

# **The Master Planning Process (MPP) for Small and Medium Island Communities (SMIC)**

Project name: Master Planning Process for SMIC in the ACP Countries

Project acronym: MPP for SMICs

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Abbreviations:

SMIC	Small and Medium Island Community
SME	Small and Medium Enterprise
SMEEP	Small and Medium Enterprise Energy Portfolio
EEN	Enterprise Europe Network
DMP	Decision Making Process
PIP	Project Implementation Process
KPI	Key Performance Indicators
MP	Master Plan
MPP	Master Planning Process
CIP	Competitiveness and Innovation Program
EDF	European Development Fund
IFI	International Financial Institutions
ACP	Africa, Caribbean, Pacific (ACP)
CDE	Centre for the Development of Enterprise
PPP	Public Private Partnership
SIPP	SMART Island Power Project
FDI	Foreign Direct Investment
CSO	Central Statistical Office
CFL	Compact Fluorescent Lamp
WSSD	World Summit for Sustainable Development
FP7	Seventh Framework Program-the future EU research policy
OMG	Object Management Group
BRG	Business rules Group
EA	Enterprise Architect (Enterprise Architecture)
EE	Enterprise Engineer (Enterprise Engineering)
RET	Renewable Energy Technology
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
ESMAP	Energy Sector Management Assistance Program

MPP Content:

Introduction

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## Introduction

We are ready to add a value to a worldwide access to technologies for small scale electricity production, assist with the needs for technology transfer and capacity building to the poor or developing countries. We will talk about renewable energy technologies, namely about solar energy, Super PV and about Enterprise Engineering's and Enterprise Architect's roles in this business processes.

We understand the gaps between developed countries and target group and challenges which this represents. The progress in (electrical) power technologies over the last two centuries and economies of scale pushed developed countries toward the use of larger and larger energy production units and expansive distribution networks. Developing countries on the other hand have not been comparable producers of equipment; instead they have been importers of equipment and expertise in building up their energy systems.

We have heard how in some cases poor people stopped using electricity, just after a few months of being connected to the grid; how small energy generation systems installed to provide electricity to villages or communities were a few months after they started operating abandoned. This phenomenon is called "unsustainable energy access for the poor", and worldwide experience proves the causes of this effects. In our paper we will deal with better ways of meeting rural energy needs for affected population.

We know that renewable energy technology (RET), and electricity market are the right way for the poor and developing countries and the developed ones as well. Mix of RET, reflecting the particular location's characteristics and environment, can deliver the lowest generation costs for the communities (small towns, villages and/or wilderness areas) with loads between 5 kW and 500 kW (ESMAP, 2007). In this paper we will discuss the SMIC.

International organization such as the UN Development Program (UNDP), the World Bank, the UN Environmental Program (UNEP), and other recognize the need for technology transfer; nevertheless the progress has been very incremental. The experience throughout the world has shown that there are no simple ways in achieving electrification for these end users. Furthermore, the range of electrification technologies is constantly expanding and the factors determining the ultimate affordability, availability and sustainability of a particular electrification scheme are becoming increasingly complex. Developments in generation technology and electrification business models have resulted in increasing diversity in how electricity is generated and delivered, including grid-connected mini-grid and off-grid arrangements. (ESMAP, 2007)

We agree and respect the opinions that the research is not a main requirement for successful SMIC. It is true that a significant gap exists in understanding what does the innovations in RET mean for the poor or the most advanced clients. There are the funds waiting for quality projects, i.e. those which have the right combination of developing principles and suitable technical solutions respecting sustainability requirements. As it has been stated at the conference titled "Technologies for sustainable energy sources in developing countries" which was part of the agenda of the Czech Presidency in the EU Council and which took place in Prague, 18th May 2009: The world needs more of successfully implemented solutions and less paperwork.

We followed up on that conference by the EMCi establishing a direct contact with the CDE in cooperation with the Czech Business Platform for Foreign Development. By making this presentation as a call for cooperation at the CDENET Annual Meeting in Florence we follow up the open way. The RETs implementation is in this paper described not only from the technological point of view but a very important emphasis is given to an adequate methodology and tools for these very specific SMEs.

# 1. What are the Small and Medium Island Communities (SMIC)?

## A. SMIC and Enterprise Engineering

Small and Medium Enterprises (SME) are well defined category of entrepreneurial activities. In this call or initiative we are introducing a specific entrepreneurial category which is called „Small and medium Island Communities“, the SMIC. The SMIC is a small or a medium-size enterprise operating in an off-grid („island“), providing a sufficient supply of electric power generated from renewable resources. The necessary pre-conditions for building up and sustaining this function are sufficient sunshine, fresh air, drinking water, fertile soil and financial income generated from the sale of products and services offered by people in such *island community*. The pre-conditions for implementation of these functions are growth in occupational skills of employees and the SMIC stakeholders, the willingness and the motivation of the given community to undergone and accept changes which the SMIC operation represents, such as supporting education of children, improving health of families in island community, etc.

We see the SMIC as a business or more businesses (Enterprise) which within the island community provide generation and sales of electric power with guaranties of a continual, year-around supply. The SMIC is selling electricity to stakeholders of the island community and it invests its income to further development of its operation and other infrastructure. SMIC, similarly to other SMEs within an island community should be designed, operated, modernized or liquidated according to internationally adopted standards in the area of Enterprise Engineering.

*An example of an island community which has decided to cover all of its needs for energy through renewable sources is Tuvalu Island next to New Zealand. Its goal to achieve 100% renewable energy by 2020 was published on 20-July-2009 in Energy Business Review. The Radio New Zealand International reported. Tuvalu is hoping to completely end its dependence on diesel and shift to solar and wind power. It anticipates that it will cost more than \$20 million to produce electricity for its 12,000 people. Tuvalu and many other low-lying atolls in the Pacific, the Indian*



*Ocean and the Caribbean are concerned that increasing sea levels can completely remove them from the map. These atolls need the governments to agree to a new UN agreement in Copenhagen in December 2009 to slow down climate change. Tuvalu's Minister of Public Utilities and Industries, Kausea Natamo, said that he sees the day when his country is powered completely by renewable resources as very realistic.*

## B. SMIC and Enterprise Architect

Enterprise Architect's (EA) role in business activities is a new visible phenomenon not only for big companies but for the SMEs as well. The General Business Models (GM), composed from Organization Model (OM), Process Model (PM), and Business Motivation Model (BMM), generally used for private companies are in our case applied to SMIC business development. EA works with stakeholders, both leadership and technology experts. EA should develop the SMIC's information technology assets for the key policy decision making processes in the island community. EA should assist the SMIC to link the Organization Model, Process Model, and Motivation model to the SMIC's IT strategy, tactics and operation. The EA

role is to provide the SMIC management and stakeholders with the tools ensuring that the business and IT are in alignment and that a strong base of data for communication exists. The EA is the one who is making systemic arrangements allowing for integration of different business activities performed by the island community.

*An example of integration of numerous aspects of responsibilities in island community, even at the time when there was no IT, might be the history of Rhodos Island, now part of Greece. 300 years before Common Era, at the time when the Rhodos State flourished, we can see an island community which was successful. Today we might say that the SMIC of the Rhodos led its citizens toward a uniform order in communication in order to understand the foundation of money and importance of human resources. In its time, Rhodos was „Switzerland of Mediterranean“. For example, state administrators set forth the laws for administering the community, generation and protection of the currency, they wrote a law about insurance for maritime industry and they established and operated an office which was supplying poor citizens with groceries. The main objective was to keep work-able population healthy so it can work for the benefit of the community. The community on Rhodos mastered the technique of communication necessary for*



*political decision making, achieving consensual agreements, legal acts, care for health and education and informing its population so that their interests are protected against destructive elements. The lesson from this ancient example is that integration of several functions is not an achievement of the last hundred years and that it is not pre-conditioned by existence of information technology. It is obvious that some Enterprise Engineers were operating on Rhodos, although they were not that visible as they are today.*

### C. The SMIC and why they are essential

We already mentioned the role of Enterprise Engineering and Enterprise Architect in *island systems* and their beneficial contributions to *island community*. The island system means a territory which currently doesn't have and most likely will never have an opportunity to be connected to a permanent electric power distribution network (grid) as they are a standard in developed countries or regions around the world. The island community means inhabitants of an isolated or hard to reach area and businesses (Enterprise) which in the island system fulfill standard economic and social functions. The task of Enterprise Engineering is to bring in and to implement the technologies for energy self-sufficiency based on renewable sources of energy and the task of Enterprise Architect is to organize these technologies, equipped them with processes, and to structure a motivational support.

