# Catalytic procurement of energy services for rural businesses

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## Summary

*This paper presents the concept of catalytic procurement and its possibilities for small and scattered users of energy. It reviews the TREESPA project, funded through the EU-Intelligent Energy COOPENER programme 2006-2009[1], also looking back upon Swedish and international experiences with catalytic procurement. The objective of the TREESPA was to improve access to modern energy services for rural businesses in Tanzania through developing a variant of catalytic procurement schemes. The project launched three pilot schemes in Tanzania centring on efficient use of energy in rural businesses. The TREESPA project experiences have been assessed and feeds into recommendations for future concept development. The concept is relevant to most parts of sub-Saharan Africa and for e.g. the agricultural business and trade that often lacks solutions for processing, storage, preservation and transportation.*

*The need for private sector investments in the power supply sector in sub-Saharan Africa is grand and off-grid supply as well as mini-grids will have to be part of the solution alongside with grid expansion. Being a private investor in rural energy systems in these countries involves risks of different kind. The customers' actual ability and willingness to pay is one central factor conditioning the projected cash in-flow and financial viability of the investment. To understand the demand, now and for the relevant time span of the investment - and to provide tailored energy services meeting this demand - is therefore a way towards sustainability.*

*The TREESPA project sought to develop strategies in Tanzania enabling rural businesses to make the best use of energy infrastructure investments and thus help develop the local economy. Finding the best available energy efficient technologies for some crucial end-use appliances was one major objective. Designing schemes for the broad accessibility of the same another.*

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[1] The project was co-funded by the Swedish Energy Agency

*The method centres on catalytic procurement schemes whereby the many scattered end-users get support from a catalyser to form an organised and well-articulated buyer of energy services; thus getting the services they need and at a good price. The support in the Tanzanian pilot case was channelled through SIDO (Small Industrial Development Organisation), TANESCO supplemented by other organisations in a board. Lead contractor and management organisation in the contract with the EU was ÅF, a Swedish independent consultant.*

*TREESPA managed put energy efficiency on the SME's agenda and helped develop cooperation between SIDO and the energy sector whereby the development goals of Tanzania can be successfully channelled down to small rural businesses.*

*There is clearly a demand in rural areas for good quality equipment and the potential is grand for Tanzania to further develop catalytic procurements and labelling of energy efficient products.*

*For future successful catalytic procurement schemes in sub-Saharan Africa, it is advised to broadly promote the concept in order to create trust between partners, to consolidate common interests and retain personal relations within the foreseen schemes.*

*It is advised to give time to the process of selecting and specifying the required service.*

*It is advised to broaden into off-grid system solutions for providing the needed energy services.*

*It is advised to appoint a private and independent actor to lead the catalytic procurement process.*

*It is central for a successful catalytic procurement that financing is secured upfront the scheme is launched.*

# 1 Universal access to electricity in sub-Saharan Africa

## 1.1 Goals

Global development goals are converging towards universal access to electricity as a prerequisite for sustainable development. The UN has expressed goals for universal access to power before 2030[2] as one of 17 Sustainable Development Goals in the Post 2015 Sustainable Development Agenda and the US administration through president Obama has set goals in the Power Africa initiative to provide electricity connections to at least 60 million people in Africa[3]. National policies reflect these ambitions and mostly set comparable goals and timelines.

For sub-Saharan Africa, the World Bank estimates that about 28 million USD per year will be needed to reach these goals, which is about six times the amount that is currently invested annually[4]. The most realistic sourcing of additional funds is from private capital through private investors. Attracting these investors will be a challenge that requires nations to prepare grounds for such viable projects, including providing reasonable legal and market conditions for investors as well as identifying potential projects. One way of attracting investors is to help predict and boost the demand through acting for the best benefit of foreseen customers as well as to support and motivate them to use electricity in smart ways.

It will be impossible to serve the entire population with grid extension projects in the next fifteen years and it will be required that mini-grid and individual small power systems are as well part of the solution. The International Energy Agency has estimated that about 44 % will be reached by grid expansion, 36 % by mini-grids and 20 % by individual off-grid solutions[5].

## 1.2 Viability challenges for investors in energy supply

Rural electrification schemes over the last decades have a few characteristics that can be more or less generalised for all developing countries of today. One is that they are hardly ever financially viable, but will require funds from outside for their realisation. A major underlying reason to this is that load development is often slower than anticipated and

[2] SDG Goal no 7: Affordable and clean energy. UN, Sustainable Energy for All (SE4All) www.SE4All.org
[3] Power Africa annual report 2015
[4] Africa's Power Infrastructure – Investment, Integration, Efficiency (Eberhard et al.), 2011
[5] African Energy Outlook, OECD/IEA 2014

that dominating energy use devices are lighting, radios, TV's and (more recently) chargers, rather than directly income bringing devices. In newly electrified areas, lighting is typically the predominant load. Lighting can be as much as 80% of the load in such systems[6.]

While the increased standard of living is as well an aim, it is often anticipated when launching the scheme, that electricity will be used for productive activities, in agricultural or other sectors.

Most countries that have realised rural electrification projects have learned that common constraints for load development are:

- High costs for connection and house wiring
- High energy prices
- Inadequate technical knowledge on how to:
    - Make constructive use of access to electricity
    - Maintain the system

In many countries, it has been realised that proper load management is imperative for the longevity of the implemented system. Often the real challenge is to motivate consumers to take advantage of electric supply for other loads than household lighting.

Both from the grid extension point of view and for investors in off-grid solutions, paying customers are crucial for system viability. Energy investments in rural areas are based upon assumptions regarding prevalent and future loads, where connections of large and medium sized loads for wealth-creating activities play an essential role in the financial viability of the investment. However, many times, there is a high economic risk for the individual power customer to invest in new technologies, and a major share of the potential loads does not connect as expected.

There are many reasons behind this. Poverty and lack of investment capacity is one. Another is insufficient supply of technologies for small industrial development, such as tools, motors, etc. in particular inadequate after sales services. Furthermore, where the national grid is founded on hydro-power generation, many customers have negative experiences of power rationing and have developed mistrust in electric supply. Hence stand-alone diesel generator sets usually persist for many years after electrification, although running them is expensive.

[6] Local management of power supply, SEI, 1999

## 1.3 Demand side management and energy efficiency

Electricity suppliers would be better off if loads were stable over time, i.e. without peaks, and if electricity losses were nil, so as to achieve the maximum utilisation of their investment in supply. The cash in-flow would then be maximised and what is more; it would be predictable. That is why it is so important for suppliers to be involved in demand side management activities, aiming at maximizing the plant utilisation factors and the thereto linked in-coming cash flow. In isolated systems, demand side management is even more important. The generating capacity must be utilised as efficiently as possible. A high system load factor is paramount. Especially if the generation is from renewable energy technologies, where the investment costs normally are very high and fuel costs negligible.

The number of customers that can be served and their perceived value of the service will be important for the supplier's income from revenues. In sub-Saharan Africa where generating capacity is generally scarce, energy efficiency is paramount for increasing the customer value.

