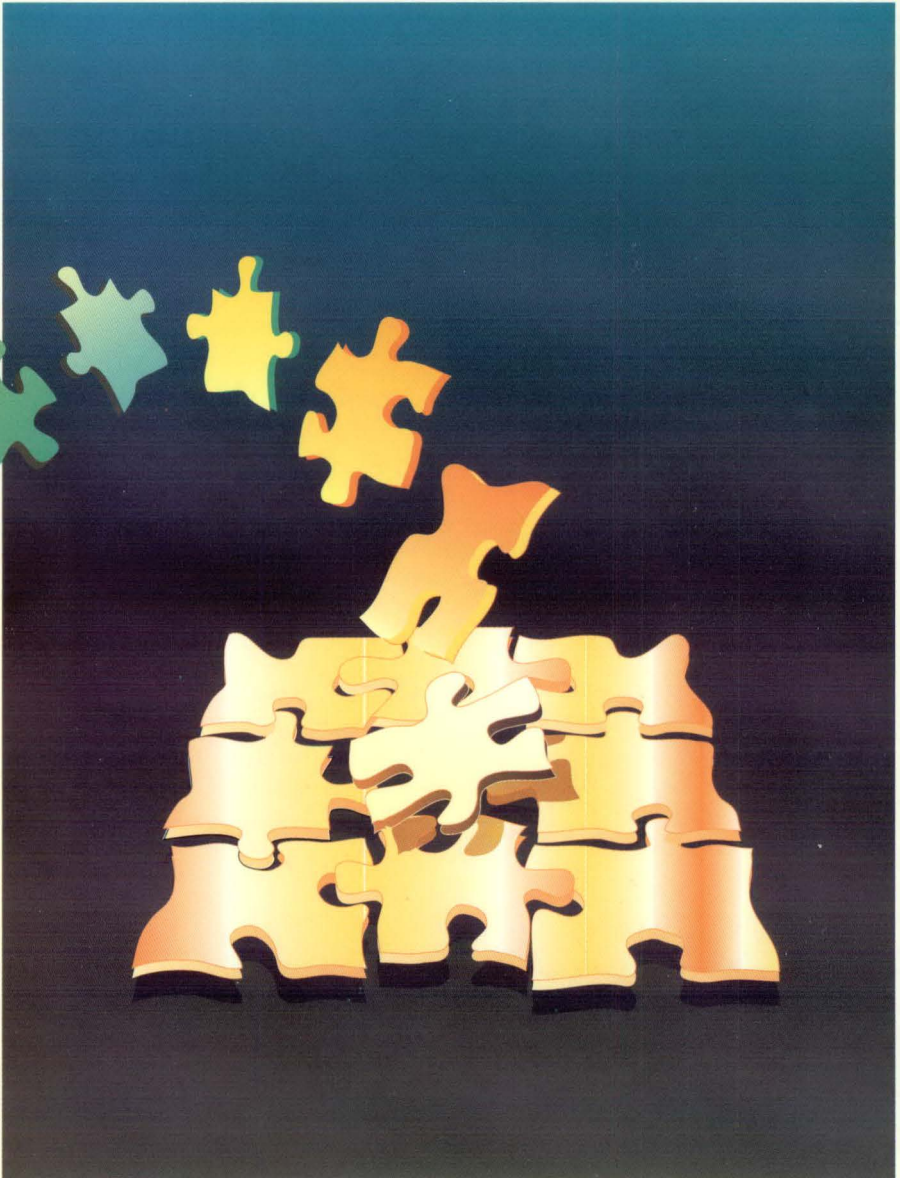


Co-operative Procurement

*Market Acceptance for Innovative
Energy-Efficient Technologies*



NUTEK



A process for co-operative/technology procurement has been developed within the IEA DSM Implementing Agreement in order to help countries, organizations, consumers and buyers to work together to draw up performance requirements and indicate a future market. This stimulates manufacturers into developing new solutions and reduces their risks, and speeds up innovation and diffusion. Case studies show an energy saving of up to 50% in a very short time. International pilot projects will further refine the suggested procedure.

Key words: IEA, DSM, Market Acceptance Process, Technology Procurement, Co-operative Procurement, Functional, Performance Requirements, Energy Efficiency, Energy Reduction, Innovation, Pilot Projects, Contracting Parties, Interaction, Creative Groups, Partnering, Project Management, Public Procurement Rules.

The material in this report may be used if reference is made to the source.

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Edition: 1 000 copies
Production: NUTEK, Energy
Cover by Nils Möllerström AB
Edited by Hamvik Konsult AB
Gotab, Stockholm 1996



Printed on
environmentally
benign G-print

ISSN 1102-2566
ISBN 91 7318-294X

CO-OPERATIVE PROCUREMENT

Market Acceptance for Innovative Energy-Efficient Technologies

Hans Westling

ABSTRACT

Within the IEA DSM Implementing Agreement, Annex III has developed a Market Acceptance Process for co-operative procurement of innovative energy-efficient technologies. Experience from case studies shows very good results - a 50 per cent energy reduction in some instances - in a very short period of time.

The process suggested could help countries and organizations to collaborate and to formulate functional requirements for energy use and other features that may stimulate development efforts among manufacturers and facilitate acceptance and dissemination of new solutions. The creation of buyer groups, consisting of future-oriented, leading buyers and users, will reduce the risks involved for manufacturers and open up opportunities for better interactive development. Pilot projects in the fields of lighting, copiers, home electronics, vending machines and "wet appliances" will shed further light on the formulation and refinement of the suggested Market Acceptance Process. Different levels of involvement are possible for countries and organizations. Leading procurement principles and rules applied in the European Union and the United States and as stated in the World Trade Organization Agreement on Government Procurement (WTO/GPA) will be used, but will have to be adapted to the innovative character of the projects.

Originally Annex III consisted of six countries, Denmark, Finland, the Netherlands, Spain, Sweden and the United States, and from the summer of 1995 also of the United Kingdom. The European Union has also expressed interest in joining the Annex.

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1. PREFACE

Different control mechanisms are used in demand-side management (DSM) activities. Information and educational programmes, labelling activities, and many forms of rebate programmes for early retirement of old equipment or accelerated introduction of new equipment have been used in many countries, especially in the United States.

Procurement, too, has also proved to be an important mechanism to inspire innovation and diffusion in a number of cases. In Annex III of the IEA DSM Agreement - "Co-operative Procurement of Innovative Technologies" - which is to be operated during a five-year period, 1994 - 1999, seven countries participate at present - Denmark, Finland, the Netherlands, Spain, Sweden, the United States, and from the summer of 1995, the United Kingdom. The European Union has expressed a firm interest in joining the Annex. The programme has the following objectives:

"to establish a procedure for co-operative procurement of innovative demand-side management technologies among the participating countries and to form the basis for the choice of a product or products suitable for co-operative efforts."

Based on work carried out before and during initial Annex III Experts meetings, analyses of answers received from a questionnaire, material about some cases (development in the energy field as well as in other areas), and references to theoretical backgrounds, a draft report on a process was formulated (November 1994). This report has been finalized, and remarks and comments received in connection with the International Energy Agency conference/workshop "Market-Pull Activities and Co-operative Procurement of Innovative Technologies" on 29-30 November 1994 in Paris (which was completely overbooked with more than 85 participants from 19 nations) have been taken into consideration. Additional cases and experience from ongoing projects have now been studied. Market contacts started with manufacturers, authorities and organizations, users and buyers, in April - June 1995, and will be intensified during the second half of 1995 and in 1996.

Technology screening for the choice of suitable technological areas has consisted of presentations from the Experts regarding activities, already fulfilled, going on, or being planned in the respective countries. At the Paris conference/workshop, short background reports were presented on three technological fields - copying, "wet appliances" and lighting - fields, which in the Experts' opinion, could provide possibilities for co-operative efforts. Already at the Paris conference, suggestions were made for additional interesting fields - home electronics and vending machines (for hot and cold drinks) - and these fields have now been studied. In addition, a more comprehensive list of suitable areas has been worked out with contributions from the Annex III Experts and their contacts.

Specifications from NUTEK¹⁾ and experience of technology procurement activities in Sweden have been collected. Reports on similar planned, ongoing and completed activities have also been inventoried in Denmark, Finland, the Netherlands and the United States. In the United States, DOE¹⁾, EPA¹⁾ and CEE¹⁾ have carried on valuable work in different groups in a number of areas.

As regards Chapter 12 with appurtenant appendices, very valuable contributions have been given by Claudio Romanini, Commission of the European Union, DG XV, Brussels, Hans Sylvén, NOU, Swedish National Board for Public Procurement, Stockholm, and Gösta Westring, attorney, Advokatfirman Cederquist, Stockholm. Gösta Westring has also actively taken part in the drawing-up of the text of Chapter 12.

I wish to thank all - Experts within Annex III as well as from other collaborating organizations - for their valuable contribution and interest.

Stockholm, January 1996

Hans Westling

¹⁾ Abbreviations are explained in a separate Appendix and when first mentioned in the main text.

2. SUMMARY

"Co-operative Procurement of Innovative Technologies", Annex III in the IEA DSM Agreement, is a five-year project, in which seven countries participate.

In this report, a market-acceptance process is suggested. This process is based on experience gained from projects where technology procurement and similar processes have been used. The process includes both innovation and diffusion, and consists of a number of different stages and activities, some of which have to be worked on in parallel. The main stages are *preparation, tendering, development, and market acceptance*.

The following issues are of particular importance during the *preparatory stage*: identification of *needs* and problems, formulation of overall *goals* and *functional objectives*, primarily in the *energy field*, but equally important are *other features* which will facilitate acceptance and penetration of the new product or system. These *features*, too, should be formulated together with the energy objectives in the specification, which consists of functional requirements, and could, for instance, include ergonomic aspects, environmental requirements, data on noise, emissions, etc.

In order to prepare for a tendering process, it is of the utmost importance to identify future-oriented, leading *buyers and users*. Establishing a group of buyers is a crucial activity. This may take a long time (due to the traditional fragmentation in some areas, for example). There is much effort involved in finding the very experienced organizations and persons, who are also open to new solutions and prepared to take some trouble with the first newly-developed solutions. If these buyers and users represent a significant proportion of a market, this will have a large impact on manufacturers and suppliers. It would also facilitate diffusion on the market and provide opportunities for interactive work during the development stage, involving the customers who are "à la mode" for all product development today. By identifying a whole set of requirements, and by having the possibilities of testing ideas and prototypes on actual users and buyers during an interactive process, the lead-time - the time to market - could also be shortened. Diffusion could be facilitated by organizing a number of *support activities* together with Government organizations and utilities. Such activities should be prepared in the early stage of the project.

In the report, reference is made to theoretical backgrounds, and comparisons are made with other procedures for product development, such as *simultaneous engineering*. Characteristics of projects suitable for technology procurement are formulated. Important points of interest during the other stages, except preparation - tendering, development and market acceptance - have been noted. Future pilot projects and analyses of other cases will contribute to further development of the process suggested.

Different degrees of involvement for participating countries are possible, as is shown for different alternatives (Figure 27) with common or separate decisions and in the matrix (Figure 28). This will make it possible for individual countries to be involved in different products to a varying extent. One country may take the lead, co-ordinating the project management organization in one product area, and limiting its involvement in other projects to participation in the formulation of requirements and support by means of economic incentives, information, educational programmes, etc.

Possibilities of using seed-money to the buyers, who buy the first series of a new product, will further facilitate the work. A possible action is the signing of a *framework contract* between a development organization, or a consortium of buyers, and a supplier. In this case, one country takes the lead, and there will be *options* for additional countries (call-off arrangements) to use the same contract conditions (price, technical requirements, warranties, etc.) for their emerging buyer groups. To facilitate the process and shorten the time for preparation, it is essential to find or strengthen existing groups and to use networks already developed. Early identification of opportunities for benchmarking to be used in the functional specifications and for testing manufacturers' fulfilment of contract afterwards is very important, as has been shown in some studies of cases. As always with challenging projects, full support at top-level is very important, and equally important are deep understanding and agreement of the goals among the key players.

Different tiers or levels can be used in a combination of technology procurement, Government or public acquisition of the best existing products, and labelling and standardization activities.

In all development projects, the project management function is of essential importance. In international collaborative projects with innovation goals, the project management and work team will be facing demanding challenges.

Creation of project management organization, development teams and establishment of buyer groups are time-consuming, but very important activities.

With the process suggested, a market will be *aggregated* by a buyer group, the needs *articulated* in the specification by functional requirements, and the innovation and diffusion process *accelerated* by parallel work, early involvement of buyers and users, and preparation together with authorities and testing organizations. The *risks* will be reduced - for buyers through the seed-money for the first series, and for manufacturers through the involvement of leading customers.

The differences in principles in European Union and U.S. public procurement regulations have been analyzed and comparisons made with the World Trade Organization Agreement on Government Procurement (WTO/GPA). All the sets of rules stress the importance of competition and objectivity. The same principles of openness, with announcement of public acquisition projects, are also in function. There are differences in the use of negotiations in connection with procurement, which might be required for many innovation projects.

As far as the pilot projects are concerned, there are different opportunities. It will be possible to refer to the special rule in the EU Directives applied when the project is "pursuant to the particular procedure of an international organization" or when it is "in pursuance of an international agreement ...". The particular procedure for the pilot projects will, however, be very much along the lines of the EU and WTO procurement rules. It is also possible to work with a procedure, which takes into account the special conditions for using negotiations (WTO) or a negotiated procedure (EU). Most likely, innovative procurement projects will be fulfilled on those conditions, since new, not yet existing solutions are expected. The exact design has to be adapted to the product concerned and to the interested buyers and participating countries involved. Both alternatives include the principles of competition and objectivity, and equal and fair treatment of all countries.

A draft report was discussed at a conference/workshop in Paris in November 1994 with large attendance from 19 countries. Some of the material from the conference has been embodied in the final report. Additional cases and experience, as well as different planned national activities have also been included. The process has been further developed, taking into consideration the legal aspects of different existing procurement rules.

Both before and in connection with the Paris conference, very positive remarks have been given by major manufacturers as regards stimulation by means of market-pull activities, such as technology procurement.

The Experts have decided to proceed with preparations for pilot projects in five areas: *lighting, copiers, home electronics, vending machines* and "*wet appliances*". Work has started on specification and creation of buyer groups for the identified pilot projects. The Experts and the Operating Agent have started preliminary contacts with the players on the market - manufacturers, authorities, users and buyers - in interested countries. Tender competitions for some of the product areas will be announced through pre-information notices in the "Official Journal of the European Communities" and similar media in the United States ("Commerce Business Daily") after the next Experts meeting in November 1995.

The European Union has expressed a firm interest in joining Annex III (consisting of Denmark, Finland, the Netherlands, Spain, Sweden and the United States already from the start, and from the summer of 1995 also of the United Kingdom).

Experience gained from the pilot projects will shed further light on the process suggested. Some important issues will be further elucidated, e.g. principles such as the "winner takes all" and the "multiple awards", permanent or *ad hoc* buyer organizations, formulation of economic goals for the procurement project already in the specification.

3. BACKGROUND

3.1 Environment and climate risks, framework conditions

The impact of energy production and CO₂ emission and the risks of a climate change have come into focus more during recent years.

A number of international conferences have focused on environment and climate concerns - the Stockholm Environment Conference in 1972, the UNCED or Rio Conference in 1992 with the Framework Convention on Climate Change (FCCC), the recent Climate Conference in Berlin, and the Climate Technology Initiative (CTI).

As Robert G. Skinner, IEA, has stressed in speeches in 1995, the threat of a climate change is generating considerable policy discussion and action in OECD countries. The section below is based on these discussions and actions (Skinner, 1995).

The energy sector will be an important area for different policy actions. Recent trends of individualism and privatization in the energy sector will *reduce the Government interventions with traditional measures*. Reduction of the use of grants and subsidies for energy-efficiency enhancing actions places serious constraints on the application to meet the goals of the Climate Convention and other energy and environment objectives.

One of the policy approaches that is a fundamental point, is the establishment of free and open markets. In this case, we need to ensure that prices reflect economic and environmental costs of production. However, market forces alone do not provide energy security or a clean environment. Governments need to set the right framework conditions and to have a choice of policy instruments, including economic and regulatory instruments.

With economic reforms, it is *private firms with origins in several countries* that make up important sources for expertise, technology, and financing for any particular project.

Standards must not prevent technological diversity in choice, stifle innovation or impair trade. Technology development and deployment may be an important vehicle for common actions among signatories to the Climate Convention.

Governments can create right conditions or eliminate the barriers to development and dissemination.

Voluntary approaches include appealing to industry to form *partnerships with one another or with Government* to meet negotiated emission reduction goals. They are market-based policy instruments, because they tend to take the familiar form of a contract. It is a fruitful area of international co-operation.

The control instruments include quality marks like Power Smart in Canada, Energy Star Computers in the U.S., Energy 2000 labels in Switzerland, minimum performance specifications and competitive procurements organized through a bidding procedure or aided by a *Government* commitment to *buy equipment* which meets pre-specified performance standards. These programmes also offer for industry opportunities to accelerate the introduction of new technologies.

Especially the calculation of the results of increasing CO₂ emissions if the developing countries adapt the usual inefficient technological solutions to their development, points at a dramatic increase of the total CO₂ emissions.

India and China, where coal accounts for over 70 per cent of power generation, are likely together to experience an increase in CO₂ emissions greater than will be in all OECD countries combined.

3.2 IEA and the DSM Implementing Agreement

Within the International Energy Agency, IEA, the member countries are working on safe energy supply and different activities for energy technology and R&D international collaboration.

"The collaboration programme aims to bring together experts and specific technologies, wishing to work on common problems and to share the results of their endeavours".

The Demand-Side Management (DSM) Implementing Agreement is one of nearly sixty implementing agreements, about two thirds of which are running at the moment. They are dealing with specific technological fields, like renewable energy and nuclear fusion, but also with efficient energy end-use, e.g. heat-pump technologies, buildings, and community systems (IEA, 1994).

Co-operative Procurement of Innovative Technologies for Demand-Side Management is Annex III of five different annexes within the IEA Demand-Side Management Programme, in which fourteen IEA Member Countries take part. The aim of Annex III is to speed up the process of market acceptance/penetration of innovative technologies, conducting competitive procurement of more efficient DSM technologies. The following countries take part in Annex III: Denmark, Finland, the Netherlands, Spain, Sweden, the United Kingdom (from the summer of 1995), and the United States. The European Union has expressed their firm interest in participation.

In its original programme, Annex III has been divided into a number of subtasks (see [Appendix 1](#)). The *first subtask* aims at defining a process for international co-operative procurement, facilitating innovation and diffusion. Expected results will include specifications and procedures to co-ordinate interest, guidelines concerning selection process, adherence to differing legal codes, financial support for initial procurement and for maintaining a demand-pull. *Subtask 2* concerns the technology screening process to select the technologies which are most suitable for co-operative, innovative and diffusion activities. The *third subtask* concerns formulation of pilot specifications and pilot procurement in the innovative DSM technological field. *Subtask 4* concerns the organization of contacts with the market, including buyers, users, authorities, etc. Finally, the *fifth subtask* includes evaluation of the procurement process developed after the pilot projects and other gained experience.

During the first twenty months, with seven Annex III Experts Meetings, the Experts have contributed valuable observations from earlier and planned activities within this area. A questionnaire has also been distributed to all IEA

countries to inquire about their experience and interest in co-operative procurement. Important observations made from some earlier cases have been analyzed by the Operating Agent, and a new case-study has also been presented regarding a NUTEK project - clothes washer and dryer for apartment laundry rooms.

The different participating countries and their organizations have worked out plans for activities, using various measures within the market-pull segment, including procurement, in order to stimulate the creation and dissemination of more energy-efficient solutions. Many activities are now in planning stages or proceeding at the implementation stage in some countries.

Procurement regulations have been penetrated in order to identify efficient ways of fulfilling formal rules as well as innovation goals with the following concrete pilot projects.

At the conference/workshop in Paris, already mentioned above, a draft report with a Market Acceptance Process was suggested. This draft has been further developed. It will be used for selected pilot technologies in order to gather experience from international co-operative activities.

3.3 Pilot projects

Subtask 2, *Technology Screening*, has been fulfilled in so far as programmes have been used, which have been carried out or are being planned in the different countries in respect of evaluation of technological areas. A number of similar activities have already been performed in the United States - by LBNL and ACEEE, among others - in the Netherlands and in Sweden. In 1994, Denmark presented a study including priorities, and Finland a report containing principles in this area. Therefore, the Experts have not started a new investigation into this area. This change in the organization of the work has been reported at IEA Executive Committee meetings.

The Experts have then agreed to proceed with the project on the basis of their own experience and activities. A list of technological areas has been presented and updated (Appendix 2). All the activities on this list comprise at least two

countries with interest in the area concerned. There is a large number of technological areas. The Experts have chosen a limited number of areas which were to be investigated more in depth, i.a. at the Paris conference/workshop. Three of these areas were discussed in Paris, viz. *copiers*, "*wet appliances*" (clothes washers, dryers, dishwashers) and *lighting*.

In addition to the three areas discussed at the Paris conference, the Annex III Experts have found *home electronics* and *vending machines* to be of common interest. The "lead times" for development are estimated to be very short in these fields. These *five areas* are further treated in Appendix 7.

Other areas recently discussed among the Experts are: traffic and road lighting, and various "support technologies" of interest for industries. These technologies concern, for example, motors, pumps, ventilation fans, lighting, etc.