In order to make this implementable even in developing countries it is necessary that the assistance from the Enterprise Architect (EA) and Enterprise Engineer (EE) correspond with the situation and conditions in location where the services will be offered and utilized. The task for the EA and EE is to be able to identify the differences in degree of integration of functions in various conditions of an economic, social, and cultural life of island communities. Introduction of electric power represents a milestone in the history of a community, affecting their cultural values, social life, customs, and work habits. Viewed from these standpoints, integration of functions puts great demands on consensus building and on responsibility for the SMIC's results, for political and economic development within and outside of a community (in administrative



system of a given country, etc.).

In general, island communities have their specific internal and external ties. These are not always transparent enough to outsiders. The fact is that when the electric power, as a technology phenomena, arrives in a community, it creates new impulses allowing for a success of the SIPP in the given community. An MPP for an ACP country and an MP for an island community allow for working on common interests and priorities such as fight against hunger and illiteracy, promoting economic development, and improving quality of life. We propose the SMIC/ SMEEP route respecting and being in harmony with the natural environment and local communities.

*Examples of how significant impacts electrification makes both in a countryside or a town abound, as the various communities and countries were making access to electricity to their people possible over the past 100 years or so. Nonetheless, in order to better understand this strategy applied to island systems and island communities, one ought to be aware of two separate phases or steps. The first one is reaching of a consensus concerning an implementation of a specific project within the given community. The second step is an implementation of the project itself. For the first step we need the MPP and then, for the second step, we need the SIPP. Concerning the impacts on human lives which introduction of electricity in a community represent, we can recall experience from early days of electrification in our country, in Central Europe. In a semi-rural community generations of my family come from and where we still have a weekend cottage, in early 20s of the last century a local entrepreneur, Mr. Mautner, decided to use the river as a renewable source to generate electricity for his busy textile factory. Production of the factory expanded, people in the area got new jobs plus they also could hook up their houses*



*into his local electric grid. Those who got their regular wages from the factory or elsewhere were able to pay their electricity bills but others needed to get a similar, regular source of income to pay for this marvelous source of light and power. My grandmother thus became a seamstress to supplement irregular income from her husband's farming. Changes in the lives of people, families, and the communities were not driven by political change but by introduction of a new technology.*

## 2. Why we need the Master Planning?

### A. SMIC and jobs, food, health, and education

RET and SMIC presents a business task composed from many functions that have to be integrated and the synergy potential has to be understood and developed. Cultural differences between cities, villages and remote places and a sophistication of a citizen in accepting the electricity as a part of one's daily life and work in developed and developing countries can be overcome as long as the foreign aid is focused on those function which will help citizens in developing countries in securing jobs, food, healthcare, and education. But these clearly identified objectives of foreign aid are not always easy to achieve. Therefore we propose to apply in foreign aid projects principles of Business Model (BM) and, in particular, the Business Motivation Model (BMM). These will capture, describe, and evaluate specific sets of motivation which each side, i.e. the donors and the recipients are bringing to the process of developing and implementing the project and operating the

RET portfolio (SMEEP) in a given SMIC.

This is a route toward the data, information, and approaches which poses a higher validity as far as a responsibility for a preparation and implementation of individual steps to be taken by donors and recipients is concerned. Foreign aid is an initial phase, a prelude to an enterprise which is being proposed. These needs to be apparent, guiding priority and all actors in foreign aid have to have the necessary training and awareness of examples representing best practices. Here we are very specific: We are talking about linking together business activities build on a common foundation, i.e. electricity in a SMIC. The primary business activity is operability and sustainability of power supply within the SMIC. There we identify three fundamental preconditions:



Organizational (a consensus within a given community as far as the foreign aid is concerned). Second: Process (readiness of donors to support and share such consensus) and third: Motivation (both sides prepare integrated, master plan for electrification of one or more SMIC). Other business activities implemented in parallel or subsequently should have logical ties to such Master Plan.

## B. Gaps, Principles and Recommendations for the Czech Presidency

There is a series of reasons for this approach. One example is identification of Gaps (G) Principles (P) and Recommendations (R), which were presented by the Czech Republic's representatives in the first half of 2009. Let's look up some of them:

### Financing:

- G: Local finance leveraging; Non-participation of a large FDI; Demand side financing,
- P: Smart Subsidies; Role of a state in supporting markets; Bundling small projects; Carbon for access; Social merchant banks,
- R: Influencing the European Community – the ACP Energy Facility,

### Capacity building:

- G: Professional capacity at local, national, sub-regional and regional levels; Energy capacity within local government and institutions in support of decentralized energy access.
- P: Support exchange, research, and education concerning energy; Focus on the local level; Develop instruments for local level support building on the French Presidency initiative.
- R: Develop a Competence Platform linking African and EU institutions and expertise; Support training and exchange programs for local level government, private, academic and CSO personnel.

Energy efficiency:

- G: Technology Shift and societal shift; Difficult decisions for government.
- P: Build on what has worked such as CFLs in Ghana, Uganda
- R: Initiate a study on how a policy can support demand/end-use technologies for energy efficiency.

Knowledge and information:

- G: Non-implementation of key international treaties and processes esp. WSSD, Paris and Accra agenda of action; Research too focused on a large-scale, cutting edge not on a decentralized, small-scale.
- P: Support independent evaluation of progress against international commitments, a kind of Moody's rating on adherence, keep pressure on conforming; Enable components of the FP7 focusing on local level, small scale, decentralized technologies focusing on cost-saving and maintainability as well as social/management models
- R: Initiate a review of the EU compliance with the key treaties and develop the EU position for Copenhagen 2010 on this basis. Council's resolution feeding into the FP7 research agenda; more support for CSO participation.

### C. SMIC and SME, SMEEP and Services in a Community

Small and medium enterprises (SMEs) or small and medium businesses (SMBs) are companies whose headcount or turnover falls below certain limits. The SME abbreviation commonly appears in the EU and in international organizations, such as the World Bank, the United Nations, and the World Trade Organization. The SMB abbreviation is predominantly used in the USA. EU Member States traditionally have their own definition of what constitutes an SME.

The EU has started to standardize the concept for EU member states. Its current definition categorizes companies with fewer than 10 employees as "micro", those with fewer than 50 employees as "small", and those with fewer than 250 as "medium". In contrast, in the USA, when a small business is defined by the number of employees, it often refers to those with fewer than 100 employees, while medium-sized business often refers to those with fewer than 500 employees.