Energy-efficiency investments are generally cost-effective, which is concluded by for example the UN Advisory Group on Energy and Climate Change (AGECC) and many others. However, AGECC continues the reasoning; costs of energy-efficiency are typically mostly front-loaded, with the benefits accruing over time. In practice, low-income countries often have access to limited and expensive capital, which they prefer to invest in the cheapest (first-cost) options available to attain their energy goals. This is also a challenge for many consumers – residential, commercial and industrial – who look for investments with quick payback periods of typically 2-3 years.[7]

Financial support in terms of innovative financial structuring such as concessional loan finance, loan guarantees and other financial instruments, supplemented by other market mechanisms, helps to address the risks and barriers, and leverages private capital. Support should aim at scaling up financial instruments that mitigate the risk of commercial lending for energy access and energy efficiency, and therefore leverage increased private sector participation over time.[8]

## 1.4 Energy services as a means to centre on demand

The concept of energy services highlights that access to electricity alone will not make much difference from a development point of view. It is

[7] Energy for a sustainable future, pg. 11; Advisory Group on Energy and Climate Change (AGECC), UN in New York, 2010
[8] Ibid.

when electricity is used for broadly needed services that it is such an important asset in development.

This more complex view point, also waters down the grid as being the ultimate solution in the short and medium term perspective. While the electric- and ideally regionally integrated power grid is a very important solution for all developing nations it is also a significant investment.

Alternative electricity supply solutions may as well suffice, also if they do not provide three-phase, high voltage power. Lower voltages and single phase is enough for a broad range of appliances. The electricity demand as it seems from the supply side can be misleading and scrutinizing national statistics will reveal that more energy-efficient appliances can often perfectly well fulfil the demand. Only, such equipment is perhaps not available to the same extent and also it is typically more expensive. In combination with renewable energy solutions, which require the bulk of costs in initial investments rather than fuel costs, these clean and efficient solutions may not seem so attractive for a poor customer, even if they can be claimed to be a better and more sustainable option that is also cheaper in the long run.

For example, with new and more efficient lamp types, demand can result in a significantly much lower electricity demand for the same light output. LED-lamps for example provide the same quantity of light with only 20% (or less) of the energy compared to incandescent bulbs. This way, of course, groups of power customers can reach at much lower demands for electricity for lighting, whereas the demand for lighting may in effect increase.

Here is a key to understanding the energy service concept; people want lighting (or cooling, heating, pumping or other demands) and do not specifically specify how much electricity the lighting device must consume. If a supplier can provide the same quantity and quality lighting at a lower cost the demand would most probably increase. Most customers would not make a difference between if it is because the supplier has optimized the lamp itself or if it is because it is using very cheap energy. The new and more energy efficient solution will leave a margin for investing in further demanded services.

In traditional energy systems however, customers are not provided the complete service, but the lamp and the electricity in two separate deals, from separate suppliers. This way, most customers must select a lamp that they can afford and the energy that is available and required. An alternative to the traditional offering could be an energy service with a combined deal, such as for examples a photovoltaic solar panel system with LED lights.

Similarly, there can be alternative solutions that meet other demands such as for example drying, cutting, graining, pressing, packaging and cooling.

# 2 Catalytic procurement; a methodological introduction

A catalytic procurement scheme is a complete tendering process, with the purpose to support and speed up the development and market introduction of a new technology or service. The aim of catalytic procurement is to get new products, systems, processes or services that satisfy the market demand better than those that are already available on the market. Catalytic procurement can therefore be regarded as an enhancement of the market forces, speeding up the development.

Catalytic procurement also leads to increased know-how, increased capability and attention around the demanded product or service. The process is broad and not very quick because it is nurturing demand and supply in parallel. Each single measure in a catalytic procurement process is more efficient as a link in a chain than as a separate activity and final results can be more sustainable.

The strength of catalytic procurements derives from the way a large number of potential customers consent around a common desire and form a group with an aggregated purchase volume. By doing so, the possibility to influence the suppliers increases. The suppliers on the other hand might for instance see the possibilities to reach new markets, get attention on their products and impact demand side management for better system viability.

Catalytic procurement have been implemented for instance by the Swedish Energy Agency and municipalities in Sweden[9], and by authorities and private energy companies organised in a collaboration organisation in USA[10]; and the IEA (International Energy Agency)[11].

The different components of a catalytic procurement can be illustrated as in Figure 1 below. From the stage when a common need is identified and a feasibility study launched it is reasonable to expect up to two years before the trial service is being disseminated on pilot scale.

[9] Examples of publications in English: NUTEK: Co-operative procurement – Market acceptance for innovative energy efficient technologies, B1996:3, Stockholm 1996 / NUTEK: Technology procurement – examples and specifications of requirements part 1 and 2, Stockholm 1994.
[10] Hollomon Brad, et al. Seven years since SERP: Successes and setbacks in technology procurement, aceee summer study 2002, Asilomar, USA.
[11] Examples: IEA: Creating markets for energy technologies. ISBN 92-64-09963-8 Paris, 2003. / IEA: Task 24, Solar procurement, Final management report, Westling Hans et al. 2003.

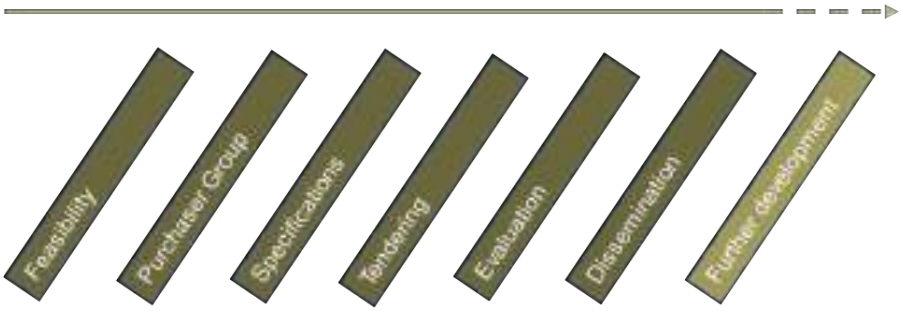


**Figure 1 Schematic illustration of the different components that can be included in a project plan for catalytic procurements (Reference:"Teknikupphandling som styrmedel-metodik och exempel", Swedish Energy Agency, March 30, 2004. Modified)**

## 2.1 Supporting the purchasers

The catalytic procurement process is concerned with providing meeting-places for purchasers and suppliers or manufacturers. The purchaser (or purchaser group) has the controlling role. A successful catalytic procurement project therefore almost always has its origin in a skilled purchaser group.

It is important to put as much effort as possible into bringing together purchasers looking to the future, i.e. those who, from the start, are aware that problems may be countered before the new service or product reaches the pilot, prototype or trials stage. A strong purchaser group provide trust and confidence for the manufacturers. However, the purchasers must also be thoroughly aware of their present problems, so that they can clearly identify their needs and express and specify their requirements. It has been found that this particular aspect is not always so easy in practice. This is because skilled specification drafters are not so frequent.

The purchasers will need to invite experts to understand current state of the art and realistic potential enhancements. However, the purpose of specifying requirements is to determine market needs and to express them in functional terms without being led astray by what seems to be possible using a particular technology. It is all too easy to get caught up in the limitations implied by present-day technology and by conventional design solutions. Just this - demonstrating openness in terms of accepting that there can be new ways of fulfilling specified requirements - is the key for successful catalytic procurement.

The purchaser group must also give sufficient time, and thought to more general quality requirements, such as assessments of the suppliers' abilities to achieve sufficient manufacturing capacity for previously unproven solutions. One central aspect apart from the initial investment is the

suppliers' ability to sustain services and perhaps to cope with future foreseen energy service demands.

## 2.2 How catalytic procurement can be useful for energy access in sub-Saharan Africa

Catalytic procurement is a method in process of refinement. The concept was originally employed by knowledgeable purchasers, turning to a limited number of suppliers. This method worked, and works, well for product development involving knowledgeable and clearly identified parties on the market. Technology procurement with the objective of improving energy efficiency has also been successfully employed numerous cases in Sweden and the USA for mass market products, and as an instrument for concentrating product development on features of products that are important for users. A possibility is joint international efforts aimed at encouraging greater competition and faster achievement of volumes for particular products, so that costs can be cut and product launches brought forward. In the energy sector, such schemes can concern for example electrical vehicles, energy efficient motors, or other broadly used products.

