin, mass, energy), interrelated with others and has a special role in total universe. Some are firstly theocratized and then proved like it was the case with Higgs boson (scalar particle, with no intrinsic spin-generates masses of leptons and quarks). Particle role is explained through positive, negative relations, gluon forces while Higgs boson has an enormous role in creation but can be visible only for a short period of time.

QUARKS	up	charm	top	gluon	Higgs boson
QUARKS	down	strange	bottom	photon	
LEPTONS	electron	muon	tau	z boson	
LEPTONS	electron neutrino	muon neutrino	tau neutrino	w boson	

From physical point of view   strong fundamental   forces   that are color changers are quarks and gluon with gluon that mediates, weak forces act that act as flavor are quarks, leptons that work through weak bosons(z/w boson); electromagnetic act on electrical charge   through all electrically charged particles working through photon. All together is related to gravitational force that still wait for particle that would bound all (gravitational theoretically explained and proposed graviton) that acts on all mass and all energy through all particles present.

What we further can do is to relate this knowledge to our Africa observation and our own missing link situation can be of following game of comparison. Strong forces   can be: political agreement (works through gluon that is law binding agreement), scientific works(gluon is findings open publisher web),; industrial power(gluon is end product that search for market) ; weak forces that gives flavor are natural advantages(Africa share sun region), lack of oil reserves in future(advances in algae bio production in Africa); electrically charged photon(relation if action – putting things at work to say in way to find a best solution, make profit to some groups, direct employment; advances in women employment, further agricultural production) etc. When recognizing all

the players we still have a   lower than needed (compared to Europe GDP/capita; and population growth expectancies in Africa) gravitational force that would put together all interest and make more vivid and advanced progress of development on that continent. This can be seen: in relation to all mass/ particle events as basic to our economical and daily life- relation to God, relation to each other. With that starting point and strong and weak force find an electromagnetic relation (pre-feasibility study starts to work), further advances in making possible that all Millennium Development Aims find a right way through.

From a scratch or a basic point we can further advance in trying to find a solution to big freeze, crunch, or constant spreading and disappearing of stars in the night through simple notion of history and human change. We can establish the fact that humans are opt to systems of power, that empires have changed throughout history: Ancient Empires Greece, Persia, Babylonia, Qing empire, Austro Hungarian, Portuguese, Spanish type of rule; USA spreading its influence, Russia and Soviet Union, Chines economic powers and the modern world of equals where non equals also exist. They spread through space, advancing toward peak of economic, military, cultural powers and then with negative force over influencing current state of no further growth the big rule declines.

What is a future that can be linked to from basic Decartean model is following: four quadrants are presented as position in which a civilization goes through periods of : (++) real equality situation of all, increases of wealth, property   valuation; economy of welfare; new knowledge with social and environmental aspects, intergenerational type of thinking, creativity, art of meaning etc.; (+,-)existence of system but with privileged , unprivileged group, discrimination, extortion of certain important values; women harder to found equality, school is not equally available, health care not equally distributed etc.; (-,+) not rightful social picture, salary distributed on party system, education is backed up with material, other factors not equally available to all, multi-party system but with difficulties to obtain common picture for broader community(world   optimization problem)etc.; (-,-) blossom of aggression of any type visible/invisible, military power, wars, disadvantaged groups, non-

believers in good, lack of creativity, steeling on all level, mafia type of society, environmental damage, CO_2, harmful particle in country or transferred to power ones, strong distransfer of good/evil, moral degradation).

In that sense dark matter is recognizable in military, or any force production, violence ,strength (visible/invisible/conscious/unconscious) possibility and energy in usage and possibility of usage- the existence value give rise to dark energy; also unequal distribution of goods and transfer of problems to poor one is represented as a matter that with existence is transferred to energy type of universe picture and lead us all to situation of growing dark energy leading us to big freeze, and non existing bounding forces small gravity particle that would unite all people.

Since the beginning of human era, economy presented a large role in a way of organizational type of community, gathering, sharing, resources and communicating knowledge. What we have today is a big picture of human attempts to reach Theory of everything in economic sense and some aspects that are tackled are reapers in cycles in more advance or less advance theory praxis models. Some basic notions are tried to be linked with Africa potentials, future growth and since space is limited (we have fund Earth, Universe I, in search of Unverse wider) but each bigger space demands bigger relation to God, each other so basics is always linked to this notion.

Table 1: History of Economic thought

	History of Economic thought	Impact	Tomorrow	**Africa**	Relation to God/each other
	Before Christ				
1	China: Fan Li (517 BC) economic issues: golden development rule ; topics: necessity to know people character, time value, speed of collection of money, adaptable behavior, credit control, articulate market, analyses market opportunity, threats to market, led by example, business foresight , value of price - do not impose arbitrarily	Important aspect for today economy, cyclical relation to these notion but with varieties of forms: (2008 crises in respect of loan and regulation); Chinese economy have sound micro knowledge lacks relation to God/Each other	Each scenario on each continents is different , put each in one data base –regarding availabilities of non renewables, potentials; Making from scratch Marks scenario- little use each aspect expect ownership. Home belong the Moon? Is it all humanity or one person that has landed?	**Each aspect is important- from price competitiveness in respect to EU, America, clean products without herbicide, potentials to present themselves**	Each aspect need to be put in new day to day relation in respect to God/each other; Golden rule in loan (avoid Venece merchant from Shakespeare case) , but with solid enlightened way(Basel III standard etc.)
2	India: Chaaky(350 BC) state craft, economic policy , military strategy	Still important and in use. Military aspect was from long time recognized as of	Tomorrow on different scenario without military violent use – as	**For Africa the best deal is working together, Africa Unite with constant**	Economic prosper is not against God, but man need to be aware of many

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		short time mostly negative impact. Still active on international scene- waiting to cease and come to table	one type of scenarios must be visible and currently is not. On new land / territory basic is not on military but on corporation and is notion to learn.	**cooperation with other continents, without any military intervention between**	limitation in respect of intellect, knowledge, moral ability .Peaceful solution to problems on God/man /men/men relation is a base
3	Greco World- Athens slave based society	Slave based society still exist in relation to powers, military advantages, modern weapons, some control in factories away of earning money etc. Not rooted still and needs many more works to lighten all past of modern and different servitude	Open, easy way, standard of equal, respect to all, opportunity to employment, work done according to ability not on servitude, social picture good for all etc. On new territory there are also two scenarios possible: but only cooperation and good team work can lead a man kind from screech further	**Africa had experienced times of colonial powers, and slaves. It need to communicate this aspects through books, literature, pictures but move on through community based, community of equal, type of cooperation and relations.**	Slave type of society is not in line with neither aspect Men/God more men/men in positive sense
4	Plato- Utopia. Ideal city related to labor , production; blueprint of common ownership of goods, credit theory of money , money as unit of amount of debt	Very large impact on many with constant referral as something impossible- somewhat reached at easy community based society, to some extent socialist type of community went in that direction	With narrow country, corporate only way of thinking scenario of broad utopia is out of reach. World strategy and actions can bring closer Plato's Utopia in modern more approachable way	**Africa has a potential to develop type of society a small community groups that work together. Today is recognized as one that lags compared to modern world on broad and each person scale.**	Utopia lacks strong and recognizable picture of living God and living person to person relation in aspect of religion, It has positive attitude and good thinking of equality
	Middle Ages				
5	Thomas Aquinas -just price, reproductive of social system; system of long term equilibrium; price sufficient to cover cost of production	Price is important in demand/supply society .In EU brought significant run to Asia East companies in search of price competitiveness, and larger harmful emissions in Asia	Price is aspect not just of demand/supply forces but environmental picture as whole (emissions, sustainability to growth whole) social peace industry in country) etc. Price on vast new territory has no role	**To reach price competitiveness with EU is not a question, but starting the production is and initial capital is Willingness to invest and attract investor is of primary role**	Price need to be related to good, available to all citizen in respect of needed good, some non basics can suffer from bigger demand/supply competition Humanitarian job and care for old, sick, having for free some immaterial work is deed of love without price
6	Duns Scotus (1205) price of relation of labor, expenses, with ideas of different perception through buyers , sellers, with clear demand/supply terms	Bigger difference in production /selling opportunities was goal from industries, now offered different picture through global society (Internet sale), smaller govern intervention in business etc.	More vivid trade/or total control? on new territory there are no supply/demand only cooperation and sharing of existing; Earth some type of labor strategy in times of crises, normal , competitive type of business	**Africa need to incorporate its way into global with local determinants ,more web sale, labor right increased significantly through new opportunities created and given**	Supply in relation to God is maximum achievement based on personal skills that can be given, in relation to trade and persons good that is available to all social picture) and more competitive

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7	Jean Buridan(1300) not individual determine supply/demand , but society as whole can determine price	Society can determine level of minimum social help and through governments agree upon that, in reality is not so, price is determined based on corporate , ability, their profit expectations, government control ,taxes etc.	Society can have impact on : social help, some basic health service, bread milk price asking for subsidies, salaries Burdon etc.: With many political parties agreement is harder, depend upon social aspect of society, GDP level, On new territory the social price is air, food, security, care, and that is one of basics	**In Africa society need to growth to manage free elementary school, and free (based on whole society contribution) health care**	There is no price to love of God, or society that love God, and has positive picture toward all
8	Ibn Khan Theory of life cycle of civilization , the specialization of labor, the value of money, position that high tax discourages the production, cause revue to fall	Life cycle of economy, state even product life is recognized to certain effect but still lacks broader knowledge, some crises can be prevented if cycle is recognized before and low level of security made – consequences can be to some extent predicted	Life cycle of product is important with decreased level of natural earth treasures(oil, gas, metals, minerals, ores, platinum etc.) more recycling, accounting based on life cycle product in each business activity, If start from search (space shuttle for example evaluate urine as impute to water recycling-water for plant etc.)	**Africa need to take special attention to past , live it through culture ,and makes steps for some new neo colonialism to take place-in form of cycle of events; Cycle of nature in form of deforestation/afforestation / need to be taken seriously**	Men is living with God, but as his life goes on different type of thinking, prayer. Maturity relation is observable. That is the same with personal relation. To recognize maturity, difference in maturity and live with God picture in each cycle
	MERCANTILE (16-18 cent)				
9	Mercantilism Europe - political movement later distributed to economical thought, advocates state military power to ensure local market supply sources , keep protectionism	Short sighted, military cannot in any since bring security, social equality, peace what are the pre steps for living social, economic and in line with long term sustainable environmental goals	Lower level of military is to be expected in modern, society that has all tools on exposal. Conversation, industry, knowledge etc. Tomorrow if start from scarce is thinking about survival and cooperation not military	**Africa can prosper in peace and cooperation. Work on institution of social growth with small industry, community based facilities**	God do not need us, but we need God-in that respect each violence and military response loses meaning. To handle personal relation and broader picture with conversation, trade, faith, since of good agreement, best deal for everybody
10	School of Salamanca. The first determined just war; intellectuals that were against conquest of America, private property- in times of great necessity can be distributed to commons, Talk about money, value, price - just price is a measure of cost of production , labor theory, defended free market in terms of	There is no just war, but there exist a fight for survival, and self-defense. State and persons should do many pre event moves –to prevent war activities(do not produce any type of weapon) –but today it is not so-military countries (that produce weapons) need to have special attention in international relation	Free will is important in society that starts from scratch in order to help each other. In modern society, free will can lead you through life to some extent but you are bounded with institutions, employment possibilities, income level etc.	**Africa need a free will to work more on available opportunities but also support from Africa Union Organization to support different financing projects. Two way process.**	In relation to God – only peace and progress no just pre emotive war is not supported as option.

	supply demand; interest on money; liberty of free will, free will is to blame for evil in the world	and trade in order to abounded its way of production and living.			
11	Thomas More (1478) utopia - land is owned by commoners universal education , religion tolerance	Good ideas that found steps in modern welfare oriented states, in capitalist economies something is tried to be achieved by support from state or private donors	It is hard to achieve that all property is owned by all people with strong private ownership structure in the world; no there is a possibilities that some work/land based on governmental intervention in case of crises is recognized and put as valuable strategy in case of crises(2008 type)	**Africa have potentials to make some of More remark available- land that is owned by village and fruits or profit achieved distributed for further common advances; however education and social are expensive currently and here much is needed to be taken care of Profit from project distributed in free education health**	Good start for thinking about welfare economics but without base that is in relation to God, ad relation to other people lacks the world to say. Always in every consideration start with base and come back in cyclical checkup how is your work related to God, to your attitude toward other human beings, plant animals etc.
12	Jean Bodine (1590) the first analysis of inflation, quantity theory of money	Although it was recognized on time, some money supply brought significant failure in economic picture(1929 crises), inflation/oil in mid-70 is than 80ies brought to conflict	Constant control of supply of money, central bank shows statistical data, inflation in relation to inputs, energy inputs can be controlled in energy is available and secure-project Africa is a way toward long term sustainable future for all	**Africa need more African Union oriented stile in order to cope with financing**	Money presents nothing to God, or man, but usage and long term prospects have a value
13	Gerard Malynes - arguing against foreign exchange as under control of banks	Banks influence financing possibilities and then influence industries, further strength of each economy.	Banks are important in obtaining capital; but we have low interest and smaller than possible investment level in advanced economies. Exchange rate is influence by past achievements and trade not banks that were subject to lower capital requirements so influenced the last 2008 crises	**Africa can turn to banks in order to obtain capital and be influenced by money in that way obtaining different advance prospects and exchange rates. Better solution is very controlled influx from loan, financing from current activities, shareholder inside Africa etc. On African Union base to avoid big difference in economic/social picture**	God have given us land, air, each other for free- without money but as tales says he expects return. Return in value added to social, culture, spiritual, help each other .In that respect exchange rate is given at rate of each person best interest
14	Misselden- argued international exchange depends upon international trade not bankers, state should request trade to insure export sum	Run of industry and economic growth of East is explained to some extent, but still dollar has a greater value than Korean or Chinese exchange rate what makes this theory subject to broader	Shall we run into regional money or one global currency is still not clear. Starting from skratch we do not need neither trade or exchange rate but effort and	**Africa is lagging behind international trade, but need to establish relation of value inside the state and then in cooperation with other world. In order to do that some impulse such as big**	In relation to Good there is no trade or exchange we are given and he does not need us. What we can do is our best effort in relation to each other based on economic social

	definition and impacts	cooperation that is done at best possible individual level	**environmental energy project can further induce rise in other industry agriculture exchange programs**	and environmental interest of all that would strongly exclude factories with children as work force for example)
15	Phillis Von Hornik (1640) foreign commodities if imported need to be in raw material and worked further in country	It was part of praxes, now industry is transferred to east due to lower costs. This project implies for the first time – only production of algae and refining process to biofuels is done in middle east Europe as part of market interchange. In that once more vivid trade can be established later for ago industrial/small sale manufacturing goods	Constant change is he only reality on market, and today this is done on world scale, It is wise to have basic production in all since in country or better say regions , and that optimize on large scale based on cost, input raw, transport facilities, etc.	**Africa lacks production of many goods that need to be implemented on regional African base to have industry of all types of product on continent**	God is far away from any type of relation that is only interest base, based on hidden knowledge etc. Common work, trust and possibilities with best attention and effort is in picture
16	Devenant- consumer demand, perfect competition	Consumers decides, but perfect competition is distorted with different financing possibilities, tax option, labor rights, employment contracts, market entrance possibilities etc.	Tomorrow can be toward big corporate big market centers control / open to small scale producers –but only if it is regulated and guaranteed by some extent by law, government intervention at the end. Entrance is still limited although there is potential of sale on web. .based on bottom- need is air, food and security work done according to individual possibility effort attention.	**Consumer demand dependent upon status income bracket and type of good offered. Work toward increase of each category**	In relation to god/each other- only basic is needed/ prayer and positive has the majority of value. Impact on help and best effort
	PRE CLASSICAL				
17	The British Enlighten Group - wealth is not in trade but in labor,	Labor rights unequal in world / unemployment and level deteriorate picture of right	Equal right to work, at least 4 hour for all, depends upon new industry, type of service created, increase in economic picture is dependent upon trade	**Africa need to value rightfully all capital including human capital –and labor that is in form of man and women with equal possibility of income. It can done by slowly rise in all sectors. Industry agriculture, trade, culture etc.**	Labor is important and work is measured as valid for existence of person family group world. But work need to be done at best interest toward God/other persons. In collective company world command structure, interdependence and small scale activity makes us responsible just for part of our action. Thai part need to be taken with best interest toward all and God picture