Preparations are now in progress within all the five, specifically mentioned areas. Future practical work in respect of procurement (including preparatory and supportive activities) will have to be carried out in keeping with the resources available within the participating countries. (There will be limitations as concerns the possibilities of having access to persons and funding.) In accordance with the initial programme for Annex III, there were to be *at least one pilot project*, and the order, in which the different pilot projects within the five areas will be possible to realize, depends on the future results of market contacts (*Subtask 4*) - interest from buyers and users, manufacturers and authorities.

4. DEFINITIONS

The following definition of DSM is used in Annex I of the DSM Agreement (Vine 1995 a and b):

"We refer to DSM as a set of customer-focused activities that are intended to affect amount and timing of customer energy use cost-effectively. DSM programs include load management and energy efficiency (which may include fuel substitution) activities along with an evaluation of results. DSM includes programs by utilities and Government with the primary focus on energy efficiency."

The process suggested refers to *co-operative procurement*, but includes most of the elements used for *technology procurement* projects. In addition, it also comprises co-operation between different buyers in general, and international co-operation, which requires particular consideration.

The Market Acceptance Process includes both *innovation* and *diffusion*. *Innovation* includes by definition both idea and invention, and further development and market introduction - the first delivery to the market outside the laboratory (see Westling, "Technology Procurement for Innovation in Swedish Construction", 1991, and Figure 1).

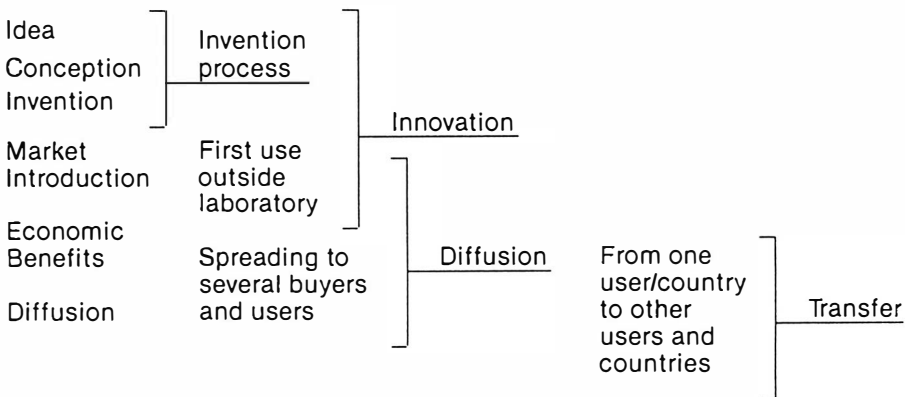


Figure 1. Innovation and diffusion concepts (Source: Westling, 1991)

Diffusion then means dissemination/penetration or market acceptance of a new product, system or process. The process suggested aims at being used together with co-operative procurement activities.

Co-operative procurement includes both

- technology procurement (of something not yet existing on the market), and
- acquisition of existing products/systems in some organized ways (perhaps among the 25 per cent "best", most energy-efficient, or best in some other aspects)

where, in both cases in this memo, a number of *buyers combine* their efforts and, to a varying extent, work jointly with the formulation of requirements, invitation for tenders, evaluation and actual buying.

Technology procurement is an entire acquisition process, which has the explicit aim of promoting *development*. Its use is intended to produce products, systems and processes that are better adapted to the buyer's requirements than those on the market at the outset of the work.

Technology procurement is defined in a memorandum from the Swedish Ministry of Industry (in English translation) as

"a process, through which a commodity, service or system is procured, and for which development of new technical solutions is essential in order to meet the requirements of the buyer. The technical development work, being part of the process, may concern application of advanced technology, but also minor stages of development as well as product modifications. The development work may concern the product, the system or the production process, for which it is developed."
(Industridepartementet, Ds I 1982:4)

The main stages in the Market Acceptance Process, as well as in technology procurement, can be seen in [Figure 2](#).

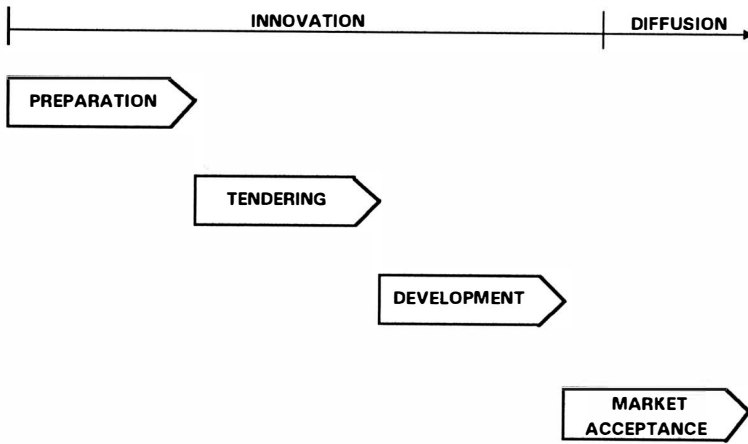


Figure 2. Main stages in Market Acceptance Process and technology procurement

As shown in the figure, the first part - innovation - is divided into

- preparation, with many different activities,
- tendering,
- development of the product, system or process concerned, until the first products are sold for use outside laboratories,
- market acceptance or penetration.

Work in a more parallel way, and in the loop-like manner used more frequently in many of today's development projects with condensed lead time, is described in Chapter 7 below.

The term "*products*" is defined in this report to include *products, systems and processes*, except in cases where it is obvious that it has another meaning.

With extensive experience of technology procurement, NUTEK in Sweden has extended the definition to include *both* the development of new products - named by NUTEK "functional procurement" - *and* other activities and control means to support diffusion of new products/systems, etc. The control means do not, however, include general subsidies for various solutions. This is an important limitation.

"Market transformation" means that the whole market, with marketed and bought products, is changed as a result of market-pull activities. This is treated more in Chapter 11 below.

This report has mainly been produced for the energy field, but many of the conclusions drawn can be of interest to other sectors as well.

5. SOME THEORETICAL REFERENCES

Over the years, researchers have consistently debated which instruments are most effective in producing innovations. (In this context, it is important to note the difference between inventions and innovations, meaning new products, systems and processes which have left the laboratory and been introduced onto the market.) Some researchers have emphasized the supply side (technology push), others the demand side (market pull). The conclusion drawn in recent times is that initiatives are important on *both* sides, but that most innovations - some researchers say 75 per cent or more - have probably materialized as the result of steps taken on the demand side. Several researchers are agreed that apart from demand-side initiatives (Marquis, 1969¹⁾), efficient organization and communication are also important (Mowery & Rosenberg, 1978; Lundvall, 1985, 1988 and 1991). A comprehensive OECD report found that technology procurement is the only sure way of speeding up innovation (OECD, 1978). Technology procurement is a method of working on the demand side (see Edquist, 1990, Memorandum on Technology Policy), Figure 3.

	Technology policy instruments on:	
	The supply side	The demand side
Development of technologies	(1)	(4)
Diffusion of technologies	(2)	(3)

Explanation:

(1) Public financing of research
R&D policy

(2) Technical attachés
Data basis, educational exchanges

(3) Procurement by the public sector
Conscious choice between different energy sources, public transport systems, etc.
Indirect through laws and subsidies

(4) Public Technology Procurement
Choice not only between existing technology

Figure 3 Supply and demand side activities (Source: From Edquist, 1990)

¹⁾ For references, see Appendix 9.

Lundvall (1991) is of the opinion that there are very few pure markets and that we see more of organized markets. Innovation is a process involving learning-by-doing and learning-by-using. The process of innovation is influenced by the design of institutions and channels of information (Arrow, 1974). Lundvall shows that the organized market represents an institution structure, necessary for product innovation, and specifies the elements of organization in the organized market. The innovation process has developed from the traditional, linear model for development into a more loop-like, chain-linked process according to Kline (consultancy work - design -energy audits - demonstration projects).

The importance of simplified communications has been shown in a large number of investigations, e.g by Allen (1977). Building up networks of long-term relationships (interactions) between buyers or consumers and manufacturers or suppliers, is emphasized for example by Håkansson (1987).

The importance of involving the customers or users at an early stage, had previously emerged in studies from SAPPHO (Rothwell et al. 1974) and Rothwell (1977), as well as by von Hippel at MIT (1978). In later studies, von Hippel emphasized the importance of lead users (1986). Similar reasoning has also been reported by Vedin (1990).

Teubal (1991) states that "a network organization, linking firms or economic agents, represents an intermediate system of governance" that lies between hierarchic organizations (the firm) on the one hand and "classical" or spot transactions (the market) on the other. He stresses the importance of the central "network agency, network PBX, that mediates among various users. It is important to create with the use of this agency a social pool of knowledge."

Teubal also says: "The emergence of a market for a radical capital-goods invention with high potential social profitability may critically depend on the creation of a network involving users of a product". "A network is a dynamically efficient organizational set-up for creating a social pool of information and knowledge concerning an invention and its uses." He also points out the importance of a centre that generates the demand.

Lundvall points out that interaction includes a number of social elements, mutual trust, cultural background, but also limitations in the number of link-ups between producers and users.

Lundvall also stresses the needs for the professional users, and how the consumers can be assisted to formulate their needs, going from a passive to a more active role. It is important both to find advanced producers, and the relative progressive, smaller users.

One action would be establishing a new agency, which must be able to muster broad acceptance of the legitimacy of its intervention, and which must have very thorough understanding of the workings of the innovation system as a whole. On the other hand, such a policy does not necessarily involve massive public subsidies. It is more important to stimulate the formation of new relationships. Organizations like MITI in Japan and major banks in Germany have played important roles in such formations.

A number of innovation cases have been studied by Westling (1991). Characteristics of projects suitable for technology procurement have been formulated, see Chapter 9 and Figure 5 below.

- x -

The importance for innovation of communication, building-up of new networks, involvement of leading future-oriented buyers and users, and interactions are the main conclusions to be drawn.

6. SOME EARLY EXPERIENCE

A number of Swedish studies (see Westling, 1991) have stressed the importance of technology procurement for innovation.

Methods similar to technology procurement have been used from the first half of the nineteenth century in developing navigational aids and the earliest steam locomotives for regular passenger trains, by way of one of the most extensive railway electrification schemes of its time (1915) - the iron ore line between the Norwegian port of Narvik and Riksgränsen on the Swedish border - to development of the Swedish X 2000 high-speed train (1982-1990) as a result of requirements specified by the State Railways. Strict functional requirements have been laid down by buyers as the introduction to extensive development work undertaken together with suppliers. Energy projects carried out by the State Power Board - such as long-distance transmission of electricity by DC power line to the offshore island of Gotland in the Baltic Sea, the first nuclear power programme in Sweden and telephone systems based on specified requirements from Swedish Telecom as well as other Nordic Telecom Boards, are examples of successful solutions. In each case, as in the defence establishment, the work has proceeded on a long-term basis with the customers making demands, but there has also been an awareness of the competitive situation. The solutions that emerge must be highly competitive in an international market.

In the field of reconstruction and energy management, there is clear evidence that technology procurement has resulted in suppliers making an earlier start to their development work. In that way, it has been possible, for example, to put products which are more energy-efficient on the market sooner than would otherwise have been the case. At the same time, suppliers involved have won competitive advantages. An example is the introduction of very energy-efficient refrigerator/freezer units in Sweden and the United States, in both cases pointing at large future markets, but using somewhat different approaches.

The Swedish Council for Building Research project "Lifts for existing buildings" resulted in solutions that were clearly more cost-efficient in total, cutting the original overall cost of construction and lift almost 50 per cent. At

the same time, it was possible to reduce the disruption to residents, installation taking a few days instead of several weeks or months as before. A "Lift Group" with about 15 participants, including representatives from users, buyers, authorities, testing facilities, was an important instrument for achieving the results. The development project also resulted in one of the main suppliers, KONE, a Finnish company, receiving very large international orders through its subsidiaries, e.g. 250 lifts in the Netherlands.

In some sectors, such as construction, split-up and fragmentation are particularly great. Special efforts are needed to get buyers to collaborate as a basis for formulating requirements.

This chapter treats mainly experience from Swedish projects. The author's background is the main reason for this. Deeper work within this area could result in valuable findings from projects in other countries. All suggestions are welcome.

7. SOME PROCESSES USED IN RECENT YEARS

It should be pointed out that processes similar to technology procurement have already been used for product development. These activities include *simultaneous and concurrent engineering*, see Figure 4, where work is done in groups with more parallel activities. Fast track or a reduction of the lead times before introduction to the market, is frequently used today in many different fields. Parallel activities, networks and teams, instead of chain work with barriers, are common trends.

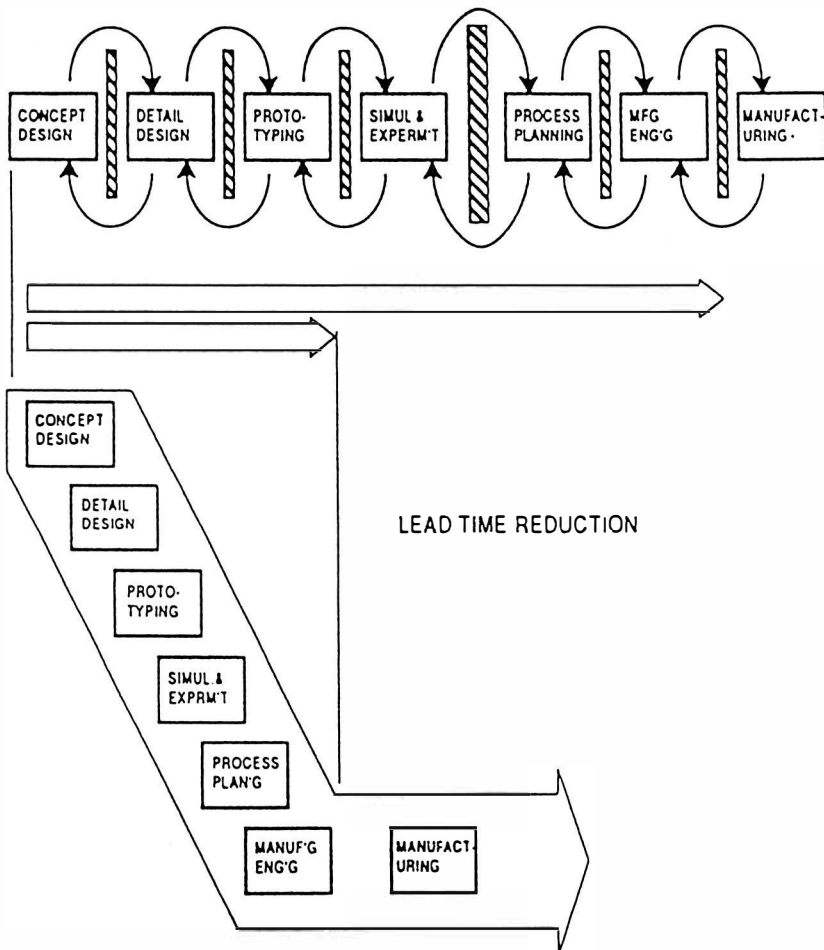


Figure 4. *Simultaneous engineering - a method of overlapping activities*
(Source: STU, 1990)

Specialists in different fields, e.g. construction, manufacturing, service, research and sales, participate in the development work simultaneously. Technology procurement takes place in different stages of development, by way of several prototypes and series of tests, to ensure quality (see presentations from the Swedish defence establishment, FMV, the Swedish Defence Materiel Administration, as well as a preliminary study by Westling (1982). The work is similar to that of quality-function-deployment, QFD. There are also great similarities with work done in creative groups etc. (Vedin, 1980a and b and 1990).

The predominant philosophy among many successful manufacturers is to strive to establish close contact with their buyers ("stay close to the customer"). Lately, limitations in resources, both in Government and business, have stressed the importance of using cost-effective measures, both from the perspective of society and enterprises.

8. INTERNATIONAL ACTIVITIES

8.1 United States - market-pull activities

Methods similar to technology procurement have been used internationally (for example by HLM in France as described in Chapter 9.7 below). In the United States, the method, sometimes named development procurement, has been applied e.g. in the space and defence fields, in the Experimental Technology Incentives Program, ETIP, and is of current interest in a number of investigations which have been concluded or are still in progress. These have been undertaken by agencies such as the Department of Energy, DOE, the Office of Technology Assessment, OTA, (OTA 1991a and b) and also the Building Research Board, where an industry-wide group suggested that Federal and State organizations play a considerably more active part in promoting development for greater competitive strength (National Research Council, 1988). At the beginning of 1992, an enquiry into innovative contracting practices aimed at achieving more competitive solutions in the bridge, road and transport field, was presented in the United States (Transportation Research Board/National Research Council, 1991).

The use of Government procurement may strengthen the demand for innovative technologies and reduce market risks and uncertainties for firms (MIT, 1978). According to this investigation, the influences on demand have often proved to be more effective in promoting innovative products and processes.

In an analysis of ETIP (Hebert & Hoar, 1982) it is stated that "technologies are more likely to be 'pulled' into the marketplace by favourable conditions among potential users than are to be 'pushed' by Government subsidy or R&D funding. Federal procurements' influence on innovation can be expected to be most effective when Government is itself the major purchaser and end-user of the innovation. Co-operative agreements are the preferred strategy of procurement when Government is not the major purchaser or end-user."

Tassey (1985) has also written about ETIP. In his opinion, it is more doubtful whether innovation or diffusion are stimulated by Government procurement. This may be the case when "Government procurement amounts to a significant share of the total market and when the procurement's timing is compatible with

the take-off stage of the market's development cycle." He says that in cases of pending product regulation, preregulation procurement can help markets adjust product technology. For the removal of barriers he points out the importance of multidisciplinary work and participation of all stakeholders.

The U.S. Energy Policy Act (1992) and the Climate Change Action Plan (1993), contain a number of initiatives in which use is envisaged of Government Purchasing Power to accelerate development of energy-efficient solutions in many fields.

On March 8th 1994, an Executive Order from the President of the United States was issued on "Energy Efficiency and Water Conservation at Federal Facilities". The goal was to reduce overall Federal facility energy consumption levels by 30 per cent by the year 2005, relative to the energy use in 1985. A similar goal for industrial facilities was to increase the energy efficiency by at least 20 per cent by the year 2005, compared to the 1990 benchmark. It is also stated that Federal agencies shall issue "a Federal procurement challenge". From another report originate a number of "reinventing procurement" recommendations. Innovative financing, contractual mechanisms including new sample contracts are among the tools mentioned. The Executive Order directs the Administrator of General Services in consultation with the Secretary of Energy to develop procurement techniques, methods and contracts to speed the purchase and installation of energy, water and renewable energy technologies in Federal facilities. It includes performance contracting, designer/builder incentives such as award fees and life-cycle-value engineering.

The Consortium for Energy Efficiency, CEE, in the United States has been set up by a number of different organizations - among them about 25 utilities and the Department of Energy, DOE - in order to facilitate joint efforts in the field of energy-efficiency (Alexander, 1994). CEE has summarized the specific arguments for using co-operative market-pull activities.

Earlier initiatives *without market-pull activities*:

- No single player represents a large enough market to encourage super-efficient products.
- Lack of clear targets.
- No improvement in market after only rebates.

But *market-pull strategies*:

- show large potential markets,
- provide manufacturers with consistent efficiency targets which also are recognized by important buyers, and
- the unit cost of the product is likely to decrease with larger volumes.

Different ways of encouraging market-pull:

- Contest approach
- Common specifications
- Procurement

These are all included in *market-pull* activities.

A number of concrete actions taken by *the United States* - by CEE, DOE, DOD (Department of Defense) and EPA (Environment Protection Agency) - have now been decided. They include e.g. the Technology Introduction Partnerships Programme (TIPP) for work in co-operation between private and Government organizations, procurement initiatives in the lighting field (HIR lamp - 30 per cent more efficient).

8.2 Individual European countries

In the DSM Agreement and Annex I, the current level of DSM in selected European countries is discussed. Thirteen European DSM programmes are compared by examining such factors as motivation for programme implementation, marketing methods, participation rates, total energy savings and programme costs. Programme evaluation is just beginning in Europe.

The following section is based on Annex I work and presentations at the Paris conference (Vine, 1995 a and b, and IEA Paris Conference Documentation, 1994).

In *the Netherlands*, DSM and energy-efficiency programmes have been promoted under an environmental task since the early 1970s, through NOVEM and the Ministry of Economic Affairs (IEA, 1995). The Government created the National Environmental Policy Plan Plus and a Memorandum of Energy Conservation in 1990 (both updated in 1993). Common DSM measures and

types of DSM are lighting, boilers, building management, residential insulation, district heating, and general operations and maintenance.

The Ministry of Economic Affairs has also signed *voluntary agreements* with industries, sixteen long-term agreements that have been negotiated within the industrial subsectors. The Government is also developing appliance and building standards.

There is a campaign to promote the use of CFLs and a programme to promote "green" refrigerators and freezers, which has been successful in changing the market share of "green" refrigerators and freezers from 20 per cent to 40 per cent during the first four months of the programme.

There has also been an efficient air-conditioning programme, the Night Tariff Programme.

In *Spain*, experience in DSM is limited. The most common strategies are time-of-day tariffs and interruptible supply contracts for customers with annual loads greater than 5 MW. The most common DSM technologies involve water heating, space heating and load control.

The National Annual Plan for 1991-2000, adopted by Parliament in 1992, has established an energy savings programme under the Energy Conservation and Efficiency Plan, which may lead to more energy-saving projects in the near future. The project for estimation of the potential improvements in electricity end-use efficiency started in 1994. An investigation has been made of the annual sales of housing appliances and the most important aspects when buying wet appliances.