Besides catalytic procurement, it can be mentioned many other market development initiatives such as for example volume guarantees to ensure the suppliers' security of sales and different product labelling schemes to ensure the buyers' value for money, lowered environmental impact or positive social impact.

Catalytic procurement is appropriate when there are still not very strong purchasers and still somewhat un-precise demands, because the focus is on supporting and strengthening the demand side.

Catalytic procurement for energy services in rural areas of sub-Saharan Africa can be a strong concept for boosting new and innovative solutions including both business concepts and technical solutions that fulfil the requirements regarding sustainable energy for all. Challenges concern for example:

- Access to electricity in remote areas
- Back up supply solutions for periods of load shedding in the national grid
- Accessibility to products in remote areas
- After sales services (particularly in remote areas)
- Access to financing of individual purchases

Back up supply is also relevant because the service need is partly very similar to off-grid needs, only it is not a remote rural phenomenon and

often refers to electricity end-users of national importance. When seeking broad solutions for rural applications, it will of course be instrumental to include also the urban needs for the same or a similar service, thus strengthening the purchasers' case to some extent.

### 2.2.1 Supporting the aggregation and formalisation of demand

Demand in markets can be created by bringing together important customers and formalising and articulating their requirements. This can be done with or without the support of central bodies. Catalytic procurement links up the more influential customers by bringing them together in a purchaser group. The group then prepares a requirement specification, a request for proposals, and negotiates with the manufacturers, producing a coherent demand.

For developing countries and scattered customers in rural areas with already week infrastructure and sometimes limited access to information - if the process is to operate within reasonable time, there is often a need for support from some party that becomes involved in the work as a catalyst, with no commercial interest of its own. The catalyst or agent will as well serve to safeguard monitoring of the implemented energy services and as such provides better security for financiers to be involved for example in results based funding arrangements.

Support must not be aimed at individual producers or suppliers, but at influencing the entire market. It is the suppliers' competitive abilities that are exploited to produce better services and more favourable prices. Therefore it is essential to express the demand rather than the solution. The catalyser supports the process by helping to specify requirements, dealing with administration of the project and ensuring that the resulting products obtain a foothold on the market. Purchasers' interest in better products must be gathered together in order to attract the interest of the suppliers. The catalyser supports by communicating with and inviting the purchaser, to enable him/her to influence the supplier.

### 2.2.2 Supporting the investment

Financing support can be required for the initial moves in the new market segment. Both pioneering customers and pioneering suppliers will have taken risks by being involved in the process of a new concept. In order to overcome the threshold of concept-development a financial support may be motivated. This financial support can be in the form of a zero series or in the form of subsides to certain customers or products. In the optimal case and perfect match of demand and supply it is indifferent whether the support is given to the customer when buying the service or to the supplier when supplying the service.

The suppliers are not paid for developing new solutions; and normally they utilise and develop their own knowledge and facilities. Instead they are supported when they can show results. Many manufacturers are willing to develop new and better products, and have comprehensive knowledge of all aspects involved. However, they often need the right signals from the market that there is a large enough demand for the new products. They need the challenge and motivation to concentrate their development resources. Suppliers perform market surveys in order to identify interested customers. In turn, interested customers are often looking for better products, but it is not always that the two parties meet. The catalyser will indirectly support the suppliers since it will be putting forward a potential customer base.

In order to avoid market distortion, the financial support shall be limited to an initial risk taking bonus for the one or few supplier(s) that can provide the first scope of services as framed by the catalyser. Alternatively it can be designed to be a result based funding facility, supporting suppliers upon fulfilled service delivery, at implementation or over some years. The terms for support needs of course be settled before the procurement is launched and the design is part of the job for the catalyser.

### 2.2.3 Success factors and difficulties for catalytic procurement

Among the success factors can be mentioned joint interest and personal relations, which is why it is so important to look locally to find the strong and interested purchaser groups that can be committed and allocate time. Moreover, it is important that there is a reasonable profit margin for administration of the process, to cover for the facilitation of meetings, internal information sharing and at times experts' involvement.

A committed project leader is paramount for a catalytic procurement process, since much of the work is to manage a multi-party process with partners' mixed backgrounds and interests. One central matter is of course a good dialogue with the potential suppliers. It is important for the suppliers to sense that the requirements on products or services are reasonable.

Some of the common difficulties with catalytic procurement schemes are:

- Difficulties on the purchaser side:
    a. There may be a lack of common opinion among potential customers
    b. There may be a lack of interest from end-customers
    c. Acceptance for "new" solutions can be difficult to achieve
    d. Administrative problems can follow on organising many small customers into one uniform entity – a Purchaser Group

e. Verifying results can be difficult

- Difficulties on the suppliers' side:
    a. Technical solutions similar to what is needed are not identified – it can be difficult to know who the potential manufacturers can be
    b. Dominant suppliers can be difficult to push in the desired direction
- External factors that can bring along difficulties:
    a. Media interest can adventure the delicate process of having many manufacturers on board ventilating possibilities while concealing details
    b. Accepting foreign supply of products in the same niche that domestic manufacturers act can be delicate, especially if the process enjoys State support
    c. Legislative restrictions can hinder the concept of aggregated procurement

# 3 The TREESPA project; a case

Stemming from the unfulfilled demand of rural energy services in sub-Saharan Africa and with experiences from catalytic procurement processes in Europe and Sweden, a team of partners from Sweden and Tanzania launched a pilot project, TREESPA. The project was financed 2006 – 2009 within the frame of the Intelligent Energy Europe COOPENER programme. TREESPA stands for Tanzanian Renewable Energy and energy Efficiency project to sustain Poverty Alleviation[12].

## 3.1 *Objectives*

The project objective was to improve access to modern energy services for rural businesses in Tanzania whereby rural businesses can really make the best use of energy infrastructure investments and thus help develop the local economy. Finding the best available energy efficient technologies for some crucial end-use appliances was one major objective. Designing schemes for the broad accessibility of the same another.

Specific foreseen results from the TREESPA project included:

- Technical specifications for selected energy equipment
- Catalytic procurement of selected equipment
- Identified potentials for new businesses based on the specified latest technologies and best practice available for equipment
- Demonstration of organizational options and financial agreements for energy service purchases
- The project findings, material and results will be disseminated and communicated to other countries in sub-Saharan Africa

## *3.2 Implementation overview for the TREESPA project*

### 3.2.1 Mapping of partners and business sectors

In early 2007, an initial mapping study served at identifying important rural businesses and their modern energy service requirements. Much of the mapping was made through discussions with important organisation as advised by the Steering Committee[13], and through literature surveys.

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[12] TREESPA Final report, Monica Gullberg et.al.; **EIE/06/278/SI2.449255; TREESPA; Tanzania Renewable Energy and energy Efficiency project to Sustain Poverty Alleviation;** Intelligent Energy – Europe (IEE); COOPENER; Key action: 12

[13] Members of the TREESPA project Steering Committee: ÅF, Mrs Monica Gullberg (Chair); Rural Energy Agency (REA), Mr Lutengano Mwakahesya; Ministry of Energy and Minerals (MEM), Mr

During this phase of the project, the following fields of business were identified to be of key importance for the rural development in Tanzania:

- Agro processing
- Metal engineering
- Fish industry
- Leather industry
- Textile industry

This initial mapping also served to settle an umbrella organisation in Tanzania for the TREESPA pilot. It resulted in collaboration between the national power utility TANESCO and the Small scale Industrial Development Organisation (Sido), where Sido acted as the procuring agent on behalf of the purchaser groups to be. Following on this initial mapping, a process of selecting relevant schemes was commenced. As shall be presented in later sections of this paper, this process can be enhanced in coming initiatives, also in terms of actors involved. However, for the understanding of TREESPA proceedings, below is how the process developed.

