File reference: F/MAROCCOvillages2012-JMF-0012
Project: Villages - Marocco

MAROCCO

Villages - Houses - Access Villages (Road) in AFRICA

All around AFRICA

F/MAROCCOvillages2012-JMF-0012

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Project Name	Villages - Houses - Access villages (Road) – Water - Electricity
File Reference	**F/MAROCCOvillages2012-JMF-0012**
Project Location/Country	AFRICA
Number Of Employees	500,000 Employees
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Funding Amount / USD	Thirty Billion US Dollars
	US $ 30.000.000,000.00

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Description of the project:

Our company intends to realize projects in Africa in the following domains:

1. Water treatment
2. Autonomous electric energy supply
3. Construction of housing

These three domains, complementary, can be also organized in sub-projects, by creating a synergy for potential one optimization of the use.
Beyond, of the mercantile aspect of our projects, we suggest supporting the efforts of the provincial authority for a sustainable development with an increase of the standard of the quality of life, particularly for the rural and outer-urban zones. We envisage in this frame, to experiment so the improvement of the standard of life of these inhabitants.

This concept plans the construction of the family housing for the members of this village, which would have an Self-sufficiency in electricity on base of the sources of the renewable energies and an autonomy in drinking water supply and also a system of pipe and purification of worn water.

The experience of the realization of these infrastructures, their financing and the effective maintenance will be then given to the other communities.

1 - Water treatment:

It is here mainly about the sale of equipments for the water treatment and the production of drinking water. These systems can be sized according to needs and according to demand, guarantee the supply centralized in water of communities or supply decentralized in drinking water of one or several families.

The sideboard in water in the system of centralized supply is realized by the construction of a network of supply. The water consumption is in such a case determined by a water meter and so charged. Alternately, we can set up a system of individual prepayment with a refillable smart card or a cash dispenser.
In a decentralized system, equipments are the property of the buyer after the installation and the payment.

The functioning of equipments is strongly automated and is fed by solar panels.

With approximately 3300 standard units (treatment of 900 liters of drinking water a day) in the $3.500 sale price, we would be capable of supplying daily with some drinking water to approximately a million persons, continuously.

The needs of investment would amount in that case to approximately $ 11,5 millions.

It is here about some water of rivers or brooks, water of sources springs or wells of drilling.

2 - Autonomous supply in electrical energy:

This kind of projects serves on one hand to increase the quality of life generally and, On the other hand, in the improvement of the ecological conditions connected to the various circles, the by replacing the expensive generators of diesel still in functioning.

The supply is made by means of solar panels, which are equipped with systems of storage for the supply in electricity during the night, with a simple system of maintenance. We install in addition, for communities, wind turbines of small powers, to stabilize the mutual internal network to adorn the cover of the peaks of demands.

The solar modules can have risen on the roofs of housing (walked individual) or installed in a way centralized in opened zones (community facilities).

The installations of communications (stations relays, basic stations, etc.) are generally fed by solar panels to insure the telecommunications network.

3 - Construction of housing:

The leave of absence of the housing of a big qualitative value, but at a low price, particularly for a big part of the rural population, is often a decisive stage in the improvement of the global quality of life of these.

The houses which we offer respect all the European standards relative to the stability of the building and its protection against the fires. The hygienic and sanitary installations (water, sewers and electric supply) are a part of the standard delivery.

Description of the individual projects

I. Water treatment:

The drinking water becomes rare. Already, a billion persons in the world have no access to the drinking water - The experts underlined it during the fifth world Forum of the water in Istanbul. The population growth and the industrialization in emerging countries may aggravate the situation in the next years. We consider that the number of persons who will have no drinking water until 2030, will pass in five billions. We are thus invited to develop business relative to solutions for the effective use of water sources and their treatment.

THE UNESCO considers that the countries of the OECD will have in the future to invest a year at least 200 billion dollars (147 billion euro), to insure the water supply.

Our company thus considers that the question of the water is one of main economic challenges and suggests offering installations for the production of drinking water within the framework of the activities planned in Africa.

Various technical solutions for the water treatment are available on the market. The use of various types of equipments depends on local conditions. From an economic point of view, the use centralized for the water treatment of villages or lots, is more recommended. To

obtain a reliable and satisfactory result in the production of drinking water, we use the experience and the technologies of treatment of water, which showed their abilities. According to the quality of raw water, we use two various technologies of systems of filtering:

Ultrafiltration

· Water of the river
· Water of lake
· Water of source / groundwater

The membrane of ultrafiltration eliminates the organic impurities such as the viruses, the bacteria, the cysts, etc.. Until a measure of 0,04 microns), without use of chemical treatment. The ultrafiltration works by a mechanical process. The raw water is subjected to a strong pressure by the high-tech membrane with hollow fiber. This process allows to preserve natural minerals in the water.