In *Denmark*, a number of initiatives are included in the Energy 2000-plan (integrated resource planning, bill for limitation of electric heating, standards for equipment, energy labelling (EU), informative electricity bills, campaigns to replace inefficient appliances, and purchase agreements with groups of buyers). There has also been a low-energy freezer promotion, which included media advertising and rebates to home-owners for replacing existing freezers by energy-efficient freezers. The utilities were responsible for making sure that the older units were properly disposed of. Another programme refers to

industrial and commercial energy audits, including also the public sector. Finally, there are programmes to promote efficient lighting in the residential sector.

In *Finland*, MOTIVA is working with energy auditing, technology demonstration and procurement, training and information services. Concrete projects in this area, such as for example energy-saving thermometers, windows, pumping in industry and refrigeration systems in supermarkets are well under way.

The United Kingdom, which has recently joined the Annex III work, has experience from many activities. It has concentrated mainly on information transfer, for example through the Energy Efficiency Best Practice programme, but, in conjunction with the Energy Saving Trust, the Department of the Environment is now developing a Market Transformation strategy. This is expected to involve a range of initiatives, including labelling, subsidies and technology procurement, focusing initially on areas such as lighting and office equipment. The United Kingdom expects to contribute fully to future pilot projects and to the planned Evaluation Workshop.

8.3 European Union Energy Programmes

The energy-efficiency policy of the European Union has been accounted for at the "Right Light Three Conference" in Newcastle in 1995 (Bertoldi, 1995).

It is pointed out that improved energy efficiency reduces energy consumption and the use of finite energy resources, especially resources imported from outside the Community. The reduction of pollutants and emissions to the atmosphere of CO₂ - the major cause of the greenhouse effect with risks for a climate change - is of vital importance. The European Union is committed to stabilizing CO₂ emissions by the year 2000 at 1990 levels. The EU promotes energy-efficiency policies through the SAVE programmes, and has also other programmes; THERMIE for innovative energy technologies, PACE with many different mechanisms, and ALTENER for alternative energy sources.

The many difficulties and opportunities in respect of energy efficiency are summarized:

- Low energy prices, which can be raised by introducing a common carbon/energy tax. Higher energy prices are likely to be necessary to ensure sufficient penetration of energy efficiency.
- The economic aspects of energy efficiency are important as energy efficiency repays the cost within a few years in many cases.
- It also creates jobs, and energy efficiency is an important new generator of jobs.
- There are economic and political barriers. In many cases, energy is only a minor part of the main activities, but often very short pay-back periods for efficiency improvement, compared to the supply side, are required for investing in new production facilities.
- In order to prevent potential barriers to trade, requirements need to be harmonized at Community level, but differing national circumstances and opportunities will often need to be taken into account. There is often no need for actions at Community level. This is in line with the principle of subsidiarity.
- Energy efficiency depends on behavioural changes and on the implementation of better energy technologies.

The European Union has an already existing research and technology programme, the JOULE programme. New energy technologies need help to move from research and development to commercial application, but also need "a push in the marketplace". In other words, they need to be disseminated. This is the underlying philosophy in THERMIE - financial support for implementation of new innovative technologies, and for technologies which already have been applied in one area in the Union and now need to expand into new markets.

The SAVE programme runs for five years from 1991 and has a budget of 35 million ECU.

There are three specific elements within the SAVE programme:

1. Programme for energy-efficiency legislation to create standards and measures to remove institutional and administrative barriers to investment. They include standards for central heating boilers, energy labelling for domestic appliances, and a comprehensive framework for non-traded goods.
2. Promotion of a series of pilot actions to help Member States establish better energy-efficiency infrastructures.
3. Comprehensive information programme.

The measures are technical, economic and behavioural measures. The programme mentions the use of demand-side management and focuses on the non-technological aspects of energy-efficiency.

It is important that Member States learn from each other's successes and failures.

The PACE programme (Bertoldi, 1994) emphasizes that the Commission is "playing a co-ordinating role, and where appropriate, leading its own actions". The overall objective also of this programme is to reduce CO₂ emissions. The programme includes initiatives in all energy fields - homes, buildings, transport, industry, etc. Methods to be used to achieve the objective include information, voluntary agreements, legislation on standards, training promotion campaigns, etc. Bertoldi points at two different levels of standards to be used: the first one would mean an average improvement of about 10 per cent, which would eliminate on average about 50 per cent of the models on sale in 1992. This is the "statistical approach". The second level would be the "engineering design" method, where the intention is to install solutions with a pay-back in terms of electricity saved of no more than 3 years. This would result in an efficiency level which is 30 per cent higher and which is more demanding than that defined by the statistical approach.

The PACE programme has paid much attention to the lighting sector because of the large potential savings and the low costs to achieve them, compared to other electricity end-use activities. It has emphasized the commercial sector because it offers the best opportunities for Community-wide actions. The commercial sector presents a number of possible actions: component performance standards, equipment prescriptive standards, system performance standards, energy labelling, promotional programmes, etc.

The European Commission proposed to the European Parliament and the Council the new SAVE II programme, which will be a five-year initiative, 1996-2000, with a budget of 150 million ECU.

The SAVE II programme will incorporate the Regional and Urban Energy Management Programme (PERU) and the Efficient Electricity End-Use Programme (PACE) and include:

- reinforced *existing actions* in labelling and standardization, pilot actions and dissemination of information,
- *new actions* such as
 - monitoring of energy-efficiency progress at national and Union level,
 - specific actions in favour of greater co-operation between Member States in the field of the establishment of policies aimed at efficient energy management,
 - actions aimed at improving energy management at regional and urban level, and
 - actions aimed at establishing energy efficiency as a criterion within existing European Union strategic programmes.

Extended collaboration with third countries in the energy-efficiency field will also be an EU activity.

8.4 Concluding remarks

The importance of working together with demanding, future-oriented customers cannot be emphasized enough. The functional requirements used in technology procurement must be drawn up with a future international market

in mind. Similarly, it is particularly important to succeed in establishing long-term rules of the game in respect of standards, terms of financing, etc.

Analyses of many development projects - from the steam engine to the X 2000 high-speed train and contracting practices in the construction and energy sector - support the conclusion that *competition*, together with good prospects of a *future demand* for innovative solutions, is an important precondition for stimulating development efforts among suppliers.

9. BACKGROUND MATERIAL FOR THE PROCESS SUGGESTED

9.1 Introduction

Formulations later on in this memo are to a large extent based on the *author's own experience* from work in the construction and energy field, especially in respect of refurbishing of housing projects, and energy projects at NUTEK with the objective of improving the efficiency of energy use. The author's experience is based on action studies through deep involvement in the projects. Some of the observations made have been summarized in the report mentioned above (Westling, 1991). In the report, some *characteristics* have been suggested for projects suitable, or less suitable, for technology procurement (see Figure 5).

Market

1. Coming adequate demand, i.e. market
2. Interest on the part of the community

Support

3. Expressed support at top level
4. Cooperation of major buyers
5. Involvement of lead users
6. Cooperation of different authorities

Goals

7. Early formulation of clear objectives
8. Initiation of initial studies of problems and needs
9. Formulation of functional requirements

Development work

10. Good potential for increasing efficiency
11. Creation of project organization with dedicated individuals and leadership
12. Maintenance of competition
13. International considerations permitted to influence
14. Existence or development of good measuring methods
15. Prototype testing in a realistic environment
16. The project concerns a subfunction with sufficient repetitive opportunities in different buildings

Financing

17. Financing guaranteed for preliminary studies, cooperation groups, prototypes and test series

Figure 5. *Characteristics of projects suitable for technology procurement (Source: Westling, 1991)*

This is also a limitation in respect of value and general usefulness of the findings. A person involved may formulate somewhat biased recommendations. The limitation of the use for technology procurement should also be pointed out. Some warnings are formulated about projects not suitable for technology procurement (Westling, 1991).

As already mentioned in previous chapters, a number of concrete actions have been started and will gradually be contributing valuable experience.

9.2 NUTEK - Sweden

An in-depth *case study* has been presented within the work of Annex III, "Clothes washers and dryers for laundry rooms in apartment blocks - Sweden" (Westling, 1994b). Some remarks from the *summary of the questionnaire* distributed in the spring of 1994 have also been considered. Included in the background material studied, are also some reports presented by NUTEK or by consultants and organizations outside NUTEK, who have evaluated NUTEK work.

Some results obtained by these projects can be seen in Table 1 below.

This material includes a Swedish *report on the purchasing of windows* and *two booklets, Part 1 and Part 2, containing specifications of requirements* drawn up by NUTEK and its consultants. Some documentation about *a number of projects* in different countries have been studied in extenso, (see Appendix 9).

Preparatory work and development of new solutions take time as can be seen in a condensed time schedule from the case study on clothes washers and dryers for laundry rooms, Figure 6.

Project area	Result	Energy reduction
Refrigerator/Freezer	From 1.2 kWh/litre comparable volume per year to 0.8	by 33%
Clothes washers & dryers for laundry rooms	From 2.6 kWh/kg of laundry to 0.8	by 70%
Ventilation. Replacement of fans in residential area	From 750 kWh/apartment and year to 380	by 50%
High-frequency ballasts for lighting	Price reduction by half Accelerating market	by 20%
Windows	From 5,900 MWh/year to 3,300 MWh in one project in Västerås	by 44%
Heat pumps	Two different suppliers have been chosen for further development and deliveries	by 30 %

Table 1. Results obtained from some technology procurement projects in the energy field in Sweden
(Source: NUTEK, 1993, and Westling, 1994b)

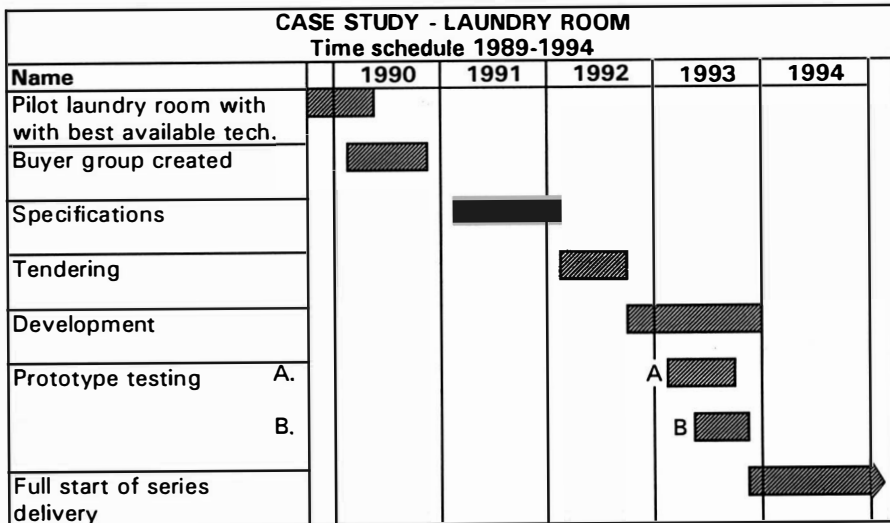


Figure 6. Time schedule 1989-1994 from the case study "Clothes Washers and Dryers for Laundry Rooms in Apartment Blocks - Sweden"
(Source: Westling, 1994b)

Distribution of costs for a central body like NUTEK for various activities and incentives during a project is schematically shown in Figure 7.

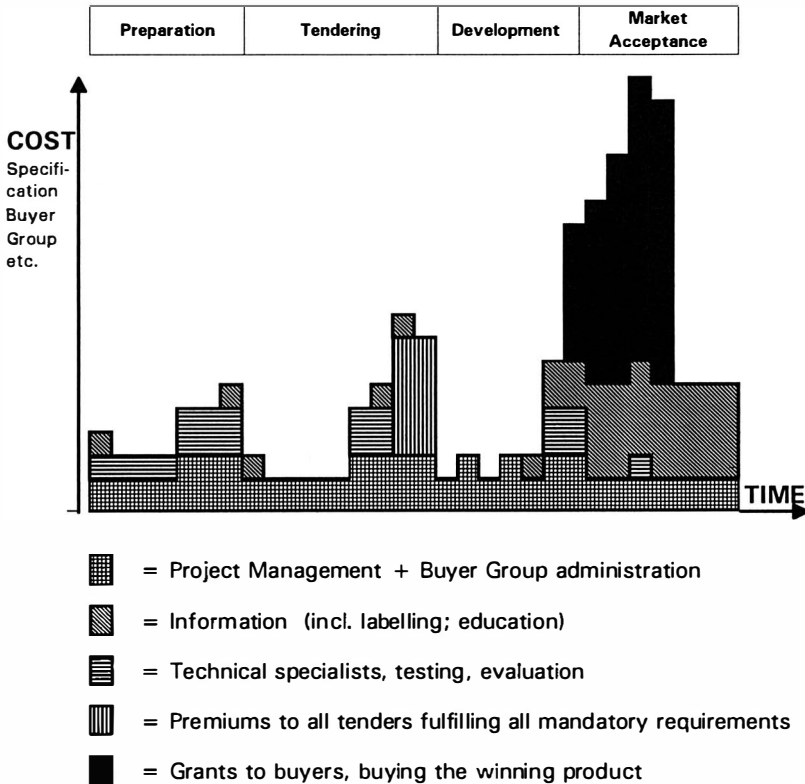


Figure 7. Costs of some of NUTEK's technology procurement projects. Schematic allocation. The total cost varies between SEK 2-10 million or USD 0.3-1.5 million per project.

Creation of buyer groups - into a consortium or an informal group - is a very important activity, which NUTEK has been using systematically and which takes time. The possibilities of depending on existing groups, where a core of people already know each other, should be utilized. In some of the projects, it was possible to involve persons representing various property-owning backgrounds - municipally-owned housing companies, housing co-operatives, and privately-owned organizations. This was the case with the refrigerator/freezer and clothes washer and dryer projects. In other areas, geographically more limited groups were created - representatives of municipally-owned

housing companies in southern Sweden, or privately-owned, individual houses outside Stockholm. A group of large insurance companies is another example. Experience shows that "grouping" is time-consuming, and that the work of the group must include, not only the actual procurement, but other activities as well. The members of the group must build up trust in each other, because there are always problems involved in a development project. Mutual understanding is important.

9.3 Wheelchairs - Netherlands

Included is also a study on electric wheelchairs in the Netherlands, "The market approach of the Gemeenschappelijke Medische Dienst" (GMD, 1990). A rough translation of the Dutch organization into English would be "Joint Medical Services". This project has included the responsibility for more than 7,000 wheelchairs per year. Much effort has been devoted to the formulation of requirements, starting with the needs of the users. The large group of users has then been divided into target groups with different thresholds or levels of requirements:

- minimum level
- desirable/additional value
- quality cost ratio or provision with preference.

The project has resulted in an overall cost reduction of 8 per cent and included large user involvement. It was a part of a quality assurance process and included a GMD guarantee.

9.4 Wind power projects - Denmark

In this sector, there has been a considerable industrial breakthrough (Energistyrelsen, 1991, and Kjaer & Andersen, 1993). In the early 1990s after 10 years of development work, wind power accounted for 2 per cent of the generation of electricity in Denmark. There were more than 2,800 wind power plants with good availability, and Denmark was the largest exporter in this technological field. This was the result of a complete "market development

programme", for which the funds were used to a large extent. In Denmark, as opposed to other countries, a great deal of work was put in on information as well as on local activities and participation. Among other things, this work included the build-up of a network between different institutions, and foundation of the test station at Risø. The efforts have been concentrated on two development lines - both large and small wind power plants - which is a somewhat different approach than the efforts made in many other countries. So called "initiative groups" have been founded, e.g. Nordvestjysk Folkecenter, which has resulted in co-operation between people with varying professional background.

9.5 "Golden Carrot" and other market-pull projects - United States

An evaluation report of the Golden Carrot Program has not yet been released, but is expected to be published in late 1995. Here follows an abstract from the Climate Change Action Plan (1993).

"In a "Golden Carrot" program, utilities offer financial incentives to manufacturers to make major advances in energy efficiency and product performance. The method: pooled utility rebates, which together have more impact on the market than individual, uncoordinated rebates that are unlikely to affect product development. In the first Golden Carrot, 24 utilities pooled \$30 million in the Super Efficient Refrigerator Program (SERP). SERP then held a contest - the manufacturer who could build the most efficient CFC-free refrigerator at the lowest cost would get guaranteed rebates from the pool to offset the incremental product cost. Consumers get a more affordable and environmentally sound refrigerator. Earlier this year SERP announced that the winner, Whirlpool Corporation, will deliver energy-efficient refrigerators beginning in 1994. The runner-up, Frigidaire, also announced it would soon introduce super-efficient models.

The idea was conceived in 1990 during discussions between Pacific Gas & Electric (PG&E), the nation's largest investor-owned utility, and the Natural Resources Defense Council (NRDC) on how utilities could get the maximum social benefits from their conservation programmes. Later that year, EPA hosted a meeting with PG&E, NRDC, the American

Council for an Energy-Efficient Economy (ACEEE), and the Washington State Energy Office to organize the first Golden Carrot. The program required an unprecedented effort to recruit a large number of utilities to pool tens of millions of dollars. EPA played a leadership role, primarily by:

- o Engaging manufacturers to research CFC-free technologies.
- o Drafting, circulating, and marketing SERP proposals to prospective utilities.
- o Educating utility regulators on the social benefits of utility investment in SERP.
- o Assisting SERP in obtaining Department of Justice assurance on compliance with antitrust laws.

As utility participation approached a critical mass, they were increasingly willing and able to design, market, and implement the program. EPA ultimately stepped back and the private sector - utilities and manufacturers - did the job. With very modest taxpayer money, EPA and its partners leveraged a much larger private sector investment in energy efficiency and pollution prevention. The approach is an important model for Federal leadership in promoting advanced technologies."

(From The Climate Change Action Plan, CCAP, by President William J. Clinton and Vice President Albert Gore, Jr., October 1993.)

- x -

The mentioned 30 million US dollar to the winning manufacturer will be available for payment in step with deliveries to end-consumers. Fourteen manufacturers altogether took part in the contest. Two companies went to the finals (Alexander, 1994/95). The main evaluation criteria were:

- energy efficiency,
- price per kWh saved,
- manufacturing and distribution capacity,
- quality of marketing, tracking and monitoring of plans for actual buying,
- corporate reliability and capital resources.

The models asked for in this contest were rather large, 18 cubic feet side by side, and even larger with an ice-maker. The winner is entitled to deliver 250,000 units. As mentioned earlier, the premium goes to the manufacturer. In this way, the intention is to avoid mark-ups through wholesalers and retailers.

Similar arguments have been used for the forming of an energy-efficiency programme in respect of lighting in Poland with premiums to manufacturers (Johnson, 1995).

In New York City, the utility New York Power Authority (NYPA) has launched a procurement for a small, 14-cubic-foot refrigerator/freezer unit for apartments in co-operation with the New York City Housing Authority (NYCHA) and the Natural Resources Defense Council (NRDC). The utility will purchase the units for the housing authority and be paid back during a 10-year period.

The volume of 20,000 refrigerator/freezer units per year over a 4-year period has been stated, but with additional buyers and utilities through CEE and DOE, the volume could be higher, which may transform the market. Increasing levels of efficiency have been suggested, Table 2.

Year	Energy Use (kWh/yr)	Description
1996	< 500	Best available
1997	< 440	30% better than 1993 standard
1998	< 395	10% better than 1998 proposed standard
1999	< 355	20% better than 1998 proposed standard

*Table 2. Efficiency requirements for 14-cubic-foot units
(Source: Demand-Side Technology Report, 1995)*

Whirlpool has already publically announced that they are now developing more energy-efficient models intended for the U.S. market, including also smaller, more compact units, similar to the most frequent models in Europe.

Similar activities have been planned by NYPA for air-conditioners, elevator motors, lighting, laundry equipment and water-beds (Demand-Side Technology Report, July 1995).

9.6 Deutsche Telekom - Germany

In a project for ventilation and cooling equipment in Germany (RWTUV, 1991) it has been possible to reduce energy consumption by more than half, down to 40 per cent of the earlier consumption. An important factor in this project was that there was one, strong customer - Deutsche Telekom (German Telecommunications Administration) - pointing at a large market, several thousand units. After the development phase, specific functional requirements were formulated and the customer was also involved in the elaboration of measuring equipment for the units at a testing facility. As an example, it has been possible to reduce the energy consumption of a unit with a capacity of 7,500 m³/hour from 52,000 kWh/year to 24,000 kWh/year.

9.7 Domotique, "Intelligent buildings" - France

Domotique (1990), is a programme, in which a group consisting of HLM (France's equivalent to SABO, the Swedish Association of Municipal Housing Companies), France Telecom, Plan Construction et Architecture, Electricité de France (EDF) and Gaz de France has carried on work on developing control systems for apartments. The initial work was performed on the basis of three basic needs:

- better administration of the building,
- better communication between tenants and property administrators,
- better and more comfortable living conditions at a lower cost.

A specification of requirements was drawn up and the needs were divided into

- "de base", which were within the financial objective of 4,000 francs per apartment in an apartment building with 50 apartments,
- "optionnelles"
- "complémentaires".

The tender competition resulted in accepting proposals from two groups of companies, Synforic and Philips. Work has then been carried out in initial

stages including some hundred apartments. The system is included in HLM's catalogue for 1993 "Sélection 1993". The intention was to install the system in 20,000 apartments by the year 2000, but the project is reported to have been delayed.

9.8 Other experience

Electricité de France (EDF) has carried out an interesting programme in Guadeloupe in the West Indies for avoiding building additional costly production units. A lighting activity for households actively involved 26 per cent of the eligible households with the use of *coupons* for buying up to 8-10 CFLs per household and with payment of the cost during an 18-month period on the utility bill, issued every three months. The price of the lamp - FRF 89 compared to FRF 240 during the pre-programme - was also favourable as all lamps were purchased by EDF, and not by individual shops. An incentive of FRF 5 was given to the shops per lamp sold.