### 3.2.2 Technology selection

In a second step, the above fields of business were further analysed and common processes within these fields of businesses were identified. These analyses indicated a substantial demand for cooling processes, packaging processes (mainly vacuum packaging), and drying processes within the agro processing sector, in addition to welding technology within metal engineering industries as well as sewing and looming processes within the textile and leather industries.

Lastly, relevant electrical equipment within these processes that have the potential to enhance the productivity and profitability within the identified businesses was identified. The identification of technology demands was based upon a dialogue with important stakeholders representing rural productivity sectors and small and medium sized enterprises in rural areas.

The outcome was a list of useful electrical equipment. In the first stage, there was no ranking made between the different equipment and the project only listed technologies based on rather broad functional descriptions. One

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Ngosi Mwihava; Tanzania Electricity Supply Organisation Ltd. (TANESCO), Mr William Mhando; *continued*: Small Industrial Development Organisation (SIDO), Mr Mike Laiser; Tanzania Chamber of Commerce and International Affairs (TCCIA), Mr Dan Machemba; Energy and Water Utilities Regulatory Authority (EWURA) Mr Anastas Mbawala; Confederation of Tanzanian Industries (CTI), Mr Geoffrey M. Makanja; Danish Energy Management (DEM), Mr Morten Søndergaard

of the sessions at the first project work shop in Stockholm was about summing up the work of SIDO and TANESCO on mapping and identifying potential technologies suitable for technology purchasing schemes. The discussion aimed at ranking the potential technologies based on selection criteria. The appropriate energy efficient electrical equipment technologies to be considered for procurement for the rural wealth creation were identified based on the following selection criteria:

- The technologies' probability to be accepted by the end-users
- The perceived strength of the potential aggregated procurement group
- The technologies' potential of actually making a difference in terms of energy efficiency and
- business development
- The possibility of reaching at distinct functional descriptions of the required products, and
- The possibility to set clear evaluation criteria for selecting the best available option.

The latter two selection criteria drives away from system solutions, i.e. mechanical applications with many parts, or performances that are heavily dependent on the mounting on site and usage, like processing or manufacturing equipment or place built, cooled storing rooms. The project further decided to commence with equipment that is compatible with grid connection, i.e. can be used in the national grid, in order not to bring too many parameters on board in the first procurement scheme. Although narrowing down the original scope, these simplifications were deemed necessary in order to not put the concept at risk through unsatisfactory procurement specifications and poor evaluation criteria.

The project launched three procurement schemes with the ambition to be of significant scale, such that at least 10% of the market can be supplied from the scheme. The technologies that were identified as appropriate for the pilot were:

- **Welding machines**; electrical arc welding in categories and eventually also in sub-categories.
- **Electrical motors**; single phase and three phase motors 2.0 to 25 kW. The actual sizes and the corresponding quantity requirement are detailed for the demonstration procurement, but other sizes might be requested during demonstrations. For the choice of capacity, considerations must be taken for the design of the electrical system in the respect of cable dimensions, and fluctuations of current

- **Lamps;** Solid State Lighting[14] (SSLs) in categories with variations of sizes (rating) and applications (luminaries). The rating will be in terms of Wattage and the application either pin or round type insert piston.

### 3.2.3 Feasibility studies

Feasibility studies where carried out based on generic and functional descriptions of the selected technologies and in five regions[15] in early 2008, almost one and a half year after project start. A selection of regions in different parts of Tanzania and with different characteristics was approached. The number of businesses were growing in all these areas if regarding the period from 2005 up to 2007.[16]

At the time for the feasibility study, there was a general idea about what products would be included in the TREESPA scheme, but the specifications where not yet official. The studies were performed partly in parallel to the purchaser group sessions and by other people with little actual involvement in the purchaser groups. However, it could have been better if the purchaser group had been more involved in this feasibility study than was the actual case for TREESPA. This experience points at one of the major challenges along with the added value of the catalytic procurement process – to involve the purchasers.

### 3.2.4 Purchaser groups

After the identification followed a process with a series of Purchaser Group (PG) meetings in which formulation of the technical specifications for the selected products was on the agenda. The aim was to settle what specific requirements the rural Tanzanian businesses do have for these products and what the best available options supplied on the market are.

Purchaser group sessions were arranged at three occasions for each the three products. The purchaser groups aimed to include the following type of invitees: members representing the market for the product as users and

[14] Solid-state lighting (SSL) refers to a type of lighting that uses semiconductor light-emitting diodes (LEDs), organic light-emitting diodes (OLED), or polymer light-emitting diodes (PLED) as sources of illumination rather than electrical filaments, plasma (used in arc lamps such as fluorescent lamps), or gas.

[15] The selected regions are: Mwanza, Kilimanjaro, Morogoro, Iringa, Lindi/Mtwara (Lindi and Mtwara are two regions that in 2009 had a common grid but isolated from the national grid).

[16] Business Survey Tanzania Mainland Report 2007, published by the National Bureau of Statistics, and the Ministry of Finance and Economic Affairs, in Dar es Salaam, in July, 2008.

owners and/or distributors and dealers; experts on standards; experts for technical specification and/or side technologies or branches including services and installations; experts on safety, health and environmental aspects; experts on criteria for the product produced; persons with experience of public relations and information; persons with experience of design; persons with good knowledge of the market and useful contacts on the market; persons with good knowledge of legislation both national as well as international; persons with experience of evaluation procedures and testing; delegate(s) from the tender board.

In retrospect, one lesson learnt is that the selection process and involvement of purchasers was not completely satisfactory; refer to the above reasoning in the paragraph about feasibility studies and also the coming paragraph about lessons learnt.

### 3.2.5 Procurement

The purchaser groups produced technical specifications including compulsory and non-compulsory conditions on products and services, after sales services etc. This work is of high quality and possible to reuse. The technical specifications were ambitious and based on advanced product development information from experts and international manufacturers.

Products were specified in terms of electrical features, among them the power factor as being central for efficiency. High expectation on performance and durability were requested. Moreover, it was requested that they fulfil current international standards.

In the tender documentation, it was further detailed other requirements on the equipment design, such as installation, health and safety, operation maintenance and repairs as well as form and design.

Furthermore, a number of requirements linked to the proper market introduction of the TREESPA product were made explicit and compulsory. These aim at finding the supplier who is prepared to seriously reach out to rural customer, also with after sales services. Alternatively, those who are prepared to co-operate with Tanzanian local organisations in this matter. It was also requested that products were labelled in order for the traceability and fulfilment of energy service agreements (as further elaborated in coming paragraphs). The requirements were:

Tenderers ***must*** describe how to introduce /*the product*/ in the potential market. The product ***must*** be labelled with the TREESPA label (refer to the description in Figure 2 below). Tenderers ***must*** indicate their preference in cooperation with local companies in outreach programmes such as financial schemes, warehouse for bulk products, new market development

programmes etc. Training to local distributors ***must*** be conducted which will be useful for the market expansion. The training must be described in the tender. Tenderers ***must*** describe how they are going to provide after sales services for /*the product*/.