#					
					inside us.
18	Dudley - specialization , dive of labor, regulation of trade interest	Specialization is firmly incorporated in modern life, but still people tend to broaden out of work activities with variety of interest that could be later turn into on other business	Only specialization is not good, computers and robots will take some of boring and repetitive actions and humans more control type of work, Variety of interest and possibility to sell can open door to more interesting job opportunities	**Wide variety of actions related to life and nature should not be abandoned. There is treasure in diverse activities and that relate to community progress**	Each moment is special and different especial in relation to God, person to person relation
	CLASSICAL				
19	Adam Smith (1723) industrial revolution- wealth to be created in larger scale ; pointed toward moral and ethics, development through personal relations; right and wrong sensed through other people reactions; invisible hand- market regulated everything	Market is supported by government – even in USA after 2008 crises , regulation, control and help with long term strategy is expected to exist on government and continent level	Slow work on long term prospects , with possibilities of resources to be depleted and consumed by those in wealth position some world strategy of common rise is needed(world transport, energy impute based on renewable best solution –solar in Africa etc.)	**Market regulates basic demand supply but many of pre event effort need to be done on government side, industry establishment etc. Africa should not rely only on market. Experienced labor has worth in long term observation and resource depletion is possible if only market forces are included**	Nothing is just a market.- in each prayer a person should give its best and is helped by community (service, church activities, organized social activities, organized help, etc.
20	lean Baptist (1767) investment and consumption are the two elements of demand	Investment opportunities are limited due to high risk, and not financing opportunities; Consumption is subject of constant innovation, cost competition, income and demand varies with income, population groups, etc.	Further investment need to be done on profit, social and environmental base. Investment need similar start up in financing not so due to risk, consumption will increase will bigger investment employment potential ,poverty reduction Based on bottom- consumption is in form of basic survival methods an jobs done (not investment but job)	**Higher investment bigger consumption power if proper labor work is evaluated correctly. Based on labor servitude bigger investment can mean only bigger job effort without consumption power. The great necessity is in line of labor rights and just salary for each worker**	To invest in God ; be oriented toward positive human relation Constant effort of giving and taking /God had given us wonders of nature,love,relation and we can serve as keeper of his values
21	Karl Marx, Friedrich Engels- socialism , working class, use value, exchange value, with every boom bust tension and conflict between increased polarized member soft group- workers capitalist is increasing	Base to Earth gain teaching and study that tried to overcome some deficiency of the first steps in industrial revolution greed –to say-It was widely interpreted, put to work in some countries, misunderstood, and fight strongly in certain areas. Basic teaching that need further connection	The world can go in three directions. Toward the social equality, more abusive type of societies or middle way. All three types can work in low and high GDP community and that is a link for Africa to consider strong relation to god, community helping further economy, social,	**Africa can learn something from Mark/Engels teaching , avoid pitfalls of staggering society, build modern society aware of all aspects but with strong community base oriented to good and service type of doing**	There is a relation between teaching of Engels/Marx in relation to Society Union Eastern block and lessened religion context. This was not a teaching to deter a person from God, or positive thinking toward another person. Only to establish more humane relation in accordance to

		with all accepts of knowledge in modern economy	and development. It can be so that modern technology brings new types of slavery attempts- but is usually recognized.		owner of industrial sites, and worker. Relation in companies – toward Good – it is not researched at all- large corporations-cross continents jobs - are of vital importance today
22	London School of Economist- established by Web, Beatrice, G B Shaw,	Each school learns something new, London School can glue together different economies, styles, learn new ways imposing some new questions	Tomorrow – in line with cost decrease, greater impact to social and environmental type of economy, Or can continue with high fee policy with lower free material than repel-free material	**In relation to Africa London School of Economics is important .It can contribute greatly with teaching, influence, free work, availability , cooperation etc. in order to advance social, economic life in Africa**	University is not free from relation to greater god, relation to other person in this case African community. To do a project in relation to god/other person is of great importance.
	NEOCLASSICAL				
23	Jevans -theory of diminishing marginal utility	Very important in today world, It was tackled lately by French economist Pikkety in a way that in the world after crises inequality rises with different picture in marginal utility. With more 1$ in Africa marginal utility rises more than in Europe, but marginal utility is also different for small group, as of majority of population when owns significant amount of income/shares structure (EU,USA,Japan)	Marginal utility will increase for the African population with each project significantly improving health educational care. Marginal utility for the rest of the world can goes toward equalization in tax policy) or further difference.	**Africa will experience rise in utilities overall and in respect marginal utility also will rise**	To calculate marginal utility is end goal of this paper, global optimization introduced on African soil, waste region of Sahara. But if all best effort succeed and we on Earth have a relation of total clean energy harnessing this is only situation of One drop of water and God is a river that never stops.
24	Marshall-use mathematic as shortened language	Good idea, shortened relation , clearly things, we calculate basics and further advancing in relations, adding impacts, put our mathematical thought to be alive or other way around	Probably will stay, but math is supported with real life, good or bad end term solutions. God way means incorporating all elements – world optimization tactic solved on positive god/person relation or on other scenario maximization of profits; larger becomes larger so to speak.	**For Africa mathematics works not as GDP/capita, energy usage numbers, even number of harmful gasses lately, but long term math formula that would bring social, economic, advances in line with world level**	Math is in relation to God, while he also calculated his position and e already won (Issue, New Testament) Math is working in a way that was to do our best in regarding to God, man to man and in long term solutions.

When considering all theories from the past, that are firmly situated in our conscious or unconscious way of thinking, doing, observing declining or accepting certain ways we can relate all aspects of our economic study in regard of result toward God, and each other. What are goals, purposes, and way of doing and how I am in relation to others, how this theory of problems brings solution? In that way core of our thinking is that relation: other person/God and from this relationship grows further knowledge and praxis.
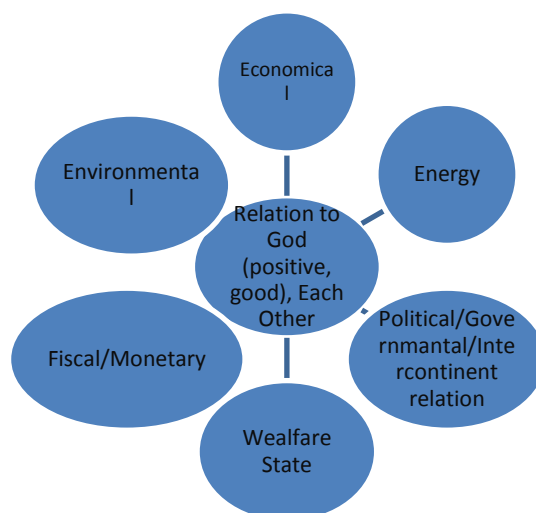
Table 2: From basics God/Positive/Person to person to other disciplines

	We cannot give	We think we can give	Activities social	Energy	Economy	Policy
	We are given We cannot give a love to a God. He has all and he does not need us.	Personal relation	Every day activities, Level of attention, care for young, old	Consider energy savings	Be aware of your own economic picture –there are no free lunch	As political governmental body the picture of aims, relationship is more enlightened. The first place is positive attitude relation to God others
	There is a different understand of light inside of each human; Some us aware of gift and live it to different extent; Some are using a gift free will to harm -	Relation to neighbors	Help, understanding, small favors, Conversation, Physical help	Recycling, new options, use renewables whenever possible	In Your own economic picture put a small amount of special fee and environmental effort(small donor) +saving , recycling	Do not promise what you cannot deliver
		Relation to community	Respect to all citizens, Help by non aggressive way: advice, physical, social	Reach standard of saving and educate others	Think about community larger or narrow in economic terms adding them social and environmental goals	Analyze situation
		Inside	Level of	Think globally	Save in good	Value all equally

whether induced on personal or broader level	working group	understanding, help people with disability	, act locally,	times, spend in tie of need , if employed Help unemployed with job, advice	
	As part of activity that is made on voluntary base	Based on interest, affinity, need, care needed, progress weakness etc. – to extent that can be offered	Invest in funds that support poor building clean projects in Africa	Economical activities of large companies are not under personal influence. If want attention , be clear, short, transparent, with profit, environmental and social picture clearly presented	Do not maximize goals just to your own constituency ;think globally
	As part of interest group	Part of donor sponsor help over tax free amount to the most needed ; not those of interest creating another interest group	Do buy electricity in a way to diversify individual portfolio	Live economical life as narrow part of your day, appreciate time for rest, spend in environment, spend with family, for leisure and insight on that in your working carrier- that will bring prosper to job also	Serve as long term candidate
	As part of social group across continents	Protection of natural habitat, poor people, collecting donor help, help animal projects etc.	Be aware of technical limitation, border saving and electricity for all policy	Economy of the world is the aim, the road is non lunar relationship to make living equal valued, with same utility base for everybody	Meetings, cooperating, evaluation, constant move and awareness of human boundary and limitations
	As our activity to God	Our prayers, intention toward the most high, church gatherings, activities related toward God	Live in energy as relating to each person, toward g God way	Live economical life in line with relation to God, to others (family, dependent members, kid, ancestors)etc.	Each step need to be evaluated again according to value another, in respect to God

All this efforts were partly explained by different level of non-economical standards: literature, tribal way of life and thinking, political decision process in line with good environmental standards, labor human rights etc.

What is a big difference between Europe and Africa is utility level- the measure of satisfaction or benefit derived by situation, consuming of a product. Further to note that change of situation in the marginal utility of good service is the change in the fact that utility can increase (decrease in consumption in space time period). In that aspect the first unit of consumption of a good or service yields more than a second subsequent unit, with continuing reduction for a greater value.

That how with increasing consumption marginal utility is diminishing $MU_1>MU_2>MU_3$.The right level of consumption or satisfaction is when marginal utility is equal to marginal costs.

Marginal Utility at level of personal life experience is of much difference in Africa as of Europe.

Utility $_{person}$ = U $_{goods, services}$ (young age till school) +U (educational period) +U (pension) +e

We can recognize two types of utility: the direct or the mostly recognized measurable or indirect that is derived, related or follow no relation with the direct utility measured by certain quantity of money or recognizable vale. For Europe and Africa it can be in form of:

A) Europe-Direct Utility

Utility $_{Europe}$ = U $_{till\ school}$ (number of kindergartens, financial support, health care, educational advances) +U $_{educational}$ (number variety so schools, school costs, possibility to enter,)+U $_{employment}$ (work place security, safety at work, payment for effort, or time, level of risk, level of responsibility. level of influence, hours worked)+U $_{pension}$(security, health , medical support, number of pension homes, nutrition, medical costs)+e

B) Europe-Indirect Utility

Utility $_{Europe}$ = U $_{till\ school}$ (time in games, environment clean nature, polluted city, time spend with parents) +U $_{educational}$ (free programs, diversity, creativity, work with hands, broad spectrum of knowledge, food, time with friends, time with parents, healthy food, fresh air time, sport activities, quality of leisure time, nutrition value of launch etc.)+U $_{employment}$ (time consumed at work, time at leisure, time with family, time in clean environment nature, time in polluted city, time in stress , unsecure work, time without job and security)+U $_{pension}$(time in medical examination, time with family, clean environment, security from pension, without firm pension, without medical care)+e

For Africa Utility picture is quite different:

A) Africa-Direct Utility

Utility $_{Africa}$ = U $_{till\ school}$ (low level or no kindergartens, no financial support for kindergarten, expensive weak health care, educational advances with family) +U $_{educational}$ (limited number of children that go to school, costs of school, family income/ school costs, donor help,)+U $_{employment}$ (low level of secure working places, working places connected with agriculture, long hours at work, unequal salary) low level of life long education connected to work)+U $_{pension}$(project to prolong life duration still weak, small scale of pension security, low level of funds that deals with secure income for older age, low number of pension homes, dependent upon family, life, agriculture)+e

B) Africa-Indirect Utility

 Utility $_{Africa}$ = U $_{till\ school}$ (time in kindergarten, environment clean nature, polluted city, time spend with parents, time in creative games, time in work) +U $_{educational}$ (free programs, diversity, creativity, work with hands, spectrum of knowledge, food, time with friends, time with parents,   food   attainability quality, fresh air time, sport activities, quality of leisure time, nutrition value of launch, difference between brothers sisters in obtain school programs etc.)+U $_{employment}$ (time consumed at work, inequality structure of society, risk at job, no perspective, time with family, time in clean environment nature, time in polluted city, time in stress , unsecure work, time without job and security)+U $_{pension}$(number of people that are retired, existing retirement process, time in medical examination, time with family, clean environment, security from pension, without firm pension, without medical care)+e

It is clear that overall Utility level in Europe is much larger than for African population, and in that respect we can write followings:

$U_{\text{Europe overall}} > U_{\text{Africa overall}}$

$U = U_{\text{base}} + a * \dfrac{\partial U}{\partial g} + e$

Once the total level of utility is reached further utility is diminishing, and in that respect U base is of great significance. European population has a greater U base than African new born and that is significant difference at first step.

It can be interpreted for Europe in terms of society that once one kindergarten is made, level of utility is decreasing while standard is reached.

For Africa since U base is small this marginal utility increase is much bigger than in Europe - have a greater weight while increasing number of growth of population is observed, impacts differently later employment prospects, and bring overall greater stability to society – if one measure of success is reached.

$U_{\text{Africa}} = U_{\text{base Africa}} + b \left(\dfrac{\partial U}{\partial g} \right) + e$

Further to note that Europe setting up standard in utility for all citizens has diminishing marginal utility with further grow. For the persons rising marginal utility increases with employment time so we can prolong our considerations:

$U_{\text{Europe personal}} = U_{\text{base society}} + b \left(\dfrac{\partial U}{\partial g} \right)_{\text{society}} + U_{\text{base personal}} + c_1 \dfrac{\partial U}{\partial g} + c_2 \dfrac{\partial U}{\partial g} + c_3 \dfrac{\partial U}{\partial g}$

$+ \ldots + c_n \dfrac{\partial U}{\partial g} + d_1 * \partial^2 U / \partial g^2 + d_2 * \partial^2 U / \partial g^2 + d_3 * \partial^2 U / \partial g^2 + \ldots + d_n * \partial^2 U / \partial g^2 + e$

$d_1 = f \left(c_1, b \left(\dfrac{\partial U}{\partial g} \right) \right)$

$d_2 = \left(c_1, c_2, d_1 * \dfrac{\partial U}{\partial g}, b \left(\dfrac{\partial U}{\partial g} \right)_{\text{society}} \right)$

$d_3 = \left(c_1, c_2, c_3, d_1 * \partial^2 U / \partial g^2, d_2 * \partial^2 U / \partial g^2, c_2 \dfrac{\partial U}{\partial g}, c_3 \dfrac{\partial U}{\partial g}, b \left(\dfrac{\partial U}{\partial g} \right)_{\text{society}} \right)$

In Africa overall growth on contrary is not so visible in adding to growth on personal level, but on the first variable that is U $_{\text{base society}}$ this first step is marked with lower than average number of facilities, opportunities, and life chances overall.

Further we can divide Utility on the following way:

$$U_{\text{overall}} = U_{\text{business, base social}} + U_{\text{environment}} + U_{\text{social}} + e$$

$U_{\text{overall}} = U_{\text{economic base}}$ (GDP base, GDP prospects, employment opportunity, educational opportunity)+U $_{\text{social}}$(social relation, existence of conflicted, peaceful resolution of problems, violence in society, invisible treats, positive, negative, couscous glows, positive, negative uncountios flows, social empathy, help, determined level of money security for each citizen)+U $_{\text{environment}}$(clean air, pollution, number of renewables, potential of renewables, recycling, level of harmful gases, time spend in nature, time   in leisure, time in quality creative, time with animals, clean sea, river, clean water streams, recycling opportunities) +e

In searching for overall results we can conclude that constant is only change and that some aspects of utility on both continents can be further changed for better or worse. From basic good structured utility in economics further social and environmental advances usually appear. This is shown on following scenario of constant advances and   further inequality picture of global growth (Pikkety). The first change and the most visible are utility from infrastructure economic and technical advances. This change will raise need for industry, transport, oil increasing harmful gases and in that respect Africa would advance in environmental sence over Europe. With further GDP growth Europe will have to choose about environmental policy. If it solely invests in renewables and in industry, economy, transport on its own soil it will increase in respect of clean environment cities without pollution, and Africa will end with depleted oil fields, with environmental problems, with harmful gases from Europe further continuing with low technological standards. What can be of advantage to Africa is social respect , care for young and older on tribal way, trust, love for each other while in Europe people are more   socializing on individual level, based on interest profit, group, income possibility , interest. In that sense Africa

can in overall utility surpasses Europe. But long term bed prospect and lack of job, kindergarten, health problems, and educational low standards can diminish social respect, while Europe with help project can give social support and in that way cycle of bed events can be of worst possible events present at least in the short run for Africa.

 The paper tries to prove that short sighted model is not good; it will eventually bring failure for both types of society and only gradually increase in economic, social and environmental for all will bring long term stability. This notion is supported by global picture of growth in economics once by importing oil from another poor country. Utility in base country is average (three types' present consumption, income, demand change of average).

2

A

B
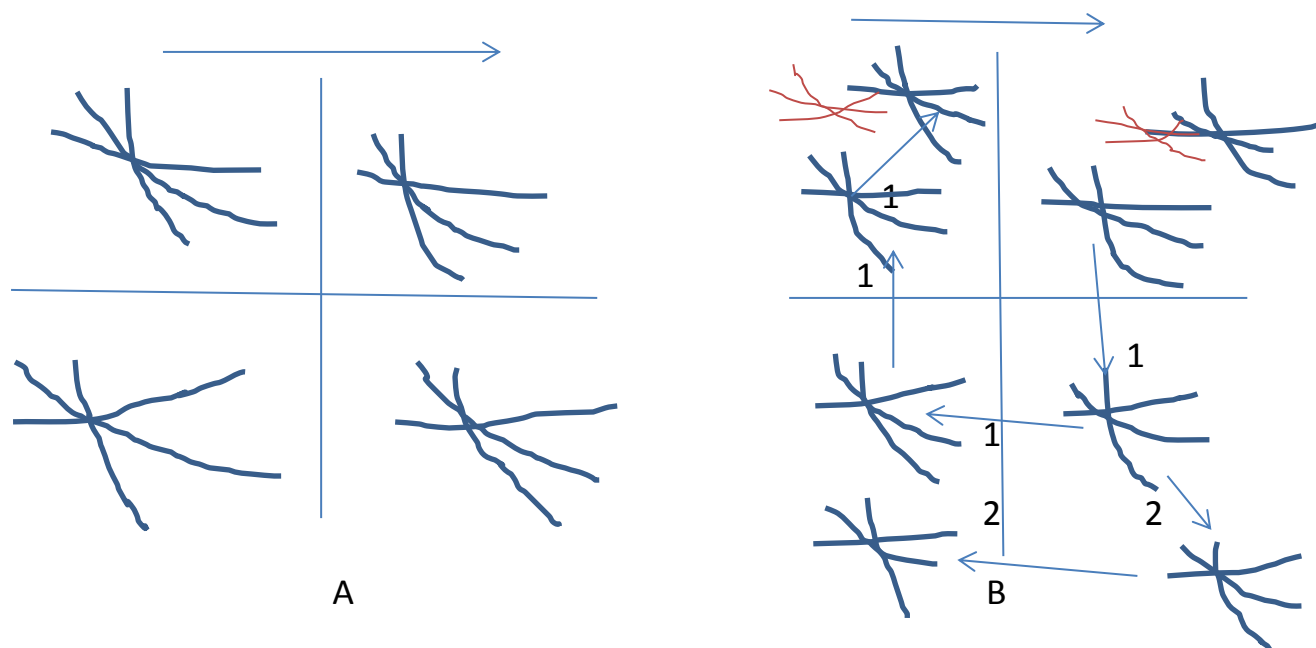
Picture A)

(+,+) In one economy three types of income groups are present based on business, social environmental standard as high, middle, low income group and its utilities

(+,-) If economy is living on non renewables, and other input goods on large and increasingly consuming way   it bring   depletion of resource, export

possibility for country of origin, but with Dutch disease problem, influence rise of negative environmental and social costs in that plane

(-,-) With continuing policy of depletion on large scale, with the low long term policies related to whole Earth, even war strategies negative picture brings further oil, gas depletion, increase of harmful gases, and low level of fair change

(-,+) The economy once satisfied with level of input, coming to significant GDP base , with considerable advances started to move toward renewable production and that it can further bring to advances in GDP level, economy overall, environmental and social security (*picture 2*)

Picture B)

(+,+) Economy that have significant amount of renewable and non renewables grows and GDP increases, bringing GDP/capita high, lower debt if further technological standard is given and sold further, bring social and environmental benefits to society inducing growth , giving impulse to investment by tax cuts, managing interest to low levels saving/investment opportunities

(+,-)For economy that serves as export country, further increase in production level of nonrenewable is option if want to continue GDP increase, but with significant environmental damage, and possible social inequality. The other scenario is lower GDP growth with mix of renewables non renewables but as high price of renewables is somewhat constrained this growth is slower than expected

(-,-)In area that is only reliant on one good, product, inflicted with war, suffer from economic, social, environmental disadvantages further degradation in growth can be observed if lower level of credit possibilities is given (with interest that was increased on large scale) , if destroyed by war it need to established basic in industry, environmental and social growth lingers further

(-,+)What the further strategy for the first nation will be is of importance. If it peruse own interest with increasing level of energy mix, social and environmental advances in its own country it will growth further, making misbalance in global income structure (Pikkety establisher growing inequality)

If invest (red lines) in a way to maximize gain optimizing at world scale (possibility to export goods in future, develop social and economic cooperation and communication), in line with God, person to person relation, it will invest some of time and money in developing poor. In that way speed of GDP growth will slow down on country base, continues on world scale and bring advances to all reaching new point of stability from constant destabilizing picture.Another way to look is sauturated domestic market (slower GDP growth, high interest and low credit demand in world , lower than possible input output relation to world scale) will force the first economy to lesson credit, increase cooperation with poor ones in order to reach stability in its own country and sustain its own growth.