A project for energy-efficient windows *in Finland* included the requirement on the future buyers when joining a consortium or buyer group to place orders, paying a minor entrance fee for participation. If there is a successful development, individual buyers will get a much higher bonus from the Finnish Government upon paying the delivery of the new windows. The same method for entrance fee is used in other projects, too, to ensure the permanent interest of the buyer group.

- x -

The conclusions drawn in this report from the analysis of earlier experience have been discussed on a number of occasions in the *Experts group*, but the author assumes the responsibility for the process finally suggested.

There might be additional valuable experience from other projects and programmes. During the work on the pilot projects and as preparation for a future workshop on experience gained, which is planned to take place in 1997, any further contributions are welcome.

The work carried out in Annex I of the IEA DSM Agreement would also contribute valuable findings.

10. PROCESS SUGGESTED

10.1 Substages and important steps for co-operative procurement

The *principle stages* in the process have been shown in order to simplify the presentation (Figure 2 above). It has already been pointed out in connection with this illustration and elsewhere, that modern product development is carried out by means of work in parallel and in a more "loop-like" manner.

The following factors are of vital importance for co-operative and technology procurement:

- early, systematic *involvement of users and buyers* for the analysis of problems and needs,
- creation of a *group/groups of buyers*, for instance with different property-owning backgrounds, representing important buyers,
- *formulation of requirements in functional terms*,
- *good communication* between customers/buyers and one or more suppliers during the development work,
- systematic build-up of a *network* including many different players,
- *support activities*.

The systematic build-up of a network includes contacts with many different buyers and users. Users can be of different categories - people actually using the product in question, but also people working with facilities management. The process also includes active work with suppliers, in groups or with individual suppliers, as well as with authorities and test organizations. All the different activities are shown in Appendix 3. Some of the different stages are shown in Figure 8 below.

Apart from the actual technological development work, preparatory work should be carried out already before the tendering stage as far as a number of *support activities or control mechanisms* are concerned.

The specification in *functional terms* is of great importance. It is essential to include in the specification other important *features* in addition to those relating to energy efficiency. The finding of *consultants suitable for the work*

on *functional specifications* is a tricky activity. It is very important to find the right consultants - consultants who have know-how and experience, not only to solve technical problems, but also to show technical solutions, to understand background and underlying needs and to see new potentialities by the formulation of functional requirements.

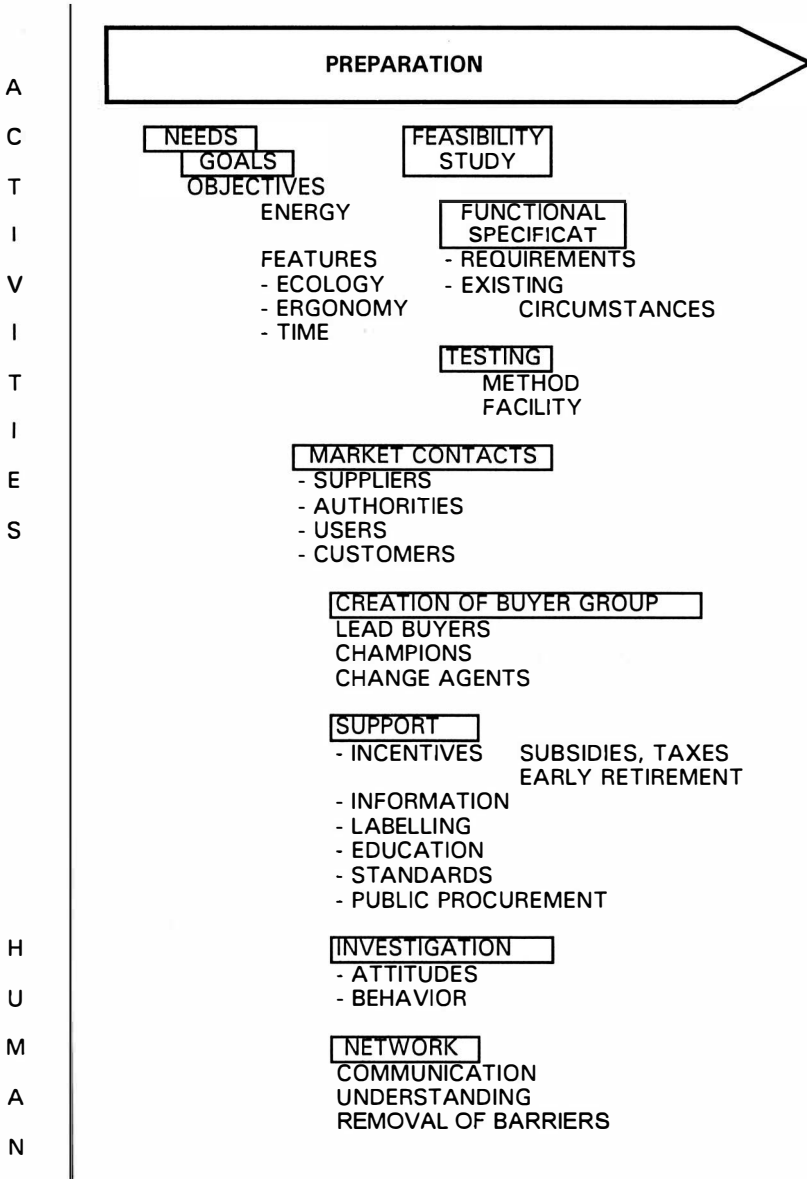


Figure 8. Co-operative procurement - Preparatory activities

It is important to know where we stand when we start a development project, to set the *goals*, and to know to what degree and when we will fulfil these goals and functional requirements.

This leads to the importance of using formulated *benchmarks* for the work on functional requirements. This can, for example, be kWh of energy per effective litre of volume in refrigerators/freezers, or kWh per kilo of laundry in clothes washers and dryers as is shown in Table 3.

(kWh/kg)	Washing	Drying	Total
Mandatory requirements	0.6	0.8	1.4
Desired requirements	0.5	0.6	1.1
Desired requirements using a heat pump	0.5	0.3	0.8

The following use has thereby been presumed:

- A Cotton articles 95° - full load
- B Cotton articles 95° - 2 kg
- C Synthetics 60° - full load
- D Synthetics 60° - 1 kg

and A - D in equal shares, i.e. 25% of the total use.

As concerns washing capacity, the equipment for washing and drying may be within the range of 3.0 - 5.5 kg. The preferences of tenants and real estate managers may vary between different residential quarters, locations of laundry rooms, etc. It is important that the equipment, also when being used with less than full load, shall provide a good electricity efficiency.

All **mandatory** and **desired** requirements for washing and drying equipment can be seen in the specification of requirements. "Mandatory" for offers to be evaluated in the contest.

Table 3. "Mandatory" and "desired" requirements and testing conditions for efficient laundry rooms of apartment blocks formulated together with a group of real estate owners (Source: NUTEK, 1992)

It should be noted in this connection that these levels should not at all be mixed up with compulsory or obligatory *minimum efficiency standards* decided by authorities in some countries. The word "mandatory" only refers to the

circumstance that the buyer(s), issuing the invitation for tenders, will *not* scrutinize any tenders that do not state that the "mandatory" level has been fulfilled.

Related to this then, is the existence of internationally *recognized test procedures*. For some areas it is important to initiate international collaboration, if such collaboration is not already under way.

The development of test procedures can be very time-consuming, if there is a difference in cultural and technical traditions in different international markets. The creation of test facilities was very important for the good results obtained in the projects for windmills in Denmark and for ventilation units for the Bundespost in Germany.

Later on in the diffusion process, it is equally important to evaluate the actual penetration of new solutions into the market.

Another important factor in the preparatory work in certain areas is the study of *behaviour and attitudes*, which may be crucial for successful penetration of the new solution. This has to be taken into consideration early in the process. Behaviourial scientists and psychologists have been tied to some projects in order to clarify the underlying procedure in respect of certain appliances.

As concerns the project for clothes washers and dryers, both quantitative analyses in the form of inquiries to 1,000 households and qualitative depth interviews and studies of about 30 households were used as a basis for the formulation of requirements.

The economy of the operation is of great importance. Benchmarking may influence the results very much. Using *LCC - Life Cycle Cost* - calculations for a project is becoming more and more important. An example is shown in Figure 9.

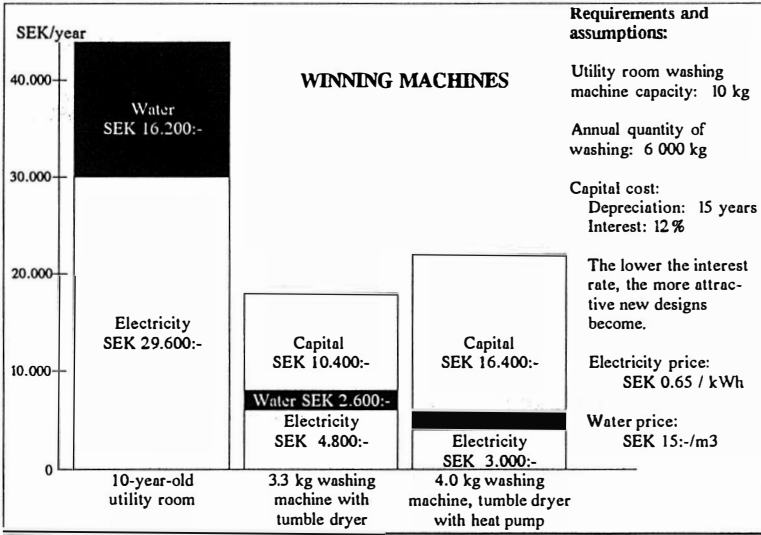


Figure 9. Life Cycle Costs. Example for clothes washers and dryers in laundry rooms. (Source: NUTEK, 1993a)

With only a small part of the whole market involved in the actual procurement and with a limited amount of seed money, NUTEK could exert a great influence on the development of the whole market, Figure 10.

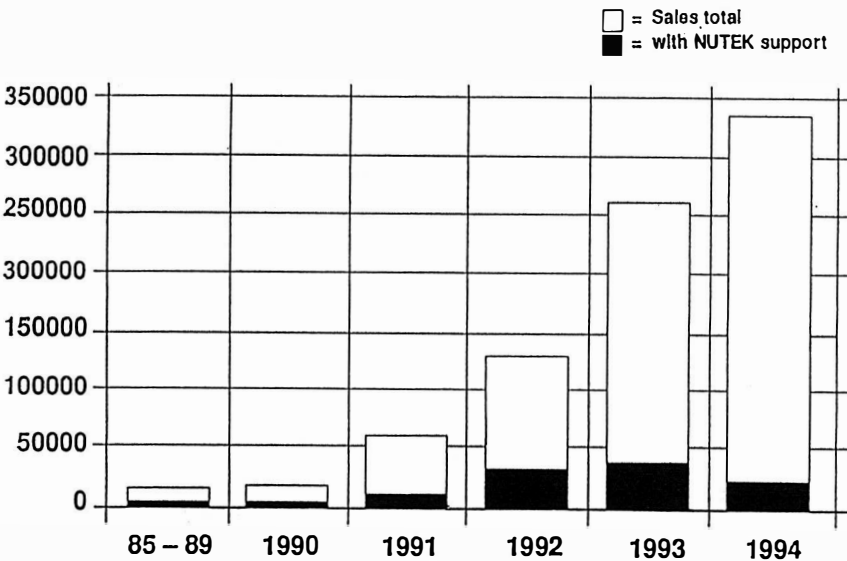


Figure 10. Yearly sales of HF ballasts in Sweden. (Source: NUTEK, 1995)

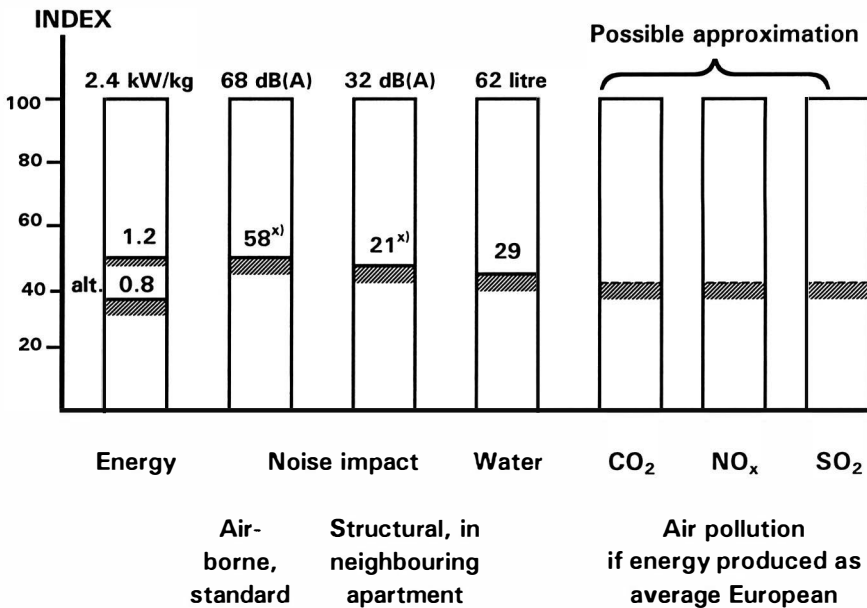
Using *features* other than those relating to energy efficiency is important, as already mentioned. Some examples from NUTEK projects are shown in Table 4. This was also stressed in many presentations at the energy conference held by ACEEE in August 1994 in Asilomar in the United States (ACEEE, 1994). Sometimes the word "externalities" is used for other features. Societal goals are often stressed as being crucial for successful technology procurement projects. Other features may include environmental impacts such as, for instance, the use of detergents as far as clothes washers are concerned, noise insulation for different appliances, labour safety and ergonomics.

Refrigerator/Freezer	Environmental impacts CFC removal from insulation and refrigeration system
Clothes Washer/Dryer	Conservation of water Reduction of the use of detergents Noise reduction
Lighting - HF ballasts & fixtures	Ergonomic aspects (less flickering) Opportunity for easy regulation of light Longer life Less frequent change of fluorescent tubes
Windows	Noise reduction If very efficient, less investment in heating systems Greater freedom of furnishing (no cold-down draught from window)

Table 4. Features important in combination with energy requirements for the acceptance and penetration of a new product

The work relating to procurement of prototypes and options for serial deliveries can be divided into some special areas of importance: different prototypes, testing and evaluation, and sometimes changes in the specifications after the study of the first prototype or even several prototypes.

The creation of more energy-efficient solutions has run parallel with substantial reductions in emissions in the form of noise or air pollutants (Figure 11).



INDEX 100 = Situation before technology procurement

^{x1} The ear perceives an increase of 10 dB(A) as though the volume has been doubled (approx)

Figure 11. Reduction of energy use and emission achieved by technology procurement projects. Example NUTEK project Clothes Washers & Dryers.

10.2 Further preparatory work

Prior to the formulation of energy requirements, characterization of the *present situation* is often required, for example for a new appliance or new solution that will have an impact on *buildings*. Statistics of the existing stock of buildings or apartments are essential, as is undertaking of market research for different equipment. A method of working developed in Finland is shown in Figure 12.

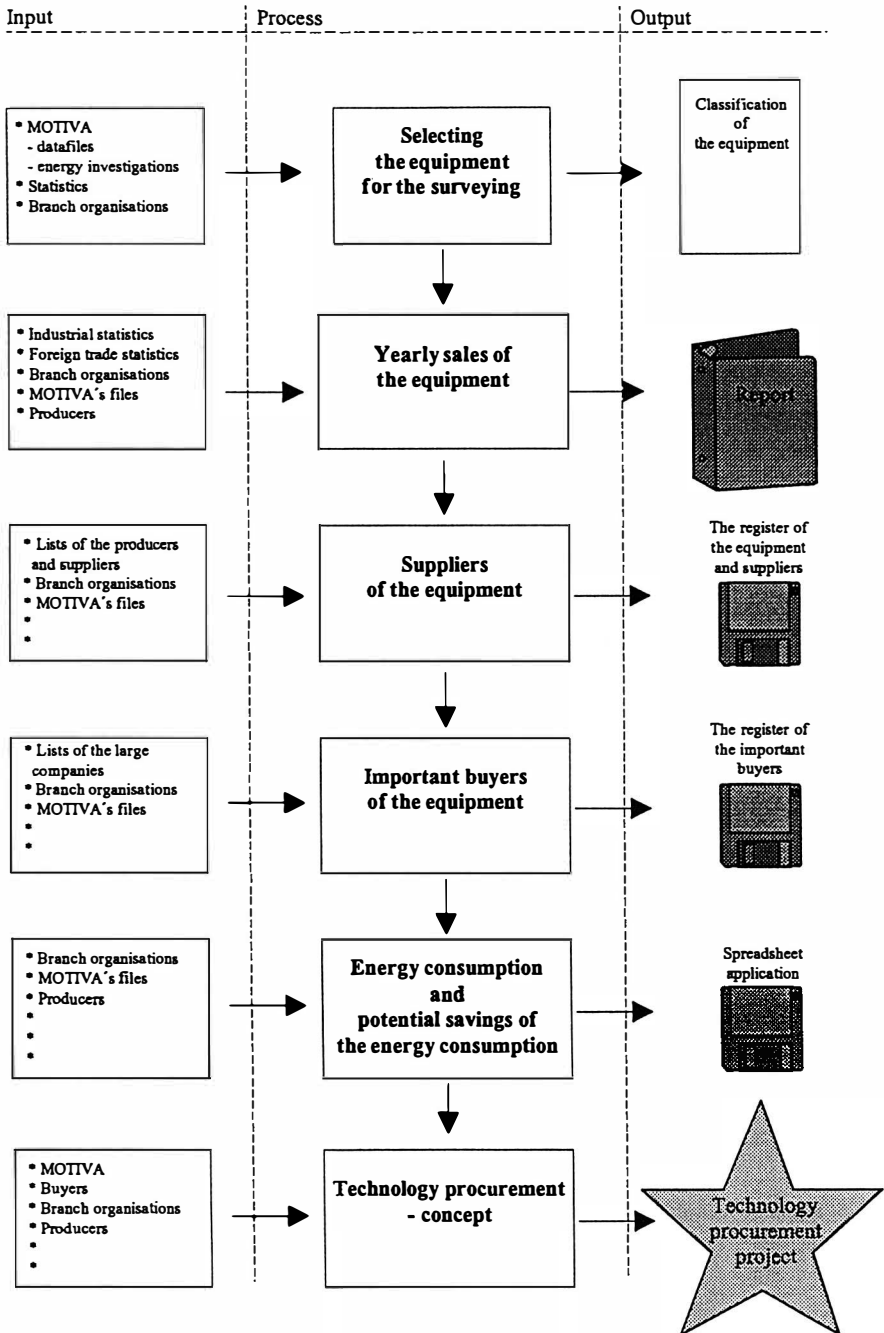


Figure 12. Market research of the energy using equipment. Method of working (Source: MOTIVA, 1994)

Creation of *user panels* may contribute valuable information.

As regards the present project in Sweden for clothes washers and dryers in apartment bathrooms, special studies of moisture/humidity reduction have been carried out in full-scale units, Figure 13.

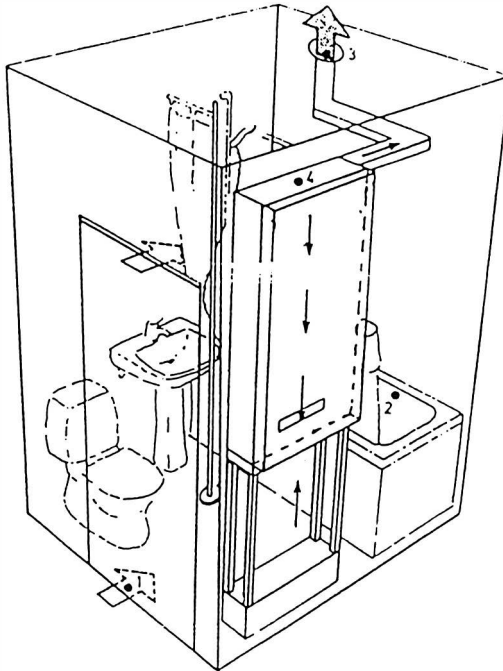


Figure 13. Bathroom model used for measuring moisture development with varying shower and clothes-drying conditions (Source: Blomqvist, 1994)

In preparing for possible activities to be taken in the field of *cooking* in Sweden, actual cooking habits in different types of households and opportunities for defining requirements and testing methods are being investigated.

In order to speed up development activities in interesting areas, it may sometimes be necessary to set up preliminary testing requirements. The international procedure for agreeing on detailed, standardized measuring methods has in some cases taken a very long time.

10.3 Different levels of requirements

The requirements and features can be divided into different groups and different *levels*. Similar thinking has been used or is being prepared in some of the countries working within Annex III.

10.3.1 Sweden

On the basis of experience obtained from the military field, Sweden has divided the requirements into mandatory or obligatory ("*skall-krav*") and desired ("*bör-krav*") requirements as can be seen from the specifications. This means that the mandatory requirements *must* be met if the tender of a supplier is to be further evaluated in a tender competition. Desired requirements are requirements the fulfilment of which will be valued positively in the process. Some examples can be seen in [Appendix 4](#). Up to now, experience has shown that the formulation of requirements has been fulfilled in such a way that mandatory requirements as well as desired requirements have been formulated: "... tougher than can be met by any existing product on the market".

In addition to energy requirements, requirements may also refer to price (cost), fulfilment of environment protective measures, environmental impacts or sometimes the time required for a process, for example for refurbishing of bathrooms, installations of lifts in existing buildings, etc.

A comparison of levels of requirements used in different countries can be seen in [Figure 14](#).