**Figure 2 Description of TREESPA Label (logotype)**

Tendering was announced to a limited group of manufacturers. The reason for limiting the call was the limited amount of funds available for procurement up front. EU-project funding within the COOPENER projects could not entail procurement of equipment on large scale. For this reason, and because other financial supply could not be secured within reasonable time, Sido could only perform a simplified procurement. Results were not overwhelming. Incoming tenders were very few and did not fulfil requirements.

However, the project proceeded to purchase equipment that was near to meeting the requests so that these products could be further analysed and demonstrated to the potential buyers.

### 3.2.6 Energy service agreements

A useful energy service is a combination between energy, equipment and management support for income bringing usage of energy. In 2007, there was no particular organisation established in Tanzania that alone could provide such a complex service. The idea with TREESPA was to attract these service providers. As has been presented above, the pilot was confined to such services that could comply with the national grid, but that would not exclude other power supply options. In the course of its implementation, there was however no other variants of electric power supply involved than on-grid supply by TANESCO. As will be discussed in the future developments paragraph, it is strongly advised to proceed into also off-grid schemes as was the original idea.

Even if the power supplier could in principle provide equipment for rent or instalment payment, it is not feasible for TANESCO at date, since the amount of administration required is too demanding. Instead TANESCO developed services that support access to electricity for those who opt for

TREESPA equipment, i.e. equipment that fulfils the requirements that TANESCO has and that are energy efficient. There were two service schemes, both concerns the connection of electricity**.** Joining up with REA and SIDO, the three parties could together present four (or five) different variants on energy service agreements:

1. TANESCO, on REA's request, include energy efficient bulbs in their rural electrification schemes
2. SIDO provide hire and purchasing schemes for those who want to buy a TREESPA welding machine or motor
3. TANESCO provide support to those customers who wish to connect on instalment, and with a TREESPA product you will be given priority to this. (4) There are two kinds of financing, one via TANESCO, the other via an external bank
5. SIDO have designed a lamp retail scheme that can be launched only if there is seed money from some external source

Through the co-operation between SIDO and TANESCO, a rural business could opt for TREESPA energy efficient technologies and instalment schemes for both equipment and connection to the grid. For the majority of SMEs, this opportunity is a good affair that would develop into sustainable income bringing activities. Better if compared to generating own electricity, buying less energy efficient equipment, constructing own appliances with relatively poorer performance - or processing by hand.

### 3.2.7 Demonstration and testing at site

The real key to any viable business solution for energy service suppliers is the actual financial viability in selecting the new products and services. In TREESPA, efforts were made to demonstrate how new equipment could be beneficial for individual businesses.

**Figure 3 Senior technician Mrs Sabina Daati from TANESCO headquarters tests equipment in Kilosa.**

**Figure 4 Group of local entrepreneurs view demonstration of welding machine in Kilosa.**

#### *3.2.7.1 Welding machines*

The welding machine was actually tested once at a work shop in Dar es Salaam, and with SIDO staff doing the observations, while an experienced welder did the work. On site tests are carried out with one selected, local and skilled welder at each site.

Both in Dar es Salaam and at site the test was conducted so that two pieces of material were joined with a straight joint. The same person carried out the same work (same metal and electrode) but with two different machines. Current, absolute power and energy was measured and data logged with 60 seconds interval for up to ten minutes.

Demonstrations and laboratory testing of the TREESPA welding machine has given very convincing results. The traditional machines, although they are somewhat cheaper, tend to use about 15 % -25 % more energy. Sometimes even 60 % more energy. For further estimates regarding the energy saving potential, it was assumed that a traditional machine uses 20 % more energy than a TREESPA machine.

**Figure 5 Existing welding machine being tested on site in Kilosa**

**Figure 6 TREESPA welding machine being tested on site in Kilosa (ESAB THJ 140 arc welding machine)**

#### *3.2.7.2 Electrical motors*

Maize milling or sun-flower oil pressing are machines that commonly are run by 10 HP motors in rural areas. Tests at each the five sites were performed such that one such machine was run for up to 15 minutes using its original motor and then using the TREESPA motor.

For motors in Tanzania, the existing equipment is a mix of old but genuinely well performing motors and new sometimes less good. Testing existing motors and comparing them to what were sought for in the TREESPA procurement schemes was very important. There are old motors with good performance, and there are new with poor performance.

The field tests show examples of when the existing motor is just as efficient as the new TREESPA motor. On the other hand examples were also found when 80 % of the energy used by the existing motor could be saved by installing a TREESPA motor. Old motors can be re-winded locally, and it is not totally certain that the declared rated power out-put is still correct.

For estimates about energy savings from introducing the TREESPA motor in Tanzania, it was assumed that around 5% energy can normally be saved.

**Figure 7 Existing motor being tested in a maize mill in Kilosa.**

**Figure 8 The TREESPA motor being tested in a maize mill in Kilosa. (BEVI High energy efficient SEE motor)**

#### *3.2.7.3 Lamps*

Lamps were not tested or demonstrated in field, because the lamp type was still only at a prototype stage when demonstrations were due, and we did not know the price.

Instead, the technical features as given by the manufacturers were used for a comparison. The LED-lamp cuts energy used for lighting with 83 % if compared to an incandescent bulb, and around 13 % if compared with a CFL. For the estimates made on energy saving for individuals and at national level, 75 % energy saving have been assumed.

**Figure 9 Traditional incandescent bulb**

**Figure 10 PHILIPS MASTER LED-bulb Glow A60**

### 3.2.8 Financial viability

Financial support for investing in energy efficient products is highly requested among the approached entrepreneurs. It is therefore interesting to estimate the full life cycle cost for different options so that both the entrepreneur and the lending organisation can calculate their financial risks.

Bank loans are generally difficult to get at low rate in Tanzania. The hire and purchaser scheme that SIDO could offer in 2009 had high rate as well, 22 %. Based on test results, comparative cost calculations were made. Parameters are applied as presented in Table 1.

**Table 1 Parameters for cost comparisons**

| Parameter | Welding machine | Motor | Lamps, 5 pieces |
|---|---|---|---|
| Rate of return | **22 %** | **22 %** | **22 %** |
| Loan pay pack period, years | **2 years** | **3 years** | **3 months** |
| Price per kWh, Tanzanian shilling (Tshs) | **120** | **120** | **120** |
| Hours per month | **120** | **120** | **150** |
| | | | |
| **Traditional option** | | | |
| Life time | **5 years** | **10 years** | **1 000 hours** |
| Investment cost, Tanzanian shilling (Tshs) | **400,000** | **400,000** | **2,000** |
| Rated output | - | 7.5 kW | 200 Watt |
| Overall efficiency | **0.59** | **0.79** | - |
| | | | |
| **TREESPA option** | | | |
| Life time | **10 years** | **25 years** | **25 000 hours** |
| Investment cost | 650 000 | 1 500 000 | 50 000[17] |
| Rated output | - | **7.5 kW** | **35 Watt** |
| Overall efficiency | 0.72 | 0.91 | - |

The TREESPA welding machine is financially feasible even with the relatively high rate, and a loan pay-back period of two years. For a business, that can contribute more than 30 % of capital cost and thus reducing the loan further, the TREESPA welding machine can be repaid within less than a year and from that point in time monthly expenditures will be lowered. On full life cycle basis, the costs will be cut with around 12 % - 15 % with the TREESPA welding machine and the SIDO hire and purchaser scheme, refer also to Figure 11.