In that way we can explore followings:

$$U_{overall} = U_{high\ income} + U_{middle\ income} + U_{low\ income\ group}$$

$U_{overall}$ (GDP; GDP part/GDP world; environmental advances/total environmental +social growth/total social opportunities) = $a_0 + a_1 * U_{high\ income\ group} + a_2 * U_{middle\ income\ group} + a_3 * U_{lower\ income\ group} + e$

Further diversification is observed in a group of high income population. In that group majority of ownership is done by small group of people and their utility differs from majority. In that group we can allocate shareholders of large corporations whether they are institutions or private. This shareholder structure with increased marginal utility can made difference further on smaller scale step procedure, while majority of population need larger step cooperation procedure in order to make Utility difference in Africa (social help programs etc.)

To present it more vividly six types of projects are made. The blue lines increase utility gradually for all population on Earth (the first is country, than region, the last one world environmental project that makes difference). The red lines present situation of usage of metals, ores, non renewables in a one that brings further degradation of interest in social, environmental sense and further bring downside to region, (producers) world(through various crises, environmental impacts - weather imbalances, hurricanes etc.)

This situation is presented more vividly as follows:
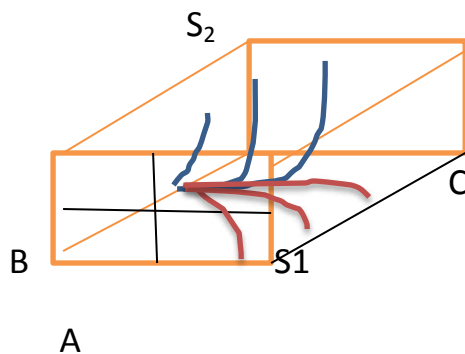
We have two planes S_1 and S_2. On the first plane S_1 environment   is considered without renewables.

The first red line makes significant growth in income for the first part of equation (20[thieth] century- time of oil) and that fall in environmental social picture. With the first blue line renewables are employed but only in high GDP region with limited impact or lower investment in solar rich areas. With social picture and broader investment in other regions that high income ones the total Utility grows – the last blue line. With c presenting population number that is impacted through projects.

Slowly with all this thinking in mind we came to our Theory of everything in economic sense. For GDP growth the usual way of writing is:

GDP = GDP $_{t-1}$+GDP $_{t-2}$ and is function of (consumption, investment, space, technological advances, material, immaterial advances etc.)

With growing space, technological advances ability to sustain growth in same trace declines and some crises occur. To develop long term sustainable relation we can write short term and long term formula for growth.

Short term is:

GDP= I+G+T +(X-M)

And mid-term is:

GDP=(I+G+T +(X-M)) + e $_{world}$ $^{1/x+yi}$

Where the first part is advances in space, technology knowledge and the second part more natural long term growth based on total space, population technology, organization achieved at moment.

If we consider that our space, technology, knowledge, intellect etc. is already known we can put our total ability as known plus total given unknown.

In that respect if space is considered as limited and given (although it can consist of 2 space level) , number of knowledge given the only formula is one that support long term sustainable growth that has God as primary variable, and relating to God other determinants.

In that respect the formula that would allow Theory of everything in economic sense is one that states:

$$GDP = e_{world}^{1/x+yi}$$

GDP f (economical, technical, environmental, social, spiritual achievements)

X= base in GDP

Y=flow of increase in marginal utilities that is related to relation to human, relation to God

1....all known+unknown space,matter,etc

0<X+yi<1 in regard of travel between start and end point in life, economy,space ,GDP growth etc

$$GDP_{growth\ sustainable\ world} = = e_{world}^{1/x+yi}$$
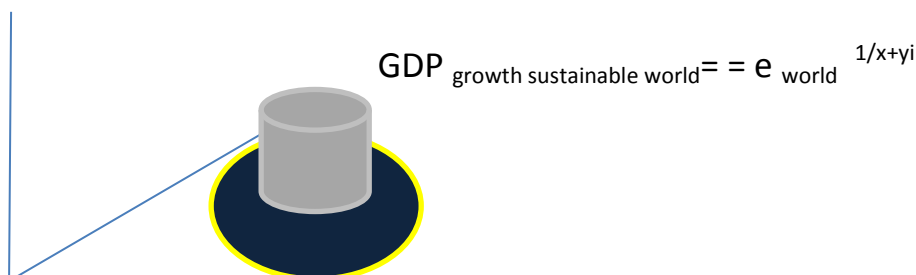
Once we have found the general idea- that is that world can progress only if quality growth is reached for everybody some interrelating is developed further:

Table 3: Interrelation Individual, Institution, Government, unconscious, 0,1

	Toward relation to God(any religion)	Individual relation to : (inside Europe) Europe Africa relation)	Instittion, Company, State, Relation to , inside tihe state, between Governma nets, Between Africa Europe	All subcoun cios regular (TV, radio, educatio n, level of moral, knowled ge etc)	All subcouncios on indivial level (family, religion, moral, behaviour, norme,atti tude, ambition, past , futur goals, achivable, unachivabl e ambition, plan	Subcuoncios, behaviour, plans, - imposed by regular,irregu la, force, by will, education, technology, other means	Time in respekt of technolo gy usage, individual level of educatio n, non renewabl e exostion time ; money value	Control variable(Control mechanis akm in wordl that cares for eqal developm ent, UN, Help Society, United Gov Control , common goals, socila help etc)	If low progre ss, very low develo pm throug h longer period of time is observ ed	Highest correlat ion possibl e
	G	xi	yi	i regular	i individual	i impposed	time	z	0	1
G	G*G	Xi *G	yi*G	i reg*G	i ind*G	i impo *G	time *G	z*G	o*G	1*G
xi	G*xi	xi* xi	yi*xi	i reg*xi	i ind*xi	i impo *xi	time *xi	z*xi	o*xi	1*xi
y1	G* yi	xi*yi	yi*yi	i reg*yi	i ind*yi	i impo * yi	time *yi	z*yi	o*yi	1*YI
i regular	G * i regul	xi*i reg	yi*i reg	i reg*i reg	i ind* i reg	i impo * i reg	time *i reg	z* i reg	o*i reg	1* i reg
i individ ual	G * i individ	xi*i ind	yi* i indiv	i reg*i ind	i ind*i indi	i impo *i indiv	time *i indiv	z*i indiv	o* i indiv	1*i iniv
i imppos ed	G * i imposed	xi* i impos	yi* i impos	i reg*i imops	i ind* i imops	i impo *i inimposed	time *i impos	z* i impos	o*i impos	1*i impos
time	G* time	xi*time	yi* time	i reg*time	i ind* time	i impo *time	time * time	z* time	o* time	1* time
z	G* z	xi*z	yi* z	i reg*z	i ind*z	i impo * z	time * z	z*z	o*z	1* z
0	G* o	xi*0	yi*0	i reg*0	i ind*0	i impo *0	time *0	z*0	o*0	1*0
1	G* 1	xi*1	yi*1	i reg*1	i ind*1	i impo *1	time *1	z*1	o*1	1
Africa	*increased*	*low streang ht*	*in progress*	*low - mid importn ace*	*importnat*	*given and than stagnates*	*medium*	*low*		
Europe	*decreased*	*import ant*	*very important*	*increase d*	*stagnating*	*increased*	*importna t*	*midium low importna ce*		

33

Further to note are the relations of primary importance while this gives impetus and quality to growth and interchange good, services, cultural spiritual well beings.

If mark the x as individual relation, y institutional, Z control variable social help, scientific etc., with all I (counties and uncounscious achievements in actions) we have different relations in respect to each other and God at end.

On individual level

$U_{business}=\partial U/\partial X*P_1+\partial U/\partial X*P_2+\partial^2 U/\partial X^2*P_3=0$ (P… opportunity, employment, ROA, profit, price, market)

U environment=$\partial U/\partial X* E_1+\partial U/\partial X*E_2+\partial^2 U/\partial X^2*E_3=0$ (air, renewables, health)

U social=$\partial U/\partial X* S_1+\partial U/\partial X*S_2+\partial^2 U/\partial X^2*S_3=0$ (social structure, equality, growth, free time, etc.)

On institutional level:

$U_{business}=\partial U/\partial Y*P_1+\partial U/\partial y*P_2+\partial^2 U/\partial y^2*P_3=0$ (P… opportunity, employment, ROA, profit, price, market)

U environment=$\partial U/\partial Y* E_1+\partial U/\partial Y*E_2+\partial^2 U/\partial Y^2*E_3=0$ (air, renewables, health)

$U_{social}=\partial U/\partial Y* S_1+\partial U/\partial Y*S_2+\partial^2 U/\partial Y^2*S_3=0$ (social structure, equality, growth, free time, etc.)

Although table present two way correlation it can be observed as relation that can be correlation of all 10 variables presented at the same time giving complex result of given structure.

With that in mind we can further advance toward Africa 2 project in which we support further development through investment in concentrated solar plants, wind areas, algae pond. This is done by economic, social and other related possibilities included in our basic physical table.

Table 4: From physics to economy in Africa, with social, technological advances

	Physics	Economics	Social	Other. Agriculture, Technology, Tourisam, Development, all other aspects
1	*2*	*3*	*4*	*5*
1.	Kinematics			
	$X_f=x+(v_i+v_f)/2$ $X_f=x_i+vt+1/at^2$ $v_f^2=v_i^2+2a(x_f-x_i)$ $V=dx/dt$	1Pre feasibility calculated for solar, wind, alga 2.Investors contacted, 3.Goverent in Europe agreed to cooperate 4. Electricity sector involved 5.Basic loan , financing activities done	Bio social difficulties and problems recognized by Union Millennium Development Goals: eradicate hunger, reduce poverty, empowering women, decree health – this carefully monitored from country to country with UN help projects and programs that explain progress	Basic financial and technical knowledge largely recognized in Africa ; some gains visible and calculated, Relation with investors electricity companies maid, best possible land technical solution reached
2.	Dynamics			
	$F=ma$ $N=MGCOSQ$ $F_K=WN$	1.Firsts shareholder stricter established in a way that African Government (all states) have at least 51% ownership 2.Companies, electrical utilities, investor funds participate 3.First credit arrangement and tax burden agreed	Once established project , revenue, government and social structure in each country contacted with list of goals and programs the most in need to be make with project money (eradicate hunger, free education of all, nets for mosquito , free health for children etc.)	The best location for wind solar given by African Government(that implies new political structure that firmly stays behind all countries) and helping to eradicate problems Pond fields are started to be built in a way to make water innate from desalinization plant
3.	Work, energy ,power			
	$W=Fds$ $W=KE$ $W=-U$ $U=mgh$ $E=KE+U$ $KE=1/2mv^2$ $P=De/dt$	Export of technologies on Sahara(wind turbine, concentrated solar technologies as well as algae pond are started to be build	With the first work women employed , school and education oriented toward further advances from algae project in a way to develop some other potential (agro, tourism)	Work on the most effective way, women employed, and have possibilities to change job with clean agriculture
4.	Simple harmonic Motion			
	$F=-kx$ $T=2P$ $SQRT(M/K)$ $V MAX =X SQRT(K/M)$	First kWh exported to Spain Portugal Italy, longer distribution nets consider. Prices competitions started to move toward further EU	Interchange of knowledge Europe Africa, in respect of education health programs, further social progress country by	With increased electricity to Europe, new computers and knowledge introduced – computers mobile on solar , new train o solar by Nile , send some

				routes that are helped with solar considered
	T pendulum =2P SQRT (l/G)	market (UK, Italy, France) First dividend paid to shareholders	country	routes that are helped with solar considered
5.	Momentum			
	P=mv J=F dt M1v1+m2v2=m 1v1+m2v2	People in Europe can choose where the electricity come from, algae come to EU market in form of input for pharmaceutical (Swiss) food industry (Germany, Italy, France)	With project some basic infrastructure is employed water sanitation , electric per capita in Africa introduced increased, free computers with some basic knowledge given on solar energy etc.	The first income give rise to new industries (agro products), tourism innovative (algae as food) , university on African languages, cultural treasure kept and saved(each day some African language and custom is forgotten)- money prevents this bloc scenario keeping culture known and recognized in the world
6.	Uniform Circulate motion and gravitation			
	A=v2/r F=mv2/r F=G m1m2/r2	Africa economy takes the first step in improving agriculture, irrigation , industry basic, improve tourist offer Tax relief in Europe due to African electricity input to some extent helping further poor regions to develop	Social projects establish in a way to take the most vulnerable group throughout Africa especially Sub-Sahara, eastern part Somalia, Chad etc.	Increased number of tourism, political stability, new techno centers , agriculture based on clean product and some basic of industrial development are exported to Europe , World
7.	Thermodynamics			
	Q=mcT I=LaT V=Vbt PV=NRL PV/T=PV/T	Africa increases electric consumption per capita, GDP/capita grows, poverty reduces, new industries arises; Some industries change position from Europe to Africa etc., Dividends from project to induce growth in whole Africa	With progress soft ponds and electricity export , more attention to new projects, give equal social GDP structure prevent new rich and constant poor structure of society, eliminate payment for primary education , etc.	Develop small factories, industries, innovative design, African suited laboratories for further development: solar trains, water irrigation, desalinization, school with solar, clean agriculture , finding new markets, cooperation inside Africa and other continents
8.	Rotation motion			
	T=Rf sin q	Africa rises pond number, algae's transported to refineries in Europe Middle East, large input in biofuels that goes to Europe	Some new innovative social structure: travelling doctors, helicopters in medical care, medical care for all population etc. Based on dividend from 51% stake in projects	Rising cooperation with Swiss(pharmaceutical) basic in Africa France(food industry) Germany car industry biofuel improvement in efficiency in production) etc.
9.	Fluids			
	F =qgv P=F/a Q=AV	Project flow observed in South America, south Asia similar start up throughout Africa, increased GDP/casita with environmental social projects further	Project gained visible results, interchange of knowledge in medical care education with Europe, Africa advances with constant equal social progress	Increased interchange of good services in world/Africa

Through stressing current difference we can reach the same level of energy, bio energetic, psych energetic potential at both continents Europe and Africa.

Table 5:Energetic EU,Africa

Energetic	Africa	Europe
Potential	in renewables:	in renewables:
Consumption electricity	to 1500 KWh/capita	3000-8000 KWh/capita
Renewables	Great potentials ; Egypt the most advance in wind other incorporating; high dependence upon GDP/costs	High growth after 2006, Spain -solar, Germany solar winds, Denmark Uk wind, low level of utilization than Sahara for solar; low level of transport dependencies on oil
Non renewables	Nigeria, Libya, Egypt, Angola- oil reserves; Congo-Wood; Algeria-gas	UK oil, gas, Romania oil., Norway- oil, Denmark -oil -very low reserves majority from import -Russia, Middle East, Africa
CO$_2$/PM 2,5	Sub-sahara CO$_2$ (0,6-0,8); Middle East +North Africa(1-6); PM2,5 Sub-Sahara (77-82), Middle East North Africa (100)	Europe CO$_2$ (5,8-7,1) metric ton per capita (1960-2011); PM 2,5 (98 -84) 1960-2011
Political structure	Political structure of Africa United not recognized to the level it should be (compared to EU); low level of financing possibilities	United political structure, with political level on each country; funds for development of rural region,
Nonlinear system GDP/capita	Great difference in development (Egypt, South Africa, Libya) with other; some political economical and especially energy related with trade to Europe can be push of for further developments	In Europe nonlinear system was observed before EU 28 on East/ West region, now it is only present in some Balkan parts that are lagging in GDP/capita after EU 28; and further east Ukraine, Belarus - Caucasus region to be slowly incorporated in economical linear growth picture;
Nonlinear system energy	Country with bigger GDP are more ready to invest in expensive technologies; some common fund, corporation with EU China is needed if energy can work for the most poor in Africa	Bigger GDP/capita bigger incorporation of renewables but it does not mean better solution on world scale; optimization on world scale in respect to metal, nonrenewable life potential is needed
Scalar	Scalar is going down - increased emission ,decreased oil reserve Nigeria, lower than possible usage of natural resources; lower GDP/capita with increased population further damages the picture	Scalar is going up; import possibilities in oil /gas is growing, renewables in energy structure is increasing; but still lags in energy diversity in transport sector
Action at near	Oil revenue in desalinization , renewable, agriculture, algae , solar , wind on price competitive base (have Africa production at some extent)	Technology innovation ,diversity in transport, invest in Africa on energy agricultural base
Action at distance	Incorporate some of technological advances from world in Africa;	More diversity in input, change obtainable, more corporation with Africa in land energy input, that would bring growth to other sectors, while oil and gas will extinct till 2200 algae wind and solar Africa will last longer
Space time	Depleted energy from Africa is consumed in other regions what further downgrade Africa in space time horizon	Energy is dealings in century what is significant disturbance in space time picture
Vacuum	Low energy lo development , vacuum picture not achieved low level of possibilities looking at grow scale)	Higher than average vacuum potential
Material	Material from Africa used under competitive (space time) base in other region; material for electricity(steel, magnets, curve) is expensive to produce	Material imported at competitive rate, input used and product sold on demand/supply rate / can be better technical and solution responsibility

Hidden variable	Hidden value- is strong and important human capital that with right education can achieve good results in any field including development of energy sector on world competitive rate	Hidden variable- is efficiency, cooperation with Africa etc.