Reverse osmosis

· Sea water
· Water of source / ground water containing some salt
· Brackish waters (lagoons, mouths)

Besides organic impurities, the technology of reverse osmosis eliminates inorganic particles as the salt or the arsenic until a measure of 0,01 microns, without use of chemical treatment. The technology of filtration by reverse osmosis is based on a membrane multi sleep which filters the water under high pressure.

The following example illustrates a system of purification of water with solar supply:

The technical specifications
- Size: 1000x 400 x 1800 mm
- Weight: 450 kg
- Alimentation: solar energy, power: 400 WC
- Pre filter with automatic wash
- Diaphragm: ultrafiltration
- active coal-based Filter: 1 x 20 microns
- supply: solar energy, 24 VDC
- Optional 220 VAC 50 Hz, 10
- Optional 110 VAC 60 Hz, 16 has
- has energy consumption: 350 Wh

The system completely rose and ready for use. The device produces approximately 900 liters of fresh drinking water a day. Thanks to the solar renewable energy and / or wind turbine, the system can be used till 24 hours a day without additional consumption of fuel.

The system is equipped with a pump, automatic filters, batteries, solar system and controller. A filter with membrane of ultrafiltration eliminates the organic impurities without addition of chemicals. This process allows to preserve natural minerals in the water. This device of water treatment is suited for the supply decentralized in water in the put off villages, for the hospitals, the hotels, etc. The device is very compact, easy to set up and to use.

For the salt water or the sea water, we would use equipments working on the principle of the reverse osmosis: the evaporation, the condensation and the cooling. In the case of a temperature of evaporation of the order of 100 ° C, we transform immediately sea water or brackish in appropriate drinking water, without germs. Without any chemical or mechanical treatment.

Besides, it is not complicated, no expensive technology, no necessity of expensive specialists or technicians for the functioning and the needs of maintenance.

Example:

- Production: 50 liters a day
- Durability of the system
- No energy costs
- No expenses
- No maintenance
- Moderate cost, Price by module: 7.000 $
- Price of the water: of 4 hundred the liter

Following the quantity of the necessary drinking water, thus according to the need of a village or a lot, we apply standardized systems, producing between 500 liters and 1.500 liters a day.

For the supply about 300  persons in drinking water, a

device of a 900 liter production capacity a day is enough. We could supply these equipments in the shape of container at a price lower than 4.000. The maintenance of these equipments is relatively simple, the price of the water is only about 0,3 hundred by liter.

With an annual need average of 1.800 liters a person, the cost of drinking water supply is only of 6,67 a year and a person.

II. Construction of housing

The project has for object the production, the sale and the construction of cheap houses, which because of the material used (panels with hive of pressing paper bees and filled with resin), are quickly mountable (in 4 days) while answering the requirements of stability and protection against the fires.

The modular conception is adaptable to the requirements of the industry (production), to the circles of realization (mainly countries with lesser purchasing power) and in the various architectures. All the articles are subjected to a strict railing, which establishes the base of the flexibility of combinations. So, various types basing on the same principle can be realized, while guaranteeing an individual development and extensibilities. We use only modular elements which can be assembled in various variants. The central and decentralized production, following the necessity is planned. For the transport, was conceived a dense and little cumbersome packaging.

The strong conception allows an easy assembly. We thought, in connection with the fast growth of the urban areas, of the system of supply and evacuation decentralized, as the solar energy, of heating of the water, the waste water treatment.

For spare parts, it is about hybrid panels, having showed its abilityies in the technology for hive of bee for decades. Indeed, the pit of patches has a hexagonal structure, similar to a hive of bees. It the semi base of finished extremely stable and very light products, for example, the doors and the partitions in the car manufacturing, but also aéronotique. Inconveniences of the conventional technology in hive of bee is that, the material of the pit must be resistant in the mechanical pressures raised on a minimal density, the aluminum, for example. Its production would been regrettably complicated, expensive and excessive in energy. Our plate, on the other hand, is with cellulose of resin, which is transformed in a particular process, under high pressure and in high temperatures, into a very thin, very stable structure and very light. Coats cellular and outside are combined in a homogeneous way. So, spare parts are resistants in the bad weather and can be of use as pond to water. Seen the weakness of the prices of the raw material and the automate whole of the production, without stages of manual assembly, these patches can be produced at very few expenses, with regard to the comparable patches.