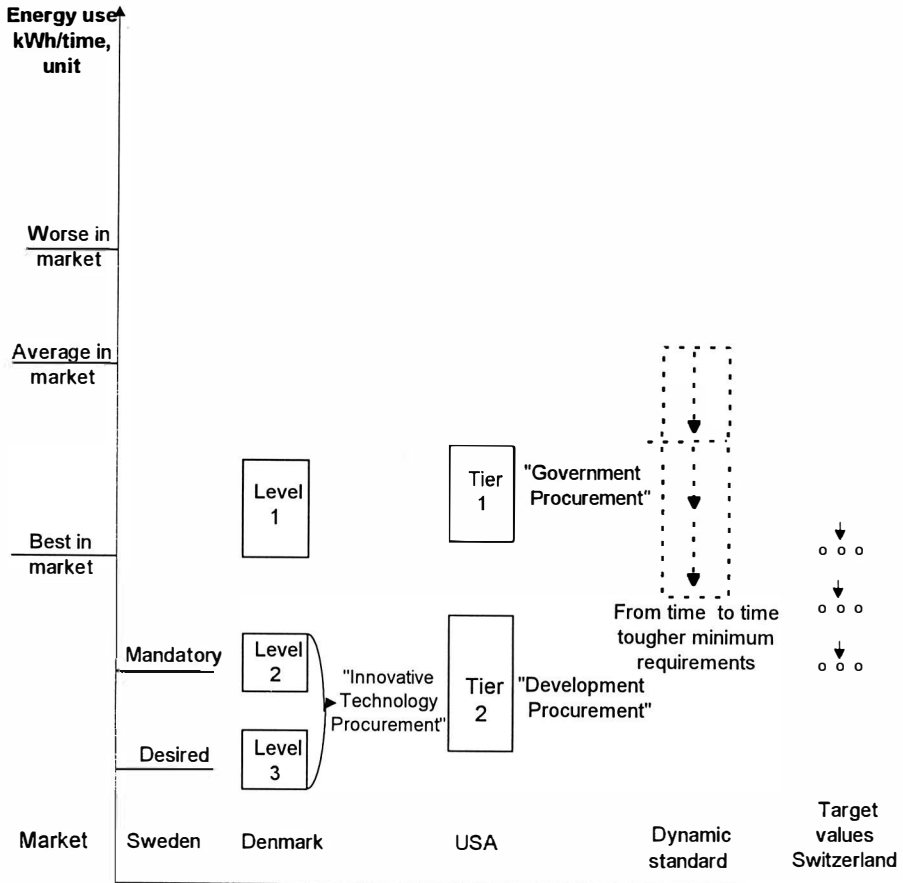


Figure 14. Different levels of requirements - international comparison

10.3.2 United States

In some energy-efficiency enhancing projects in the United States, *two or several tiers* have been used, for instance in the Energy Star and Green Light Programmes initiated by EPA, Environment Protection Agency and in the CEE programme for clothes washers. The use of functional requirements was evaluated in some reports for ETIP, the Experimental Technology Incentives Program, which was in force ten to fifteen years ago in the United States. The Department of Energy is managing a programme within the Climate Change Action Plan and the Energy Policy Act with a number of instruments to accelerate innovation and diffusion.

In many of the CEE programmes, a number of different tiers - requirement levels - are used, for example for air conditioners, washing machines, etc.

10.3.3 Denmark

Denmark has suggested three different levels in the report "Technology Procurement for Household Appliances" from the Ministry of Energy, Danish Energy Agency (1994). Purchaser groups and the organizing of such groups has also been specifically mentioned in the memo. *Level 1* is categorized as purchasing agreements and *levels 2 and 3* as technology procurement. At *level 2* there are the "demands on the appliances which cannot at present be met by products already being on the market. At this level demands are formulated that can be met by means of simple adjustments or technological improvements (based on the state of art) of existing apparatus", that is more incremental innovations. *Level 3* of technology procurement include more sophisticated requirements which are set up on the product. It may be that "a distinct research or product development effort may prove necessary before an appliance meets the demands and can be marketed. It is obvious that the higher the level of technology procurement the wider is the time horizon and the larger the amount of information required. *Level 3* initiatives may, furthermore, require considerable financial support in the form of grants or subsidy schemes."

In Denmark, "technology procurements at *levels 2 and 3* can be referred to as *Innovative Technology Procurement* as in both cases an element of innovation is involved. This report particularly addresses the topic *Innovative Technology Procurement*." It is pointed out "that in Denmark as well as internationally there is an enormous need for information retrieval and for collection and accumulation of empirical data in this specific field." Reference is also made in the memo to the International Energy Agency five-year programme.

Denmark has illustrated the combination of different activities in a "development wheel" or "product circle" - a loop, instead of the traditional, linear model (see Chapter 11).

10.3.4 Netherlands

In the Netherlands, experience has been collected from the development of electric wheelchairs (GMD, 1990), as described in Chapter 9.3. The requirements were formulated as minimum level and desirable/additional level.

10.3.5 Switzerland

In Switzerland, "target values" have been used in the "Energy 2000" programme, especially for office equipment. The principle is to negotiate voluntary agreements with manufacturers and distributors on the Swiss market in order to reach certain efficiency levels within a stipulated time limit. The level for the maximum energy consumption in respect of copiers in "off mode" is illustrated in Figure 15.

	E 2000	E 2000	TARGET VALUE
	1994	1995	DEADLINE: 1997
Off	10 W	3 W	1 W
Stand-by	20 W + 4.0*c	27 W + 3.23*c	27 W + 3.23*c

c = pages per mn

Figure 15. Labels and target values for copiers (Source: Aebischer, 1994)

10.3.6 Lighting requirements

The importance of energy efficiency and different criteria in respect of quality has been stressed (Feldstead, 1991 and Johnson, 1995). Light levels, uniform glare control, etc. have been focused on in quality guidelines. Here the levels *basic* and *preferred* are used, see Table 5.

Direct Luminaires		
Maximum Average Luminance		
	Preferred	Basic
55°	850cd/m ²	-
65°	350cd/m ²	850 cd/m ²
75°	175 cd/m ²	350 cd/m ²
85°	175 cd/m ²	175 cd/m ²
Indirect Luminaires*		
Maximum to Minimum Ceiling Luminance Ratio		
	Preferred	Basic
	4:1	8:1
*Maximum Ceiling Luminance: 850 cd/m ²		

Table 5. *RP-1 Preferred and basic criteria for direct and indirect luminaires. (Source: Johnson, 1995)*

10.3.7 Comparison between principles in different countries

Using the two different tiers in the United States, tier 1 may for example refer to the purchasing of already existing products - perhaps only to the 25 per cent best products on the market. Tier 2 then refers to the Danish levels 2 and 3, for which innovation is needed to a large extent. A comparison is made between different levels of requirements in Figure 14 above. The different levels of requirements will create challenges without hindering the proceeding, which could be the result if only one level has been defined and no offer fulfilling it has been received. There is often some uncertainty as to how far and how fast the development may proceed. The evaluation principles shall show the preferences by order of priority, if possible with relative weight. A bonus system could be formulated in the request for proposal, RFP, showing how the new, more energy-efficient solutions will be evaluated, if they prove to be better than stated in the mandatory or minimum requirement.

11. COMBINATION OF SUPPORT AND BUYER COLLABORATION

11.1 Support activities

To achieve real market acceptance/penetration, preparatory work for the use of different *incentives and control mechanisms* is important (see also Figure 8). These instruments shall help to remove existing barriers to innovation and diffusion. They include standardization and regulation, information, educational and labelling activities, as well as economic incentives, being contributions to groups of buyers or manufacturers, or to some people "in between", or for the management work required to create *buyer groups* and to keep them working together. Various support activities have been used in different countries. A schematic outline of different support activities is shown in Figure 16.

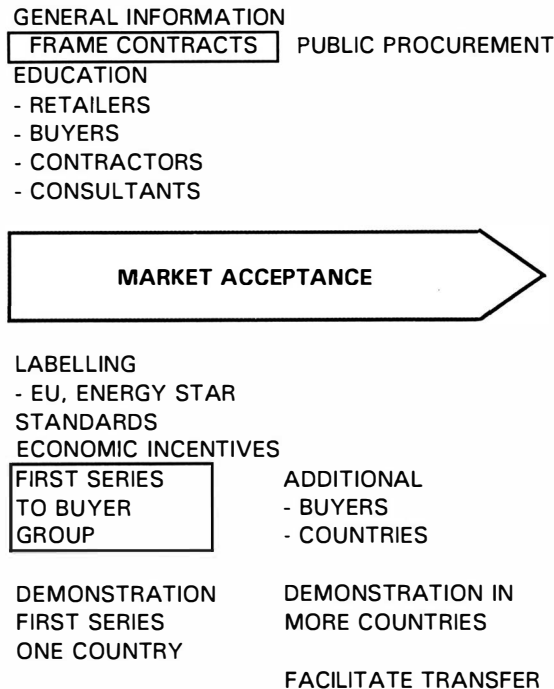


Figure 16. Different support activities

One example of the use of different mechanisms in alternatives with central or more fragmented markets is shown in Figure 17.

EFFICIENCY

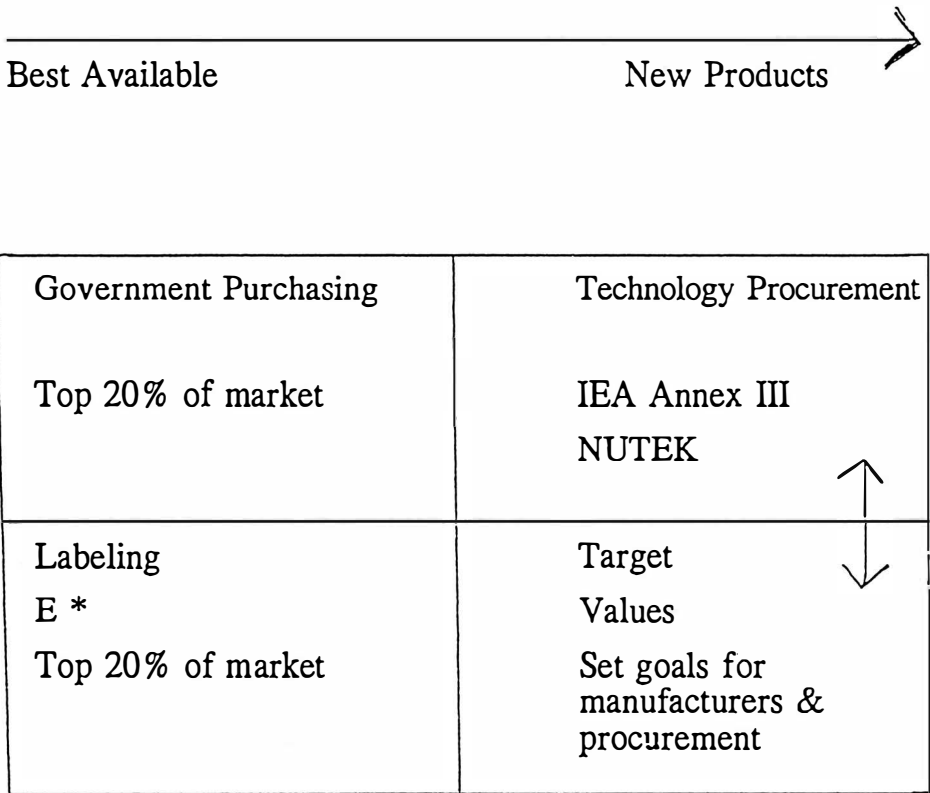


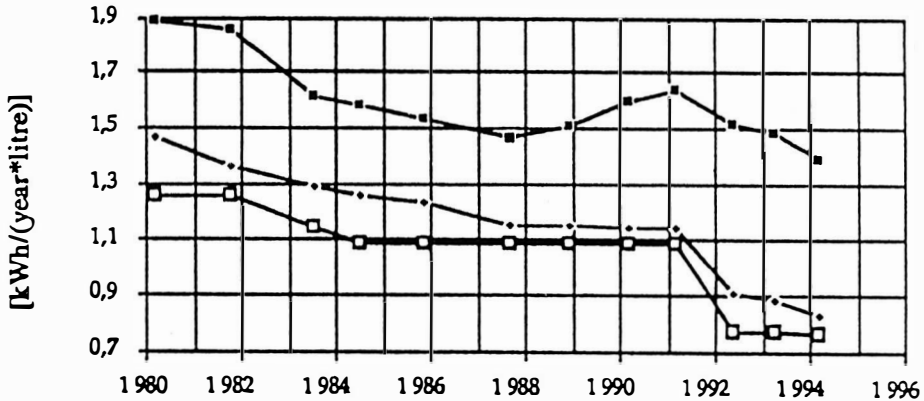
Figure 17. Use of different mechanisms. (Source: Latham, 1994)

Preparations for these support activities have to be made at an early stage. In this area, international co-operation opens up new opportunities that will be tested in the pilot projects chosen.

11.2 Total impact most important

It is important to understand that, for the acquisition of *one model*, for instance a refrigerator/freezer, the most important thing is not that this very product (brand and type) in its exact size and appearance will be a success on the market. It is the *impact* of the activity, technology procurement, that is important - the inspiration to the winner in a competition to market the

winning model, to develop additional models and to adapt the winning model to the current market situation or to different markets and segments, and the activities that this competition may result in for other suppliers, see [Figure 18](#). They will all have to protect their market shares to keep their customers.



The upper curve refers to the entire range available, the middle to the 10 most efficient and the lower curve to the most efficient unit.

By means of extrapolation, the energy number is 1.1 in 1998. Consequently, the best energy efficiency level from 1991 could become average level already in 1998.

Figure 18. Energy efficiency for refrigerator/freezer units in Sweden. Development 1980-1994. (Source: NUTEK, 1993)

In many areas, a competition will mean that the winning supplier or suppliers will have a lead over other suppliers by one to three years.

11.3 Combination of different measures

A combination of different measures can create a stepwise reduction of the energy use. [Figure 19](#) illustrates a hypothetical development in principle as a result of technology procurement, Government (public) procurement and adjusted minimum standards.

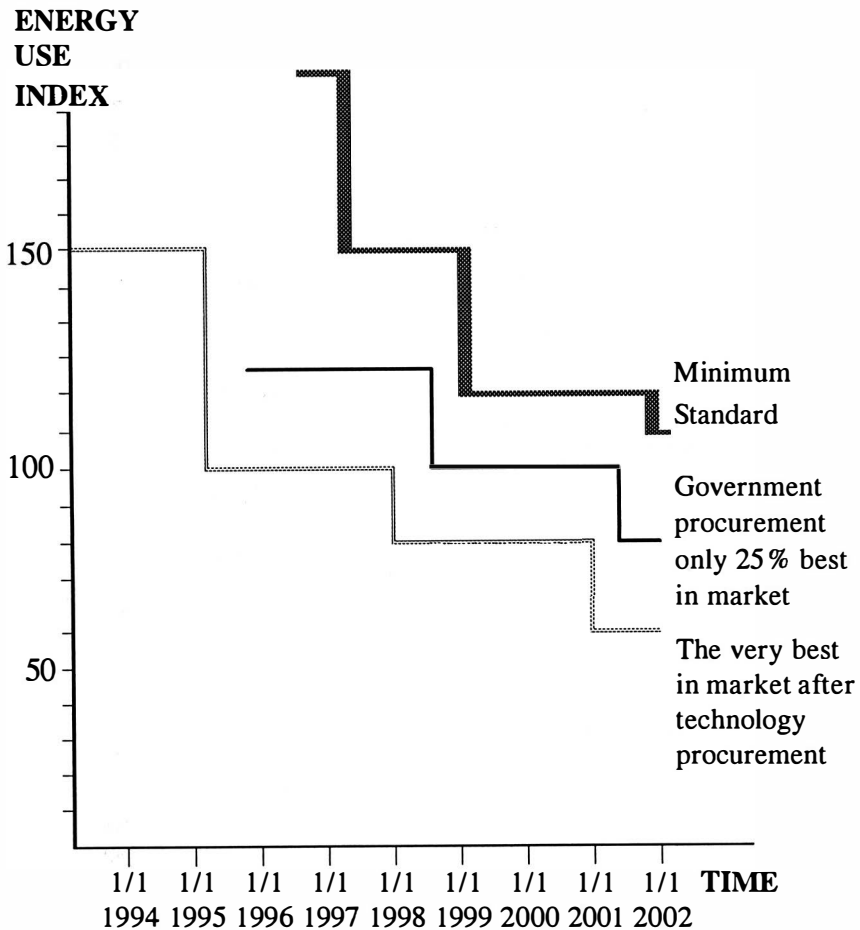


Figure 19. Combination of energy-efficiency promoting measures. A hypothetical example with index.

A recent example (also mentioned in Chapter 9.5) is the development procurement, using RFP, of small, 14-cubic foot refrigerator/freezer units in New York City, where successively lower energy consumption is required (from a maximum of 500 kWh/year in 1996, to a maximum of 355 kWh/year in 1999, 20 per cent better than the 1998 proposed standard).

Different activities by the Department of Energy, DOE, in the United States are shown in Figure 20. They include Government purchasing, labelling, education, R&D, standards, etc. The efficiency factor (gradually *more energy-efficient products*) is increasing from the left to the right in the figure.

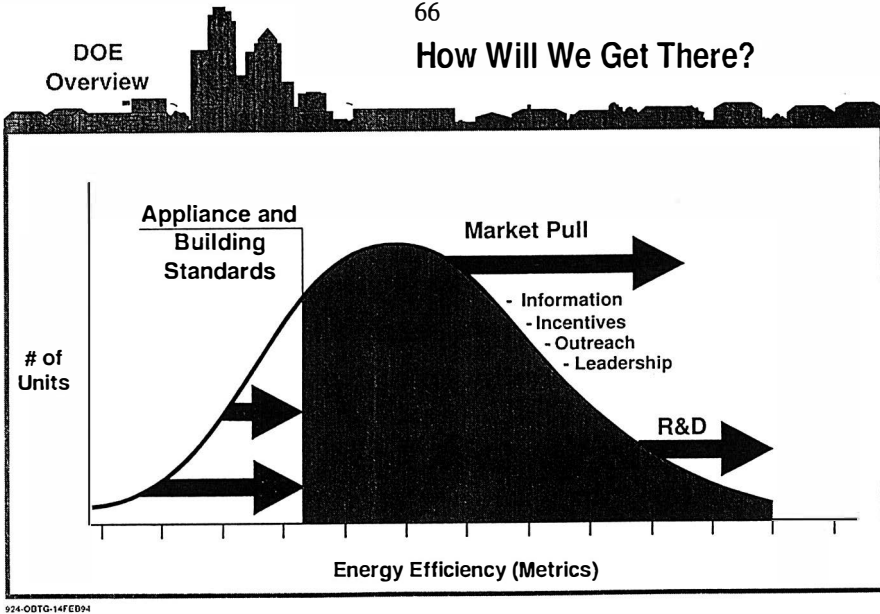


Figure 20. Department of Energy, USA - Different control instruments for more energy-efficient solutions (Source: Millhone, 1994).

A similar development has been described by Bertoldi (1992), see Figure 21, where the *use of energy* is shown on the horizontal axis, instead of the efficiency factor used by DOE. Here, gradually more energy-efficient products are shown to the left.

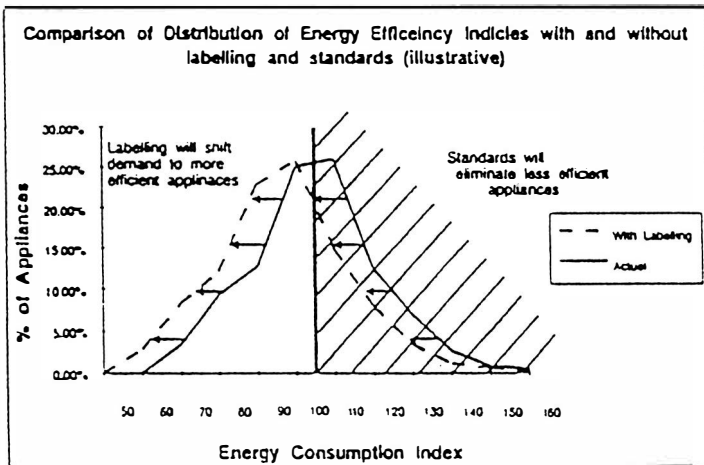


Figure 21. Combination of measures. European Commission. (Source: Bertoldi, 1994)

The combination of different activities has been very well illustrated by Denmark (Figure 22) by means of a "development wheel" or "product circle", where work is being carried out in a loop-like manner, instead of the old, more static linear model, which has been mentioned by Lundvall (in Chapter 5 and at the Paris conference). From consumer choice and behaviour over R&D and product development to co-operative procurement to accelerate market introduction, and subsequent education, labelling and purchasing policies.

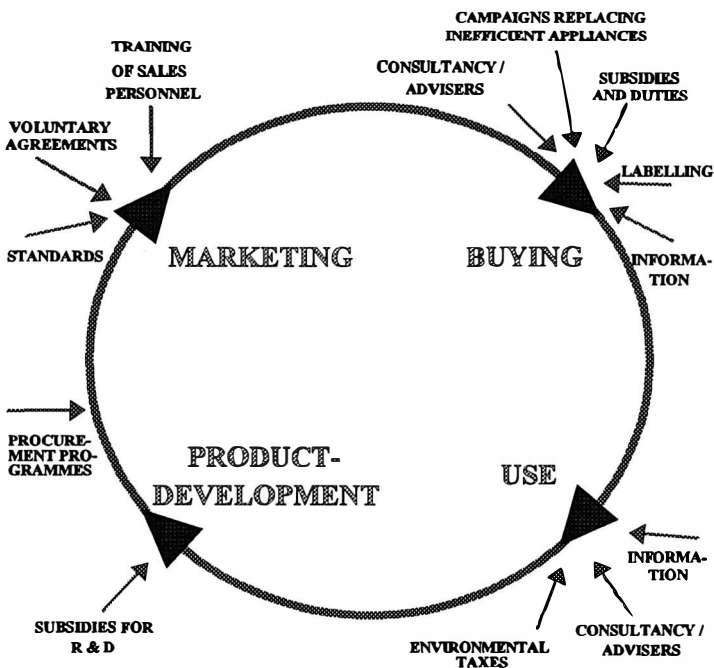


Figure 22. Combination of activities - the "Product Circle" proposed by Lene Nielsen, Danish Energy Agency.