Table 6: Bio energetic EU,Africa

Bio energetic	**Africa**	**Europe**
Population	1 bill to growth to 2,5 bill in 50 years	around 700-800 mill
Population growth	strong growth	stagnates
GDP/capita	under 1000 $/ capita	10000-20000$/capita
Health	Health care is not free, vast region and low GDP significantly influence	Free basic health care, available health care in all states
Education	Education is not free; this is goal at least till 18 years old to have free education in all states	High educated work force
Living system/body	Very young people	Many old people
Cells/change	Low level of GDP influence nutrition, disused related to Africa (sun, malaria, water problems etc.)	Change with modern disese:sugar, pressure, heart problems
Disease	HIV/ poverty/ low level of GDP influence all aspects	Cancer , hearts attack the most common enemy
Man	Very young population, long term HIV problems in some region, lower level of older population, potential to growth, prosper, good religious help base and effort	Old population, illness : sugar, obesity, cancer; Slower rate of population growth, good educational base, good root in religion but with lower level of truly believers
Animal	Wild animals. Parks, space is reduced for other (deforestation Congo); Domestic animal production can experience large growth	Domestic. Reduced; Numbered; Wild: in cages: Can be different policy: free wild animal on large space in Africa and Europe ,
Plant	Many distinct species/afforestation	Many distinct specie/careful preservation of species
Action at near	Invest in hospital education , agriculture and animal life	Help with medical care on educational level to Africa; have animals on large free spaces, growing care for plant life
Action at distance	Further increased to have EU standards in health education; cure diseases, prevention is important for HIV etc.	Further plant animal space rights, Increased care for older population,
Quantum	Sun area can give rise to certain illness ;	Usual disease with weather
Scalar	Scalar is lingering	Scalar is growing
Hidden variable	Large hidden variable is nonexistence free medical care	Large variable is population growth, with plant animal better solution and variety of species grown on its own territory

Table 7: Psyche energetic EU,Africa

psyche energetic	Africa	Europe
Population	Growing number worth growing life quality expectancies	Same number of population psycho energy constant, with growing number of older population
Education	With growing education /TC/computers/Internet - growing expectancy of life achievements and values, psycho energy grows	The same level of educational standard, increased with further innovative advances
Health	Health is influenced by low GDP/capita- must be increased -larger number of older generation in next period	With better standard level of health is increased bringing better psyche energetic level
Living system(man)	Living system is still large influenced by traditional, historic values	Living system influenced by change, irrational, increased transport, sales, greater control
Thoughts	Thoughts are clear, in line with nature, common ground, sound logics, need further strong educational impulse for all population	Thoughts are influenced by education, family, income, land values
Memory	Strong memory, but need to be recognized on paper value, each day one story, language is extinct in Africa- what is enormous loss to humanity	Memory preserved kept in variety of forms, (computer, archives, history etc.)
Emotion	Emotional plays a big er rule than in Europe	Emotions important but subject to cultural, land values, distinct south north way of expressing
Religion	Weak religion roots, but growing number of people that goes and believes truly in common church activities	decreasing number of people in regular church activities, strong religion roots
Conscious	Concourse in line with tribe , country, income, opportunity	Couscous tailored by social rightness, TV, newspaper, preferences, group , etc.
Unconscious	Unconscious strong, but losing its memory with daily activities	Unconscious under control of education, emotions, social acceptance, induced type of unconscious etc.

3. PROJECT...AFRICA 2–WIND, CONCENTRATED SOLAR, ALGAE

When starting a project some pre stage calculation, observation and possibilities need to be taken. With current state of technology that allows significant usage of natural resources in form of wind energy, solar influx and that due to competition and technical advances have tendency to decrease current too high values this projects can be observable and in Africa.

Africa is endowed with good solar radiation influx especially Sudan Egypt Libya), and has good position for wind plants north/north west of the continent.
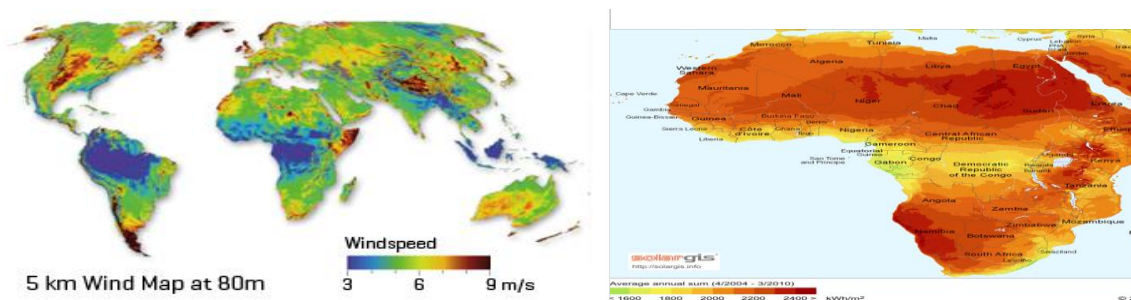
With current global capacity of wind around 432Gw(600 TWh) and plans to build additional potential from 2000-4000 GW by 2050 and solar energy produced in 2015 of around 253 TWh with plans to build additional capacity by 2050 to around 4500 TWh Africa can in future found its position as global as significant partner in start point energy flow.

Each pre calculation now, and in case of decreased technology price need to have some positive result in terms of investment analysis. In that case NPV (Net Present Value) that is sum of market NPV, environmental gains/costs NPV and social NPV (gains/problems) need to end with positive result.

$$NPV = -I + (B-C)/(1+r)^1 ..... + (B-C)/(1+r)^n$$

$$NPV_{total} = NPV_{market} + NPV_{social} + NPV_{environmental}$$

While Africa can serve as a base or input for electricity Europe is largely perceived as market end goal so calculation can have two sides (adding transmission costs in Europe, market calculation of price, opportunities, security etc.).In that respect formula gains following:

NPV $_{Total\ Project}$= (NPV $_{market}$+ NPV $_{social}$+NPV $_{environmental}$) ^{Europe}+ (NPV $_{market}$+ NPV $_{social}$+NPV $_{environmental}$) ^{Africa} +e

NPV market:

Wind $_{technical}$=a_1+a_2(wind speed)+a_3*(power available from wind)+a_4*(height above ground)+a_5*(mass density of air in kilos)+a_6*(efficiency increased due to technical innovation+a_7*(storage costs)+a_8(input to grid Africa)+a_9(input to grid Europe)+e

Wind $_{financial}$= b_1+b_2(CAPEX)+b_3(operating costs)+b_4*(financial costs)+b_6(investment opportunities new shareholders)+b_5(tax advantages)+e

Wind $_{market}$=c_1+c_{2*}(current consumption kWh increased)+c_3*(new market Europe)+c_3*(potential to work with equipment producers)+c4*(potential to build a factory of wind turbine+c_5*(relation with generator, curve, plastic , turbine industries)+e

NPV environmental

NPV $_{environment}$ =a_1+a2*(decreased CO_2 Africa) +a_3*(decreased CO_2 Europe) +a_3*(other gasses decreased reduced compared to average impute fuel) +a_4*(other clean industries to develop-agro, energy algae, tourism irrigation desalinization etc.)+a_5*(Europe increased supply of secure energy with low harmful emission)+a_6* (better usage of land in Europe)+a_7* (lower negative impact on birds species in Europe) +a_8*(places with lowest negative impact on bird migration west Africa , north)+e

NPV social

NPV $_{social\ Africa}$=a_1+a_2*(job opportunities)+a_3*(migration prevented)+a_4*(loss of life prevented)+a_5*(increased prospect in economy)+a_6* (increased prospect in education)+a_7*(increased prospect in social health care projects) +a_8*(increased cooperation with Europe, China, South Africa)+a_9*(improved quality of life)+a_{10}*(increased political stability+a_{11}*(decreased migration due to poverty)+e

NPV $_{social\ Europe}$=a_1+a_2*(clean energy increases)+a_3*(diversity of supply increases)+a_4*(cultural social economical advances through cooperation with Africa)+a_5*(decreased negative impact from migration)+a_6*(climate

security)+a_7*(potential to further develop industries with cleans secure energy input)+a_8*(increased cooperation with Europe, China, South Africa)+a_9*(improved quality of life)+a_{10}*(increased political stability+a_{11}*(decreased migration due to poverty)+e

$NPV_{common\ goal}$=a_1+a_2*(better ground for dialoged)+a_3*(trade that can be established with more balanced parties)+a_4*(strong common goal)+a_5*(prevented danger from climate change)+a_6* (prevent loss of life)+a_7*(prevent loss of property) +a_8*(increased education)+a_9* (political stability)+a_{10}*(market open for dialogue+e

With concentrated solar and wind project some significant amount of energy input can be obtained by Sahara region, security to net, reduction in CO_2 emission and increase in social advances for both continents. If 1000MW of solar is put to work savings of 440898 tCO_2 is reached and with increased quantity of 20000MW the 8, 8 mil tCO_2 is reduced on total Earth scale what means measure of 1, 5 mil cars not used. With installed 1000MW wind capacity 705 th t of CO_2 is reduced or 126 thousand cars not in used.

Table 8 : Solar-CO_2 reduction

MW	kW	MW	MWh	t CO_2	propos	saving	cars not used
10	10.000	10	26.280	4.898	489	4.409	791
30	30.000	30	78.200	14.696	1.469	13.227	2.374
80	80.000	80	210.240	39.190	3.919	35.271	6.331
100	100.000	100	262.800	48.988	4.898	44.090	7.914
1000	1.000.000	1000	2.628.000	489.886	48.988	440.898	79.137
20000	20.000.000	20000	52.560.000	9.797.720	979.772	8.817.948	1.582.709

Table 9: Wind –CO_2 reduction

MW	kW	MW	MWh	t CO_2	propos	saving	cars not used
1	1.000	1	52.556	979	98	881	58
100	100.000	100	525.600	97.977	9.797	88.180	15.827
300	300.000	300	1.576.800	293.931	29.393	264.538	47.481
600	600.000	600	3.153.600	587.863	58.786	529.077	94.963
800	800.000	800	4.204.800	783.817	78.381	705.436	126.617
1000	1.000.000	1000	5.256.000	979.772	97.977	881.795	158.271

3.1. CONCENTRATED SOLAR, WIND

In order to start a project some basic elements need to be determined that are inputs to each calculation. The most significant parts are:

1. Investment costs- decrease through time, taken Price/MWh (source Wikipedia).These costs can increase efficiency (wind 35%, solar 20-30% with combination of resources, technological advances, to calculate and build a much more efficient base)

2. Operation costs (based on standard elements, fixed variable rates)

3. Discount rate- a rate of 7% is taken in calculation, depends upon risk of country, project, demand/supply on market interest,

4. Financing opportunity – some good shareholder input is taken, otherwise is usual 60-40 loan-own resources

Table 10: *Investment/Operative Costs Wind, Concentrated Solar*

	WIND ONSHORE	WIND ONSHORE	WIND ONSHORE	SOLAR CONCENTRAT ED TERMAL	SOLAR CONCENTRAT ED TERMAL	SOLAR CONCENTRATED TERMAL
INVESTMENT	1.627.780	162.778,00	138.361.300,00	3.096.690,00	309.669,00	4.335.366.000,00
Fees	81.366,00	8.136,60	6.916.110,00	154.984,00	15.498,40	216.977.600,00
Engineer	146.460,00	14.646,00	12.449.100,00	278.972,00	27.897,20	390.560.800,00
Land	162.733,00	16.273,30	13.832.305,00	309.969,00	30.996,90	433.956.600,00
Administrative	113.913,00	11.391,30	9.682.605,00	216.978,00	21.697,80	303.769.200,00
Install	325.913,00	32.591,30	27.702.605,00	616.938,00	61.693,80	863.713.200,00
Mechanic	797.395,00	79.739,50	67.778.575,00	1.518.849,00	151.884,90	2.126.388.600,00
OPERATING COSTS	403.464,00	40.346,40	34.294.440,00	749.336,00	74.933,60	899.203.200,00
Salary	58.119,00	5.811,90	4.940.115,00	291.923,00	29.192,30	350.307.600,00
Communal	9.686,00	968,60	823.310,00	48.653,00	4.865,30	58.383.600,00
Energy	19.373,00	1.937,30	1.646.705,00	97.307,00	9.730,70	116.768.400,00
Fees	9.686,00	968,60	823.310,00	48.653,00	4.865,30	58.383.600,00
Mater invest	245.280,00	24.528,00	20.848.800,00	210.240,00	21.024,00	252.288.000,00
Administrative	61.320,00	6.132,00	5.212.200,00	52.560,00	5.256,00	63.072.000,00

To start calculations we have to be sure that some advances in Africa (land position, fees, administrative costs, labor work) need to be competitive if compared with Europe. This example is only for showing purposes of possible reasoning and thinking-each country has its own strategies, fees, administrative labor demands and need to calculate its own position that is subject to daily change.

Table 11: *Comparison Europe/Africa costs and possible advantages/startegies/cooperations in costs structure due to large scale, cooperation between countries, new market, better efficiency in technology etc.*

10% ret	EUROPE			AFRICA		
	WIND ONSHORE	WIND ONSHORE	WIND ONSHORE	WIND ONSHORE	WIND ONSHORE	WIND ONSHORE
PRICE						
€/MWh	56	53	45,13	44,81	44,81	38,09
MWh	30.660,00	3.066,00	3.066.000,00	30.660,00	3.066,00	3.066.000,00
Price MWh	20	20	14	12	12,5	10,5
INVESTMENT	1.627.780,00	162.778,00	138.361.300,00	1.373.827,30	137.382,73	116.775.320,50
fees	81.366,00	8.136,60	6.916.110,00	*56.956,20*	*5.695,62*	*4.841.277,00*
engineer	146.460,00	14.646,00	12.449.100,00	146.460,00	14.646,00	12.449.100,00
land	162.733,00	16.273,30	13.832.305,00	*32.546,60*	*3.254,66*	*2.766.461,00*
administrative	113.913,00	11.391,30	9.682.605,00	*79.739,10*	*7.973,91*	*6.777.823,50*
install	325.913,00	32.591,30	27.702.605,00	*260.730,40*	*26.073,04*	*22.162.084,00*
mechanic	797.395,00	79.739,50	67.778.575,00	797.395,00	79.739,50	67.778.575,00
OPERATING COSTS	403.464,00	40.346,40	34.294.440,00	216.261,50	21.626,15	18.382.227,50
Salary	58.119,00	5.811,90	4.940.115,00	*29.059,50*	*2.905,95*	*2.470.057,50*
Communal	9.686,00	968,6	823.310,00	*4.843,00*	*484,30*	*411.655,00*
energy	19.373,00	1.937,30	1.646.705,00	19.373,00	1.937,30	1.646.705,00
fees	9.686,00	968,6	823.310,00	9.686,00	968,6	823.310,00
mater invest	245.280,00	24.528,00	20.848.800,00	*122.640,00*	*12.264,00*	*10.424.400,00*
administer	61.320,00	6.132,00	5.212.200,00	*30.660,00*	*3.066,00*	*2.606.100,00*

German LCOE in €/MWh (2013)		
Technology	Low cost	High cost
Coal-fired power plants — brown coal	38	53
Coal-fired power plants — hard coal	63	80
CCGT power plants	75	98
Wind Power — Onshore wind farms	45	107
Wind Power — Offshore wind farms	119	194
Solar — PV systems	78	142
Biogas power plant	135	250

Kinetic energy can be captured by wind turbines and used as base for renewables. The end result is dependent upon wind average speed and location. The most attractive regional are near coast, inland areas while in water/sea means high investment and maintenance costs. Demand is growing with increasing number of producers with aim that world will by 2050 have capacity of at least 2000 GW wind turbines. The one turbine can be from 100 kW do 3,5 MW and is increasing in capacity and efficiency. Modern wind system operates automatically -are dependent upon same aerodynamically forces as wings of an aero planes to cause rotation. The major components are: rotor with 2, 3 blades that converse wind into mechanical energy, gearbox to match the slowly turning rotor shaft to the electric generator, tower that help to capture the higher wind speed, control system –start end. Yield obtained is $Y= E_c/ NA$ N..number of turbines A.. is the area swept by the rotor of a single wind turbine. Energy is captured in a way that $E=1/2\ mv^2 = ½\ A*t*ρ*v^2$ with Avt volume of air passing through A .The most significant wind farms are in USA and Chian (6.000MW-Gansu Farm).

Concentrated solar power /thermal uses lenses or mirrors and focus it into small beam. There is difference between photovoltaic that converts sun energy directly into electric and thermal that uses heat of the suns radiant to generate electricity from conventional steam driven turbines.   Different kind of technology exist (parabolic trough, reflector, dish, compact linear reflectors, solar power tower etc.) and thermal storage can work to 24 hour electricity generation. The largest known concentrated solar station is 392W Mojave Desert California solar power.

After calculating possible options –only business results without environmental and social consideration the followings are obtained. Wen putting to work social and environment (labor, CO_2 reduction) more positive results for Africa

projects are end result of our efforts and can add to whole picture as scale of decision at the end.

With business results, favorable costs, greater efficiency Africa can compete in business since also adding to secure network of electricity coming to Europe.

Table 12 : *RESULTS OF CALCULATION WIND/CONCENTRATED SOLAR AFRICA / EU*

		AFRICA CONCENTRATED SOLAR	EU CONCENTRATED SOLAR	AFRICA WIND	EU WIND
A					
1	INVESTMENT	261.373,00	325.163,00	137.382,00	170.914,00
2	Sales MWHX €/MWH	3000X25=75000	3000X35=105000	3060X20=61200	3066X20=61320
3	NPV;Payback; IRR	51439;9,46;10	13933;11,1;7,66	145211;5,2;23%	19597;10;8,76
B					
1	INVESTMENT	2.631.738,00	3.096.690,00	1.373.827,00	1.627.780,00
2	Sales MWH	30660X25=766500	30660X35=1073100	30660X12=367920	30660MWHX20=613200
3	NPV;Payback; IRR	630199;9,2;10,7,2	397336;10,56;8,9	166200;11,23;8,5;	390357;10,10;9,94
C					
1	INVESTMENT	3.659.234.040,00	4.335.366.000,00	116.775.320,00	145.277.410,00
2	Sales MWH	61300000X14=858200000	61300000X23=1.409.900.000	3066000X10,50=32193000	3066000X14=42924000
3	NPV;Payback; IRR	206MIL;11;7,8	959 MIL; 10;9,49	19332196;10,71;9	28646955;9,59;10,24

See Appendix I

3.2. ALGAE

Algae fuel uses algae for production of biofuels while they are energy rich with oils. Although they are alternative to sugarcane their usage is not so widespread but with constant effort of production possibilities with decreasing cost present potential for future fuel input .They releases CO_2 when they are burned, release CO_2 recently removed from atmosphere via photosynthesis as the algae or plant grew. Algae grows much faster than other crops, they do not compete with food industry so much making it more comfortable for end use as biofuels. They also produce hundreds of times more oil per unite area than conventional crops such as rapeseed, palms, soybeans, or jatropha. Algae have a harvesting cycle of 1-10 days their cultivation permits several harvests in a very short time. Can be done in unsuitable terrene (what makes Sahara competitive). While EU researches tend to grow them in clean but expensive photo bioreactors open pond is more cheap, and for fuel more suitable to maintain.Model of algae grows is done by group of Netherlanders experts where: production based on photosynthetic radiation); production of sugar(influenced by temperature and influx of CO_2 gasses, heating temperature achieved during the day), (sugar is diverted into dry matter), harvesting is done by centrifuge model increasing algae density to 30 kg/m^3 where 90% of water is returned to pond, electricity use(for different purposes: flue gas supply – put into algae by blower 7,3kW per month per m^3 of water into ponds, mixing of pond 3,7kWh per month per m^3, heat supply 0,7kWh per month per m^3; centrifuge 3kW per m^3. Refinery data (not included –can be transported to Middle East or to one of European Refineries France, Spain, Italy, Germany, Switzerland etc.).