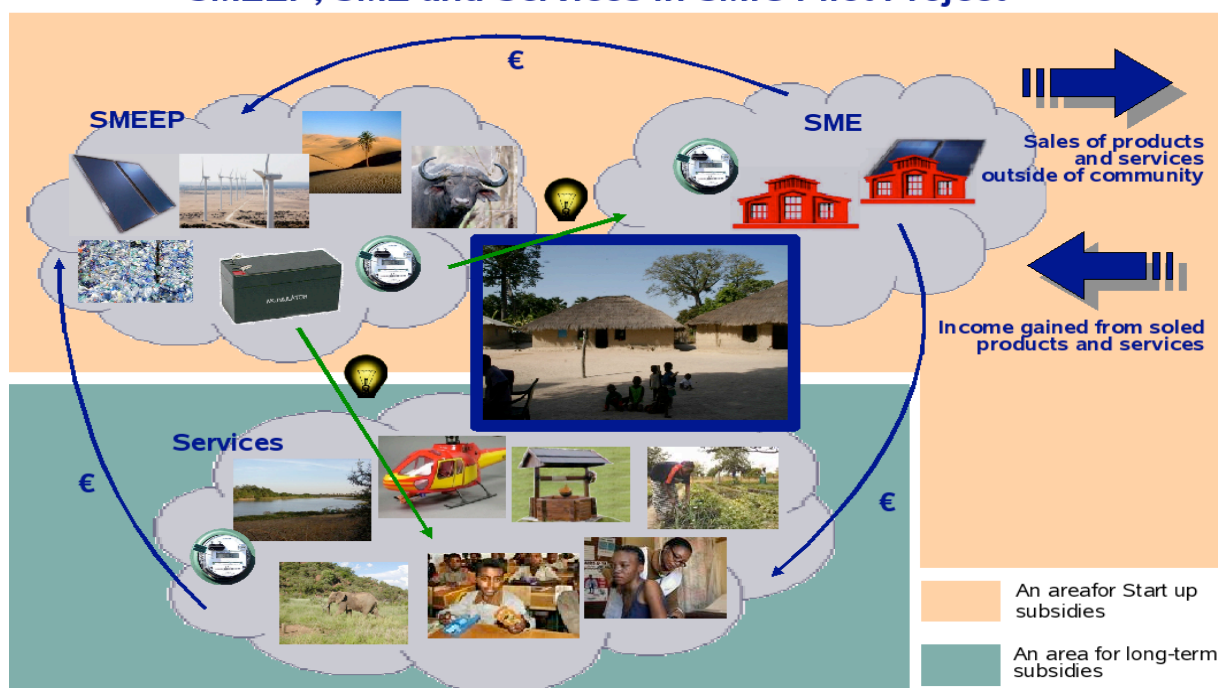
Both the US and the EU generally use the same threshold of fewer than 10 employees as a micro business. In other, mostly not developed countries, the Micro and Small Enterprises (MSEs) sector plays a pivotal role in the overall industrial economy of a country.

In South Africa the, the SMME abbreviation is used for Small, Medium and Micro Enterprises. Elsewhere in Africa the MSME is used for Micro, Small and Medium Enterprises. Size threshold varies from country to country. For the purpose of this paper we will use abbreviation used in EU, i.e. the SME (or SM<sub>2</sub>E).

It is estimated that in terms of value of a less developed countries, the SM<sub>2</sub>E sector (inclusive micro) accounts for about 39% of the manufacturing output and around 33% of the total export. Furthermore, in recent years the SME sector has consistently registered higher growth rate compared to the overall industrial sector.

The major advantage of the sector is its employment potential at a low capital cost. As per available statistics, this sector employs about 31 million people spread over 12.8 million enterprises and the labor intensity in the SME sector is estimated to be almost 4 times higher than in large enterprises. SMIC fit into the above-mentioned range of SMIC.

## SMEEP, SME and Services in SMIC Pilot Project



### D SMIC – Research or/and Master planning process (MPP).

Research is not, as already mentioned, a main pre-condition for a SMIC. The basic solutions, as it is described in the ACP background study, exist in ample variations. A certain lack of understanding what innovation means will exist for some time. Some will refuse electrification and will instead prefer quickly available “solar energy cooking pots”, other will understand the impacts of electrification and they will start to cooperate with us.

It is not easy to prepare a good project when a strategy is missing. Funds are waiting for projects of a good quality, projects which are the right combination of developing principles and suitable technical solutions, in our case Sustainable Energy Sources. Excellent innovative examples are usually forced by local needs and reflecting the local conditions. In some cases those can be technical challenges, in other it might be a high cost of maintenance. But this doesn't require a deep, extended research, it is challenge for the business master planning process and an opportunity for what is called SMART Island Power Projects, the SIPPs.

The DG Enterprise has opened the way how to better understand “Enterprise” and its role in any public and private business project-driven activities, and the DG had restructured its huge network of national bases of SMEs support for innovative enterprise. The network is called Enterprise Europe Network (EEN) and since 2008 their branch offices work in every Member State in within the framework of the Competitiveness and Innovation Program (CIP). This represents a strong potential as to how better understand what “Enterprise” means for the SMIC in the ACP countries.

What we would like to add to this EC approach? It is our presentation of the MPP including an explanation what the role of Enterprise Engineering and participation of Enterprise Architects are in SIP projects in the ACP countries. This is our call for seeking a consensus concerning the SMIC as a solution of challenges that island communities in developing countries are facing, a consensus that implementation of SMEEP based on what the MPP and MP are telling us can be expanded into a suitable model for this area of a foreign aid in the ACP countries. We are ready to develop a pilot SIPP for a specific client.



### 3. What the MPP-SIPP should do?

#### A. Methodology and tools

Our approach is based on the general Business Model (BM), i.e. from the standpoint of the ultimate business owner. Its main components are focused on organization and organizational arrangement of processes which are aimed at the objectives of the activities which are being proposed and at the processes themselves. These processes must be prepared, regulated, coordinated, managed and controlled. The emphasis is given to motivation and answers to a question why this particular arrangement, why this particular sharing of responsibilities, what really leads to implementation of commitments each party made along the route toward the preparation and implementation of the processes which follow shared objectives.

We follow the motivation at the levels of strategic decision making down to the level of tactical decisions. In this we look at the way how a participant approaches his commitments, how he prepares the processes under his authority, how he supervises activities related to suppliers of technology and those who install it as well as to the future end-users and operators. In this approach we make a distinction among two basic processes concerning a SMIC as far as securing financial resources and capacities. The first one is called Decision Making Process (DMP) and the second one Project Implementation Process (PIP). The DMP can be supported in a way of pair comparison of expert and peer reviews. The objective is to reach a consensus concerning the key decisions for an investment outlay and to set up Key Performance Indicators (KPI).

The result of the pair comparison method is an existence and sustainability of a knowledge-based support which is necessary for achieving the consensus concerning financial operations related to the life-cycle of the given project. The PIP follows the outputs from the DMP, i.e. the already identified project to be financed and it provided further, more detailed planning addressing financing, personnel, material aspects as well as specific tasks and time frames (Project Portfolio Management and Project Management methods, respectively).

### Master Planning Process (MPP) for ACP countries and MP for Small and Medium Island Communities (SMIC)



## B. Organization models (OM) and the MPP structure

A distinction is made between organizational arrangement for Decision Making Process (DMP) and for Project Implementation Process (PIP). Initially, when the work on a MPP for a SMIC and its SIPP starts, the priority is a preparation and implementation of key decisions.

We see a preparation of an MP as a primary basis and instrument for selected pilot applications. This will also start MPP for the ACP countries in the RET sector. Prior to preparation of a MP there should be, for example, an interest group or a committee established to oversee the Master Plan process, to nominate the Master Plan design team (Enterprise Architects, Master Plan professionals), to collect and disseminate Master Plan data, and to establish a governing committee to oversee the MP process, we are proposing at the CDE level.

Pilot projects based on energy mix of the renewable sources should be developed, e.g. Small and Medium Energy Enterprise Portfolio, SMEEP.

## C. Process Modeling (PM) and SIPP base for SMIC units

In our draft of the MPP we included procedures allowing for modeling of main processes which we will apply in preparation of a SIPP for the specific SMIC, to include mapping out the immediate and extended surrounding (a cluster of several SMEEP, SMEs, etc.).

In preparation of the MP for the pilot application we will focus on the integration of project activities (financing, capability building for the SMIC, selection of technology mix, efficiency and effectiveness of technologies used and their sustainability), integration of target objectives (production of electricity for the SMIC, job growth, sufficiency in food supply, adequate health status of the community, expansion of offering and quality of universal education of children, and skills training for adults operating in SMEEP, SME, and island's services).