The different instruments have also been illustrated in Figure 17 above. These instruments refer to already available products / new products, and to markets with few, central buyers / more fragmented markets (Latham & Annex III Minutes of meeting, December 1994).

One example from the Danish and EU information activities is the use of "arrows" to indicate energy efficiency - shorter arrows are better - as shown in the "Robin Hood" brochure, Figure 23. This principle has been used in appliances overviews by the Netherlands in 1989.

**2 pile-systemer
supplerer hinanden:
EU's energimærkning
og el-selskabernes
energisparepile.**

EU's ABC-pile giver kunden et godt overblik over de udstillede køleskabe og fryseres energiforbrug i forhold til hinanden. El-selskabernes energispårepile er en nuanceret oversigt, der sammenligner samtlige køleskabe og fryser.

**Følg pilene til det energirigtige
salg af køl og frys!**

Det synlige EU mærke gør det hurtigt og nemt for kunden at se, hvilken kategori (A-C) det udstillede apparat tilhører.



Energispårepilene er en oversigt, der giver en nuanceret sammenligning mellem mange apparater samtidig.



Spar på energien.
Det hjælper både miljøet og økonomien.

Energistyrelsen Energi-Spareudvalget

Følg pilene

ABC

for sælgere af køl og frys



**Et hurtigt overblik over
EU's nye energimærkning**

Figure 23. Example of information and labelling activities. Shorter arrows are better - products more energy efficient. (Source: Danish Energy Agency)

11.4 Positive remarks from manufacturers about the stimulating effects

Major suppliers, who have been involved in DSM development projects/co-operative procurement projects, have given positive remarks.

The winner of the Swedish tender competition for refrigerator/freezer units, Electrolux, expressed the following opinion about the competition:

"Electrolux is of the opinion that the concentration made by NUTEK, earlier the Swedish National Energy Administration, in the form of technology procurement of energy-efficient refrigerator/freezer units has given Electrolux an incentive for concentrating its efforts into producing energy-efficient household appliances, refrigerator/freezer units in particular. The technology procurement with test series has encouraged Electrolux to market its energy-efficient range of products to a larger extent. This has also involved designing of special marketing material, energy declarations and the 'Super Low Energy' labelling on the units." (From NUTEK, 1993).

The winner of the Super Efficient Refrigerator Program in the United States, Whirlpool, stated:

"The SERP program allowed us to accelerate the development process and bring environmentally superior products to the market sooner .. which will have all the latest technological advances to a super-efficient product and all of the quality, style, and convenience consumers expect from a Whirlpool appliance." (Statement made by Jeff Fettig, Vice President of Group Marketing and Sales, Whirlpool North American Appliance Group. From The Climate Change Action Plan, 1993.)

Many manufacturers have pointed to the fact that working with future-oriented buyers and a whole set of requirements (not only for energy but for other features as well) will facilitate the first introduction of new products and *reduce the risks* for manufacturers of developing wrong models. This stresses also the important difference between *invention* (in laboratories) and *innovation* (on the market), see Chapter 4.

11.5 Procurement collaborative efforts in the United States

A number of initiatives have been taken recently in addition to the CEE and SERP activities.

The "*Energy-Efficient Products Challenge*" is a joint Federal and Local Government purchasing programme in co-operation with private industry.

This is a *voluntary* commitment that uses Federal buying power to

- *support and expand markets* for today's "best-practice" energy-efficient and water-conserving products,
- *create new entry-markets* for advanced, high-efficiency technologies and products not yet in widespread commercial use,
- *educe Federal energy use* and greenhouse gas emissions,
- *provide a model* for other levels of Government, corporate and institutional purchasers and individual consumers.

(Harris, 1995)

"Collaboratives for Energy-Efficient Procurement"

In preparing for these collaborative activities, experience has been summarized at meetings with representatives from both State and Federal authorities, as well as from other organizations (NYSEO, 1994.)

Most States thought that the meeting should focus on "market push" defined as "encouraging more widespread purchasing and distribution of most energy-efficient equipment currently available", usually through standards and incentives. This contrasted with the opinion of representatives of Federal and other organizations, who thought that both "market push", and "market pull" should be considered. "Market pull" was defined as "promoting development or production of new, highly efficient equipment *not currently available*", usually through incentives.

Emphasis was put rather on commodity products than on building, design and construction.

Doug Richins, Director of Purchasing for Utah and new President-elect of NASPO, informed about his experience from "multi-state co-operative purchasing" in the *Western and Central region* of the country. Co-operative commodity contracts are used for the purpose of reducing administrative costs and lowering purchasing prices. Utah and several other States have been

successful in providing greater purchasing value through co-operative interstate purchasing. One of the most successful has been a consortium of States, participating in co-operative purchasing of pharmaceuticals. It was run by the State of Minnesota. They have saved approx. *20 per cent* over standard purchasing contracts, and significantly reduced *administrative costs*.

Utah belongs to the Western States Contracting Alliance, a 15 member purchasing co-operative, formed some years ago. The goals of the co-operative include energy-efficiency, environmental considerations and market improvement. Bidding of a product is usually managed by a "*lead State*" and other States participate, as desired.

Doug Richins also mentioned that there are *many potential barriers* to co-operative purchasing.

One important thing is also for the States to first assure that their *statutes* permit multi-state co-operative purchasing. Buy-in by participants and the vendor community is equally important. They may be opponents to the concept, because they wish to *preserve their distribution network*, or dump certain products in some localities. Consensus in respect of *specifications, terms and conditions*, and *distribution* requirements is essential. They are not applicable for all products, but multi-state contracts for carefully selected commodities can achieve excellent results, and when appropriately used, can be a very effective procurement method.

Similar presentations were made on multi-state co-operative purchasing in the *East Coast region* with the use of *life-cycle costing*.

Problems during the process were related to *disparity amongst State procurement methods*, proprietary considerations, local preferences and some last-minute changes *in direction*. Emphasis was laid on the value of *uniform specifications*, which helped the vendors to *consolidate their bidding* options and to *lower prices*.

Attention must be paid to the fact that many *unseen factors could impact* on a co-operative agreement, and that it is *essential to look* at all aspects prior to commitment. Another problem, not related to bidding, is the increased

difficulty in *obtaining feedback from the end-user* when multiple States use the same contract.

Contacts with *vendors* and manufacturers are essential to *identify problems* and to get them *onboard* as soon as possible, although some States *may not permit this type of open contact*.

A number of activities were planned, including access to existing data sources, procurement strategies for critical technologies, exchange of information, and pilot installations.

The Concept Diagram for the Energy-Efficient Procurement Collaborative is shown in Figure 24. Work has now been intensified in certain product areas, such as computers, office equipment, air-conditioners, motors and CFLs.

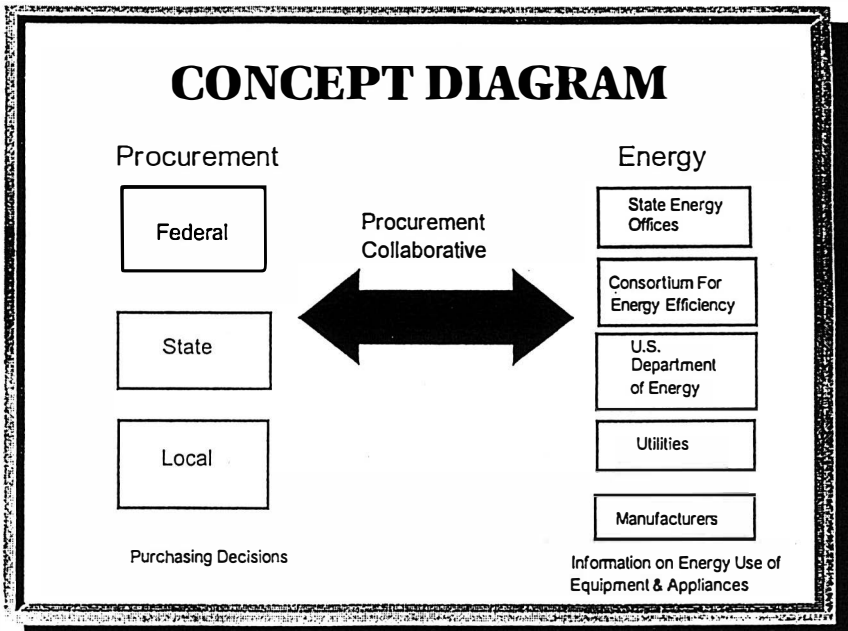


Figure 24. *Concept Diagram - Energy-Efficient Procurement Collaborative*
(Source: Costello, 1994)

11.6 Distribution channels in the United Kingdom

Other solutions have to be used in more fragmented markets. The whole "distribution chain" has to be analyzed. The United Kingdom has had good experience of working with retailers, wholesalers, multiple stores, etc. in the lighting field. The United Kingdom has joined Annex III during the summer of 1995, and valuable contributions for future work on the Market Acceptance Process are anticipated.

12. PROCUREMENT LEGISLATION - EEC/EU AND OTHERS

For the future pilot projects, special rules and laws relating to public procurement (both EEC/EU, U.S. and WTO regulations) are of particular interest. The main part here refers to EU rules, which seem to be more formalized than some national procurement regulations, for instance those applied in the United States, which allow public agencies a greater deal of latitude within the principles of competition and objectivity.

12.1 General remarks

Working in the manner described in this report has during earlier efforts shown positive, general experience. The procurement projects in Annex III have explicit *innovative purposes*. The procurement rules within the European Union (in the different Directives) and subsequent national legislation for public procurement may cause some unforeseen situations in *innovation projects* as the EU public procurement rules mainly have reference to the major part of all procurements, which, as we know, concern supplies, systems or services, already developed, existing and introduced on the market.

During meetings with representatives of the Commission of the European Union (mainly DG XV "Internal Market and Financial Services" and DG XVII "Energy"), a keen interest in the IEA Annex III co-operative procurement activities was displayed. It was decided to have continuous contacts regarding the issues concerned. Questions that arose will be further considered in the European Commission, and additional comments will be received during the preparation for concrete pilot projects. For some areas it is of particular interest to get suggestions for the work on the Market Acceptance Process.

It can also be noted that *the replies given will not be final*. This is due to the fact that there are pending cases, which may be taken up in the European Court of Justice, and which may establish guiding principles. In the EU regulations, there is no access to "the legislative history material of an enactment with considerations" as there is in some countries when submitting a proposal for the wording of an Act.

It was noted that special issues arise when work is carried out through an international organization or working group with representatives of public organizations and companies from both *EU- and non-EU countries*, and from countries which have acceded to the Agreement on Government Procurement concluded in connection with the Uruguay round, here referred to as WTO/GPA, which will succeed the previous GATT Agreement on Government Procurement as from January 1996.

It should also be noted that NATO has turned to the European Commission in questions concerning procurement. With tighter budgets, there is a desire to make procurement procedures more efficient, particularly for many items that are not directly related to weapons systems.

The limits of "public procurement" may vary in different countries. The EU rules include electric utilities and areas with important public financing. WTO/GPA is more limited in scope and coverage.

Since there are still some unclarified items regarding procurement after these preliminary contacts with the European Commission, it is suggested that the alternative stated in Article 4.c (see Appendix 5, item "International Projects") might be considered *when carrying through the pilot projects*.

This means that, to start with, procurement for these pilot projects could be carried out as being "pursuant to the particular procedure of an international organization". Additional work can be carried on in parallel with the pilot projects to bring the details into line with the EU Directives.

12.2 EU Directives

For the additional work, some findings about the EU procurement Directives for supplies, works and services in the public and utilities sectors (see Figure 25) should be mentioned.




<i>public authorities</i>			
Supplies	Works	Services	Remedies
77/62/EEC 80/767/EEC 88/295/EEC  93/36/EEC	71/305/EEC 89/440/EEC  93/37/EEC	92/50/EEC	89/665/EEC
<i>utilities</i>			
Supplies, Works and		Services	Remedies
90/531/EEC		 93/38/EEC	92/13/EEC

Figure 25. *Internal market. Public procurement legislation. Overview.*
(Source: European Commission, 1994)

The importance of *competition* and *objectivity* is stressed. There must be no "unfair treatment" with regard to giving more information to certain tenderers, or prior information about requirements only to some companies and not to all of them at the same time. This has influenced the procedure suggested in so far as certain "pre-information" activities are suggested later on in this Chapter.

It is noted that the way of using *performance requirements* in co-operative procurement/technology procurement, is perfectly in line with European Union activities.

The *contracting entity* has to be defined. Also for collaborative purchasing with framework contracts and call-off arrangements, *one juridical party* has to be defined. *One* country/organization may act on behalf of the others, or different, separate procurements can be launched with different entities. Another solution would be that an international organization, like the IEA, assumes the role as an "umbrella" organization for framework contracts, wholly subject to orders (call-offs) from individual buyers, and with no financial responsibility for the concrete buying.

There are certain *threshold values* for procurement projects, above which it is compulsory to apply the EU Procurement Directives. These values are different for the separate areas above. The minimum *time limits* for procurement projects have also been defined (see Figures App 5:1 - App 5:3 in Appendix 5).

According to the European legislation in this area, *all the criteria of evaluation* should be mentioned already in the tender documents. If possible, these criteria should also be listed in order of importance.

Another problem after the opening of tenders received (as more comprehensive contacts than clarifications and/or discussions might be needed), may be the use of *negotiations*, which might be necessary in innovation projects, the aim of which is, as we know, to inspire new, previously unknown solutions. Normally in the EU, the term *negotiated procurement* is restricted to a limited number of situations, as are the conditions for the term *research or experimental projects*, the use of which is also an instrument used for innovation in the energy field. In its Government Procurement Agreement the World Trade Organization is more open to negotiations, when commercially relevant, see below.

Normally within the EU, a written *evaluation report* will be drawn up in connection with a decision. Competitors may seek remedies against violations of the principles embodied in the EU Directives in specific courts of justice in the country concerned. The European Court of Justice for EU-countries may deal with matters of a principle nature on the initiative of the European Commission, if the Commission suspects unfair treatment in some way. However, the Commission will first request a statement from the country concerned. Within the WTO/GPA there will be similar challenge procedures.

Contacts with the European Commission - DG IV "Competition" - may shed further light on risks of situations with unfair subsidies to manufacturers, premiums to the first buyers in a buyer group in order to speed up market introduction, etc.

12.3 U.S. procurement process

In the procurement process for the U.S. Federal Government, either sealed bidding or negotiation is used. The sealed bidding procurement and solicitation document is an invitation for bid (IFB). A selection is made solely on the basis of the lowest price submitted by a qualified supplier. In a negotiated procurement, the solicitation document is either a request for proposal (RFP), or a request for quotation (RFQ). In this situation, the award is made on the basis of price *and* other technical factors (Alston et al, 1992).

As a main rule, the U.S. Government uses the competitive procurement procedure that includes the sealed bidding or competitive proposals. It is also possible to use a two-step sealed bidding procedure. In the first step, only technical proposals, without price data, are submitted. In step two, offerers whose technical proposals are acceptable submit sealed bids, and the lowest responsible offerer receives the award.

"Negotiation is one of the major methods of procurement, which is employed under certain permissive circumstances prescribed by statutes when formal advertising is determined to be infeasible and impracticable. In its more general context it is a bargaining process between two or more parties, each with its own viewpoints and objectives, seeking to reach a mutually satisfactory agreement on, or settlement of a matter of common concern." (Alston et al, 1992, in Glossary).

The impression is that, within the principles of competition and objectivity, public organizations are allowed a greater deal of latitude for choosing the procedure most suitable for the individual case.

Different terms are used in American and British English, for instance "offer/offerer", "tender/tenderer". Therefore, differences in procedure as well as in linguistic usage are circumstances that will have to be dealt with during the pilot projects.

There are also differences in experience and legislation between Europe and the United States in respect of collaboration and contacts between suppliers. In the United States, this "anti-trust-law concern" has been guiding the

preparatory contacts between a buyer, or group of buyers, and suppliers in respect of formulation of requirements and other elements in a future RFP. Therefore, early information to suppliers (see item 12.7) should be taken into particular consideration.

12.4 WTO/GPA

The WTO Agreement on Government Procurement (WTO/GPA) was negotiated primarily between the EU and the USA, and the general idea was to make sure there would be a close kinship between the procurement policies applied by these two major trading partners.

The procurement procedures in the WTO/GPA (WTO, 1994) are open tendering, selective tendering and limited tendering. The first two procedures correspond in substance to open and restricted procedures under EU Directives. The WTO/GPA limited tendering procedure permits the contracting authority to "contact suppliers individually" (Article VII:3) in certain exceptional situations which make it impractical to generate competition (enumerated in Article XV). Those situations are basically the same as those in which the EU Directives permit negotiated procurement without previous advertisement.

Bearing these common features in mind, it would be fair to assume that an EU contracting authority could apply the WTO/GPA without risking to violate the EU Directives, and vice versa. There are some differences, however, which are expected to result in amendments to the EU Directives: GPA thresholds are slightly lower; GPA forbids authorities from seeking technical advice on tender documents from persons who have a commercial interest therein; GPA requires some additional information and statistical reports.

Another difference, of particular interest to the co-operative procurement activity in the DSM project, is the attitude to so-called precontract negotiations with tenderers. The general interpretation of the EU Directives is that there is no room for such negotiations in the open and restricted procedures: the contract is awarded without prior negotiation to the tenderer that submitted the most advantageous bid. The WTO/GPA, on the other hand, allows some negotiation in connection with open or selective tendering so long as the entity has

announced its intent in this regard in the invitation to bid (Article XIV:1 (a)) or "when it appears from the evaluation that no one tender is obviously the most advantageous" (Article XIV:1 (b)). According to the WTO/GPA (Article XIV:2 and 4), negotiations "shall primarily be used to identify strengths and weaknesses in tenders", and the entity shall not in the course of negotiations discriminate between suppliers. In particular, the entities shall ensure in accordance with Article XIV:4 (a) - (d) that:

- "(a) any elimination of participants is carried out *in accordance with the criteria* set forth in the notices and tender documentation;
- (b) all *modifications* to the criteria and to the technical requirements are *transmitted in writing* to all remaining participants in the negotiations;
- (c) all remaining participants are *afforded an opportunity* to submit new or amended submissions on the basis of the revised requirements; and
- (d) when negotiations are concluded, all *participants remaining* in the negotiations shall be *permitted to submit final tenders* in accordance with a common deadline."
(author's italicizing)

It remains to be seen how a potential conflict of this kind between the EU and WTO regimes would be resolved; under WTO/GPA (Article XXIV:5), participating governments must remove conflicting provisions in their laws.

Based on these remarks, it might be preliminarily concluded that a selective tendering procedure based on the WTO/GPA, and incorporating a reservation that the award of contract might be preceded by negotiations in accordance with WTO/GPA Article XIV, would not only be suited in principle for the type of innovative procurement required in the context of the DSM project but that such a procedure would also be acceptable in countries acceding to the WTO/GPA, including countries which have incorporated the EU Directives in their respective legal systems.

12.5 Partnering and maintaining competition

Partnering, or partnership sourcing may open up opportunities as well as raise problems. "Such vertical arrangements may indeed provide scope for increased competitiveness, enhanced product quality and reduction of total costs. However, such arrangements should be approached with a certain amount of circumspection. The danger with such relationships is that they may well prevent the purchaser from dealing with other suppliers, thereby foreclosing third party competition." (Trepte, 1993.)

- x -

Future contacts with other EU DGs (as DG IV "Competition" for instance) and the World Trade Organization might contribute valuable viewpoints on the size and nature of buyer groups to be created for future co-operative procurement projects.

12.6 Procurement procedure for pilot projects

As far as Annex III work on co-operative procurement projects is concerned, it is essential to avoid unnecessary delays for the interpretation of procurement regulations. The pilot projects could therefore be treated as IEA projects, for which the special exceptions for international agreements can be applied. This report - "Market Acceptance Process" - with its suggested stages and general guidance of the WTO procurement rules and the use of the national procurement legislation in Annex III participating countries would form the framework for the IEA procedure.

In preparing for the pilot projects, it is suggested to use the following procedure (see item 12.7). This procedure is in line with the EU Directives concerned, the WTO procurement rules, and also with the principles regarding competition and objectivity used in public procurements in the United States (Trepte, 1993 and Alston et al, 1992). What is special about the situation, is that the contracting entity reserves the right - within the overall principles of competition, objectivity and commerciality - to use negotiations for the innovation projects before final decisions on procurement.