Another big advantage is in the insulation. So, a plate in hive of bees five centimeters in thickness isolates so much that a big plate of 50 centimeters in foam sheets lasts.
Houses have different characteristics which can be individually defined.

In the construction of the whole lots, housing is linked with the central supply and with the canals of evacuation: the central treatment of the water, the processing plant of waste water

and power production (wind and solar field of panels). We can also install solar systems and heating of the water on the roofs of detached houses to ease congestion in the central production of energy.

Here, some projections for possible realizations the smallest unity

- living Surface of 13 m ²
- Lounge and bedroom for up to 5 persons
- Room fitting: kitchen and bathroom inside
- Dress(Toilet) outside
- The wall surface of 52 m ²
- Thickness: 50 mm
- total Weight (without base) 170

Universal House

- Livable Surface of 30 m ²
- Stay and bedroom for up to 15 persons
- Arrangement of rooms: internal kitchen; shower, toilet outside
- Surface of the wall: 120 m ²
- Thickness: 50 mm
- Total Weight (without base): approximately 400 kg

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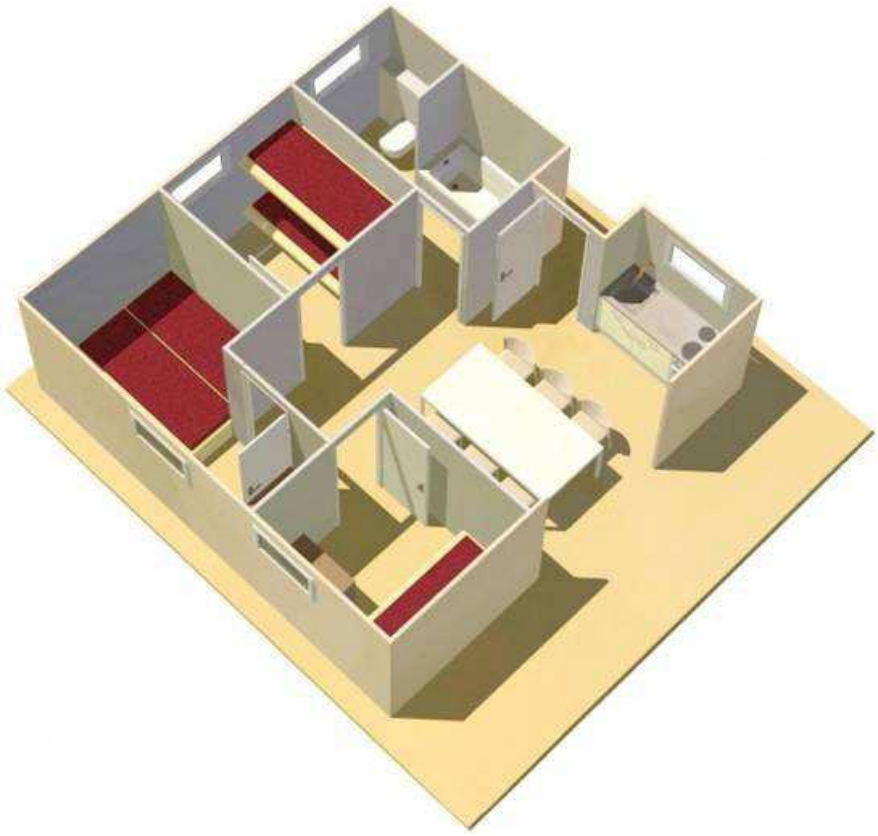