Different types of algae and contents of protein lipids, carbohydrates are presented in picture.
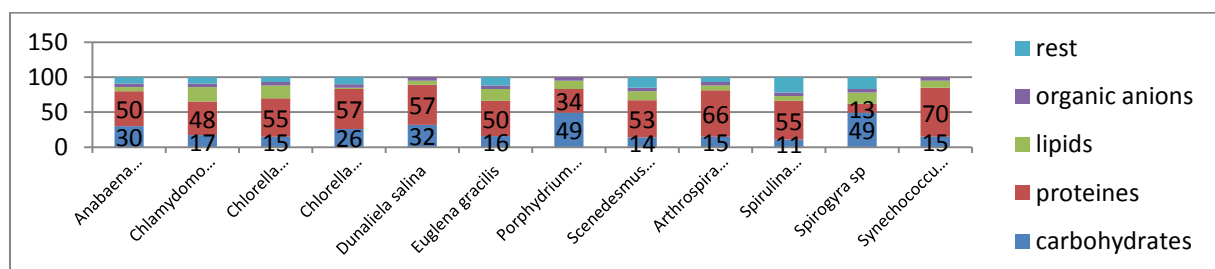
Picture 2: Algae contents

The input for project starts with numbers and possible saving, negotiating strategies, many pond areas that would decrees cost of technology as well are considered. These numbers varies from time to time and can be further lower with technological advances. In Africa open pond have lower values in investment and operating terms giving more competitive labor, input energy, land usage, fees environment.

Table 13: *Investment Costs Open Pond Africa/Europe, Europe tube algae project*

Africa	AFRICA OPEN POND		EU OPEN POND		Europe tube	EUROPE TUBE		*Europe*	*Africa/Europe*
Investment capital goods		**life span**	**Investment capital goods**	**life span**	**Investment capital goods**	**Investment capital goods**	**life span**	*Open pond/Tube difference*	*open pond*
Reactor construction	€ 5.000	15	€ 5.000	15	Reactor construction	€ 11.141	3	*-€ 6.141*	*€ 0*
Mixing equipment	€ 9.000	8	€ 9.000	8	Circulation pump	€ 10.000	8	*-€ 1.000*	*€ 0*
Heating equipment	€ 15.000	15	€ 27.000	15	Heating & cooling equipment	€ 55.000	10	*-€ 28.000*	*-€ 12.000*
Sparging equipment	€ 27.000	10	€ 27.000	10	Degassing equipment	€ 45.000	10	*-€ 18.000*	*€ 0*
Lighting equipment	€ 0	15	€ 0	15	Lighting equipment	€ 0	15	*€ 0*	*€ 0*
Process control	€ 15.000	15	€ 15.000	15	Process control	€ 40.000	15	*-€ 25.000*	*€ 0*
Infrastructure	€ 30.000	15	€ 75.000	15	Infrastructure	€ 75.000	15	*€ 0*	*-€ 45.000*
Total	**€ 101.000**		**€ 158.000**		**Total**	**€ 236.141**		*-€ 78.141*	*-€ 57.000*
Investment capital goods		**life span**		**life span**	**Investment capital goods**		**life span**	*€ 0*	*€ 0*
Centrifuge	€ 40.000	10	€ 94.737	10	Centrifuge	€ 33.437	10	*€ 61.300*	*-€ 54.737*
Process control	€ 0	15	€ 0	15	Process control	€ 0	15	*€ 0*	*€ 0*
Infrastructure	€ 6.565	15	€ 16.564	15	Infrastructure	€ 16.564	15	*€ 0*	*-€ 9.999*
Total	**€ 46.565**		**€ 111.301**		**Total**	**€ 50.000**		*€ 61.300*	*-€ 64.736*

Source: Algae Economics,2014-Chriss de Visser,Schipperus,Spruijt, Kootsstra,calculation Africa

In calculation deprecation is made for 15 years duration for all (6, 67% depreciation rate) although once put at work can serve more than half a decade and more. Proper maintenance and insurance are further inputs to considered.

Table 14: *Depreciation, Maintenance, Insurance three algae projects*

		deprec.	maint.	interest	insur.	
open pond	Algae raceway investment cost per 1000 m³	€ 10.763	€ 750	€ 4.780	€ 790	€ 17.082
open pond	Algae harvesting investment cost per 1000 m²	€ 9.520	€ 9.474	€ 3.367	€ 557	€ 22.917
	sum	€ 20.283	€ 10.224	€ 8.146	€ 1.347	€ 39.999
tube	Algae raceway investment cost per 1000 m³	€ 20.367	€ 1.150	€ 7.143	€ 1.181	€ 29.841
tube	Algae harvesting investment cost per 1000 m²	€ 4.003	€ 3.344	€ 1.513	€ 250	€ 9.109
	sum	€ 24.370	€ 4.494	€ 8.656	€ 1.431	€ 38.950
open pond	Algae raceway investment cost per 1000 m³	€ 7.343	€ 465		€ 505	€ 8.313
open pond	Algae harvesting investment cost per 1000 m²	€ 9.520	€ 9.474		€ 557	€ 19.550
	sum	€ 16.863	€ 9.939		€ 1.062	€ 27.863

Source: Algae Economics,2014-Chriss de Visser,Schipperus,Spruijt, Kootsstra,calculation Africa

Operating costs are reduced also for Africa open pond in respect of labor, electricity costs (wind solar).

Table 15: *Operating Costs, three algae projects*

Europe open pond

return				total return
algae biomass	1538	kg ds DM	35	€/kg	€53.838

variable costs	amount	price per unit		total variable costs
Water use	1796	m3	0,878	€/m3	€1.577
Electricity	43357	kWh	0,107	€/kWh	€4.639
CO2	3046	kg	0	€/kg	€0
Heat recovery	929386	kWh	0	€/kWh	€0
Labour LQ	682	hr	11,53	€/hr	€7.863
Labour HQ	31	hr	25,57	€/hr	€790
digestate	0	m3	-20	€/m3	€0
Fertilizer (N)	174	kg N	1,08	kg N	€188
Fertilizer (P)	10	kg P	2,22	kg P	€22
Wastewater	1549	m3	0,1	€/m3	€155
Total					€15.234

capital goods	total costs capital goods
depreciation	€20.283
interest	€8.146
maintenance	€10.224
insurance	€1.347
Total	€39.999

land	total costs land use
Land	€125

total costs	€55.358

Africa open pond

return				total return
algae biomass	1538	kg ds DM	35	€/kg	€53.838

variable costs	amount	price per unit		total variable costs
Water use	1796	m3	0,5	€/m3	€898
Electricity	43357	kWh	0,05	€/kWh	€2.168
CO2	3046	kg	0	€/kg	€0
Heat recovery	929386	kWh	0	€/kWh	€0
Labour LQ	682	hr	2	€/hr	€1.364
Labour HQ	31	hr	10	€/hr	€309
digestate	0	m3	-20	€/m3	€0
Fertilizer (N)	174	kg N	0,90	kg N	€157
Fertilizer (P)	10	kg P	1,00	kg P	€10
Wastewater	1549	m3	0,1	€/m3	€155
Total					€5.060

capital goods	total costs capital goods
depreciation	€16.863
interest	
maintenance	€9.939
insurance	€1.062
Total	€27.863

land	total costs land use
Land	

total costs	€32.923

Europe tube

return	amount	selling price		total return
algae biomass	3076	kg ds	35	€/kg	€107.675

variable costs	amount	price per unit		total variable costs
Water use	206	m3	0,878	€/m3	€181
Electricity	97494	kWh	0,107	€/kWh	€10.432
CO2	6091	kg	0	€/kg	€0
Heat recovery	2974	kWh	0	€/kWh	€0
Labour LQ	682	hr	11,53	€/hr	€7.863
Labour HQ	31	hr	25,57	€/hr	€790
digestate	0	m3	-20	€/m3	€0
Fertilizer (N)	275	kg N	1,08	kg N	€297
Fertilizer (P)	9	kg P	2,22	kg P	€20
Wastewater	188	m3	0,1	€/m3	€19
Total					€19.602

capital goods	total costs capital
depreciation	€24.370
interest	€8.656
maintenance	€4.494
insurance	€1.431
Total	€38.950

land	total land use	price per ha		total costs land
Land	0,1200	ha	1041	€/ha	€125

total costs	€58.678

Source: Algae Economics,2014-Chriss de Visser,Schipperus,Spruijt, Kootsstra,calculation Africa

Output for different types of technology used is presented in table 16. Tube technology reaches more results but it is more expensive investment and not suited for Africa at moment.

Table 16: *Output results/three algae projects*

	open pond				tube					Difference
Yield	water surface		land surface in use		Yield	water surface		land surface in use		
Algae dry matter	15,4	ton ds/ha	12,8	ton ds/ha	algae dry matter	30,8	ton ds/ha	25,6	ton ds/ha	-13
Carbohydrates	2,3	ton/ha	1,9	ton/ha	Carbohydrates	6,2	ton/ha	5,1	ton/ha	-3
Proteins	8,5	ton/ha	7,1	ton/ha	Proteins	15,4	ton/ha	12,8	ton/ha	-6
Lipids	2,8	ton/ha	2,3	ton/ha	Lipids	6,2	ton/ha	5,1	ton/ha	-3
Rest	1,1	ton/ha	0,9	ton/ha	Lignin	1,5	ton/ha	1,3	ton/ha	0
Organic anions and ash	0,8	ton/ha	0,6	ton/ha	Organic anions and ash	1,5	ton/ha	1,3	ton/ha	-1

Source: Algae Economics,2014-Chriss de Visser,Schipperus,Spruijt, Kootsstra,calculation Africa

The end results cleary states that Africa is capable as being a base to big open pond facilities for algae growth, this raw material can be further transported to middle East or European (Spain, Germany, France, Swiss) refineries , or serve as base for pharmaceutical food industry inside Africa/Asia/Europe.

Table 17: *Pre feasibility results –three algae projects*

	EU tube	EU open pond	AFRICA open pond
Investment	286.142,00	269.301,00	147.565,00
Sales kg x price	3076x35=100660	1538 kgx35=53830	1539 kgx35=53830
NPV	313.000,00	- 56.031,00	129.925,00
Payback	4,48	10,90	4,31
IRR	26%	2,71%	22,78%

See Appendix II

4. MODEL

To start a project some gravitational potential need to be reached: meetings, willingness to invest, Government support, right level of social environmental problems that impacts one and another region, industrial stagnation, and the most important seeing the Gods picture in one that live in poor conditions under 1$ a day without further prospects. If right measure of success on both sides is recognized (calculation, Institutes, Industry, Governments) strong forces of labor and project input are coming together (Industry, Shareholders, Government). With the first steps and output everyday situation occurs- labor , price measurements, transmission stability, market clearance- more social chances are obtained not just in project region, but in Africa and Europe also (lower level of migrant, prevention of possible accidents/targedies at Mediterranean, social problems in Europe).

Table 17: Physics/Economics

Property /Interaction	Gravitation	Weak	Electromagnetic	Strong	
		(Electroweak)		Fundamental	Residual
Acts on:	All actions, capital possibilities, end work	Impact of project in social, environmental energy saving , security activities	Actions (investment+Operating results basic)	The first and pre event possibilities, strategies, actions - Basics in financing	Grown of other activities. Desalinisation,irrigation, agriculture, industry tourism
Particles experiencing:	All (economic, environmental, social, industrial , further development , etc.	All employees, women work force, secondary social activity, market comparison EU/Africa	Investment study, Investors, Governments, Financing opportunities, Market	Government will, Credit availability, Work force ready,	All combines, countries, investors, employs including
Particles mediating:	Making possible , Perpetua of project ,	Social, environmental consideration	In relation to God, In relation to each other, intergeneration activities	Meetings, Common interested Africa legislation act ; Electrical utilities distribution network meetings,	Mid-size, small size companies, communities, village community, agro and tourist employs,
Strength in the scale of quarks:	Constant work each day life	Further employment opportunities, securities at work, security of energy, environmental advances	Strong dividend policy toward further action ; broadening of business	Tax consideration , Profit, Dividend share, Further advances in Political economical life	Growing at multiplication available from country to country

4.1. POLITICAL AGREEMENT

Before starting a project that can increase to large and significant amounts of investment clear understanding of market opportunities, entries, possibilities, price expectations and pre investment contract of sale or possibility to work is necessary.

In Project Africa (solar, wind) large sum of money need to be invested and electricity market in Europe ready to accept some new energy from another region. So far it was not a problem in oil gas sector but as electricity is dependent upon transmission capacity in Europe, limited storage potential some pre calculation is necessary. For the project algae Africa a long term strategy in Europe can be twofold: the first one is policy toward migration, increase of employment possibility inside Africa and trade with algae on smaller scale (pharmaceutical, smaller part bioenergy, food industry). For the longer term policy – in times behind oil to say- some long term company average financing, auto industry significant input ,refinery interest (Colombey refinery-that is closed , Refinery Germany, France) can work on pond to pond base to increase production in order to satisfy its need for biofuel on larger and more significant scale .

Two big and significant partners need to cooperate in this process .The first one is already recognized European Union with   much stronger GDP base, institutional strength, history of achievements in negotiating strategies and other is African Union, that is not established to full scale but needed to strengthen and achieve better results for the whole continent.

Each partner, or negotiating strength has each own interest and this can be recognized as follows:

Table 18: EU SWAP

EUROPEAN UNION	
Strength	Weakness
Excellent institutional base, Good GDP base, Organizing financing opportunities, Experience in production and installment whether wind/solar energy/ Policy in line with 20-20-20 support of renewables	High dependence of import in energy sector in oil gas more than 80% on average EU ; Renewables implied on regional that are not naturally endowed for greater efficiency and quantity, Strong presence of Nuclear energy (especially France, Belgium, Germany) and with closure (long term) big gap in energy demand/supply relation will occur
Opportunity	Treats
To help development on other continent that suffered from colonial history; To increase its share in industrial ,agricultural development, To increase stability of electricity network by importing clean energy; To mitigate negative results of oil , oil rising price, competition for oil with Asia; etc.	If investing in Africa some risk regarding situation of political unrest, war , can end import and gain from big and significant projects leading to energy instability in Europe, If not investing with increasing number of population In Africa bigger number of migrants will come and has social impact

Table 19: Africa-SWOP

AFRICAN UNION	
Strength	Weakness
Can learn from experience from EU, learn from EU institution , have good energy related position ,can gain from vast territory , have large and increasing population with so many with strong religious beliefs etc.	Still lags significantly in development behind Europe, Small GDP base, lower starting point in negotiation (no industry, lower possibility to invest)
Opportunity	Treats
EU policy of renewables is a great opportunity to work together, increase export potential, and with gain pro project bring industrial , agricultural development with social improvements	Project is overtaken by big corporations, profit is not invested in Africa, some new players with land and only profit taking skills are coming, the profit has lower impact on poverty throw-out the whole African Union etc.

After basic opportunities and treats are   recognized for the each partner in relation, the driving force or interest need to be more enlightened.

Table 20: Physics/Economics -EU

	Subject Europe	Interest Europe
1	European Union	Long term policy of renewables in total energy consumption structure, energy input diversification, Partner of stability with African Union,
2	European Bank for Development	Opportunity to invest on larger scale, bring further development and strength to Europe, be present and factor of growth, offer smaller interest rate than commercial banks in that way avoid bankruptcy , conflict situation in terms of long term energy , financing policy
3	Countries (France, Italy, Spain, Germany)	Direct impact from electricity usage, lower level of dependency on nuclear, oil gas , input for total electricity can growth -electrical car engineering etc.
4	Electrical Utilities	Diversification of resources, good efficiency obtained, security of supply with clean source, large waste area cost competitive, offer negotiating price to different population picture(social price, medium income price) companies (the same reasoning offer lower price for newly established industrial sites in cooperation with local government etc.)
5	Wind turbine producers, Solar equipment producers-industries	Clear gain of selling produced good to large and significant area, can offer longer term of payment, compete with increasingly cost cutting other producers, induce innovation in end goal with bigger efficiency ,have under control maintenance while end market is situated in Europe , offer education to African engineers etc.
6	Refineries	With larger production of algae growth in Sahara some refinery plants can avoid closure(Columbary) or some increase biofuel end result with oil+alge+biomass from agricultural land Europe in that way satisfy need with variety of resources
7	Food companies, Pharmaceutical	Input to companies, production of new and healthy food, additional flavor, increased research in area of algae
8	Car industry	Long term prospects in maintain fuel in current machine equipment, two way possibility (electrical car+ bio fuel car) etc.
9	Other companies	Enter into market of ponds, with physical pond to have fuel for own car part, necessities, or as a means to have paper gain, some tax reduction in EU , Africa for other business opportunities, profit sharing, source of stable income etc.
10	Social service/Help organization	With development of industry in Africa migration, many accidents, and social unrest in Europe and Africa will gradually stop, Europe has to invest at least 10000€ per coming family a year, and with one pond many families will found employment, and total Africa better prospect

Table 21: Physics/Economics -Africa

	Subject Africa	Interest Africa
1	African Union	To be recognized as stable , long term partner with increasing strength in cooperation with other continents, increased opportunities on the whole continent
2	African Bank for Development	To work with EU partner on developing other projects (after wind, solar, algae) some small scale industrial, manufacturing agricultural opportunities
3	Countries near Sahara (direct impact)	Direct impact on employment (women employment is preferable) ; direct impact for engineers skill in Africa, other potentials- security and peace as long as energy input to Europe will bring tourist in Mediterranean area further inducing growth
4	Countries in Africa (total impact)	For other Africa(especial sub-Sahara) poverty reduction through tax sharing , improved irrigation, desalinization plan could make a difference, better prospects on education, social through whole tax policy
5	African companies	Increase share in direct investment, develop further relation with EU partners, improve its own position through large stable base in Africa ; opportunities to work as shareholders
6	Population	Increased potential to employment, indirect effect through tax rates and induce social growth, clean energy in house -improving kWh/capita in Africa , etc.
7	Women	Women as employees , and as potential to feed their families
8	Children	Through tax rate- free elementary , secondary education,
9	Agricultural small /medium/big communities	With induced trade and energy output to Europe some other doors can open : for clean agricultural good without herbicide
10	Industrial sites	New important throughout Africa industrial sites with respect to all labor rights- each have a chance to work for at least four hours bringing income to home
11	Tourist potential	Increased energy input, clean energy, food and agro industry will improve tourist coming in whole continent especially Mediterranean region

4.2.COMPANIES/SHAREHOLDERS/GOVERNMENTS/FINANCING OPPORTUNITIES

Although policy can play a significant role further progress is determined by supply/demand and strong forces that are present on market. They need to be convinced that this is a good project that yields results, have short and long term strategy of success and could further bring growth to both regions. Players in these relations are: Individual Governments, Potential Shareholders, and Industries.