## D. Business Motivation Modeling (BMM) and consensus in SMIC

The MPP should extend application of the BMM principles to the specific conditions of SMIC in the ACP countries. This is our other basic recommendation. The fundamental elements of the BMM for SMIC are as follows: The Means (the summary of the potential of people and assets ties to the specific SMIC; strategy, tactics and processes how to achieve the SMIC's mission) and Ends (vision, supported expected results, costs related to achieving Goals and Objectives).

To get a Vision transferred into a Mission which will achieve its objective, we have Influencers affecting the process. They are either external or internal. The SMIC and its Business Process must be evaluated and assessed. Operation in the BMM groups; BRG (Business Rule Group), OMG (Object Management Group), MICROSOFT is set-up on a logical structure typical for organizational behavior and application processes of a project type scenario (Project Driven Application).

The language and definitions of the basic elements of the BMM is a suitable instrument of interaction among various professions experiences in a given area and those who are dealing with the agenda of programming and planning for the first time. In the Czech Republic, we used the BMM language when doing an audit of integrity of the Operational Program of Structural Interventions of the EU in the Czech Republic called: „Education for Competitiveness.“ In Bulgaria, the language and definitions of the basic elements of the BMM helped us to conduct training for municipalities as the country was preparing to join the EU and they wanted to participate in projects co-financed from the Structural Funds.

E. Pilot application approach is proposed

Pilot application approach is our core recommendation. Over the years we met broad spectra of programs and projects co-financed from the EU funds before and after the Czech Republic joining the EU. We are drawing on about 15 years of progressive experience in this area as we also see two fundamental characteristics related to public finance expenditure processes. The first one is a process of political transformation, mainly in the area of property, such as privatization or restitution. The second issue is setting up management and controlling systems and fight against corruption.

The Czech Republic is able to get, as other EU Member States do, receive a significant funding to finance programs and projects. The pre-condition is to comply with the EU rules which apply to using the EU funds. The rules are not always easy to follow. The objective of the EU structural interventions is to even out disparities among the old and the new Member States and among regions throughout the EU. Request for co-financing assistance can be submitted by applicants from the public as well as the private sectors. The criteria for measuring a relative disparity or falling behind in development is the Gross Domestic Product (GDP) of a given region or country, compared to the EU average. The applicants (from a non-profit and for-profit sectors) have an opportunity to ask for a subsidy from EU funds and EU directives set forth what share of co-financing – based on the nature of proposed project and classification category of the applicant – will apply.

Business approach, for example application of methodology of Project Portfolio with an adequate ICT and added value chaining from individual activities (programs, priority axes, subsidies, projects themselves) in a given location (country, region, municipality) cannot be in such expansive and centrally regulated program of subsidies easily identified. Lessons learned from implemented projects are communicated rather quickly but the methodology and the procedures are not seasoned enough, therefore it is not possible to adopt them as generally applicable recommendations.

Therefore we recommend SIPP of individual SMIC in the ACP countries to be implemented within the framework of an MPP using pilot applications and emphasizing quality of decision making processes concerning the implementation of proven RETs in the specific conditions of given countries and locations. There is a list of symbols on the next pages representing our MPP approach to the pilot projects for the ACP countries:



**SME:** The already existing or planned for micro, small, or medium businesses which are or will be at the territory of the island community generating income (cash) necessary for maintaining and development of supplies of electric power. Under this category we find the SMEEP (generating and selling the electricity), SM<sub>2</sub>E (sale of products, and services within and outside of the SMIC). SMEEP and SM<sub>2</sub>E should get a one time, start-up subsidies. Services within SMIC should represent an environment where such subsidies can be expected to have a long-term positive outlook and impact.



**SMEEP:** For more details see part 3F (the next paragraph)

**SM<sub>2</sub>E:** Mainly micro and small businesses able to produce and sell products within and outside of the community, for example agricultural products, crafts, etc. Market operation at the strategic level should be addresses at the MPP, tactical level for decision making about SM<sub>2</sub>E operation in a specific country and island community is a job description of an MP and, subsequently, SIPP.



**Administrative system:** It is not easy and often even counterproductive to transfer an experience or good practices of an administrative system from the EU Member States into the ACP countries. Nowhere, among the EU Member States nor the ACP countries we find universally applicable model solutions. What we are left with is a patient work, step by step approach, using the EA/EE know how for the specific country and the community within it. An example might be a solution for providing a security for a SMIC (operability and sustainability of security)



**Education:** Education is an essential precondition for a community to accept the electricity, to sustain it and to be competitive in respect to other communities. Education of children has a motivational dimension for development of a community; improvement in qualifications of the adult population is a requirement for SMEEP and SME within the territory of such island community to operate successfully. In order to support skills development of occupational skills of adults we propose a separate program, for example, „Job Opportunities“ (see an example from the Czech Republic shown).



**Health of children and adults:** A healthy community is a necessary distribution of electric power (SMEEP), production and sale of products, precondition for ensuring the workforce needed for production and both within and outside of the island community (SM<sub>2</sub>E). Again, strategic solutions should be, above all, subject of an MPP, tactical operations then reacting to the specific circumstances of a given country and locality where the SMIC pilot operations are going to be implemented. The guidelines are best practices in healthcare in the ACP countries.



**Water:** Water is, of course, the basic, vitally important precondition for a sustainable development of an island community. At the MPP level this concern is addressed in a long-term view which gives the island communities a prospect of sufficient supplies of water for their operation and sustainable development. At an MP level, specific measures have to be spelled out as how to ensure sufficient water supply and SIPP should present adequate technical solutions and other aspects, such as the legal and economical criteria to water usage within the SMIC.



**Environment:** Soil, its composition, climate, climate impacts, hydrological circumstances, interconnection of functions of flora and biota, and lifestyle traditions of the local population are the fundamental elements which the MPP is to work with and which each MP will include in any specific project fitting the given location.



**Pastures, forests:** It is necessary to protect them, as long as they still represent a unique feature and element in a landscape without an industrial and extensive agricultural production. This can be done, for example, by implementing best practices, establishing national parks, preserves, etc. In order to make this doable it is necessary to include in an MPP such mechanism as DMP (decision making processes to achieve consensus concerning preservation of set aside areas and for having the will to comply with agreement which were adopted).

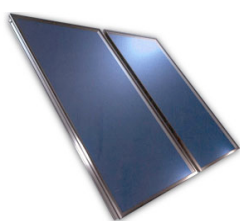




**Agricultural land, fields:** These are source of livelihood. The MPP is to seek the ways of more productive agriculture, higher quality of products both for a local consumption and for their sale outside a community, i.e. within a given country. MPP should offer the insights how to enhance the existing food chain with products to be made by the SMIC. MPs and SIPP then prepare these products for trade on the global food markets.

#### F. SMEEP recommended for SMIC in the ACP countries

Concerning the RETs, the Czech Republic has – especially in cooperation with other EU Member States - something to offer. A short overview describes selected technologies and basic mixes of energy sources for production of electricity in SMIC. The objective of an energy mix is to allow SMIC to cover energy use needs for 24 hours a day, 365 days a year, year after year. As an example we selected RET's (Renewable Energy Technologies) candidates for application of an energy mix portfolio:



**Solar energy:** Photovoltaic panels available on the market are provided by a great number of manufacturers. Panels supplemented by Super PV technology increase its performance by 60 to 200%. They are in particular suitable for areas with a lot of intensive solar radiation as this technology prevents overheating of the panels. The first European certification laboratory for Super PV application is operating in our country.



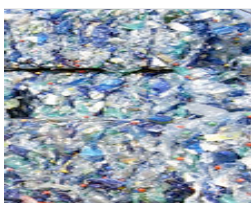
**Wind energy:** Blade or turbine wind power stations are available on the market offering broad spectra of technologies and energy outputs. Parameters are improving and affordability grows.



**Bio energy:** On the market in the Czech Republic are biogas power stations, using, for example, manure of domestic animals, waste from plants, etc.



**Energy from waste heat:** Equipment is being developed allowing for use of energy from a low temperature waste heat which is stored in water or the air and subsequently used for production of electricity.