The TREESPA motor can be financially viable for some but not for all given the characteristics of existing motors in the country, the present BEVI SEE motor, and the high rate of return. Some of the motors sold in Tanzania at low price (only 25 % of the BEVI SEE motor) declare similar overall energy efficiency as the standard BEVI Sg/Sh motor, but they are assumed to have shorter life time. However, the financial viability of the TREESPA motor has to be assessed further. Should the cheap motor have an overall efficiency below 0.79, the TREESPA motor would be financially viable under the given circumstances, refer also to Figure 12. If better loans can be found, a motor with lower overall efficiency would be sufficient.

Testing existing motors around the country and comparing them to what has been specified in the TREESPA procurement schemes is very

[17] This is the price at the prototype stage, about USD 50.

important. There are old motors with good performance, and there are new with poor performance.

In TREESPA we sought motors, both single phase and three phase that can perform well, are durable, and energy efficient. It is rare to find single phase motors on the market with output capacity above 5 HP, and their energy efficiency is then normally not the best. The TREESPA motor that we could demonstrate cut energy costs with around 5 % only compared to most existing motors. It is not negligible, especially not in the national point of view, but even more efficient or cheaper high-energy efficient motors are needed in order to be able to reach out broadly as long as the interest rates are as high as they are.

The TREESPA lamp is as well financially viable for the end-user over a period of up to ten or even fifteen years under the given conditions. The cost is cut with around 40 %. For the lamp, however, the hire and purchaser scheme was not applicable in 2009. Should someone choose to buy the TREESPA lamp without borrowing money, it would certainly be financially viable, refer also to Figure 13.

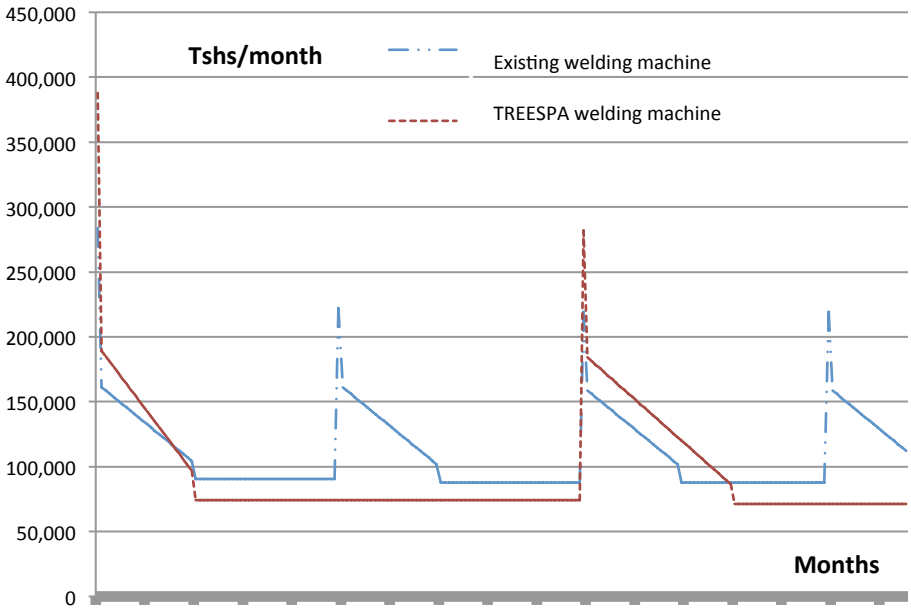


**Figure 11 Monthly cost comparisons between a TREESPA welding machine and an old welding machine (in Tanzanian shillings, Tshs)**

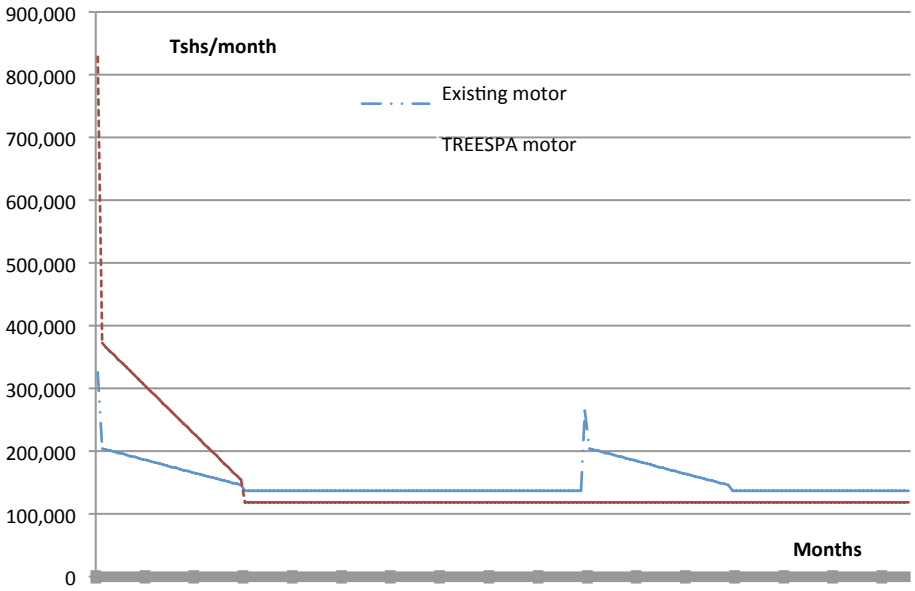


**Figure 12 Monthly cost comparisons between a TREESPA motor and cheaper option available in Tanzania (in Tanzanian shillings, Tshs).**

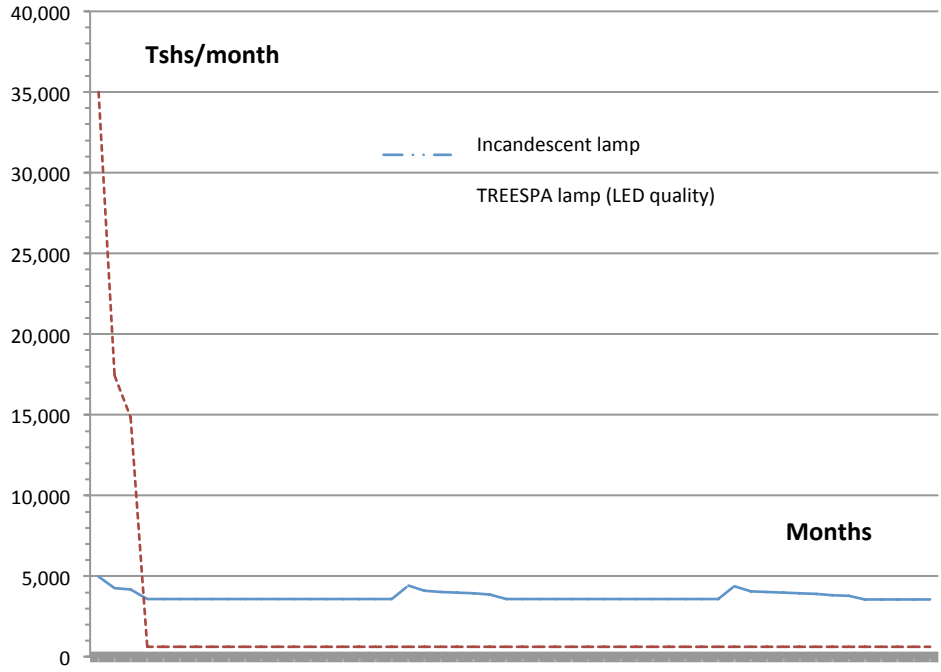


**Figure 13: Monthly cost comparisons between 5 TREESPA lamps and 5 incandescent bulbs (in Tanzanian shillings, Tshs).**

## *3.3 Summary of results for the TREESPA project*

TREESPA managed put energy efficiency on the SME's agenda and helped develop cooperation between SIDO and the energy sector whereby the large scale development goals of Tanzania can be successfully channelled down to small rural businesses.