Premium House

- Livable Surface of 36 m ²

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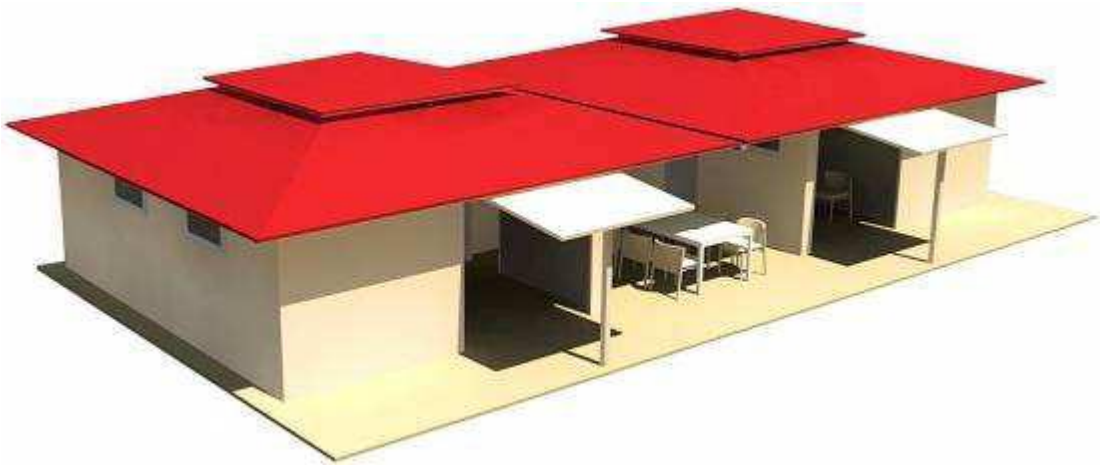
- Stay and bedroom for a maximum of 6 persons
- Arrangement of rooms: kitchen inside, shower and toilet outside
- A storeroom separated
- Surface of the wall: 150 m ²
- Thickness: 50 mm
- Weight total (unfounded) kg: 650



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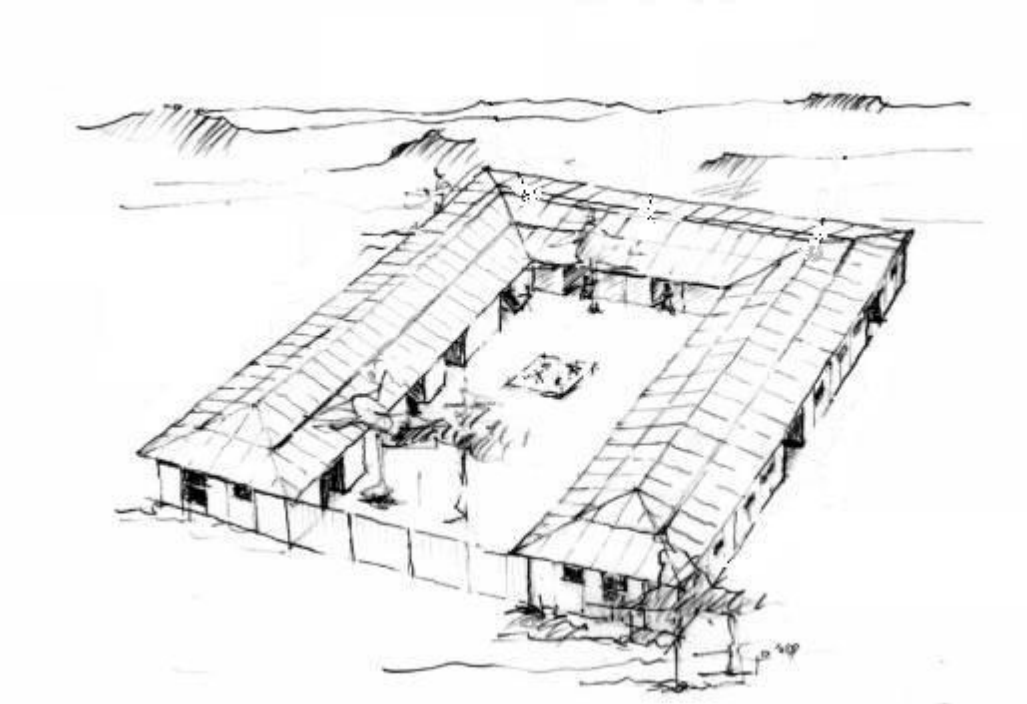
Villa: individual Layout



The construction of the urban areas with the necessary central infrastructure (water, sewers, electricity): Been a member (part) also of the project of construction.

These urban areas should also join children's day nurseries or schools, health centers and shopping malls.

III. The autonomous supply in electrical energy

The photovoltaic systems convert rays of light in electricity by means of solar cells. These are thus in the center of a photovoltaic system and are usually made by pure silicon. In a photovoltaic module, several solar cells are connected on-line, so that the power corresponds to the sum of units.

The best degree of efficiency is reached with a photovoltaic centred system on the midday sun. Between 10-20 percent of rays of light can be converted in solar energy.

The energy so obtained is appropriate(clean) from the environmental point of view, without harmful carbon dioxide emission. An installation photovoltaic centred with a capacity of a kWc (1 kilowatt crest), requires a surface about 8-10m ^{2}.