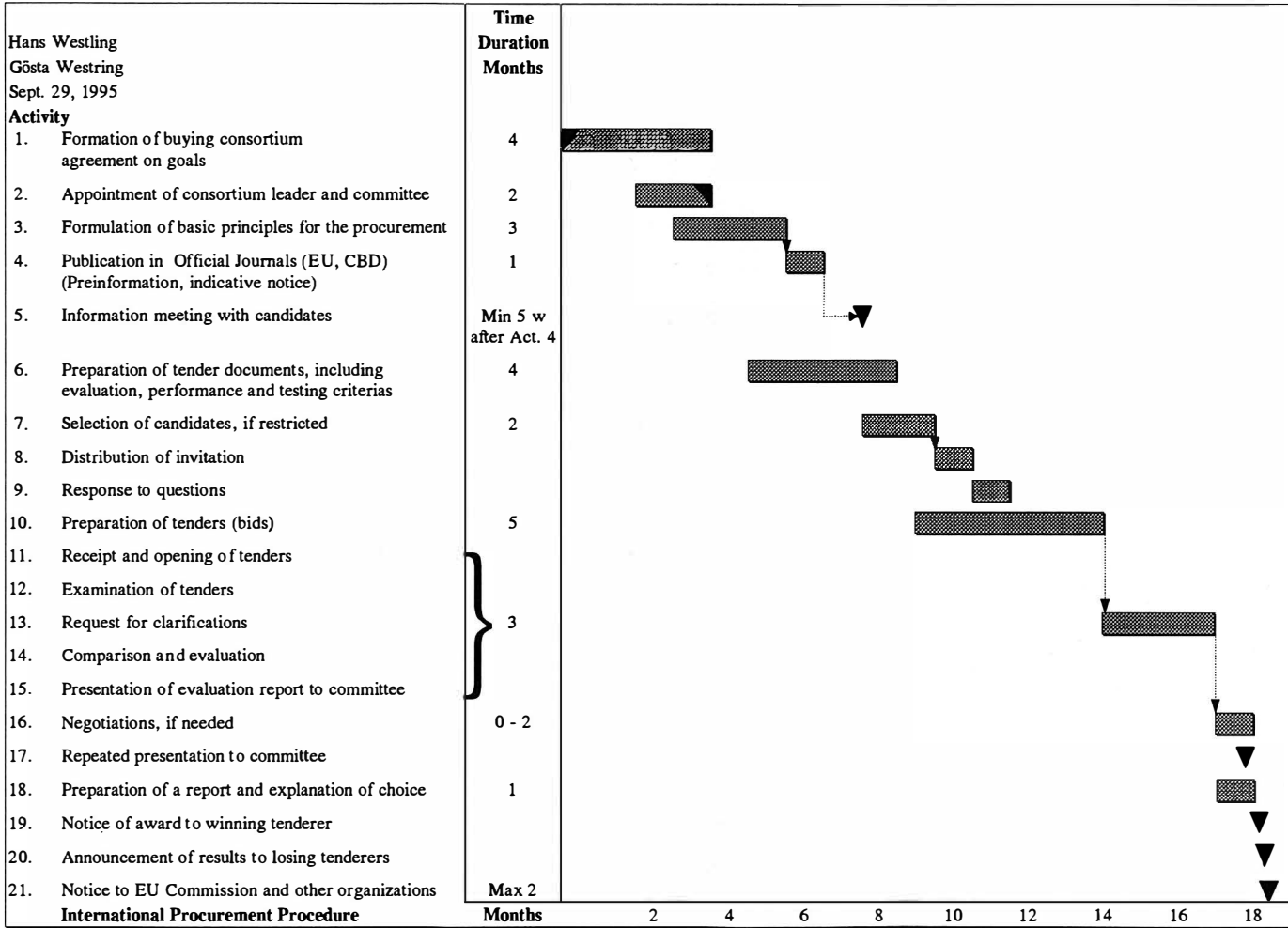
In order to decide on this policy matter, a few question marks have first to be straightened out: Would the IEA statute and operating procedures allow the IEA to assume a role as an "umbrella organization" during procurement activities? What relation should there be between the IEA and the ultimate buyers? How could the necessary need for clarifications and negotiations during the evaluation of various innovative solutions proposed by different tenderers be fulfilled during the procurement process?

If these questions cannot be satisfactorily answered, an alternative would be to request a major buying entity in a participating country to lead the consortium of buyers.

12.7 Examples of important stages in the tendering procedure suggested

The different stages are illustrated in [Figure 26](#), and detailed comments are given in [Appendix 6](#) (where Figure 26 is also presented as Figure App 6:1).

Figure 26. *Different stages in the tendering procedure with regard to EU and WTO regulations.*



It is important that goals and principles be decided early in the procurement project.

Information should be given early as *pre-information*, or indicative notice, to *all* interested parties at the same time, before any formal contacts have been taken with individual manufacturers, or groups of manufacturers. When the tender documents or RFP, which can be either a combined tender document, or a set of separate, but co-ordinated tender documents, is ready for distribution, the project must be *advertised*. Official media should be used, such as the "Official Journal of the European Communities" and the U.S. "Commerce Business Daily". In the future, *one* source might be used through the World Trade Organization. Electronic media, e.g. the "Tender Electronic Daily" (TED) have now been developed. Different paths could be chosen with prequalification, bidding in two steps (first regarding technical issues, and then price), and with steps over delivery of prototypes and testing before final decision on series delivery. The different evaluation criteria should be mentioned already in the tender documents. A written report to the European Commission and similar organizations in the United States should be planned during the evaluation, and a contract award notice should be published.

It is, of course, understood that no discriminatory actions will be allowed during these pilot procurements. Fair treatment must characterize the work.

13. DIFFERENT DEGREES OF INVOLVEMENT AMONG COUNTRIES AND BUYERS - MATRIX FOR SUPPORT

International co-operative procurement can be achieved by means of co-operation and involvement to *a varying extent*. This is very much like the situation in the cases shown in Chapter 11.5 concerning collaborative efforts among U.S. States.

A matrix can show different degrees of involvement from different countries in a number of activities, with full active participation, or more supportive participation. This may vary for different technologies.

Co-operative procurement could also be realized through formally separated bidding processes with collaboration among the buying organizations to a varying extent.

In the extreme instance, collaboration is *very loose* and only consists of the buying organizations using the *same principles* for the formulation of functional requirements and subsequent *testing* procedures. In the other end, different bidding processes are initiated at exactly the same time - during the same period of time - and evaluation is coordinated. A common decision or *separate decisions* could be made by the different buying groups. A number of alternatives are shown in Figure 27.

Co-operative procurement could be used within national borders between separate buyers, or internationally over the borders, including two or more countries.

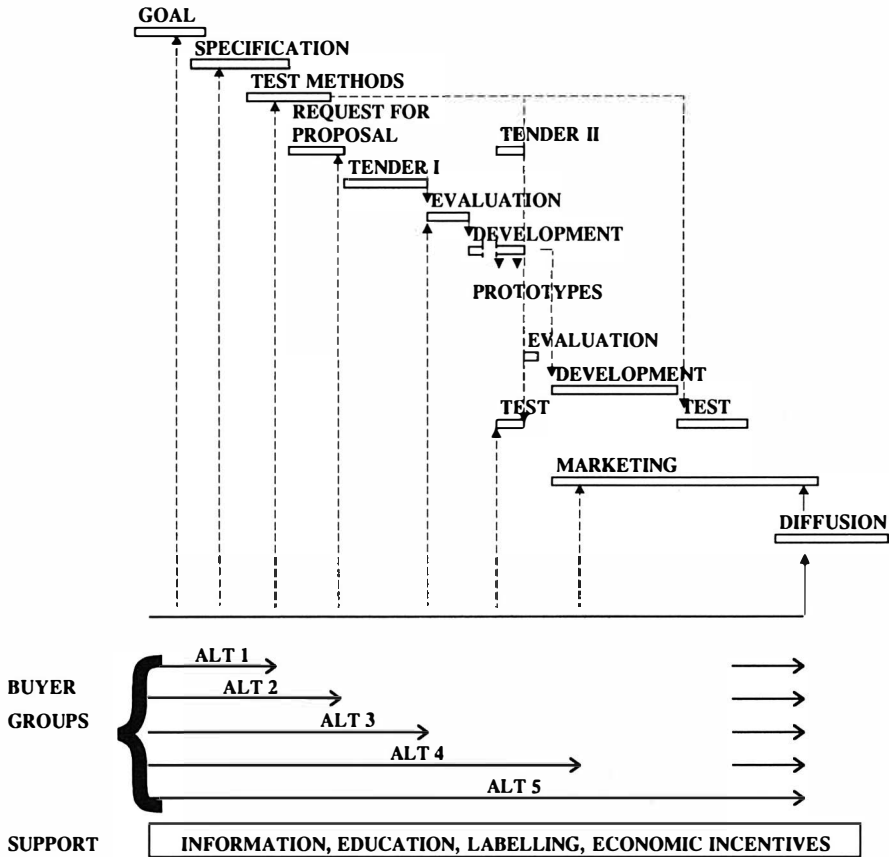


Figure 27. Schematic illustration of alternative involvement (alternatives 1-5)

Parallely with this procedure, a *checklist* could be used to show different ways of supporting procurement or co-operative work. Figure 28 illustrates an example with countries (A, B, C) and different activities. By means of symbols an example is given where *all the countries* take part in the analysis of problems and formulation of *needs*. *Some of them* work deeper than others with objectives, being energy costs, etc. A more limited number of countries take part in the forming of a group of buyers. As concerns testing, it would, on the other hand, be very useful if several countries participated in the establishing of methods. Testing facilities however, could be limited to one country. *Support* in the form of *economic incentives* includes contributions to buyers, for the actual purchase, management, demonstration of pilot projects and diversification of risks. Tax incentives can also be included in economic incentives.

X = Full active participation
0 = Supportive participation

COUNTRY	A	B	C
NEEDS	X	X	X
OBJECTIVES			
Energy	X	X	0
BUYER GROUP	X	X	-
FEATURES	X	X	-
TESTING	0	X	-
SUPPORT			
Economy	X	-	X
Information	X	X	X
CO-ORDINATING BODY			
PROJECT MANAGEMENT	X	-	-

Figure 28. Degrees of involvement from different countries. Example.

Other support activities (more often in the *information field*) can be used to a varying extent by all the participating countries for standardization, regulation, information activities such as campaigns, seminars, education, and labelling.

Finally, *project management and a co-ordinating body* is a very important factor for the success of a project. This issue has to be worked out very carefully.

During the establishing and strengthening of a *network*, contacts with different representatives of buyers, manufacturers, authorities and testing laboratories should be included.

14. FINAL REMARKS

Co-operation between different countries means that various measures can be used to influence manufacturers working world-wide. In one country, one instrument could be suitable - standardization, for example. In other countries, a labelling activity, buyer groups, Government purchasing or economic incentives could be useful instruments. So, even if the countries do not use all these instruments, the *combined results* will have a much *larger impact* on manufacturers/suppliers than is the case when an individual country tries to use the instruments that are possible and achievable for economic, legal or political reasons in the country in question.

Working in collaboration always raises new problems. This is the case already when only *one country* is involved. Experience from collaborative efforts, both in Sweden, France and between different U.S. States, shows this. But, as quoted in Chapter 11.5, the conclusion drawn, is that *collaboration is worth the effort*. Also collaborative efforts, only including some stages in preparing for a procurement, are valuable experience.

Co-operative work between different organizations, even in the same country, displays different cultural traditions. These cultural differences become even more apparent in international work. But, with patient work step-by-step, experience will gradually increase and contribute to better, more efficient solutions within a shorter period of time. But building up trust and common understanding takes time. Often it can be of great value to strengthen and deepen work within existing groups or networks.

The need for more efficient solutions becomes even stronger when the way of living in developing countries approaches that of the western world, with household appliances, increased mobility etc. and when their need for energy-consuming products increases. The impact of CO₂-emissions and other greenhouse gases will substantially increase the risks of a climate change. The process for collaborative work, using demand-side management mechanisms and co-operative procurement, including various preparatory steps and common acquisition activities, may be a valuable tool for developing countries as well.

Experience from the pilot procurement areas decided upon (which are described in [Appendix 7](#)) will contribute to refining the process of facilitating innovation and diffusion of more energy-efficient solutions.

The order in which the pilot projects will be materialized is dependent on many circumstances. Important factors are the participating countries' and organizations' resources available (funding and personnel) and the opportunities of finding and creating buyer groups. Identification of an existing group may facilitate the start of international co-operative procurement actions. Hotel chains, groups of retailers, department stores, or consumer organizations are examples in this area.

The level of complexity, the amount of cultural differences and the period of time required for development have considerable impact on the work. [Figure 29](#) is an attempt to illustrate the level of difficulty for different areas.

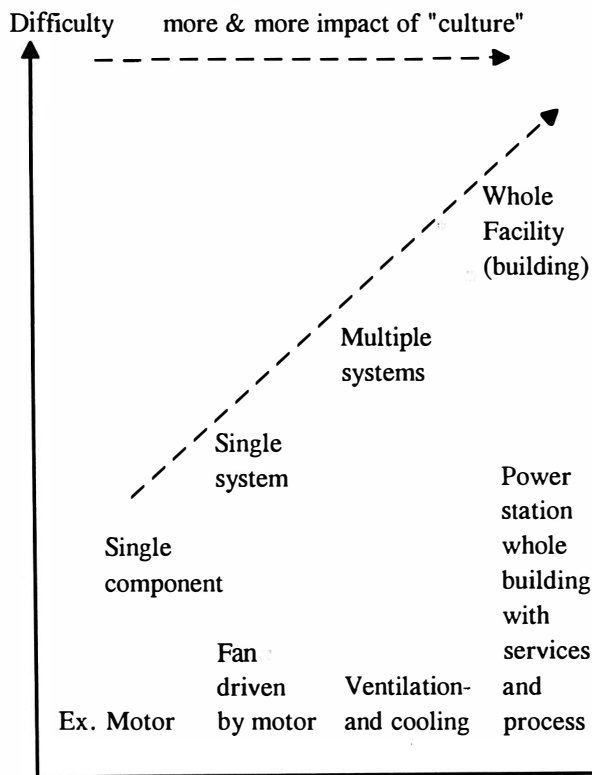


Figure 29. Product complexity "ladder"

A workshop is planned for 1997, where an evaluation report on the initial pilot projects will be discussed.

The time limit for this first subtask makes it impossible to carry out further analyses. It has only been possible to a very limited extent to include in this report experience gained in countries and organizations which have recently joined the Annex. The future collaboration will be a good source for more analyses.

The pilot projects will shed further light on the following issues:

- The way in which different procurement legislation and regulation, originally intended for the acquisition of standard products, can be adapted to an efficient product development process.
- Other legal aspects of technology procurement projects with explicit development goals.
- The way in which the use of international general agreements after co-operative procurement will be influenced by the existing structure with agents, subsidiary companies, competition legislation, subsidy restrictions, etc.
- In what way after-sales activities, maintenance service, etc. will be affected by joint agreements.
- In what way the need for efficient international management and important involvement of different national players can be balanced.
- Establishment of an initial market, identification of important players and mechanisms for the transfer to other market segments.
- If a very large buyer group would be too dominant and come into conflict with rules in respect of competition.

Some important issues as concerns principles have not been sufficiently penetrated in this context. Ongoing work within other IEA projects may also contribute. Annex I of the DSM Agreement is working on some of these issues.

1. What is the best form of economic incentives? Is it an "upstream-solution", going to players early in the distribution of manufactured products? To manufacturers or wholesalers, instead of end-users or buyers?
2. Are economic incentives always needed? Can other instruments be as effective? Target values, compulsory minimum efficiency standards?
3. What is best, a permanent (existing) buyer organization, or an *ad hoc* buyer group?
4. What will the impact of innovative efforts and penetration be when using the "winner takes all" or the "multiple winners" policy?
5. Should an economic goal be formulated (mandatory or desired) in the set of functional requirements as often as possible?
6. And finally: Which combination of innovation instruments has the maximum leverage effect in the shortest time?

All these questions will be further dealt with during the pilot projects and during the different national programmes in the energy-efficiency field.

ACKNOWLEDGEMENTS

This work has been supported by NUTEK, (Sweden), and the following organizations also participating in Annex III: the Danish Energy Agency (Denmark), MOTIVA (Finland), NOVEM (Netherlands), ENHER and ADEA (Spain), BRE and ETSU (United Kingdom), and DOE (United States). The author is especially grateful for all contributions from the Annex III Experts: Mette Lundgren-Beck, Lene Nielsen, Heikki Härkönen, Seppo Silvonen, Piet Heijnen, René Kemna, Enrique Brazis, Julio Peña, Egil Öfverholm, Paul Davidson, Melanie Slade and Jeffrey Harris. The author is also grateful for valuable contributions to Chapter 12 from Gösta Westring, attorney, Advokatfirman Cederquist, Stockholm, Claudio Romanini, Commission of the European Union, DG XV, Brussels, and Hans Sylvén, NOU, Swedish National Board for Public Procurement, Stockholm. Special thanks are also due to the speakers and participants in the Paris Conference/Workshop in November 1994, the persons and agencies responding to the Questionnaire, the special Experts for the technological areas Bernard Aebischer, Olof Molinder and Preben Munter, and a number of persons and organizations mentioned in the text.

Annex III co-operative procurement

Time schedule 1995-1999

Decisions contract – 931115	Qtr	94		1995				1996				1997				1998				1999		
		3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
III:1 Pilot market accept process																						
Workshop no1 with Draft Report 941129			•																			
Final Report				█																		
III:2 Technology screening																						
Copiers, Wet appl, Light, Vend. mach, Home elect.				█																		
Further areas				█																		
III:3 Draft spec and pilot procurement			•																			
Final decision of pilot product(s) Dec 94-Nov 95				█																		
Specification, possible buyer groups, phase 1				█																		
Spec. continued, formation buyer groups				█																		
Tendering								█														
Development											█											
Introductory series and market penetration															█							
III:4 Market contact																						
Manufacturers									█													
Organisations and authorities								█														
Customers, users								█														
Further pilot(s)											█											
III:5 Further procurement																						
Techn no2. Spec, tendering & development											█											
III:6 Evaluation																						
Experiences, analysis													█									
Workshop no2																						
Further projects: Techn no3...																						

CANDIDATE TECHNOLOGIES (AREAS OF INTEREST) - Updated June 1995

- 1. Household and commercial appliances**
 - a) Refrigerators and freezers^{x)}
 - b) Dishwashers
 - c) Clothes washers and driers
 - d) Water heaters
 - e) Stand-by losses (electronics) lighting
 - f) Cooking
 - g) Waterbeds
 - h) Low-flow shower heads

- 2. Lighting equipment**
 - a) Ballasts^{x)}
 - b) Fixtures^{x)}
 - c) Sensors^{x)}
 - d) Light sources
 - e) Traffic lights
 - f) Lighting for roads and streets

- 3. Building components**
 - a) Windows^{x)}
 - b) Insulation^{x)}
 - c) Ventilation

- 4. Heating equipment**
 - a) Boilers^{x)}
 - b) Heat pumps (water heater), gas-engined heat pumps
 - c) Solar water-heaters
 - d) Ground-source heat pumps
 - e) District heating

- 5. Office and industrial equipment**
 - a) Commercial refrigeration
 - b) Computer screens
 - c) Motors^{x)}
 - d) Variable speed drives^{x)}
 - e) Ventilation^{x)}
 - f) Copiers
 - g) Vending machines
 - h) Pumps
 - i) Cooling systems, central packaged
 - j) Auxiliary systems used by many different industries

- 6. Others**
 - a) HDTV
 - b) Fuel-conserving cars
 - c) Storage heating car motors
 - d) Home electronics
 - e) Teller machines for banks

^{x)} Areas of particular interest according to the preliminary survey at the IEA Meeting in Stockholm in March/April 1993. (Four or more countries.)

PREPARATION

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NEEDS

GOALS

OBJECTIVES

ENERGY

- FEATURES
- ECOLOGY
- ERGONOMY
- TIME

FEASIBILITY STUDY

FUNCTIONAL SPECIFICAT

- REQUIREMENTS
- EXISTING CIRCUMSTANCES

TESTING

METHOD FACILITY

MARKET CONTACTS

- SUPPLIERS
- AUTHORITIES
- USERS
- CUSTOMERS

CREATION OF BUYER GROUP

LEAD BUYERS
CHAMPIONS
CHANGE AGENTS

SUPPORT

- INCENTIVES SUBSIDIES, TAXES
 EARLY RETIREMENT
- INFORMATION
- LABELLING
- EDUCATION
- STANDARDS
- PUBLIC PROCUREMENT

INVESTIGATION

- ATTITUDES
- BEHAVIOR

NETWORK

COMMUNICATION,
UNDERSTANDING
REMOVAL OF BARRIERS

PROJECT MANAGEMENT

TENDERING

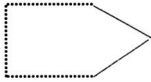
INVITATION
ADVERTISEMENT

CONTRACTORS/SUPPLIERS
PREBID INVESTIGATION

FORMULATION
OF BID

EVALUATION OF BIDS
NEGOTIATION
CONTRACT

DIFFERENT DEGREE OF INVOLVEMENT AND SUPPORT FROM DIFFERENT COUNTRIES



IN SOME CASES
IN STEPS:
- PROTOTYPE
- SERIES

TESTING



DEVELOP
- TECHN. 1
- TECHN. 2

DESIGN PRODUCT
DESIGN PROCESS
SUPPLIERS OWN
EVALUATION OF
- TECHN.
- ECON.
- MAINTEN.
- MARKET.
- ATTITUDES

PROTOTYPES 1-3
PROCESS PLANNING
TEST SERIES
TEST INTERNAL
O-SERIES

BUYER
GROUP

INTERACTION WITH

DEMONSTRATION
PROTOTYPE

EVALUATION



GENERAL INFORMATION
FRAME CONTRACTS
EDUCATION

- RETAILERS
- BUYERS
- CONTRACTORS
- CONSULTANTS

PUBLIC PROCUREMENT



LABELLING
- EU, ENERGY STAR
STANDARDS

ECONOMIC INCENTIVES

FIRST SERIES
TO BUYER
GROUP

ADDITIONAL
- BUYERS
- COUNTRIES

SUPPLIERS
PROJECT TEAM

DEMONSTRATION
FIRST SERIES
ONE COUNTRY

DEMONSTRATION
IN MORE COUNTRIES

FACILITATE
TRANSFER



**EXAMPLES OF SPECIFICATIONS WITH MANDATORY AND
DESIRED REQUIREMENTS**

Abstract from Technical Requirements and Data Requested, Appendix 3 in
Specification of Requirements for Electricity-Efficient Laundry Rooms of
Apartment Blocks

NUTEK, Sweden, February 10, 1992

The following performance requirements must be met:

When demands are made on energy and water consumption the washing effect, rinsing effect and smoothness (only for synthetics) shall attain lowest rating 4.