**Other RET:** As an example, one can mention already available technology of recycling of plastics (for example PET bottles) to generate energy. Pyrolysis units using PET bottles are currently being tested in the Czech Republic.



**Energy storage:** *Quality batteries suitable for storage of electricity are available on the market, allowing direct hook-up, tapping or sending electricity into the power grid. Likewise, a great selection of diesel-powered generators is available to cover peak or emergency demand for electricity.*



**Smart grid:** *Offers sustainable voltage in the grid, 24 hours a day, year around and at the time when RET are being built, it represents a global challenge to standard solutions. Today, smart grid is a buzz word in electric power industry. Results achieved by large electric power companies and large power grids in the US, Europe, and Southeast Asia can be used for island (off grid) systems*

Other alternative sources for electricity production: Currently, a great number of ideas, patents and actual implementations are taking place, offering useful, effective, and economical applications in specific locations. They are waiting for their Enterprise Architects and engineering support. Decentralized production of electric power for island (off grid) systems is undergoing dynamic development and enjoying a substantial public and political attention.

#### 4. Architect's role and Engineering Support for SMIC in the ACP countries

*Lack of integration of knowledge: I became an engineer in 1971. In my first job I worked with a colleague who became an engineer in 1925. His employment started with his an owner of a coal mine inviting him at a green pasture in Ostrava region and told him: In two years you will build a mine here and the price will be competitive on European market. He and the mine owner managed to get that done. As I was listening to the story it was clear to me that as a fresh-from-school engineer I would manage the same. His was a different era; specialization in my time was already substantial.*

*Civil, mechanical engineers, economists, financiers and lawyers long time ago went their separate ways. We are now in 2009 and problem of integrated approach among specialized profession remains with us. At times there seems to be too much of it, often it is painfully lacking. Engineering practice has been – for at least 100 years now – that it doesn't make sense to solve problems only because they exist but that need to be solved where they really are.*

##### A. Enterprise Architect's role in SMIC in the ACP countries

Her/his task is to propose and to solve a feasibility of the primary function of the SMIC, i.e. electrification of the area of the given island community and to propose and solve feasibility of secondary functions (new jobs, enough food, reasonable health and educational opportunities for community members). EA is working with integration of the above-mentioned functions and creates organizational preconditions and process operations allowing for sustainability of primary and secondary functions via motivation linked to achievement of objectives. She/he is an architect in the field of „Enterprise“.

EA task is to build in the island community an enterprise (SME generating electric power) which will be selling the community its electricity and at the same time it will become a reliable technological base for creation of other businesses (such as SME for community services), and

businesses for economic activities in the community, region, and the country at large (SME for production). But her/his role doesn't end there. EA has also a task to support growth in number of jobs in the island community and manage and control SMIC project so that the ratio between the subsidies for building energy mix and their operation profitability is proportional and the route toward the SMIC profitability and self-financing is transparent and feasible.

### Enterprise Architect (EA)



Organization Modeling (OM), Process Modeling (PM), Business Motivation Modeling (BMM)

- To Shift an Enterprise from Vision to Mission
- To Build Portfolio of Enterprises in a Community
- To Assist Community's Competitiveness from a Close Market Environment

These objectives will be supported by initiation and support of implementation of other SME which will be generating job opportunities in the community, for example in water supply, agricultural production, processing and sale of agricultural product outside of the community, making other product for sale, etc. But even here the EA's role doesn't end. Her/his task is to look at the administrative system of the community as it is an enterprise and to that sense EA will also play a role of an advisor to community representatives, regional and country administration where the community belongs to.

Such methodology and tools will allow EA to generate – at strategic level – a KPI for individual projects as well as for the SMIC functions in cooperation with representatives of the community. EA should be ready to react to inputs concerning protection of communal property and lives of individual citizens also as it relates to governmental agencies of the countries which provide the assistance and representatives of a country which is its recipient.

Another system role of the EA falls into this area and it relates to initiation of a system of generating and receiving directives within the community which will in legislative manner provide the tools for the functions which are being envisioned and which will make the process transparent. EA also prepares a document considering future, additional investments in the community and will substantiate why they are justifiable, useful, effective and sustainable. We recommend that island communities are introduced to the EA's role using pilot projects. We believe that specific ideas what a given community really needs in order to be ready to build and operate SMIC, will be modified directly on the ground. At this point, any generalization or general recommendations might be counterproductive.

We believe that the island community will get in an EA the support for its start up and for its

further development. It is clear that an EA (as an individual as well as an organization) can in her/his role succeed only with a support of a Help Desk type, though the island community will get all necessary support. Such Help Desk should – at least in initial phases of building SMIC – be approached as a suitably structured foreign assistance directly linked to financial resources of the EDF. We recommend that the CDE assumes this role.

## B. Enterprise Engineering for SMIC in the ACP countries

It is not easy to build and operate a micro enterprise especially for someone who is just starting with business activities. This is true concerning application and adherence to the basic business rules and their links to international standards. Being able to follow best practices of businesses and organizations which do very well is for a person in an island community essentially impossible. Integration of processes within the contemporary, successful organizations is for such person impenetrable.

When such person starts to be able to orient himself in organizational arrangement and how the basic processes are arranged he very quickly realizes that he is still just scratching the surface and that he cannot expect for himself gaining a substantial added value. A fast progress in ICT doesn't solve this gap, it makes it larger. Therefore, if we want to talk about poorer areas in the ACP countries, we must also outline the ways how to deal with this situation. Concerning development activities in the areas where a help with food, healthcare, and illiteracy is needed we recommend to consider and to demonstrate feasibility of combination of the following two operations:

- 1) a quick entry of a new technology into the community (with shock impact of being personally responsible for paying for the electricity), and
- 2) a permanent care for impacts caused by the changes (acceptance of responsibility for sustainable supply of electric power in the community).

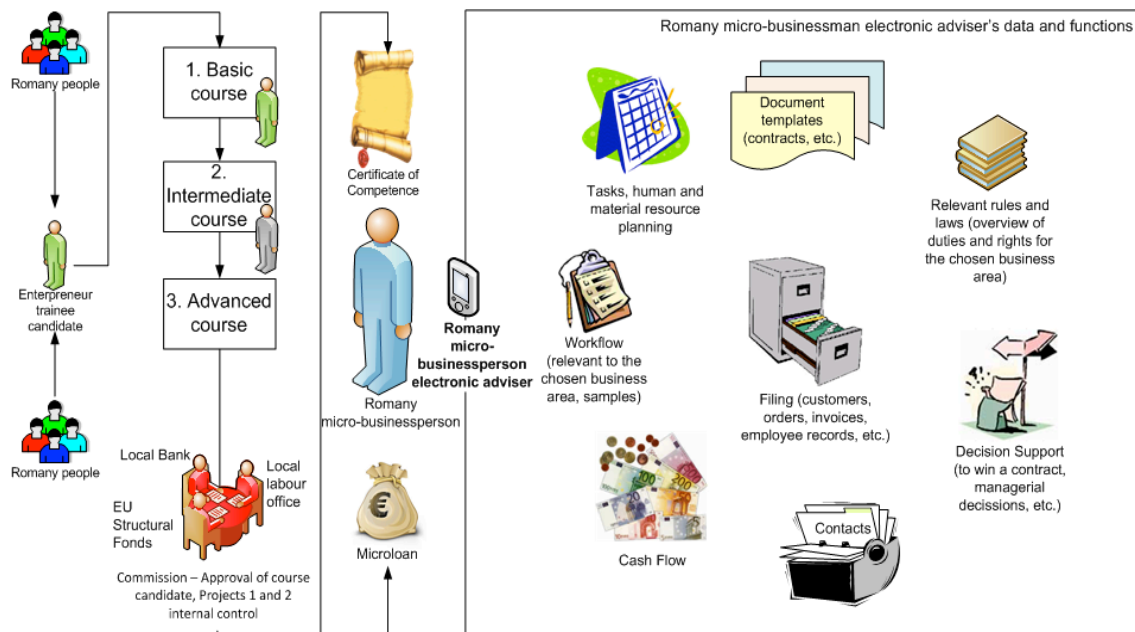
For the MPP it means that there is a transfer of the skills to the local population so that it is able to take care for the sustainability and newly gained added value – having electric power in their community. In order for the RET to function, even when delivered to the community in a form of work packages, must be delivered as a micro or small enterprise, including the know-how as how to manage it, control it and audit it. Like others, we see foreign assistance not as a gift or a sale of goods, but as a process where critical supplement is transfer of the Enterprise know-how. That means, in these cases, transfer of basic skills such as SM<sub>2</sub>E. This is not a new vision, nonetheless getting from the vision to mission accomplished is not easy. It will be, for sure, necessary to verify how far apart are the knowledge and the skills related to transfer of best practices between those who offer foreign aid and those who are accepting it. Let me use an example from the Czech Republic:

*The need to bring to the labor market part of Roma citizens who live in the Czech Republic. But for jobs characteristics for SM<sub>2</sub>E skills they don't have the necessary education and qualifications. Therefore it is necessary to consider and pay attention to specifics of perception of regular, repeated operations and team cooperation which are typical for successful SM<sub>2</sub>E.*

*We are starting a project co-financed from EU funds, a pilot application where we will, on the ground and through face-to-face interviews describe work processes as they are perceived by a Roma entrepreneur and then we will transfer this information, using an IT specialist, into a standard workflow charts. We want to create a definition of an interface for entry of a future entrepreneur into a real world with the logic and tools which are characteristic for the work of an IT specialist. The result will be a customized IT support for decision making processes concerning responsibilities of a future entrepreneur in selected (pilot) business activities. For example, it will be a micro enterprise do repair or upgrade pavement of sidewalks or digging*



*ditches for cables, a micro enterprise aimed at providing beauty salon services.*



These are very rudimental, basic business activities (especially when one looks at them from the IT supports' standpoint); nonetheless from the micro enterprise view this is an important milestone. Managers of today's sophisticated SME forgot those beginnings long time ago, despite that, their predecessors, must have gone through those same milestones as well. Therefore we think that the approach through the SME support – for example in the above-mentioned form in a foreign aid – is the right approach.

What we mean by that is a support for individual SMEs, including respect for the will of the owner or an operator of the given micro or small business, as well as a support for an entire portfolio of SMEs. The qualifications necessary to present such a vision should be, above all, possessed by the EA, who, together with Enterprise Engineer (EE) can bring the vision into the mission and initiate that way a foreign aid for the project. Financial Engineer should get involved then.

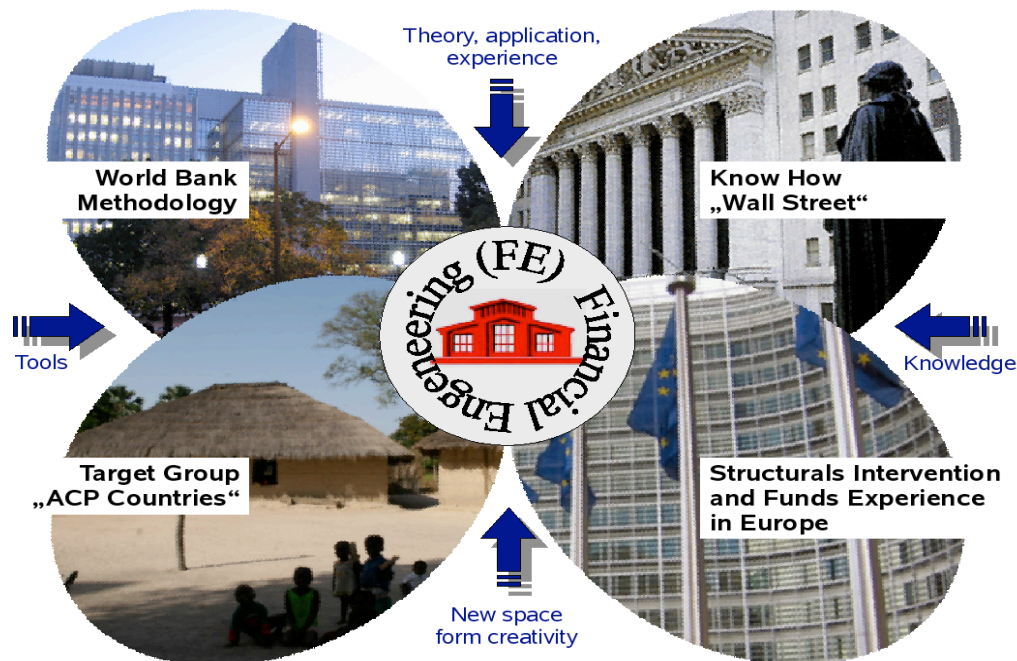
### C. Financial Engineering for SMIC in the ACP countries

Financial Engineering is a well known discipline. Despite that, from the MPP point of view and for the end users, i.e. the ACP countries, not always easily transparent. This discipline shows obvious signs of a dynamic development of the current world. Although the financial operations „on the Wall Street“ are certainly different than operations financing a micro business in an ACP country, failures and successes of financial engineers have something in common. They are either bad or good management controls or internal audit.

When internal financial controls and internal audit missing are or when they don't perform their functions, the results are the same, i.e. the budget, public or private, shows a loss. Only the impacts, measured in the size of a financial loss, are vastly different. But as far as loss of credibility and individual failure it in some way doesn't matter if the outcome are milliards or just hundreds of Euros, it is always a failure of professionalism of people responsible for financial operations entrusted to them.

*According to Wikipedia, the Financial Engineering is currently defined as computational or reinsurance financial skills. Computational finance is a cross-disciplinary field which relies on computational intelligence, mathematical finance, numerical method, computer simulation to*

make trading, hedging and investment decision, as well as facilitating the risk management of those decisions. Utilizing various methods, practitioners of computational finance aim to precisely determine the financial risk that certain financial instruments create. Computational finance was traditionally populated by PhDs in finance, physics and mathematics.



In recent years, advanced computational methods, such as neural network and evolutionary computation have opened new doors in computational finance. Financial Reinsurance (or *fin re*), is a form of reinsurance which is focused more on capital management than on risk transfer. In the non-life segment of the insurance industry this class of transactions is often referred to as finite reinsurance.

Any case the FE is a multidisciplinary field involving financial theory, the methods of engineering, the tools of mathematics and the practice of programming. This is a definition of the Columbia University. Other university, Cornell University, presents the FE as knowledge to design, analyze, and construct financial contracts to meet the needs of enterprises.

Generally, we can say that the FE is a process where quantitative methods are used to design financial transactions of an organization or an enterprise in order to maximize their effectiveness, efficiency and economy (simply said - competitiveness).

To sum it up, today a sufficient numbers of examples of good practices exist, we have quality, internationally recognized standards and – despite of that – for the MPP needs and for the ACP countries it one might not say that the necessary know how in FE services exists. Therefore we recommend that the CDE, together with the EDF, address – in sufficient depth - the need for having a definition and explanation of the FE expertise for the ACP countries.

What we mean here, above all, is preparing a document (standards, directives, rules, etc.) which might be useful for setting up and maintaining sustainability of SM<sub>2</sub>E in countries and regions which need services of both European institutions. An example might be micro loans for startup or expanding SME in island communities.