Equipment for network:

In a photovoltaic system linked with a network, the energy obtained individually is injected in the central network and the producer of electricity is entirely indemnified.
The individual need in electricity is covered by the appeal to a central supplier.

In most of such cases, the photovoltaic systems are connected to the central network for an efficient use of the energy. The connection to the public network is obtained by means of an inverter, which converts the common solar energy in alternating current.

Isolated site:

The systems of isolated site are different from systems in network in the sense that the produced electricity is only used for the own use.

Such a system requires big solar batteries to keep the electricity.
It reduces the efficiency of this equipment. The systems of isolated site are often necessary in the put off zones where the access to the public network is difficult.
Small systems of isolated site are used for road marking, parking meters or the other small similar needs.

The solar energy:

Within the framework of our activities, we suggest solar modules for domestic use going up on the roofs of houses, including solar parks for the central supply in energy for lots, agglomerations or villages. We also supply solar modules with site isolate for the functioning of technical equipments such as radio transmitter, relay stations.

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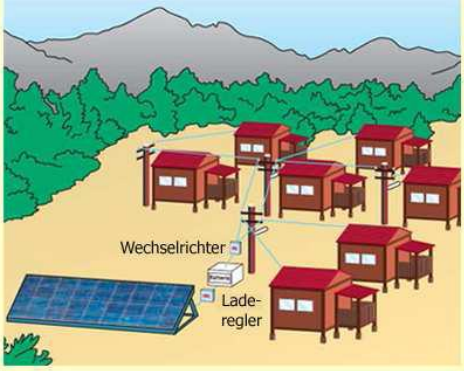
The energy needs individual, for a family house for example, (isolated site) can be covered, under the latitudes of Central Africa, by modules of a capacity from 0,5 to 1,0 kWc.
With an average duration of the usable solar radiation about 2000-2500 hours a year, these modules can produce 1.000-2.500 kWh of electricity a year.
The installation of these modules requires a roof of 10 - 40 m ².

The photovoltaic systems in isolated site consist of a generator (solar panel), a different rectifier (controller of load), a storage of energy deprived (battery) and, if need be (in case of connection with electric devices, thus alternating current), a transformer of the energy (inverter). The prices for a complete system are at present in the order of 5.000 - 5.500 USD by kWc.

The solar parks for the supply centralized the urban areas or the villages are specially cheaper. The costs are situated in the fork 4.000 - 4.500 USD by kWc.



However, in these cases, are to be added the costs of posage of the local electricity network of the power plant to the users.

Besides the solar energy, the use of the hydropower offers another alternative in not polluting energy. It is not a question here of realizing powerful hydroelectric power plants with the construction of dams on big rivers, but rather small systems using particularly what we call collectively snail.

As a rule, we can describe this snail as energy inversion of the Archimedes' screw.
The production of the energy can be realized with a small flow of water (5 m3 / s) with a lowerings (up to 10 meters). The snail, similar to a big saw, is obliquely put managed in the direction of the flow of the water on the bed of the stream.
The water, by sliding on saw it, provokes a rotary movement. Given that the slope of the snail is relatively low, it turns slowly (20 in 80 tours per minute). In its superior extremity is an electric generator, sometimes also with an intermediate pine cog.

The hydroelectric advantage of snails lives well in the compatibility in the fluctuations of water (of 0,1 m ³ / s), in the possible fragments and even in the circulation of fishes, contrary to the hydroelectric turbines. It is not necessary to go up a sieve for fine fragments there.
With regard to the hydrolic wheel, the snail is more effective:

- Debit: 0,01 - 8 m ³ /
- Height of the fall: 1 8 m
- Power: up to 300 kW, increase by posage parallel
- Efficiency: 85 90 %
- Use: all year long (hours of functioning > 7.000 a hour / the year)

With a fall of one meter in height and a debit(flow) of 1 m ³/, we can install a unity of a capacity about 7,5 kW.
This system can supply a quantity of electricity of more than 50.000 kWh.

This quantity of electricity is enough for the supply in electricity during a whole year of an urban area about 25 housing. The appeal to this clean energy can help to save more than 18.300 liters of diesel, for generating sets.
It corresponds to a reduction of emissions, about 17 tons of CO2 a year.