For the country, the surge for power production can be lessened through the introduction of more energy efficient end-use appliances. On a national level the estimated potential savings are as presented in Table 2.

**Table 2 Estimated possible energy savings per year in the country and per product**

| | Products' estimated annual market | Estimated possible energy savings per year |
|---|---|---|
| **Lighting** | 8 million | ≈ 400 – 600 GWh |
| **Welding** | 2 000 | ≈ 4 GWh |
| **Motor** | 40 000 | ≈ 25 GWh |

There is clearly a demand in rural areas for good equipment and the potential is grand for Tanzania to further develop catalytic procurements and labelling of energy efficient products.

One of the most important project results has been to implement the concept and analyse what partners may co-operate and how. It has been important to demonstrate the possibility of catalytic procurements and efficient energy services provision.

For the catalytic procurement concept to suit the sub-Saharan market there are however room for improvements as identified from the TREESPA pilot.

## 3.4 Lessons learnt

### 3.4.1 Management of a multi-party initiative

The introduction of a scheme built upon a broad co-operation between Tanzanian partners in traditionally different sectors is demanding but worth-while because it leads to understanding gaps in the current energy service provision. It is through this co-operation that new solutions can be developed for the benefit of rural end-users. However, for the actual launching of new concepts like TREESPA, it has become obvious that the different organisations have different routines as regards:

- Decision making
- Customer relations
- Co-operation with external consultants
- Outsourcing and procurement

- Information and outreach

One observation is that it has been very important to give time to the TREESPA project partners to meet and interact. For example, while energy supply matters is traditionally hosted by the energy sector, the organisations in the energy sector over time appreciated the resource that SIDO provides in their rural presence, meeting rural SME's and providing knowhow and long-term support to those. With a little support, an organisation like SIDO is very well placed to 'do the job' that nor energy suppliers neither equipment suppliers tend to, albeit their knowledge about energy efficient equipment and its paramount importance for the national electric energy use.

SIDO on the other hand, beyond dealing with each and every SME separately, need support to think big, to negotiate to clarify business schemes for funders to understand and trust.

Tanzania imports a lot of equipment and has over the years attracted grand sums of bi-lateral and multi-lateral aid money. However, it is clear that institutions and end consumers can still develop their skills in proactively putting a pressure on the partners delivering products and services and learn to negotiate better conditions for themselves.

A private sector actor representing the concerned business sector and with focus on energy service provision could have been an appropriate catalyst for the purchaser group. When implementing TREESPA, no such actors were identified in Tanzania.

### 3.4.2 Critical factors for sub-Saharan Africa

The following factors have been identified as critical for a successful implementation of catalytic procurements in sub-Saharan Africa:

#### *3.4.2.1 To Create Trust*

##### 3.4.2.1.1 Trust in the catalyst

The umbrella organisation for the catalytic procurement must be trusted among the end-users and the suppliers as being non-bias and non-corrupted. It must also have proven general knowledge of the rural energy service requirements, and appropriate channels to reach those potential customers.

If the umbrella organisation is not trusted or if it is not given the right to make relevant decisions on the prioritisation and implementation of the catalytic procurement programme as regards the timing and conditions for support, the process will be severely hampered and hardly worth starting.

It is advised based on the TREESPA experience that a private sector actor can be more efficiently leading the purchaser group. However, this actor still needs to be viewed as strongly supported by concerned ministries, agencies and organisations. Building trust requires to show competence and to show sincere interest in the customers and suppliers, thus the market development both initially and in the longer term.

#### 3.4.2.1.2 Trust between suppliers and customer

It is further likely that the confidence issue between market stakeholders is weak. Rural customers generally have low trust in products, spare parts and financial schemes to reach rural areas. Financing institutions generally have limited confidence in providing loans at low interest rate for the purchase of small portable assets that can easily be sold on a second hand market. Manufacturers may have doubts whether the market for their products is really there in rural areas.

In other words - the culture is of great importance and the tradition among sub-Saharan African authorities to engage in marketing activities is likely to be weaker than in many countries where Catalytic procurements has already been implemented.

Experiences show that there might also be a threshold among companies to overcome for collaborating with authorities or other companies. Also, the established market in sub-Saharan Africa does not traditionally have a strong culture with technology innovation, and the purchasers do not have a strong culture of coordinating themselves.

General factors restricting international investors in sub-Saharan Africa include:

- Poor infrastructure
- Non-educated labour force
- Corruption
- Unsecure paying ability among customers

### *3.4.2.2 To demonstrate potential for sufficient volume*

If the manufacturers judge the potential markets for the selected technologies as insignificant, it is most likely that they will not be interested in participating in the procurement. Therefore, the project has to include a market of sufficient potential. It will be beneficial if services or products are demanded on a broad base. It is likely that rural customers in many sub-Saharan countries have very similar needs and the schemes can be repeated in several countries, or perhaps even coordinated over a few countries – especially if the catalyst is a private actor.

#### *3.4.2.3 To demonstrate the potential project benefits*

New and un-established ways of approaching the market, as well as introduction of new technologies can easily get a bad reputation, if not properly implemented. It is therefore important to demonstrate the results in a transparent manner.

#### *3.4.2.4 To have good financial support for the project*

Lack of long term financial support has been pointed out by the Swedish Energy Agency among others, as a problem for getting catalytic procurements successfully implemented. For the TREESPA project, lack of secured financing for large volumes' procurement was a drawback.

# 4 Recommendations for future development

### 4.1.1 Promote the concept

The concept of catalytic procurement is new in sub-Saharan Africa, as is also the market concept. It is therefore important to promote the concept of catalytic procurements as often as possible so that stakeholders get more familiarised with the concept and the meaning of it.

Conclusions from TREESPA as well as from implemented catalytic procurement schemes in Sweden show that also the contact network that the customer group has is very important for the marketing of the concept. It is important to get customer stakeholder groups to participate in the process, and give them time and resources to get to know each other; their specific needs; and demand of new services.

It was experienced in TREESPA that the purchaser group had insufficient control on the market information from the demand side. It relied too much on market research information conducted by a third party. Thus demand side information could be presenting a misleading picture to the purchaser group that in turn poses a risk to take the wrong decisions. It is therefore recommended that members from the purchaser groups are invited to be part of the market assessment.

The new services should also be marketed in order to help the winning suppliers and the purchasing customers to bring the service on the market. This should, according to Swedish Energy Agency, be done already during the feasibility study of the catalytic procurement (which means when interesting function specifications have been selected and the feasibility study for these started). In the TREESPA project, information and results

from the feasibility on the one hand and the purchaser group on the other were not consolidated early enough.

Ideally the catalyser should also be able to inform about other energy service procurements in pipeline, because a supplier may want to be prepared to take on also coming schemes.

### 4.1.2 Select services carefully

It is important to carefully select the services that should be included in the catalytic procurement scheme. The views and engagement of the purchaser group are of outmost importance. In the TREESPA pilot, it was experienced that the end-user demand could have been captured even better.

One challenge however in the rural areas of sub-Saharan countries is the balance between providing information and creating expectations. It is recommended that an information process involves several steps, starting by a broad problem formulation and narrowing down to a specific service. Each step need reach the end-users and there viewpoints understood. The actual interest from the customer end cannot be fully understood until the service is actually demonstrated in a pilot, including cost specifications and other conditions.

As mentioned above, the purchaser groups must still represent purchasing volumes large enough to make it trustworthy for manufacturers that the new product; system; or process selected, will be large enough to make it profitable to participate.

The performance of a reliable market study (feasibility study) for the selected service is important for each of the selected products, systems or processes.