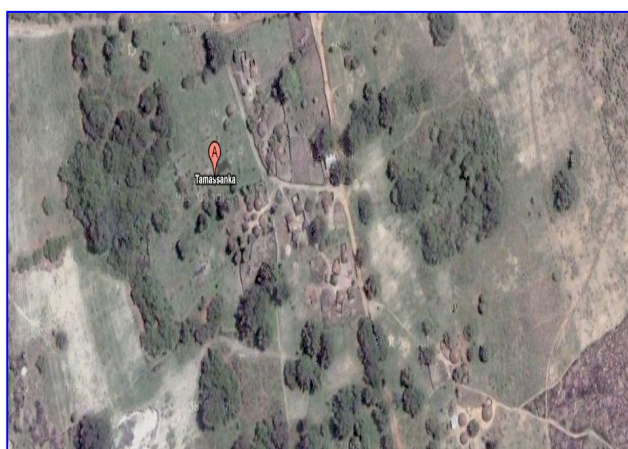
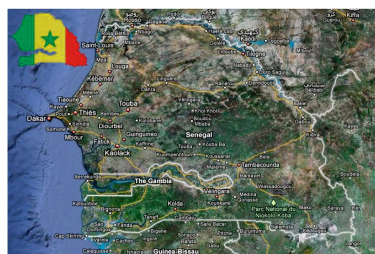
## 5. Examples of activities for Africa, already started

After the conference on “Technologies for sustainable energy sources in developing countries”. Which took place during the Czech EU Presidency in Prague, on 18th May 2009; the EMCi sent a letter to CDE with an offer, discussed at the confereee with their representative, for cooperation on a pilot activity in Senegal. The offer has the following main points:

1. The EMCi is ready to prepare a Master Plan (MP) for a pilot project in Senegal.
2. Prior to preparing the MP a preparatory visit of selected Senegalese entrepreneurs into the Czech Republic will take place.

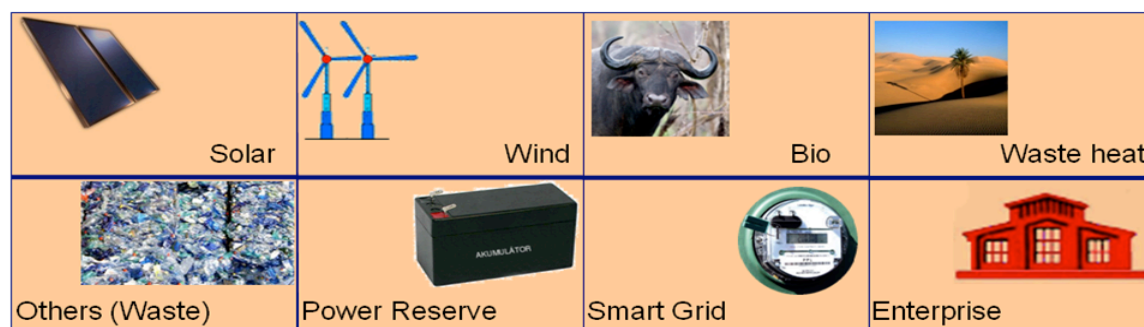
The entrepreneurs will visit Czech companies in the RET sector; data and information for preparing a MP will be gathered. In a conjunction to that offer to the CDE we prepared this presentation and sent it to the CDE and present it today here. The presentation has separate sections with the following content:

Master Planning Process:



Master Plan Techniques

Small and Medium Enterprise Energy Portfolio (SMEEP) - RET opportunities for

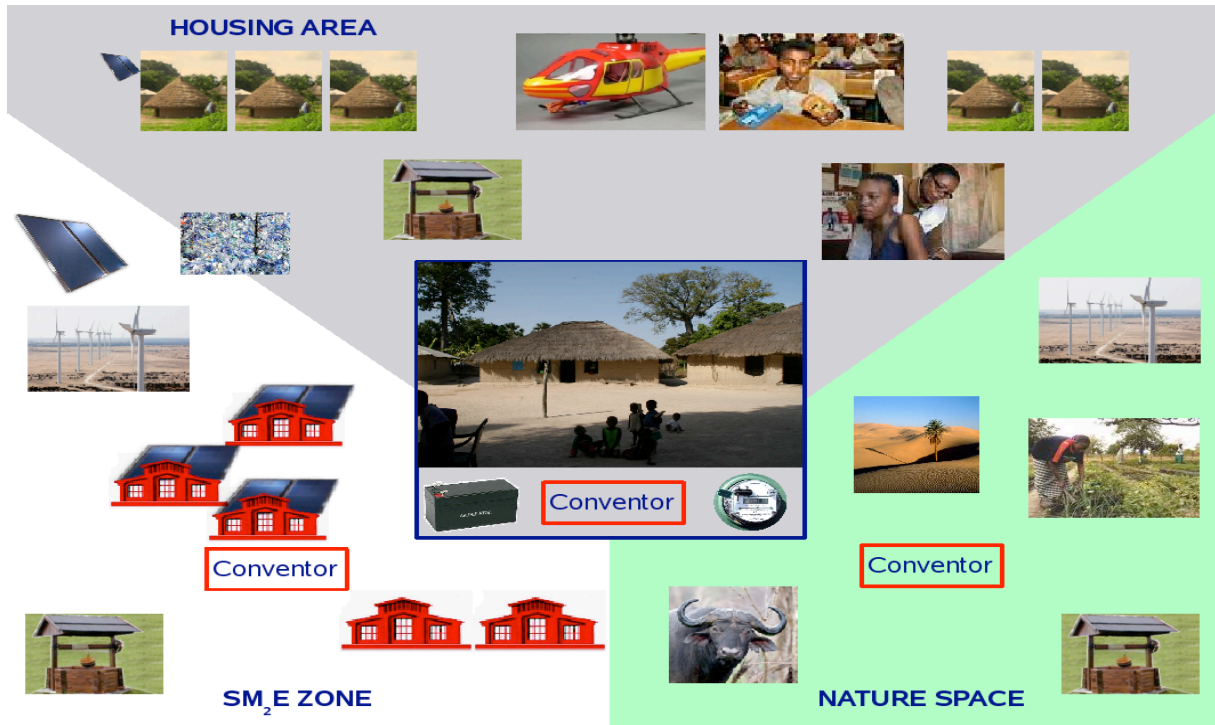


SME production in the Small and Medium Community (SMIC) MIC and Services in SMIC



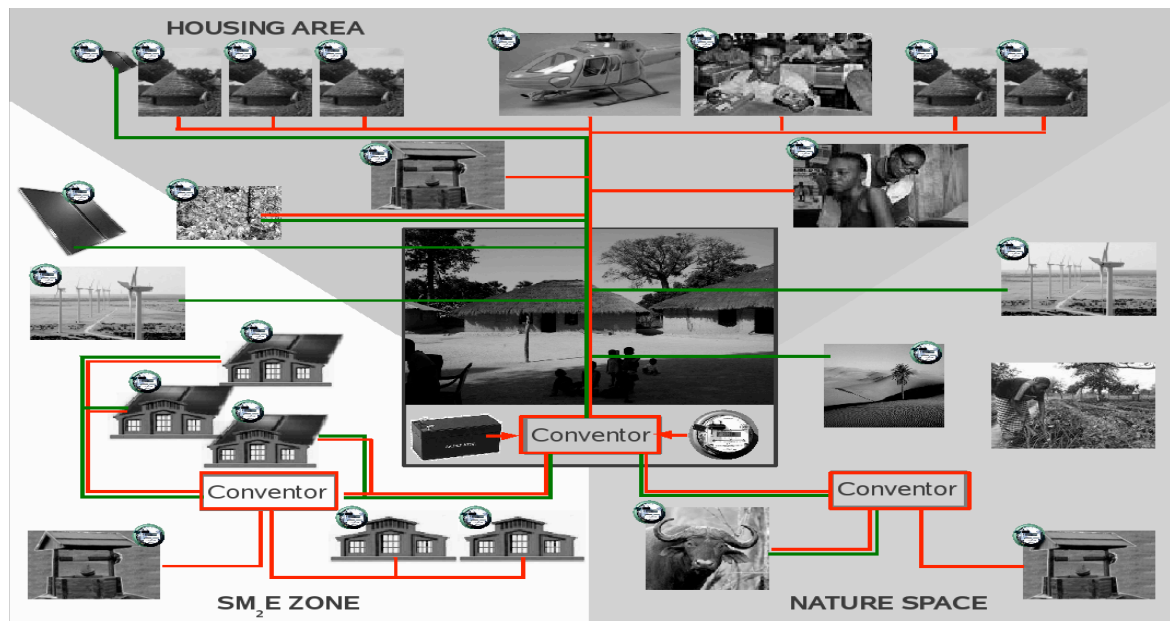


(EA/C) Role of Enterprise Architect and selection of an Island Community (C<sub>x</sub>)