What are the reasons to invest , what kind of shareholder picture is good and advisable, what kind of good ling term strategy in terms of ownership is a prosperous for African land and Union as whole is further to consider.

Table 22: Shareholder structure-possibilities

	Who	What	Gain
1.	African Union input shareholder	Can work as investor. In total shareholder structure it offers and owns. Land, fees , communal administration expense , goodwill for investment further, strategy position in negotiating industrial agro sites further, have to 51% loan agreement offer etc.	It is of great advantage to have at least 51% of ownership keeping control interest of big projects
1.a	African Union output shareholder	Thorough electricity price tax that is used to improve social picture on whole continent, the same as for dividend	Tax on employment gain - in whole continent, dividend improve other industry social
2.	Producer equipment	Selling the product- gain on spot in longer period with contract of maintenance, price in line with total market in expectation of more stable selling opportunities	Gain immediately, through time ,market, new potentials for further investment
3.	Bank-European African Bank for Development	Secure future income , interest through stable project	Interest
4.	Investment fund EU , pension, savings	Investment fund can serve as shareholders to project, clean energy index fund in Europe established and invest in Europe and whole region of interest Africa	Dividend, Index growth, Energy Index in Europe etc.
5.	Car producers, refinery, industries Europe	Investment opportunity to minimize costs and increase gain, Dividend, Future market, Input to production	Dividend, shareholder, market

Tax policy is subject to constant change regarding different political structures (in much political system. More left oriented structures are inclined for   equal tax burden   sometimes with progressive tax as part of income grows and distribute through social services , while   rights are more oriented toward inducing growth with tax benefits to industry, salaries and more competitive social structure(state + private school for example or state   and private hospitals).

Africa should work for it tax strategy so we can have African Union tax strategy (something as in USA Federal tax) and country strategy (county tax income) in that way inducing general and country growth support for social projects (education, social help, health/medical related issues etc.).

So price structure can look like:

Table 23: Price policy

Tax to African Union	Tax in Whole Africa bring benefits to whole continent decreasing poverty and induce growth
Tax to country in Africa	Tax in country induce growth, social benefits, education health care
Cost of project (social,environmental)	Big social benefits can leads to negative comp price, CO_2 credit can lower price to competitive level even to be more advance than large NE energy input
WACC	Smaller expectations of WACC -lower investment opportunities in Africa, need long term stable investment and be satisfied with some basic market return
Cost of project-Business	Smaller cost of project due to larger quantity, better position on land not in sea, possibility to innovate and have solar wind increased efficiency, long term relation can lower price , can import from Chinese at competitive cost ,or at magnet,copper producers
Tax to Country in Europe	Tax depends from country to country with UK Norway as having a larger rate, and south smaller (in that way African end price is competitive to UK wind end price)
Cost of project (social, environmental)	Costs of project : limited land sea potentials , bigger price for wind in sea , negative impact on birds, larger area of land is unobtainable, lower efficacy in energy solar relation, larger investment to algae tube and uncompetitive with classical oil price
WACC	Bigger expectation than in Africa due to variety of

	more quick solutions, more index funds that offer bigger returns , comparison with East European market
Cost of project-Business	Cost is burdened with high land price, many fees imposed by governments, high cost of labor,

Investors, business relations= f(technology , efficiency, price, investment opportunities and maintenance costs, market openness, end market, good relation in past, good knowledge obtained, treats avoided –to high dependency lead to slavery in any sense, investors that plan takeover of material immaterial goods, etc.)

Some good potentials need to be recognised, but old or modern problems also considered in regard of possible majority shareholder structure, etc.

Table 24: Companies, Relation, Old Modern treats

	United Kingdom	USA	Croatia
positive	Good potential market for electricity export, UK has a larger network of wind energy input; Still can improve kwh/capita and reduce end price	Very big market, can be export/import ordination with many people from Africa to establish business relation, excellent technology, good standard of communication	Old inheritance from Ex-Yugoslavia in respect of community ownership, social society with basic frr educational service based on tax
negative	Old experience with colonial power ; The system of master servant/ This was overcome with Gandhi in India on peaceful way New types of abuse, modern	The spot of last return, slaves brought from Africa old home to new home in USA where took a while to get a status as free human being. Still exist struggle between white/black community in some parts /way of look New types of abuse, modern	As member of old alliance (Nazi, fascist states) in2 nd world war Croatia was the only country in the world to have concentration camp for children in Sisak. Today interest, usage, to serve in line with modern treats that affect 3-25 mil people in the world; electronic harassment, organized gangs stalking, raven1 technology DEW., covert war, pre event strike,etc spreading

4.3. INVESTMENT AND CAPITAL

When thinking about capital in our calculation after initial pre given investment costs are considered some depreciation rate need to be carefully put into consideration. While this are long term projects some long term strategy can imply, but some informatical, electrical parts can have higher depreciation rate (shorter life period).

1)$K_t = K_{t-1} + $ Amortisation $+ e$

Consider carefully what can be produced in land, continent without import. What is a value of land, administration, future market in capital as whole?

2)$K_t = K_t$ (made in land) $+ K_t$ (imported) $+ e$

When buying a product keep trase about maintenance costs, possibilities, spare parts, discounts on spare parts, innovation given etc. from producer

3)$K_t = K_{t-i} + $ Amortisation $+$ Maintenance of Kapital $+ e$

With some production facilities (algae) some additional electricity input need to be calculated. Link two project with lower costs of electricity as comparative advantage over European production

4)$K_t = K_{t-1} + $ Amortization $+$ maintenance $+$ energy inpute $+ e$

If shareholder structure in project is given by investors, Government, equipment producer's depreciation rate can be calculated on different scale

5)$K_t = K_{t-1} + $ Amortisation (different structure if financing) $+$ Energy inpute $+ e$

Different shareholder structure can mean lower administrative costs, bigger loan, more expensive, less expensive technology – consider that in calculation

6)$K_t = K_{t-1} + $ Amortization (Shareholders in country, Shareholders in Europe, Loan from Africa, loan from Europe) $+$ Energy impute $+ e$

4.4. LABOUR

One of goals in millennium development UN program is to empower women. To find a stable job, good prospect for family is important not just for male but for women also. While they are usually with lower educational level, and less strength job means strengthening social society toward long term growth.

Labor input need to be based on equal opportunity chance.

1)$L_t = L_{women} + L_{men\ employment} + e$

Some of decisions about new employment can goes in lien with dependent family members without income.

2) L_t= Labor total (number of family member dependent upon) +e

Take care about good structure –that skilled and unskilled labor is represented and later advances in procedures can take place.

3)$L_t = L_{skilled} + L_{unskilled} + e$

You can divide work as one needed in hour base, constant yearly scale, or from time to time with maintenance need to be undertaken.

4)$L_t = L_{hours\ worked} + L_{constant\ year} + L_{each\ four\ years\ as\ maintenance\ work\ force\ input\ water,\ energy} + e$

After direct costing is done, calculate indirect labor needs in other possible projects.

5)$L_t = L_{direct\ project} + L_{other\ projects\ industry} + L_{other\ projects\ agricultural\ tourism\ social\ (education,\ health\ care)}$

Labor is not done only in Africa but also in transport sector between continents, transport sector in Europe and in Europe as in end sale.

6)$L_t = L_{direct\ Africa} + L_{transferred\ of\ energy\ Africa} + L_{transfer\ of\ energy\ Europol\ electricity\ supplier\ Europe} + e$

The work is done by selling the electricity from day to day base, selling with bioinput from Africa etc, these working places are related and dependent each upon other.

7)$L_t = (L_{Africa} + L_{Europe})_{direct\ energy} + (L_{Africa} + L_{Europe})_{trade\ energy,\ direct} + CO_2\ trade + (L_{Africa} + L_{Europe})$ security of supply with green energy to households in Africa and Europe+e

4.5. ENERGY

Energy can be seen as end product of the whole process calculates some input. Total energy need to be calculated in order to have clear picture of output potentials, and input requirements. These input energy need can be given from another Africa based project.

1)Energy= Energy $_{output}$ +Energy $_{input}$+e

Total energy in input- is a base for life cycle calculation (production of some technologies can require more energy than end goal and bring no overall progress). Some require water that is not aboundand in Africa, irrigation procedure need to be undertaken, or pond base done near sea, desalinization plant etc.

2) Energy $_{input}$= E $_{in\ project}$ (wind, solar, algae) +E $_{in\ production\ of\ capital\ goods}$ +E $_{other\ energy\ related\ (water\ intake)}$ +e

What is energy produced in Africa, what are energy possibilities in transmission lines, what are losses in production , transmission line to reach end buyer is further task to be calculated on kWh base.

3) Energy $_{output}$= Energy $_{output\ in\ Africa}$+ E $_{output\ in\ Europe}$ +E $_{transmission\ line}$ (Africa Italy; Africa Spain; Africa France; Africa Switzerland, Germany)+e

Further energy efficiency that can be made in project itself and for the whole life cycle calculation (CO_2 reduction of other energy sources) is a task that has no end.

4) Energy efficiency= Energy $_{efficiency\ Europe}$ +Energy $_{efficiency\ Africa}$ +e

4.6. DISCOUNT RATE

Discount rate can be divided into three basic parts:

A) Business discount rate…. r_m
B) Discount rate for social consideration……r_s
C) Discount rate for environmental consideration…..r_e

All three types are calculated differently based on notion of capital cost, risk of county, WACC methods of calculation, social picture, environmental benefits and costs. They differ in end results in Africa and Europe and change from county to country, day to day basis.

1.) Calculation for the whole project with three distinctively different discount rates that would bring the whole project to full scale.

$$NPV = -I + (R_m - C_m) / \sum (1+r_m)^{1..n} + (R_s - C_s) / \sum (1+r_s)^{1..n} + (R_e - C_e) / \sum (1+r_m)^{1..n} + e$$

2.) Two separate calculations need to be done for Africa and Europe based on business, environmental and social aspects. To sum both and compare with the first result.

$$NPV_{Africa} = -I + (R_m - C_m) / \sum (1+r_m)^{1..n} + (R_s - C_s) / \sum (1+rs)^{1..n} + (R_e - C_e) / \sum (1+r_m)^{1..n} + e$$

$$NPV_{Europe} = -I + (R_m - C_m) / \sum (1+r_m)^{1..n} + (R_s - C_s) / \sum (1+rs)^{1..n} + (R_e - C_e) / \sum (1+r_m)^{1..n} + e$$

$$NPV = NPV_{Africa} + NPV_{Europe} + e$$

3.) To recognize (while this is the large sum of money)all three aspects in the first investment decision

$$NPV_{Africa} = -I_{market} - I_{social} - I_{environmental} + (R_m - C_m) / \sum (1+r_m)^{1..n} + (R_s - C_s) / \sum (1+rs)^{1..n} + (R_e - C_e) / \sum (1+r_m)^{1..n} + e$$

$$NPV_{Europe} = -I_{market} - I_{social} - I_{environmental} + (R_m - C_m) / \sum (1+r_m)^{1..n} + (R_s - C_s) / \sum (1+r_s)^{1..n} + (R_e - C_e) / \sum (1+r_m)^{1..n} + e$$

$NPV = NPV_{Africa} + NPV_{Europe} + e$

I_{market} (direct, transmission)

I_{social} (pre work education , exploring potential social status of employees maximum benefit strategy , family members dependence, the best marginal utility rate of increase etc. , investment in further education needed etc.)

$I_{environmental}$ (part of equipment that serves exclusively for environmental purposes solar in wind etc.)

4.) Take care of life cycling cost and scrap value that can differ if project is done in north Europa (in sea with high level of corrosion) or Africa-(good maintenance).

After all projects are done , scrap value of material goods sold on each market what is long term interest in project:

NPV= Scrap Europe –Scrap Africa + Environment Europe +Social Africa +e

4.7. TAX

Each society has its own priorities, way of thinking, reasoning how and why the tax rate is imposed, changed based on common ground policy, political strength or some other factor that influents end decision. Some thinking is given as follows:

Table 25: Tax consideration

	Tax rate	Calculate daily, in comparison with EU tax rate, standards in order to keep competitive base
1.	Country of Project	Tax rate in comparison with EU end price, With country need for water, energy ,labor
2.	African Union level	Tax rate in comparison to EU end price , tax rates,
3.	African Union special long term in danger countries	From total part to very poor undeveloped region: Sub Sahara, Sudan, East Africa desert, special area that is very much lagging behind Africa average
4.	African Union - current crises	From total tax rate - one part to potential crises situation- crop failed, environmental damage, conflict etc.
5.	African union short term project	Short term project that would solve immediate crises, induce industry , agro project
6.	African -long term project	Long term projects in education, health, social programs

Table 26: Tax usage

	Tax Usage	
1.	Poverty reduction	Determine the most needed family structure - minimum income social benefit per family (based on poverty) and give support
2.	Health care	Large and significant health care base , keep aim at social basic free health care system , big hospitals and many small centers
3.	Gender equality	Keep truck upon employment opportunities ensure women are employed on equal right payment base
4.	Reduce child mortality	Special attention to young age group, support with money each new born child tile age of 3
5.	Invest in prevention health(HIV/AIDS, malaria, other)	Education, prevention programs , nets, supply of basic medicine ,research etc.
6.	Ensure environmental sustainability	Support afforestation projects(wood growth, fruits, citrus, aloe Vera, cleanness of water, recycling project of waste, best effort in energy/utility service , clean (without herbicide) agro production)
7.	Develop global picture for development	Induce growth with large centers of industrial sites and many supported community based manufacturing, Support tourism

4. 8. FURTHER MODEL

After basic is done – investment reached, day to day operation put to work-some further prospects can be considered that goes in line with another production bringing end results good, or induce new potentials.

4.8.1. Basic input
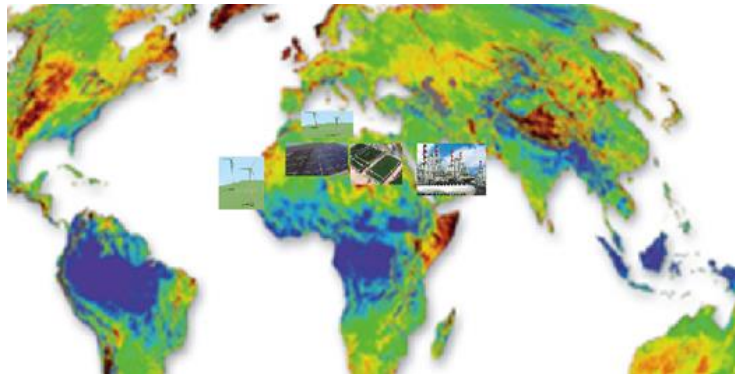
Basic input from project is transferred to Europe – form of electricity, or Middle East and Europe-refining capacity for biofuel.

4.8.2. Transfer to Europe

Africa can connect with Europe with Africa- Italy (undersea line), Africa Spain (cross Gibraltar), and ship (port France, Italy, Spain) further pipeline to EU car industry, refineries further, food, and pharmaceutical companies.

4.8.3. Innovation

Innovation can be a reached as: solar train that goes by Nile, bringing thousands of tourists, making additional income while not polluting river and with minimum fuel to spend. Many activities, sight sign projects programs can be done in train. Further progress is a small car, or helicopter that helps people that run agriculture or distant village is also possible on small solar power bringing medical help.

The projects that were presented were pond for algae, wind and consentrated solar. The innovation in each term is following: the pond can be made pond by pond bases, allocated to each company in the world, with only paper ownership that can change from year to year, be bought sold, dividend received subject of birthday present as way to invest etc. For the wind and solar innovation that has no price is in terms that neither wind or solar is made on ground that can be easily cultivated but on sand, that brings neither wheat nor corn, and harnessing the energy is greater in this region. The   other innovative solution is prospect and wellbeing for humanity and in that since regulates relationship to person, relationship to greater good.

It is common praxis that we calculate wind output at rate of 35% efficiency. That can be increased if we add to solar turbine solar panel to induce motor further, or with changing magnetic field start turbine to spin gain in case of no wind situation. Small vehicle car, motorbike- can be supported by solar and serve as good and clean transport mechanism in whole Africa.

To find a long term solution for its energy need is a problem for the person from north also. We all think about different cause situation and found our self in thinking about small accumulator on antigravity. But since this is not available yet, we continue with energy efficiency in a way that long term transport in Africa can be solved with buses, trains with solar input. Also we all think about small battery that would be shared from station to station –to say- and continue with small bicycle with charged on solar wind-battery.

Every day cooking demand power, wood input or gas, oil. Some people try to solve the issue with solar oven that can have different forms power and price input. For the first time a village can have common oven - that is energy for food without cost for each member in village. In town similar situation can be

reached with street oven on solar – and smaller charge while input price is decreased. That project can be financed through African Bank for Development.

The big issue is how to keep the food in good condition for several weeks. For Europe with constant electricity supply it is not a problem, for Africa each fridge with solar power is expensive. The solution can be collective storage – big fridge in village, town with paid or small fee, even free small box in which each family can have its own long term supplies-until standard is reached and long term electricity is supplied on regally bases to each household.
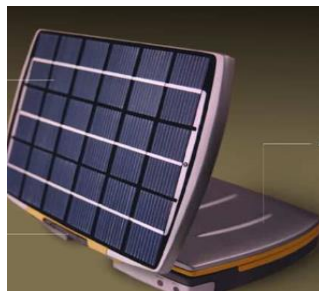
The problem of free elementary school or payment for secondary education can be solved as following. For the each class a program is made for the school year on DVD, CD and small solar computer given to each child. He/She can attend only one day school without charge, or fee and learn from computer. After year is done – a small test made, CD DVD is transferred to on other child and he heads to another free program. On that way can be solved issue of specialized projects - secondary school and soon the whole Africa will be literate and good educated. The university can be established with different state/private/donor/support projects and programs. This project can be supported and financed through UN, UNIDO, UNICEF and African Bank for Development, as well as African Education Program.