IV Example of a combined project of infrastructure

The sub-projects enumerated above can be combined very well together in a global project for the case of a construction of a village. Let us take the example of the construction of a lot or a village about 500 persons, with 50 type Universal House's houses . These houses are connected to a station centralized by treatment of water. So, every house will have the tap water. Besides, the power supply is insured by a photovoltaic park. The technical data for the realization are thus, as a rough guide:

Housing:

- Inhabitants: 500
- Number of the houses: 50
- Floor surface: 4.000 m ² (erection of houses and park photovoltaic)

Total Cost: 500.000 $

Water supply :

- Demand in drinking water: 2.500 liters a day
- Length of pipes: 1.500 m
- Water treatment plant: Two units unique(only) of 1.500 l / j
- The pumping plant, the gates, the water meters, etc.

Total Cost: 100.000 $

Power supply:

- Need in electricity: Houses: 50.000 kWh / has, water treatment: 1.000 kWh / has
- PV system: 27 kWc
- on-surface Need: 250 m ²
- Power cable: on 2000 m
- Inverters, batteries(drum kits), electricity meters, etc. total

Total Cost: 300.000 $

Cost of the project (estimation): 900.000 $
For an amount estimated at 900.000 dollars, we would set up a village for 500 persons, with a power plant of water and electricity. So, the specific costs of construction amount to 2.000 $ a person. The costs of water consumption and electricity are of the order of 12 $ a person and a year.

V. Projects - MDP

The Mechanism of appropriate development, MDP in initials, is an important pillar of the Kyoto protocol. It plans a reduction of greenhouse gas emissions, recognized at the international level, thanks to projects in developing countries and those of the emergent economies. The use of mechanisms of market aims at rewarding the institution of technologies of reduction of emissions in developing countries, and in monétariser the value, negotiated in units of equivalent of a ton of CO2, but also at contributing so to a sustainable, respectful development of the climate in the non-industrialized countries.

In return of the economies of these emissions, the UNO, through his agency, the CCNUCC emits certificates of reduction of emissions (CER = Certified Emission Reduction), who can be negotiated.

The duration of a project MDP is once 10 years or three times seven years old = 21 years old, and in this last case, the project is subjected every time to a new complete analysis. The following points are particularly important for the planning and the evaluation of a project MDP:

1. Quantification of the registered emissions: an exact comparison of emissions generated by the project, with the base line, that is the emissions which would have been brought out without the project.

2. Criterion of the additionnality: proof that the project would not have existed, without the recording as MDP.

The reduction of emissions can be affected by various manners. The golden rule is, the use of the renewable energies or the measures for the efficient use of the energy are allowed in the MDP, but more widely, the simple conversion of dangerous gases in gases less dangerous for greenhouse effect o the detention of the carbon by the afforestation.

To insure an effective contribution to the sustainable development, the projects clearly have to answer the following conditions:

- only the projects on the renewable energies or on the efficient use of the energy, with transfer of technology for an appropriate development.

- examination of the projects on the basis of a "matrix" of a sustainable development (employment, improvement of the environmental local conditions). - planning of the project with the local actors and the institutions.

- the particularly strict proof of the additionnalité, among others, use of a tool standardized of additionnalité with economic indicators.

The MDP was essentially designed as a mechanism to support the sustainable development, in the country host. To understand better, here is briefly the explanation of the concept of sustainable development: " Development " represents a positive change in the social,

economic or environmental domains and " long-lasting " a fair distribution of the development, as long inside a generation, that with regard to the other generations to come.

The sustainable development covers three domains: the economic, social and environmental domains. The objectives in every domain can be paraphrased:

- economy: creation of wealth and life

- Social: the abolition of the poverty and the improvement of the quality of life

- Ecology: improvement, increase and the extension of natural resources for the future generations.

The projects described above will always be subjected by us to a control of qualification as MDP projects and if necessary, executed as such. There are the other projects, which will be downright realized from the beginning MDP projects, but are by described here, such as the reafforestation and the extraction of the gas methane resulting from garbage dumps, followed by the power production (combustion engine).

As an example, a calculation

- 20.000 unifamiliales houses with an average consumption in electricity by household of 2.000 kWh/a, supplied rather with the solar energy or a ydroelectric power plant than diesel generators.

- The total demand is 40 GWh / has.

- With an average yield by diesel generator of 30 %, we need about 133 GWh, that is 14,6 million liters of diesel to produce the quantity required by the electricity.

- To avoid the combustion motorized by 14,6 million liters of diesel, saves 40 880 tons of CO_2 emissions a year.

- With an average price of certificate of CO_2 about 15,30 / t (forward price for 2011s and 2012), the marketing of the certificates of generated CO_2 allows a 625,000 annual income. The total duration of validity of these certificates is of 10 years.