It is also valuable that suppliers, already in an initial stage are given the opportunity to express their viewpoints on the specifications for the selected services. The reason for this is to give feedback into the project on the proposed requirements; are the requirements too simple or too hard to achieve? Does the technology and service already exist? Will the intended product/technology be impossible to produce at a reasonable cost?

A method proposed by the Swedish Energy Agency is to invite suppliers to a workshop before launching the procurement scheme, where these issues can be discussed.

Due to the novelty of the catalytic procurement concept and the aim to carry out three schemes in three years, TREESPA was not able to cover complex service demands. The schemes were narrowed down to equipment

that can be used in the national grid. Also, system solutions were avoided, i.e. mechanical applications with many parts. The reason for this was that clear evaluation criteria was deemed important in the pilot. For future development, it is strongly recommended to proceed into also off-grid schemes as was the original idea and to allow system solutions.

### 4.1.3 Allow time

The TREESPA project could not afford to let processes happen in sequence as would have been desired. Instead, activities had to be planned in parallel. For example, the market assessment and the purchaser group meetings were partly parallel in time and tasks were split between different actors. The project plan and financing had been too optimistic as regards early results from different initial activities such as the mapping of demand and identification of relevant purchaser group members. Still, the general perception among the end-users is it took much too long between the first visit, when services and technologies were initially discussed and the second visit, when actual products were demonstrated. The recommendation is therefore to plan for longer time so that all concerned parties can share the same information and make sure to have members from the purchaser group in the market assessment.

### 4.1.4 Consider the evaluation of the project

Already in the beginning of the project, the evaluation strategy should be settled. In addition, special evaluation criteria shall be set up for each single catalytic procurement scheme. This is very important for the clarity of the actual procurement of services and for deciding on financial support – it must be clear what service should be provided before the supplier can attain financial support from the catalyser and to what extent financial support can be provided.

### 4.1.5 Secure financing

Financial support facilitates a successful implementation of catalytic procurements when costs of services are somewhat beyond the customers' paying ability. The following measures are recommended:

- Initial (Zero) series support through direct financial support to the winning supplier(s) for producing a first series, as to facilitate the market entry of the selected product. The need for a zero series support is of particular importance if the technology promoted is a new technology also from a global point of view. If the technology

is only new in sub-Saharan Africa, the measure is of lesser importance.[18]

- Result based funding supporting a part of the suppliers' investment costs for such services that fulfil set conditions. Funding support can also concern running costs if found more appropriate. Result based funding has the benefit that it can allow many service providers to get support, so long as the services can be considered to meet the set conditions.

For either of these support types, there need be secured funding. When a catalyst is managing the scheme and when partial grants or guarantees are provided, it helps to build trust in the sustainability and proper monitoring of services supplied so that financial institutions can confidentially provide loans.

### 4.1.6 Provide information

Hammering a new message into many partners appears as if nothing new happens – but for catalytic procurement, it is important to reach at a broad understanding, otherwise it is deemed to not be successful at all. Inhabitants in rural Tanzania have demonstrated a high interest in new solutions and information on the same. The Tanzanian partners in TREESPA have overall convinced in their ability to reach out in rural areas with oral information, for example explain energy efficiency, or grid losses due to low power factors. There is a seemingly never ending surge for more and better information. Many appreciate written information, such as printed newsletter and brochures. Information via internet is also important. Most appreciated is however demonstrations at site.

In the case of TREESPA, there was a problem of trustworthiness because the actual procurement of demonstration equipment was delayed. The local organisations and SIDO in particular, have felt that people were disappointed about the lengthy process of providing the much longed for equipment. From a project management point of view, it has been important for ÅF not to be the message carrier in Tanzania. Rather the local TREESPA team should take on this role.

It was a challenge in TREESPA to identify and engage the right people, especially the anticipated end-users, in the purchaser group. To give information without creating too high expectations requires that information is packaged differently in different stages. It is needed broad and general information in order to create interest and motivation for

[18] Zero series support has been used by the Swedish Energy Agency for catalytic procurement schemes in Sweden.

considering new services, but also very specific information for those potential customers that are nearing a decision.

It is also imperative to keep domestic manufacturers well informed. The TREESPA concept of inviting international manufacturers and suppliers to sell their products and services in Tanzania, with the management support from Tanzanian parastatal organisations has been provocative to some. This is particularly outspoken among organisations with the mandate to support local manufacturing. It need be made clear that the local companies are as well invited to bid, and that the support is not meant to be exclusive to one supplier, but to anyone that can fulfil the specifications as communicated in the tender documents. Further, for reasons of trustworthiness towards the customers on the one hand and the local manufacturers on the other, it is important offer transparency in testing and labelling of the TREESPA products.

## 4.2 Summary of recommendations

For future successful catalytic procurement schemes in sub-Saharan Africa, it is advised to broadly promote the concept in order to create trust between partners, to consolidate common interests and retain personal relations within the foreseen schemes. The information and outreach challenge is grand. It is part of the project management strivings to keep all actors informed, and reach out to as many potential customers as possible with adequate information in different stages of the process. A high degree of transparency is useful, but still the process must respect the suppliers' business secrecy since they are ultimately expected to compete in a tendering process.

It is advised to give time to the process of selecting and specifying the required service. It is strongly advised that the purchaser group discussions and the feasibility study results need be fed into one another and that the two activities are coordinated. For example members of the purchaser group can be involved in the market assessment.

It is advised to broaden into off-grid system solutions for providing the needed energy services. Systems and complex services are more difficult to evaluate and therefore it should be highlighted that the evaluation of offers must be considered already at an early stage and be clearly communicated to suppliers.

It is advised to appoint a private and independent actor to lead the catalytic procurement process. However, it will be paramount that this actor is supported by the central governmental institutions and agencies within the energy and industries sector.

If it is found that financial support is required to match supply and demand, it is central for a successful catalytic procurement that financing is secured upfront the scheme is launched.

**References:**

UN: SDG Goal no 7: Affordable and clean energy, 2015 UN, Sustainable Energy for All (SE4All) www.SE4All.org

USAID: Power Africa annual report 2015

World Bank: Africa's Power Infrastructure – Investment, Integration, Efficiency (Eberhard et al.), 2011

IEA: African Energy Outlook, OECD/IEA 2014

SEI: Local Management of Rural Power Supply; A new approach in Tanzania, Monica Gullberg, Maneno Katyega and Björn Kjellström, Stockholm 1999 (ISBN: 91 88714 68 3)

UN: Energy for a sustainable future; Advisory Group on Energy and Climate Change (AGECC), UN in New York, 2010

Swedish Energy Agency (STEM): Teknikupphandling som styrmedel-metodik och exempel, Agneta Persson et.al. Swedish Energy Agency, March 30, 2004.

NUTEK: Co-operative procurement – Market acceptance for innovative energy efficient technologies, B1996:3, Stockholm 1996

NUTEK: Technology procurement – examples and specifications of requirements part 1 and 2, Stockholm 1994.

Hollomon Brad, et al. Seven years since SERP: Successes and setbacks in technology procurement, aceee summer study 2002, Asilomar, USA.

IEA: Creating markets for energy technologies, Hans Nilsson ISBN 92-64-09963-8 Paris, 2003.

IEA: Task 24, Solar procurement, Final management report, Westling Hans et al. 2003.

ÅF: TREESPA Final report, Monica Gullberg et.al., EIE/06/278/SI2.449255; TREESPA; Tanzania Renewable Energy and energy Efficiency project to Sustain Poverty Alleviation; Intelligent Energy Europe (IEE); COOPENER; Key action: 12