5. CONCLUSION

Africa is still laggings behind the world in GDP level, poverty level, and overall increase in standard especially in Sub Sahara region. If compared with other poor areas of the world such as South East Asia poverty rate in Africa continues to linger while Asia is succeeding in some of its development goals through rising industry, and various social programs.

We have established the fact that each person is a special and unique picture of God on Earth, so poverty, hunger and lower than possible prospects opportunities do not serve humanity as a good and positive picture that needed to occur. In that respect a help from energy in called upon to start projects in Africa north in order to induce growth in economic, social and environmental respect. This will further induce growth and market opportunities through clean agriculture and trade with Europe(energy long term stability, input and security of supply, 20-20-20 goal reached on easy and good way).It is presented that large scale investment bring further price competitiveness, social advances (mostly through environmental efficient projects of wind, concentrated solar and algae for biofuel). Today investment climate in high income countries is turned to potentials of each country trying to solve clean input by own opportunities and chances. Only solving a problem by further increasing GDP/capita while Africa decreases in future chances will not bring to stability in long run. After market is saturated lower chances for market growth, further investment strategies are reduced and possible crises occur (right level of classical growth is not sustained). If we consider space and technology as given (whether known or unknown) we can come to basic growth rate on natural growth in relating to God/Positive/relation to person to person as the only that really brings advances. In order for project to come to end right steps and procedures need to be calculated: Government supports, Tax policies(Africa support further projects, social justice),Investors (Shareholder structure), Industry (price decline, more innovative technology, energy efficiency),discount rate(in line with long term strategy), price(competitive to end EU price) etc. When project is reached further advances in social picture (poverty reduction, educational possibilities, health standard improves, empowering women labor, better working chances appears, new market for other sectors agro, tourist, small manufacturing) is further to go.

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ANEX I

COMFAR ANALYSIS WIND/SOLAR

WIND- EU INVESTMENT 170 914 €, 3066MWh/53 €/MWh invest ment costs

TOTAL INVESTMENT COSTS	170.914,60	0,00	170.914,60

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	170.914,60	0,00	170.914,60
Foreign	0,00	0,00	0,00
Local	170.914,60	0,00	170.914,60
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	170.914,60	0,00	170.914,60

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	61.320,00	61.320,00	61.320,00
Factory costs	34.214,40	34.214,40	34.214,40
Administrative overhead costs	6.132,00	6.132,00	6.132,00
OPERATING COSTS	40.346,40	40.346,40	40.346,40
Depreciation	3.866,03	3.866,03	3.866,03
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	44.212,43	44.212,43	44.212,43
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	44.212,43	44.212,43	44.212,43
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	17.107,57	17.107,57	17.107,57
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	17.107,57	17.107,57	17.107,57
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	17.107,57	17.107,57	17.107,57
Income (corporate) tax	3.421,51	3.421,51	3.421,51
NET PROFIT	13.686,05	13.686,05	13.686,05

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	19.595,28
Internal rate of return on investment (IRR)	8,76%	
Modified IRR on investment	8,76%	
Net Present Value of Total Equity Capital Invested	at 7,00%	19.595,28
Internal rate of return on equity (IRRE)	8,76%	
Modified IRRE on equity	8,76%	
Net present values discounted to	12.2018	

WIND- EU   INVESTMENT 1.627. 780 €, 30660MWh/53 €/MWh invest

| TOTAL INVESTMENT COSTS | 1.627.780,00 | 0,00 | 1.627.780,00 |

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	1.627.780,00	0,00	1.627.780,00
Foreign	0,00	0,00	0,00
Local	1.627.780,00	0,00	1.627.780,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	1.627.780,00	0,00	1.627.780,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2033
SALES REVENUE	613.200,00	613.200,00	613.200,00
Factory costs	342.144,00	342.144,00	342.144,00
Administrative overhead costs	61.320,00	61.320,00	61.320,00
OPERATING COSTS	403.464,00	403.464,00	403.464,00
Depreciation	36.626,17	36.626,17	36.626,17
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	440.090,17	440.090,17	440.090,17
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	440.090,17	440.090,17	440.090,17
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	173.109,83	173.109,83	173.109,82
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	173.109,83	173.109,83	173.109,82
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	173.109,83	173.109,83	173.109,82
Income (corporate) tax	0,00	0,00	34.621,96
NET PROFIT	173.109,83	173.109,83	138.487,86

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	390.357,76
Internal rate of return on investment (IRR)	9,94%	
Modified IRR on investment	9,94%	
Net Present Value of Total Equity Capital Invested	at 7,00%	390.357,76
Internal rate of return on equity (IRRE)	9,94%	
Modified IRRE on equity	9,94%	
Net present values discounted to	12.2018	

Increase in net working capital	0,00	0,00	0,00
TOTAL INVESTMENT COSTS	145.277.410,00	0,00	145.277.410,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	145.277.410,00	0,00	145.277.410,00
Foreign	0,00	0,00	0,00
Local	145.277.410,00	0,00	145.277.410,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	145.277.410,00	0,00	145.277.410,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2033
SALES REVENUE	42.924.000,00	42.924.000,00	42.924.000,00
Factory costs	823.310,00	823.310,00	29.082.240,00
Administrative overhead costs	0,00	0,00	5.212.200,00
OPERATING COSTS	823.310,00	823.310,00	34.294.440,00
Depreciation	3.286.127,63	3.286.127,63	3.286.127,63
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	4.109.437,63	4.109.437,63	37.580.567,63
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	4.109.437,63	4.109.437,63	37.580.567,63
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	38.814.562,38	38.814.562,38	5.343.432,38
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	38.814.562,38	38.814.562,38	5.343.432,38
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	38.814.562,38	38.814.562,38	5.343.432,38
Income (corporate) tax	7.762.912,47	7.762.912,47	1.068.686,48
NET PROFIT	31.051.649,90	31.051.649,90	4.274.745,90

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	28.646.995,49
Internal rate of return on investment (IRR)	10,24%	
Modified IRR on investment	10,24%	
Net Present Value of Total Equity Capital Invested	at 7,00%	28.646.995,49
Internal rate of return on equity (IRRE)	10,24%	
Modified IRRE on equity	10,24%	
Net present values discounted to	12.2018	

WIND- AFRICA INVESTMENT 137 380 €, 3066MWh/44 €/MWh invest

TOTAL INVESTMENT COSTS	137.380,50	0,00	137.380,50

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	137.382,00	0,00	137.382,00
Foreign	0,00	0,00	0,00
Local	137.382,00	0,00	137.382,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	137.382,00	0,00	137.382,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	61.200,00	61.200,00	61.200,00
Factory costs	18.074,30	18.074,30	18.074,30
Administrative overhead costs	3.066,00	3.066,00	3.066,00
OPERATING COSTS	21.140,30	21.140,30	21.140,30
Depreciation	3.353,16	3.353,16	3.353,16
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	24.493,46	24.493,46	24.493,46
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	24.493,46	24.493,46	24.493,46
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	36.706,54	36.706,54	36.706,54
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	36.706,54	36.706,54	36.706,54
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	36.706,54	36.706,54	36.706,54
Income (corporate) tax	7.341,31	7.341,31	7.341,31
NET PROFIT	29.365,23	29.365,23	29.365,23

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	145.211,30
Internal rate of return on investment (IRR)	23,01%	
Modified IRR on investment	23,01%	
Net Present Value of Total Equity Capital Invested	at 7,00%	145.211,30
Internal rate of return on equity (IRRE)	23,01%	
Modified IRRE on equity	23,01%	
Net present values discounted to	12.2018	

WIND- AFRICA INVESTMENT 1 373 826 €, 30.660MWh/44 €/MWh invest

~~Increase in net working capital~~	0,00	0,00	0,00
TOTAL INVESTMENT COSTS	1.373.826,00	0,00	1.373.826,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	1.373.827,00	0,00	1.373.827,00
Foreign	0,00	0,00	0,00
Local	1.373.827,00	0,00	1.373.827,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	1.373.827,00	0,00	1.373.827,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2033
SALES REVENUE	367.920,00	367.920,00	367.920,00
Factory costs	180.758,00	180.758,00	180.758,00
Administrative overhead costs	30.660,00	30.660,00	30.660,00
OPERATING COSTS	211.418,00	211.418,00	211.418,00
Depreciation	33.532,00	33.532,00	33.532,00
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	244.950,00	244.950,00	244.950,00
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	244.950,00	244.950,00	244.950,00
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	122.970,00	122.970,00	122.970,00
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	122.970,00	122.970,00	122.970,00
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	122.970,00	122.970,00	122.970,00
Income (corporate) tax	0,00	0,00	24.594,00
NET PROFIT	122.970,00	122.970,00	98.376,00

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	166.200,43
Internal rate of return on investment (IRR)	8,50%	
Modified IRR on investment	8,50%	
Net Present Value of Total Equity Capital Invested	at 7,00%	166.200,43
Internal rate of return on equity (IRRE)	8,50%	
Modified IRRE on equity	8,50%	
Net present values discounted to	12.2018	

WIND- AFRICA INVESTMENT 116. 775. 320€, 3066.000MWh/38 €/MWh invest

TOTAL INVESTMENT COSTS	116.775.320,00	0,00	116.775.320,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	116.775.320,00	0,00	116.775.320,00
Foreign	0,00	0,00	0,00
Local	116.775.320,00	0,00	116.775.320,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	116.775.320,00	0,00	116.775.320,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2033
SALES REVENUE	32.193.000,00	32.193.000,00	32.193.000,00
Factory costs	14.129.480,00	14.129.480,00	15.776.185,00
Administrative overhead costs	2.606.100,00	2.606.100,00	2.606.100,00
OPERATING COSTS	16.735.580,00	16.735.580,00	18.382.285,00
Depreciation	2.850.221,48	2.850.221,48	2.850.221,48
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	19.585.801,48	19.585.801,48	21.232.506,48
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	19.585.801,48	19.585.801,48	21.232.506,48
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	12.607.198,53	12.607.198,53	10.960.493,53
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	12.607.198,53	12.607.198,53	10.960.493,53
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	12.607.198,53	12.607.198,53	10.960.493,53
Income (corporate) tax	2.521.439,71	2.521.439,71	2.192.098,71
NET PROFIT	10.085.758,82	10.085.758,82	8.768.394,82

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	19.332.196,05
Internal rate of return on investment (IRR)	9,06%	
Modified IRR on investment	9,06%	
Net Present Value of Total Equity Capital Invested	at 7,00%	19.332.196,05
Internal rate of return on equity (IRRE)	9,06%	
Modified IRRE on equity	9,06%	
Net present values discounted to	12.2018	

Solar AFRICA 261 371 3000MWhX25€

TOTAL INVESTMENT COSTS	261.371,00	0,00	261.371,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	261.371,00	0,00	261.371,00
Foreign	0,00	0,00	0,00
Local	261.371,00	0,00	261.371,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	261.371,00	0,00	261.371,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	75.000,00	75.000,00	75.000,00
Factory costs	42.135,00	42.135,00	42.135,00
Administrative overhead costs	2.628,00	2.628,00	2.628,00
OPERATING COSTS	44.763,00	44.763,00	44.763,00
Depreciation	6.379,30	6.379,30	6.379,30
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	51.142,30	51.142,30	51.142,30
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	51.142,30	51.142,30	51.142,30
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	23.857,70	23.857,70	23.857,70
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	23.857,70	23.857,70	23.857,70
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	23.857,70	23.857,70	23.857,70
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	23.857,70	23.857,70	23.857,70

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	51.439,67
Internal rate of return on investment (IRR)	10,04%	
Modified IRR on investment	10,04%	
Net Present Value of Total Equity Capital Invested	at 7,00%	51.439,67
Internal rate of return on equity (IRRE)	10,04%	
Modified IRRE on equity	10,04%	
Net present values discounted to	12.2018	

SOLAR AFRICA INVESTMENT 3 653 225 980 61300000MWh x14

	Total construction	Total production	Total inflow
~~increase in net working capital~~	0,00	0,00	0,00
TOTAL INVESTMENT COSTS	3.659.225.980,00	0,00	3.659.225.980,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	3.659.225.980,00	0,00	3.659.225.980,00
Foreign	0,00	0,00	0,00
Local	3.659.225.980,00	0,00	3.659.225.980,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	3.659.225.980,00	0,00	3.659.225.980,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	858.200.000,00	858.200.000,00	858.200.000,00
Factory costs	476.449.800,00	476.449.800,00	476.449.800,00
Administrative overhead costs	31.536.000,00	31.536.000,00	31.536.000,00
OPERATING COSTS	507.985.800,00	507.985.800,00	507.985.800,00
Depreciation	89.310.866,50	89.310.866,50	89.310.866,50
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	597.296.666,50	597.296.666,50	597.296.666,50
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	597.296.666,50	597.296.666,50	597.296.666,50
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	260.903.333,50	260.903.333,50	260.903.333,50
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	260.903.333,50	260.903.333,50	260.903.333,50
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	260.903.333,50	260.903.333,50	260.903.333,50
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	260.903.333,50	260.903.333,50	260.903.333,50

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	206.685.789,53
Internal rate of return on investment (IRR)	7,88%	
Modified IRR on investment	7,88%	
Net Present Value of Total Equity Capital Invested	at 7,00%	206.685.789,53
Internal rate of return on equity (IRRE)	7,88%	
Modified IRRE on equity	7,88%	
Net present values discounted to	12.2018	

SOLAR AFRICA   INVESTMENT 2 631 738 €, 3066MWh/25

TOTAL INVESTMENT COSTS	2.613.736,00	0,00	2.613.736,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	2.631.738,60	0,00	2.631.738,60
Foreign	0,00	0,00	0,00
Local	2.631.738,60	0,00	2.631.738,60
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	2.631.738,60	0,00	2.631.738,60

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	766.500,00	766.500,00	766.500,00
Factory costs	421.360,00	421.360,00	421.360,00
Administrative overhead costs	26.280,00	26.280,00	26.280,00
OPERATING COSTS	447.640,00	447.640,00	447.640,00
Depreciation	63.793,57	63.793,57	63.793,57
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	511.433,58	511.433,58	511.433,58
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	511.433,58	511.433,58	511.433,58
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	255.066,42	255.066,42	255.066,43
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	255.066,42	255.066,42	255.066,43
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	255.066,42	255.066,42	255.066,43
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	255.066,42	255.066,42	255.066,43

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	630.199,87
Internal rate of return on investment (IRR)	10,72%	
Modified IRR on investment	10,72%	
Net Present Value of Total Equity Capital Invested	at 7,00%	630.199,87
Internal rate of return on equity (IRRE)	10,72%	
Modified IRRE on equity	10,72%	
Net present values discounted to	12.2018	

SOLAR EU INVESTMENT 325 163 €, 3000Wh/35

~~increase in working capital~~	0,00	0,00	0,00
TOTAL INVESTMENT COSTS	325.163,00	0,00	325.163,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	325.163,00	0,00	325.163,00
Foreign	0,00	0,00	0,00
Local	325.163,00	0,00	325.163,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	325.163,00	0,00	325.163,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	105.000,00	105.000,00	105.000,00
Factory costs	69.676,00	69.676,00	69.676,00
Administrative overhead costs	5.256,00	5.256,00	5.256,00
OPERATING COSTS	74.932,00	74.932,00	74.932,00
Depreciation	7.354,18	7.354,18	7.354,18
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	82.286,18	82.286,18	82.286,18
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	82.286,18	82.286,18	82.286,18
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	22.713,83	22.713,83	22.713,83
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	22.713,83	22.713,83	22.713,83
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	22.713,83	22.713,83	22.713,83
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	22.713,83	22.713,83	22.713,83

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	13.933,53
Internal rate of return on investment (IRR)	7,66%	
Modified IRR on investment	7,66%	
Net Present Value of Total Equity Capital Invested	at 7,00%	13.933,53
Internal rate of return on equity (IRRE)	7,66%	
Modified IRRE on equity	7,66%	
Net present values discounted to	12.2018	

SOLAR EU INVESTMENT 3 096 690 €, 3066MWh/35

TOTAL INVESTMENT COSTS	3.096.690,00	0,00	3.096.690,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	3.096.690,00	0,00	3.096.690,00
Foreign	0,00	0,00	0,00
Local	3.096.690,00	0,00	3.096.690,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	3.096.690,00	0,00	3.096.690,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	1.073.100,00	1.073.100,00	1.073.100,00
Factory costs	696.776,00	696.776,00	696.776,00
Administrative overhead costs	52.560,00	52.560,00	52.560,00
OPERATING COSTS	749.336,00	749.336,00	749.336,00
Depreciation	69.668,03	69.668,03	69.668,03
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	819.004,03	819.004,03	819.004,03
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	819.004,03	819.004,03	819.004,03
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	254.095,97	254.095,97	254.095,97
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	254.095,97	254.095,97	254.095,97
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	254.095,97	254.095,97	254.095,97
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	254.095,97	254.095,97	254.095,97

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	397.336,11
Internal rate of return on investment (IRR)	8,97%	
Modified IRR on investment	8,97%	
Net Present Value of Total Equity Capital Invested	at 7,00%	397.336,11
Internal rate of return on equity (IRRE)	8,97%	
Modified IRRE on equity	8,97%	
Net present values discounted to	12.2018	

SOLAR EU   INVESTMENT 4 335 366 000 €, 61300000x23

TOTAL INVESTMENT COSTS	4.335.366.000,00	0,00	4.335.366.000,88

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	4.335.366.000,00	0,00	4.335.366.000,00
Foreign	0,00	0,00	0,00
Local	4.335.366.000,00	0,00	4.335.366.000,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	4.335.366.000,00	0,00	4.335.366.000,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	1.409.900.000,00	1.409.900.000,00	1.409.900.000,00
Factory costs	836.131.200,00	836.131.200,00	836.131.200,00
Administrative overhead costs	63.072.000,00	63.072.000,00	63.072.000,00
OPERATING COSTS	899.203.200,00	899.203.200,00	899.203.200,00
Depreciation	97.535.235,00	97.535.235,00	97.535.235,00
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	996.738.435,00	996.738.435,00	996.738.435,00
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	996.738.435,00	996.738.435,00	996.738.435,00
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	413.161.565,00	413.161.565,00	413.161.565,00
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	413.161.565,00	413.161.565,00	413.161.565,00
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	413.161.565,00	413.161.565,00	413.161.565,00
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	413.161.565,00	413.161.565,00	413.161.565,00

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	959.615.178,03
Internal rate of return on investment (IRR)	10,39%	
Modified IRR on investment	10,39%	
Net Present Value of Total Equity Capital Invested	at 7,00%	959.615.178,03
Internal rate of return on equity (IRRE)	10,39%	
Modified IRRE on equity	10,39%	
Net present values discounted to	12.2018	