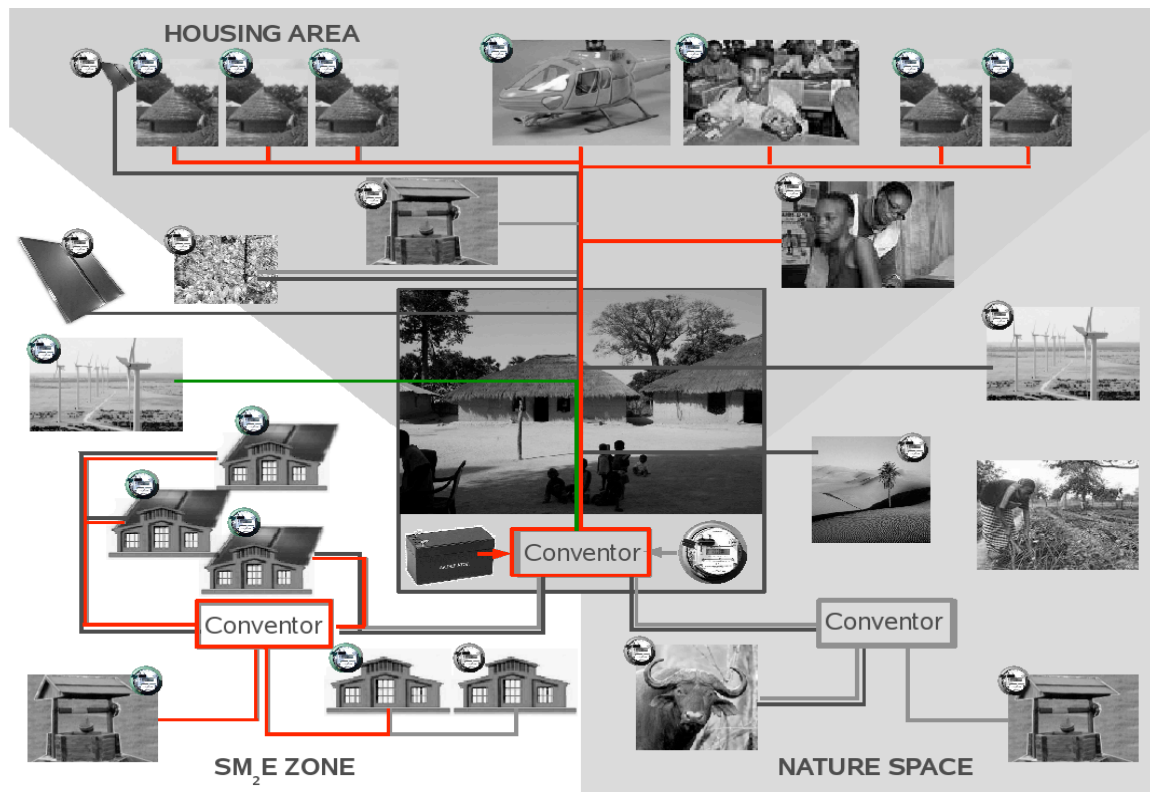
The first phase includes selection of a suitable location, description of the location and lives of people living there as well as the climate, weather, access to water, soil quality, and other information necessary for starting work on the MP. Prior to MP a feasibility study is prepared as a document used for a decision concerning the form, extent and allocation of foreign aid, together with positions and conditions set forth by the recipient country, such as that the MP of the community is in agreement with the administrative system and economic development of the region and the country, etc.

(EA/EE) Role of Enterprise Architect and Enterprise Engineer in selected Island Community





**(EE/EA) Role of Enterprise Engineer and Enterprise Architect in implementation of the SIPP.**



In the second phase, EA part of the MP is prepared. It includes definition and subsequent negotiations concerning the consensus within the community related to the functions and procedures in implementation of the SMIC. Organizational chart, description of processes and explanation of motivation to accept the electricity by the community.

At the same time, the MP describes the preconditions necessary for maintaining sustainability of the SM<sub>2</sub>E in the SMIC and requirements for modernization and establishment of the SM<sub>2</sub>E on the territory of the island community. The MP represents a comprehensive business model of the future state in the community and its surrounding.

In the third phase, the SIPP is being designed and subsequently implemented. Project documentation for SM<sub>2</sub>E is generated and SM<sub>2</sub>E are built, including the energy mix and smart grid. Facilities to implement functions concerning job creation, food, health, and education are being brought into operation. The SM<sub>2</sub>E portfolio in the island community has the knowhow available for regulation of the necessary details in management. Controls, and audit and assurance of safety in individual SM<sub>2</sub>Es within the entire territory of the community.

In the fourth phase, the community administers, manages, regulates all aspects of the operation, and performs owner's controlling functions, audits of all SM<sub>2</sub>Es, which were based on the MP and the SIPP brought into operation. The criteria of success is availability of electric power throughout the community (SMIC function) and existence of sources of income within the community, thus the ability to maintain it or even make further developments. A consensus concerning these goals is maintained and work on the MP continues, reflecting the changing needs of the community, always applying fine-tuned criteria of costs versus benefits and risk assessments of further development.

## Conclusion

It is an honor to participate in the program of foreign aid to help the ACP countries. We are glad that we have the opportunity to make this presentation at your CDENET Annual Meeting and share with you our proposal and a call on to the CDE and the EDF as well as other organizers and donors in foreign assistance and we invite you to join us in a work on the MPP for the ACP countries as we have just presented it to you. At the same time, we thank for the opportunity to address the representatives of the individual ACP countries outlining to them our understanding of the MP for the specific applications of development aid and to explain our approach to the SMEEP and the SIPP, i.e. the projects which are build on an introduction and sustainability of electric power supply in these island communities.

### **What points we have tried to make:**

Our understanding of the Master Planning Process (MPP) for the ACP countries and our approach to the MP for a specific Small and Medium Island Communities (SMIC). We tried to explain how we see the SMART Island Power Project (AIPP) and its impact on knowledge base of new entrepreneurs in a given island community. We see an introduction of electric power in a community as the main, target objective of a MPP and, therefore, also as the main target function of individual MPs, regardless in which ACP country they might be. SIPP is a project activity focused on building up a portfolio of power-generating businesses in a given location.

### **The added value we are bringing in:**

In understanding and acceptance of an Enterprise Architect's (EA) role in a MPP and MP and in understanding and acceptance of an Enterprise Engineering (EE) in preparation and implementation of an SIPP under specific circumstances and conditions of a given community. Financial Engineering is a specific segment of our approach to development assistance to the ACP countries. We have presented for a discussion the EA and EE tools and what mostly keep in mind is a timely introduction of internal control systems and objectives of internal audit into preparatory, project and operational activities.

We are optimists and we have the reasons to feel so. An example among them is our own experience over the past 50 years of practicing engineering and people we had the privilege to meet and to work with. For example, at the Prague's conference titled "Technologies for sustainable energy sources in developing countries" which was a part of the agenda of the Czech Presidency at the EU Council or here, at your Network Annual Meeting. Other examples are virtual meetings via internet, including sites such as [www.afrigadget.com](http://www.afrigadget.com). That one presents, under the title "Solving everyday problems with African ingenuity", documents the optimism on the side of the recipients of developmental assistance and their own creative and innovative ways to improve life in the communities where they live and work.

We are fully aware of the fact that we are not the pioneers of new ideas as far as their originality is concerned but we know that we are ready to help in this area and to do so to the full extent of capacity of Czech companies, where the EMCi is one of them. We wish everyone who already do and implement what we have been here talking about. We wish the full success to the Solomon Islands in their mission as they have opened their first renewable energy demonstration centre this past August.