ANEX II

COMFAR ANALYSIS ALGAE

ALGAE EU OPEN POND

Local currency		Construction 2018	Production 2019	Production 2020	Production 2021	Production 2022	Production 2023	Production 2024
TOTAL CASH INFLOW		0,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00
Inflow operation	➡	0,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00
Other income		0,00	0,00	0,00	0,00	0,00	0,00	0,00
TOTAL CASH OUTFLOW		269.301,00	26.808,24	26.808,24	26.808,24	26.808,24	26.808,24	26.808,24
Increase in fixed assets	➡	269.301,00	0,00	0,00	0,00	0,00	0,00	0,00
Increase in net working capital		0,00	0,00	0,00	0,00	0,00	0,00	0,00
Operating costs		0,00	26.808,24	26.808,24	26.808,24	26.808,24	26.808,24	26.808,24
Marketing costs		0,00	0,00	0,00	0,00	0,00	0,00	0,00
Income (corporate) tax		0,00	0,00	0,00	0,00	0,00	0,00	0,00
NET CASH FLOW		-269.301,00	27.021,76	27.021,76	27.021,76	27.021,76	27.021,76	27.021,76
CUMULATIVE NET CASH FLOW		-269.301,00	-242.279,24	-215.257,47	-188.235,71	-161.213,95	-134.192,18	-107.170,42
Net present value		-269.301,00	25.253,98	23.601,85	22.057,81	20.614,77	19.266,14	18.005,74
Cumulative net present value		-269.301,00	-244.047,02	-220.445,16	-198.387,35	-177.772,58	-158.506,44	-140.500,69
NET PRESENT VALUE		at 7,00%	-56.031,81					
INTERNAL RATE OF RETURN		2,71%						
MODIFIED INTERNAL RATE OF RE		2,71%						
NORMAL PAYBACK		at 0,00%	10.97 years	= 2028				
DYNAMIC PAYBACK		at 7,00%	not found					

ALGAE EU OPEN POND

Local currency		Production 2019	Production 2020	Production 2021	Production 2022	Production 2023	Production 2024
Sales revenue		53.830,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00
Less variable costs	➡	26.808,24	26.808,24	26.808,24	26.808,24	26.808,24	26.808,24
VARIABLE MARGIN		27.021,76	27.021,76	27.021,76	27.021,76	27.021,76	27.021,76
in % of sales revenue		50,20	50,20	50,20	50,20	50,20	50,20
Less fixed costs	➡	22.536,30	22.536,30	22.536,30	22.536,30	22.536,30	22.536,30
OPERATIONAL MARGIN		4.485,46	4.485,46	4.485,46	4.485,46	4.485,46	4.485,46
in % of sales revenue		8,33	8,33	8,33	8,33	8,33	8,33
Interest on short-term deposits		0,00	0,00	0,00	0,00	0,00	0,00
Financial costs		0,00	0,00	0,00	0,00	0,00	0,00
GROSS PROFIT FROM OPERATION		4.485,46	4.485,46	4.485,46	4.485,46	4.485,46	4.485,46
in % of sales revenue		8,33	8,33	8,33	8,33	8,33	8,33
Extraordinary income		0,00	0,00	0,00	0,00	0,00	0,00
Extraordinary loss		0,00	0,00	0,00	0,00	0,00	0,00
Depreciation allowances		0,00	0,00	0,00	0,00	0,00	0,00
GROSS PROFIT		4.485,46	4.485,46	4.485,46	4.485,46	4.485,46	4.485,46
Investment allowances		0,00	0,00	0,00	0,00	0,00	0,00
TAXABLE PROFIT		4.485,46	4.485,46	4.485,46	4.485,46	4.485,46	4.485,46
Income (corporate) tax		0,00	0,00	0,00	0,00	0,00	0,00
NET PROFIT		4.485,46	4.485,46	4.485,46	4.485,46	4.485,46	4.485,46
in % of sales revenue		8,33	8,33	8,33	8,33	8,33	8,33
Dividends		0,00	0,00	0,00	0,00	0,00	0,00
RETAINED PROFIT		4.485,46	4.485,46	4.485,46	4.485,46	4.485,46	4.485,46
RATIOS							
Net profit to equity (%)		1,67	1,67	1,67	1,67	1,67	1,67
Net profit to net worth (%)		1,64	1,61	1,59	1,56	1,54	1,51
Net profit+interest to investment (%)		1,67	1,67	1,67	1,67	1,67	1,67

ALGAE EU OPEN POND

Local currency		2018	2019	2020	2021	2022	2023
TOTAL ASSETS		269.301,00	273.786,46	278.271,93	282.757,39	287.242,85	291.728,32
Total current assets	➡	0,00	27.021,76	54.043,53	81.065,29	108.087,05	135.108,82
Total fixed assets, net of depreciatio	➡	269.301,00	246.764,70	224.228,40	201.692,10	179.155,80	156.619,50
Accumulated losses brought forwar		0,00	0,00	0,00	0,00	0,00	0,00
Loss in current year		0,00	0,00	0,00	0,00	0,00	0,00
TOTAL LIABILITIES		269.301,00	273.786,46	278.271,93	282.757,39	287.242,85	291.728,32
Total current liabilities	➡	0,00	0,00	0,00	0,00	0,00	0,00
Total long-term debt		0,00	0,00	0,00	0,00	0,00	0,00
Total equity capital	➡	269.301,00	269.301,00	269.301,00	269.301,00	269.301,00	269.301,00
Reserves, retained profit brought fo		0,00	0,00	4.485,46	8.970,93	13.456,39	17.941,85
Retained profit		0,00	4.485,46	4.485,46	4.485,46	4.485,46	4.485,46
Net worth		269.301,00	273.786,46	278.271,93	282.757,39	287.242,85	291.728,32

ALGAE EU OPEN POND

TOTAL INVESTMENT COSTS	269.301,00	0,00	269.301,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	269.301,00	0,00	269.301,00
Foreign	0,00	0,00	0,00
Local	269.301,00	0,00	269.301,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	269.301,00	0,00	269.301,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	53.830,00	53.830,00	53.830,00
Factory costs	26.808,24	26.808,24	26.808,24
Administrative overhead costs	0,00	0,00	0,00
OPERATING COSTS	26.808,24	26.808,24	26.808,24
Depreciation	22.536,30	22.536,30	21.411,30
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	49.344,54	49.344,54	48.219,54
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	49.344,54	49.344,54	48.219,54
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	4.485,46	4.485,46	5.610,46
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	4.485,46	4.485,46	5.610,46
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	4.485,46	4.485,46	5.610,46
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	4.485,46	4.485,46	5.610,46

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	-56.031,81
Internal rate of return on investment (IRR)	2,71%	
Modified IRR on investment	2,71%	
Net Present Value of Total Equity Capital Invested	at 7,00%	-56.031,81

increase in net working capital	0,00	0,00	0,00
TOTAL INVESTMENT COSTS	286.142,00	0,00	286.142,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	286.142,00	0,00	286.142,00
Foreign	0,00	0,00	0,00
Local	286.142,00	0,00	286.142,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	286.142,00	0,00	286.142,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	107.660,00	107.660,00	107.660,00
Factory costs	25.529,64	25.529,64	25.529,64
Administrative overhead costs	0,00	0,00	0,00
OPERATING COSTS	25.529,64	25.529,64	25.529,64
Depreciation	27.078,30	27.078,30	22.114,63
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	52.607,94	52.607,94	47.644,27
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	52.607,94	52.607,94	47.644,27
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	55.052,06	55.052,06	60.015,73
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	55.052,06	55.052,06	60.015,73
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	55.052,06	55.052,06	60.015,73
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	55.052,06	55.052,06	60.015,73

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	313.000,80
Internal rate of return on investment (IRR)	26,32%	
Modified IRR on investment	26,32%	
Net Present Value of Total Equity Capital Invested	at 7,00%	313.000,80

ALGAE EU TUBE

Local currency	Construction 2018	Production 2019	Production 2020	Production 2021	Production 2022	Production 2023
TOTAL CASH INFLOW	0,00	107.660,00	107.660,00	107.660,00	107.660,00	107.660,00
Inflow operation ➡	0,00	107.660,00	107.660,00	107.660,00	107.660,00	107.660,00
Other income	0,00	0,00	0,00	0,00	0,00	0,00
TOTAL CASH OUTFLOW	286.142,00	25.529,64	25.529,64	25.529,64	25.529,64	25.529,64
Increase in fixed assets ➡	286.142,00	0,00	0,00	0,00	0,00	0,00
Increase in net working capital	0,00	0,00	0,00	0,00	0,00	0,00
Operating costs	0,00	25.529,64	25.529,64	25.529,64	25.529,64	25.529,64
Marketing costs	0,00	0,00	0,00	0,00	0,00	0,00
Income (corporate) tax	0,00	0,00	0,00	0,00	0,00	0,00
NET CASH FLOW	-286.142,00	82.130,36	82.130,36	82.130,36	82.130,36	82.130,36
CUMULATIVE NET CASH FLOW	-286.142,00	-204.011,64	-121.881,27	-39.750,91	42.379,46	124.509,82
Net present value	-286.142,00	76.757,35	71.735,84	67.042,84	62.656,86	58.557,81
Cumulative net present value	-286.142,00	-209.384,65	-137.648,81	-70.605,97	-7.949,11	50.608,71
NET PRESENT VALUE	at 7,00%	313.000,80				
INTERNAL RATE OF RETURN	26,32%					
MODIFIED INTERNAL RATE OF RE	26,32%					
NORMAL PAYBACK	at 0,00%	4.48 years	= 2022			
DYNAMIC PAYBACK	at 7,00%	5.14 years	= 2023			

ALGAE EU TUBE

Local currency	2018	2019	2020	2021	2022	2023
TOTAL ASSETS	286.142,00	341.194,06	396.246,13	451.298,19	510.063,92	568.829,65
Total current assets ➡	0,00	82.130,36	164.260,73	246.391,09	328.521,46	410.651,82
Total fixed assets, net of depreciatio ➡	286.142,00	259.063,70	231.985,40	204.907,10	181.542,47	158.177,83
Accumulated losses brought forwar	0,00	0,00	0,00	0,00	0,00	0,00
Loss in current year	0,00	0,00	0,00	0,00	0,00	0,00
TOTAL LIABILITIES	286.142,00	341.194,06	396.246,13	451.298,19	510.063,92	568.829,65
Total current liabilities ➡	0,00	0,00	0,00	0,00	0,00	0,00
Total long-term debt	0,00	0,00	0,00	0,00	0,00	0,00
Total equity capital ➡	286.142,00	286.142,00	286.142,00	286.142,00	286.142,00	286.142,00
Reserves, retained profit brought fo	0,00	0,00	55.052,06	110.104,13	165.156,19	223.921,92
Retained profit	0,00	55.052,06	55.052,06	55.052,06	58.765,73	58.765,73
Net worth	286.142,00	341.194,06	396.246,13	451.298,19	510.063,92	568.829,65

ALGAE AFRICA OPEN POND

~~Increase in net working capital~~	~~0,00~~	~~0,00~~	~~0,00~~
TOTAL INVESTMENT COSTS	147.565,00	0,00	147.565,00

SOURCES OF FINANCE

	Total construction	Total production	Total inflow
Total equity capital	147.565,00	0,00	147.565,00
Foreign	0,00	0,00	0,00
Local	147.565,00	0,00	147.565,00
Total long-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Total short-term loans	0,00	0,00	0,00
Foreign	0,00	0,00	0,00
Local	0,00	0,00	0,00
Accounts payable	0,00	0,00	0,00
TOTAL SOURCES OF FINANCE	147.565,00	0,00	147.565,00

INCOME AND COSTS, OPERATIONS

	First year 2019	Reference year 2019	Last year 2028
SALES REVENUE	53.830,00	53.830,00	53.830,00
Factory costs	16.062,35	16.062,35	16.062,35
Administrative overhead costs	0,00	0,00	0,00
OPERATING COSTS	16.062,35	16.062,35	16.062,35
Depreciation	12.596,00	12.596,00	11.471,00
Financial costs	0,00	0,00	0,00
TOTAL PRODUCTION COSTS	28.658,35	28.658,35	27.533,35
Marketing costs	0,00	0,00	0,00
COSTS OF PRODUCTS	28.658,35	28.658,35	27.533,35
Interest on short-term deposits	0,00	0,00	0,00
GROSS PROFIT FROM OPERATIONS	25.171,65	25.171,65	26.296,65
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	25.171,65	25.171,65	26.296,65
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	25.171,65	25.171,65	26.296,65
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	25.171,65	25.171,65	26.296,65

RATIOS

Net Present Value of Total Capital Invested	at 7,00%	129.825,84
Internal rate of return on investment (IRR)	22,78%	
Modified IRR on investment	22,78%	
Net Present Value of Total Equity Capital Invested	at 7,00%	129.825,84
Internal rate of return on equity (IRRE)	22,78%	
Modified IRRE on equity	22,78%	

ALGAE AFRICA OPEN POND

Local currency	Construction 2018	Production 2019	Production 2020	Production 2021	Production 2022	Production 2023
TOTAL CASH INFLOW	0,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00
Inflow operation ➡	0,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00
Other income	0,00	0,00	0,00	0,00	0,00	0,00
TOTAL CASH OUTFLOW	147.565,00	16.062,35	16.062,35	16.062,35	16.062,35	16.062,35
Increase in fixed assets ➡	147.565,00	0,00	0,00	0,00	0,00	0,00
Increase in net working capital	0,00	0,00	0,00	0,00	0,00	0,00
Operating costs	0,00	16.062,35	16.062,35	16.062,35	16.062,35	16.062,35
Marketing costs	0,00	0,00	0,00	0,00	0,00	0,00
Income (corporate) tax	0,00	0,00	0,00	0,00	0,00	0,00
NET CASH FLOW	-147.565,00	37.767,65	37.767,65	37.767,65	37.767,65	37.767,65
CUMULATIVE NET CASH FLOW	-147.565,00	-109.797,35	-72.029,70	-34.262,05	3.505,60	41.273,25
Net present value	-147.565,00	35.296,87	32.987,73	30.829,65	28.812,76	26.927,81
Cumulative net present value	-147.565,00	-112.268,13	-79.280,40	-48.450,75	-19.637,99	7.289,82
NET PRESENT VALUE	at 7,00%	129.825,84				
INTERNAL RATE OF RETURN	22,78%					
MODIFIED INTERNAL RATE OF RE	22,78%					
NORMAL PAYBACK	at 0,00%	4.91 years	= 2022			
DYNAMIC PAYBACK	at 7,00%	5.73 years	= 2023			

ALGAE AFRICA OPEN POND

Local currency	Production 2019	Production 2020	Production 2021
Sales revenue	53.830,00	53.830,00	53.830,00
Less variable costs ➡	16.062,35	16.062,35	16.062,35
VARIABLE MARGIN	37.767,65	37.767,65	37.767,65
in % of sales revenue	70,16	70,16	70,16
Less fixed costs ➡	12.596,00	12.596,00	12.596,00
OPERATIONAL MARGIN	25.171,65	25.171,65	25.171,65
in % of sales revenue	46,76	46,76	46,76
Interest on short-term deposits	0,00	0,00	0,00
Financial costs	0,00	0,00	0,00
GROSS PROFIT FROM OPERATION	25.171,65	25.171,65	25.171,65
in % of sales revenue	46,76	46,76	46,76
Extraordinary income	0,00	0,00	0,00
Extraordinary loss	0,00	0,00	0,00
Depreciation allowances	0,00	0,00	0,00
GROSS PROFIT	25.171,65	25.171,65	25.171,65
Investment allowances	0,00	0,00	0,00
TAXABLE PROFIT	25.171,65	25.171,65	25.171,65
Income (corporate) tax	0,00	0,00	0,00
NET PROFIT	25.171,65	25.171,65	25.171,65
in % of sales revenue	46,76	46,76	46,76
Dividends	0,00	0,00	0,00
RETAINED PROFIT	25.171,65	25.171,65	25.171,65

ALGAE AFRICA OPEN POND

Local currency	Construction 2018	Production 2019	Production 2020	Production 2021	Production 2022	Production 2023
TOTAL CASH INFLOW	0,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00
Inflow operation ➡	0,00	53.830,00	53.830,00	53.830,00	53.830,00	53.830,00
Other income	0,00	0,00	0,00	0,00	0,00	0,00
TOTAL CASH OUTFLOW	147.565,00	16.062,35	16.062,35	16.062,35	16.062,35	16.062,35
Increase in fixed assets ➡	147.565,00	0,00	0,00	0,00	0,00	0,00
Increase in net working capital	0,00	0,00	0,00	0,00	0,00	0,00
Operating costs	0,00	16.062,35	16.062,35	16.062,35	16.062,35	16.062,35
Marketing costs	0,00	0,00	0,00	0,00	0,00	0,00
Income (corporate) tax	0,00	0,00	0,00	0,00	0,00	0,00
NET CASH FLOW	-147.565,00	37.767,65	37.767,65	37.767,65	37.767,65	37.767,65
CUMULATIVE NET CASH FLOW	-147.565,00	-109.797,35	-72.029,70	-34.262,05	3.505,60	41.273,25
Net present value	-147.565,00	35.296,87	32.987,73	30.829,65	28.812,76	26.927,81
Cumulative net present value	-147.565,00	-112.268,13	-79.280,40	-48.450,75	-19.637,99	7.289,82
NET PRESENT VALUE	at 7,00%	129.825,84				
INTERNAL RATE OF RETURN	22,78%					
MODIFIED INTERNAL RATE OF RE	22,78%					
NORMAL PAYBACK	at 0,00%	4.91 years	= 2022			
DYNAMIC PAYBACK	at 7,00%	5.73 years	= 2023			

ANEX III

AFRICA SONG

- AFRICA -

THROUGH many VALLIES, DESERT SHINES   WIND IS DANCING

(1) WITH SUN'S GOLDEN ARMS   LIKE A RIVER   FULL OF DREAM

YOUR FOOTSTEPS GO THROUGH THE TIME   .... IT'S GOD SIGN

Ref   ONLY TO YOU BROTHER   SMILE OF GOD

Ref   WALKING TOGETHER   THROUGH SUN AND STARLIGHT NIGHT

WHEN LAST POINT   OF AFRICA LAND   KISSES THE SEA

(2) AT THE MORN   OF GOOD HOPE   WE SAY PEACE

AND HUG WHITE SHORES   OF PINGUIN LAND   THERE'S NO END

Ref   STRONG IS THE HOPE   IN MY AFRICAN BROTHER

Ref   BLESSING THAT RISE   HOPE THROUGH DAY AND EACH NIGHT

(3) SPIRIT IN PREY   THAT RISES   EACH DAY

STORY THAT   RUNS   WITH LONG BLUE   RIVER OF NILE