If the washing programme is unchanged, tests only have to be made for full load.

For testing methods and nomenclature, please refer to Appendix 7.

WASHING MACHINE

	Mandatory requirements	Desired requirements	Data requested
Capacity kg (1:13)	min. 3 kg		
Connection to cold water or cold water + hot water?			

COTTON ARTICLES WASH 95° C

Energy consumption with full load	0.5 kWh/kg	0.45 kWh/kg	
Energy consumption with 2 kg load	0.6 kWh/kg	0.5 kWh/kg	
Water consumption with full load	25 l/kg	20 l/kg	
Water consumption with 2 kg load	40 l/kg	30 l/kg	
Spin efficiency with full load	0.55 l/kg	0.50 l/kg	
Washing time with full load	80 mins	60 mins	

SYNTHETICS WASH 60°C

Full load (= half capacity)	min 1.5 kg		
Energy consumption with full load	0.5 kWh/kg	0.45 kWh/kg	
Energy consumption with 1 kg load	0.7 kWh/kg	0.6 kWh/kg	
Water consumption with full load	30 l/kg	25 l/kg	
Water consumption with 1 kg load	60 l/kg	50 l/kg	
Spin efficiency with full load	max 0.6 l/kg	max 0.5 l/kg	
Washing time with full load	55 mins	30 mins	

NB 95° 60° are fabric symbols, not recommended washing temperatures.

For machines connected to both cold and hot water the same requirements as for cold water-connected machines apply. The amount of energy supplied through hot water is calculated as follows: Hot water is assumed to have a temperature of 50°. It is heated up from 10° with an efficiency of 90%.

MISCELLANEOUS

	Mandatory requirements	Desired requirements	Data requested
Top or front loaded			
External measurements width x depth x height			
Weight			
Draining through valve (not pump)	X		
Fixed programmes ¹ (not adjustable thermostat)	X		
Stability	200 imbalance tests load = 1/3 capacity		
Clogging	X		
Service accessibility (heater, door lock, emptying valve)			
Airborne noise ²	59 dB(A) washing 70 dB(A) centrifuge	56 dB(A) washing 64 dB(A) centrifuge	
Structural noise	The National Housing Board's standards for new buildings		
Non-sensitiveness to damage ³	X		
Adapted to handicapped persons ⁴		X	
Rated wattage			
S-marking (mark of approval by SEMKO (Swedish Board for Testing and Approval of Electrical Equipment) X			
Safety measures in addition to S-marking			
Guarantee	2 years 5 years on the drum, frame, bearing housing, bearings	longer than 2 years	

Service. How speedy a service can be guaranteed?
Describe service organisation in appendix

OTHER MATTERS OF INTEREST. Special properties

¹ Attach programme description and how to choose different programmes

² Noise power level

³ Describe what makes the machine non-sensitive to damage

⁴ Specification of requirements. See appendix

DRYING APPLIANCE

	Mandatory requirements	Desired requirements	Data requested
Appliance type (tumble-drier, drying-cabinet, other)?			
Vented air - condensation - heat pump?			
Capacity cotton articles (1:30)	≥ washing machine		
Capacity synthetics (1:90)	≥ washing machine		
Electricity consumption with full load cotton articles ⁵ kWh/l ⁶	1.1 (0.55)	1.0 (0.50)	
Electricity consumption with 2 kg cotton articles kWh/l ⁶	1.3 (0.65)	1.1 (0.60)	
Electricity consumption with full load synthetics ⁵ kWh/l ⁶	1.3 (0.65)	1.1 (0.60)	
Electricity consumption with 1 kg synthetics kWh/l ⁶	1.6 (0.70)	1.3 (0.65)	
Drying time cotton articles full load ⁵	60 mins	30 mins	
Drying time synthetics full load	40 mins	25 mins	
Noise ⁷	59 dB(A)	55 dB(A)	
Type of automatic system	moisture sensing		
Fixed programmes (attach description)	X		
Non-sensitiveness to damage ⁸			
Adapted to handicapped persons ⁹		X	
Easy to remove fluff (attach description)	X		
Rated wattage			
Safety S-marking (mark of approval by SEMKO (Swedish Board for Testing and Approval of Electrical Equipment) X			
Safety measures in addition to S-marking?			
Service - see Washing Machine			
Guarantee	2 years 5 years on the drum, frame, bearing housing, bearings	5 years	

OTHER MATTERS OF INTEREST. Special properties

- ⁵ Refers to amount of laundry and spin efficiency in washing machine included in the tender
- ⁶ Figures in brackets refer to drying appliance connected to heat pump
- ⁷ Noise power level
- ⁸ Describe what makes the machine non-sensitive to damage
- ⁹ Specification of requirements. See appendix

EU DIRECTIVES AND TECHNOLOGY PROCUREMENT

Examples of detailed formulation in different EU Directives which may be of importance for technology procurement projects with explicit development purposes

The Directives have been followed by different national procurement acts, which might include minor differences.

It should be underlined that the principles for public procurement applied within the EU are in essence good. They give the procedure a commercial character and emphasize maintaining competition and objectivity. However, they have been drawn up mainly for the purchasing of already existing, already developed goods or services, often standardized, and not specifically for development projects.

Figure App 5:1 (Figure 25 in the main text) gives an overview of the internal market public procurement legislation with different Directives for public authorities and utilities in respect of supplies, works and services. Figure App 5:2 a and b illustrates the minimum time limits for procurements. The threshold values for these areas are shown in Figure App 5:3.




<i>public authorities</i>			
Supplies	Works	Services	Remedies
77/62/EEC 80/767/EEC 88/295/EEC  93/36/EEC	71/305/EEC 89/440/EEC  93/37/EEC	92/50/EEC	89/665/EEC
<i>utilities</i>			
Supplies, Works and		Services	Remedies
90/531/EEC		 93/38/EEC	92/13/EEC

Figure App 5:1. Internal market. Public procurement legislation. Overview. (Source: European Commission, 1994)

Minor changes are now being prepared in the EU Directives in order to create conformity with the WTO Public Procurement Agreement which is planned to take effect as of January 1996.

(a) Public sector

Number of days from date of dispatch of * notice or ** invitation to participate	Open procedure	Restricted procedure ²	Negotiated procedure with prior publication of notice ²	Accelerated procedure ³	Contract award
<i>Without</i> prior indicative notice ⁴	≤ 52 *	≤ 40 **		≤ 10 **	≥ 48
<i>With</i> prior indicative notice ⁴	≤ 36 *	≤ 26 **			
Time limit for request to participate in restricted or negotiated procedure		≤ 37 *		≤ 15 *	
Contract information ⁵	≥ 6 from application	With invitation			
Additional information ⁵	≤ 6 Before date fixed for receipt of tenders			≤ 4	

*Figure App 5:2 a. Time limits for receipt of tenders and contract information: Works, supplies and services.
a) Public sector. (Source: Trepte, 1993)*

(b) Utilities sector

Number of days from date of dispatch of * notice or ** invitation to participate	Open procedure	Restricted procedure ²	Negotiated procedure with prior publication of notice ²	Contract award
<i>Without</i> prior indicative notice ⁴	≤ 52 *	Either • mutual agreement or • general rule: 3 weeks ** minimum : ≤ 10 days ** ⁶		2 months
<i>With</i> prior indicative notice ⁴	≤ 36 *			
Time limit for request to participate in restricted or negotiated procedure		General rule: 5 weeks * ** minimum : â 15 * ** ⁷		
Contract information ⁵	≥ 6 from application	With invitation		
additional information ⁵	≤ 6 Before date fixed for receipt of tenders			

*Figure App 5:2 b. Time limits for receipt of tenders and contract information:
Works, supplies and services.
a) Utilities sector. (Source: Trepte, 1993)*

The EU Directives have been studied exclusively for the reason that 6 of the 7 countries participating in Annex III at the moment belong to the European Union and that these rules are stricter than the U.S. rules.

	Works	Supplies	Services*
Public sector	5,000,000	200,000 (125,672)**	200,000
Utilities sector: water, energy and transport	5,000,000	400,000	400,000
Utilities sector: telecommunications	5,000,000	600,000	600,000

*Where a design contest is organised independently of a procedure for the award of a services contract, the relevant threshold for all contest prizes and payments is ECU 200,000. In the case of the utilities sector, the relevant threshold will be the same as for contracts.

**Threshold value in the case of contracting authorities under GATT.

*Figure App 5:3. Threshold values (figures in ECU net of VAT)
(Source: Trepte, 1993.)*

The wording examples of special interest in technology procurement projects shown below are in principle the same in the Directives for Supplies, Works and Services as far as public authorities are concerned. For utilities, there are variations, one important being the greater freedom for contracting entities to choose between open, restricted and negotiated procedures.

International projects

Where an international organization is involved, Art. 4 of Council Directive 93/36/EEC stresses the following with regard to supply contracts:

"This Directive shall not apply to public supply contracts governed by different procedural rules and awarded:

- (a) in pursuance of an international agreement concluded in conformity with the Treaty, between a Member State and one or more non-member countries and covering supplies intended for the joint implementation or exploitation of a project by the signatory States; all agreements shall be communicated to the Commission, which may consult the Advisory Committee for Public Contracts set up by Decision 71/306/EEC;

- (b) to undertakings in a Member State or a non-member country in pursuance of an international agreement relating to the stationing of troops;
- (c) pursuant to the particular procedure of an international organization."

The latter could apply in the case of Annex III, namely if the IEA as an international organization adopts the proposed Market Acceptance Process with regard to procurement.

Development projects

Art. 8, para 3 (93/36/EEC) of Title II Common rules in the technical field, states:

"A contracting authority may depart from paragraph 2 (i.e. not to use European standards, author's comments) if:

.....

- (d) the project concerned is of a genuinely *innovative nature* for which use of existing European standards, European technical approvals or common technical specifications would not be appropriate."

The reasons for not going by European standards shall, however, be recorded.

Para 4 states:

".... Contracting authorities... shall record wherever possible, the reasons for doing so in the tender notice published in the *Official Journal of the European Communities* or in the contract documents and in all cases shall record these reasons in their internal documentation and shall supply such information on request to Member States and to the Commission."

The need for non-hindrance of innovation is formulated in the Utilities Directive, Art. 18 para 6 (93/38/ECC):

".... Contracting entities may derogate from paragraph 2 if:

....

- (d) the relevant European specification is inappropriate for the particular application or does not take account of *technical developments* which have come about since its adoption. ..."

Information to the appropriate standard organizations might be advisable.

Named solutions - suppliers

It also says, self-evidently we may think, that the technical specifications may not stipulate special trade marks or a special process that can favorise or eliminate certain tenderers. However, "or equivalent" may be written in special cases.

Art. 16 of Title IV, Chapter I, Common rules on participation, states that there is a right to lay down minimum specifications. Furthermore, it says that the tender notice should state if variants are not permitted. Normally, technology procurement projects have minimum specifications and are outspoken and open to (better) variants.

Alternative solutions, variants

When the criterion for the award is "the most economically advantageous tender", the contracting authorities may take account of variants which are submitted by a tenderer and meet the minimum specifications required (authors's underlining).

Art. 16, para 1 (93/36/EEC) treats a matter worth considering:

"Contracting authorities may not reject the submission of a variant of the sole grounds that it has been drawn up with technical specifications defined by reference to national standards transposing European standards, to European technical approvals or to common technical specifications referred to in Article 8 (2), or again by reference to national technical specifications to in Article 8 (5) (a) and (b)."

It is also important to pay attention to para 2:

"Contracting authorities which may have admitted variants pursuant to paragraph 1 may not reject a variant on the sole grounds that it would lead, if successful, to a service contract rather than a public supply contract within the meaning of this Directive."

Negotiated procedure

The EU Directives give different circumstances for negotiated procedures *with* and *without* publication.

It is important to consider the following passage in Article 6 (93/36/EEC) when going over to "negotiated procedures":

".... The contracting authorities shall in these cases publish a tender notice unless they include in such negotiated procedures all the enterprises satisfying the criteria of Articles 20 to 24 which, during the prior open or restricted procedure, have submitted tenders in accordance with the formal requirements of the tendering procedure."

In the beginning of Council Directive 93/36/EEC it is stated:

".....

Whereas provision must be made for exceptional cases where measures concerning the coordination of procedures may not necessarily be applied, but whereas such cases must be expressly limited;

Whereas the negotiated procedure should be considered to be exceptional and therefore applicable only in limited cases;

...."

One comment is that

- to start with, purchasing projects with the explicit goal of innovation, such as technology procurement projects, are exceptional projects among all the thousands of "normal" purchasing projects, and
- that the probability is much greater for innovative procurement projects to run into a situation mentioned in Art. 6 para 1-3 when a change to a negotiated procedure with or without notice is allowed (irregular, unacceptable, absence or inappropriate, purely research experiment, etc). Tougher requirements and new, unforeseen solutions work for such situations.

Restrictive and negotiated procedure (93/36/EEC Article 19; supplies, works and services)

"... select from among the candidates with the qualifications required by Articles 20 to 29 those whom they will invite to submit a tender or to negotiate."

Restrictive procedure

"... they may prescribe the range within which the number of suppliers which they intend to invite will fall".

... "The range must number at least 5 and may be up to 20."

In any event, the number of candidates invited to tender shall "be sufficient to ensure genuine competition".

Utilities (supplies, works, services) for entities operating in the water, energy, transport and telecommunications sectors

These entities have more freedom to choose open, restricted or negotiated procedures.

In the last two cases with or without prequalification (93/38/EEC) Article 1, para 7 (c):

- "(c) In the case of negotiated procedures, the contracting entity consults suppliers, contractors or service providers of its choice and negotiates the terms of the contract with one or more of them;"

Article 20:

- "1. Contracting entities may choose any of the procedures described in Article 1 (7), provided that, subject to paragraph 2, a call for competition has been made in accordance with Article 21." (notice, periodic indicative notice or notice on the existence of a qualification system).

References to quality

Pursuant to Art. 23 "evidence of the supplier's technical capacity" could be asked for which

"... may be furnished by one or more of the following means according to the nature, quantity and purpose of the products to be supplied:

- (a) a list of the principal deliveries....
 - where effected to public authorities
 - where effected to private purchasers
- (b) a description of the supplier's technical facilities
- (c) indication of the technicians or technical bodies involved
- (d) samples, description and/or photographs of the products to be supplied
- (e) certificates drawn up by official quality control institutes
- (f) where the products to be supplied are complex or, exceptionally, are required for a special purpose, a check carried out by the contracting authorities or on their behalf by a competent official body of the country in which the supplier is established, subject to that body's agreement, on the production capacities of the supplier and if necessary on his study and research facilities and quality control measures."

Evaluation criteria

In Art. 26 it is stated as follows:

"1. The criteria on which the contracting authority shall base the award of contracts shall be:

- (a) either the lowest price only;
- (b) or, when award is made to the most economically advantageous tender, various criteria according to the contract in question: e.g. price, delivery date, running costs, cost-effectiveness, quality, aesthetic and functional characteristics, technical merit, after-sales service and technical assistance.

2. In the case referred to in point (b) of paragraph 1, the contracting authority shall state in the contract documents or in the contract notice all the criteria they intend to apply to the award, where possible in descending order of importance."

The third paragraph of Art. 27 states:

"If the documents relating to the contract provide for its award at the lowest price tendered, the contracting authority must communicate to the Commission the rejection of tenders which it considers to be too low."

Framework agreement

It could also be useful to study Council Directive 93/38/EEC The Utilities Directive.

In Art. 1, para 5 "framework agreement" is mentioned. It is furthermore stated that "... contracting entities may not misuse 'framework agreements' in order to hinder, limit or distort competition".

In Art. 7 it is stated:

"1. This Directive shall not apply to contracts awarded for purposes of resale or hire to third parties, provided that the contracting entity enjoys no special or exclusive right to sell or hire the subject of such contracts and other entities are free to sell or hire it under the same conditions as the contracting entity."

Reports, notices etc. (93/36/EEC, Article 7)

Notice of award to winning tenderer.

Announcement of result to losing tenderers.

Prepare explanations (of reasons for rejection and grounds on which not to award) to be sent to losers on request.

Notice to EU Commission on contract award (Official Journal).

Prepare a written report to EU Commission on request.

27 September 1995
 G. Westring/
 H. Westling

APPENDIX 6
 Page 1 (6)

**DIFFERENT STAGES IN THE TENDERING PROCEDURE
 (fulfilling public procurement regulations and promoting technical
 innovation) - Outline of restricted tendering process**

For detailed comments to the stages see Figure App 6:1.

0. *Principles* should be drawn up for formulating functional requirements, testing, setting up groups of buyers and possible support activities.

By way of introduction, the direct and indirect significance of energy efficiency to the environment, should be underlined.

1. *Formation of buying consortium*, EU and non-EU members, (agreement on goals) perhaps under the IEA as an "umbrella organization";
2. *Appointment of consortium leader and committee* to which leader reports (the appointed leader might be major public utility in an EU country);
3. *Formulation* (and approval by committee) *of basic principles* and assumptions for:
 - a) structure of purchase agreement (pilot or framework);
 - b) functional requirements (= preliminary technical specifications);
 - c) quantity of purchase (estimated or committed);
 - d) qualification requirements of candidates (technical experience; record in innovation);
4. Preparation and *publication in EU Official Journal, Commerce Business Daily (USA)*, (and elsewhere to cover "market"), calling for competition (see Directive 93/38/EEC, Art. 21:1 (a) and Annex XII B re. content of notice; Art. 26:2 (a) re. time limit = minimum 5 weeks);

A copy of this notice should be forwarded — *at the earliest, on the day it has been sent to the EU Bureau of the Official Journal and similar media* — to companies that have shown an interest in the matter, or who are believed to be interested.

The notice should state areas concerned, how it is intended to organize the project and invite interested parties to address questions about the planned activities to the IEA Annex III subcommittee.

It is noted that if a seminar is held in conjunction with a fair such as the "Domotechnica" Trade Fair for household appliances in Cologne, it may *not* according to EU regulation be sufficient to invite every exhibiting company that is included in the fair catalogue. A notice should be published in the Official Journal as well.

5. *Information meeting with candidates*; discussion especially about
- functional requirements, minimum technical standard, potential for further technical refinements
 - techniques of mixing price and technical performance criteria in evaluation of tenders
 - time for preparation of tenders (min. 3 weeks as per Art. 26:2 (b), but perhaps more to allow development)
 - commercial aspects, including conditions of contract, general and particular re. payment terms, etc.

An information meeting and seminar could be held in conjunction with a leading international trade fair, e.g. the "Domotechnica" Fair. Exhibiting companies included in the fair catalogue should be invited, together with those who have taken part in the same activity in previous years, or who have shown an interest by replying to the pre-information notice in the Official Journal(s).

6. *Preparation of tender documents*, incorporating definite technical specifications (performance criteria), evaluation criteria and conditions of contract (ref. Art. 28:4);

While the specification of requirements is being drawn up, but long before it has been completed, *general information* may be given to companies who have shown an interest in the notice in the Official Journal. The notice will have stated that the Annex III subcommittee for the specific technology is open to comment.

In drawing up the final specification of requirements, it is important to state the *criteria for evaluation* in the specification of requirements. They should preferably be given in *order of priority*. However, a complete index or points table for them is not necessary. It is fully permissible not to go for the lowest price. Other criteria can be used if this is stated from the start. It is something which requires careful evaluation. These criteria may relate to energy efficiency, the life-cycle aspect, new-development value, environmental considerations, or ergonomomy.

The difference between "desired requirements" and "mandatory requirements" should be clarified, and it should be established that the "mandatory" requirements relate solely to the specific innovation project and its *procurement* and must not be confused with "minimum efficiency standards" in other contexts (e.g. EU standards).

It is important to describe the right to carry on work in several stages - for example, to make a proper evaluation of newly-developed prototypes - before the final order of series will be made.

7. *Selection of candidates* to be invited to tender, within range stated in notice, sufficient to ensure competition (see Art. 31), but limited enough to encourage real effort by those selected;

8. *Despatch/distribution of invitation* to tender and tender documents (request for proposal) to selected candidates;
9. *Response to queries* regarding tender documents, if any, communication of response to all tenderers, and amendment to tender documents if query gives rise to reconsideration of any aspect of documents;
10. *Preparation of tenders/offers/proposals* (4 - 6 months);
11. *Receipt and opening of tenders* (opening should take place immediately after deadline and a record should be made of tenders received, including any special remarks);
12. *Examination of tenders* to check conformity with tender documents, especially re. fulfilment of minimum technical requirements;
13. *Requests for clarifications*, if necessary, to tenderers;
14. *Comparison and evaluation* of responsive (conforming) tenders according to stated criteria;
15. *Presentation of evaluation report to committee* of buying consortium and authorization to award contract, if necessary conditional upon negotiation ("when it appears from the evaluation that no one tender is obviously the most advantageous", see WTO Government Procurement Agreement, Art. XIV:I (b), or indicated such content in a notice of proposed procurement Art. XIV:1 (a));
16. *Negotiations*, if needed;
17. *Repeated presentation to committee*, if necessary or so instructed;

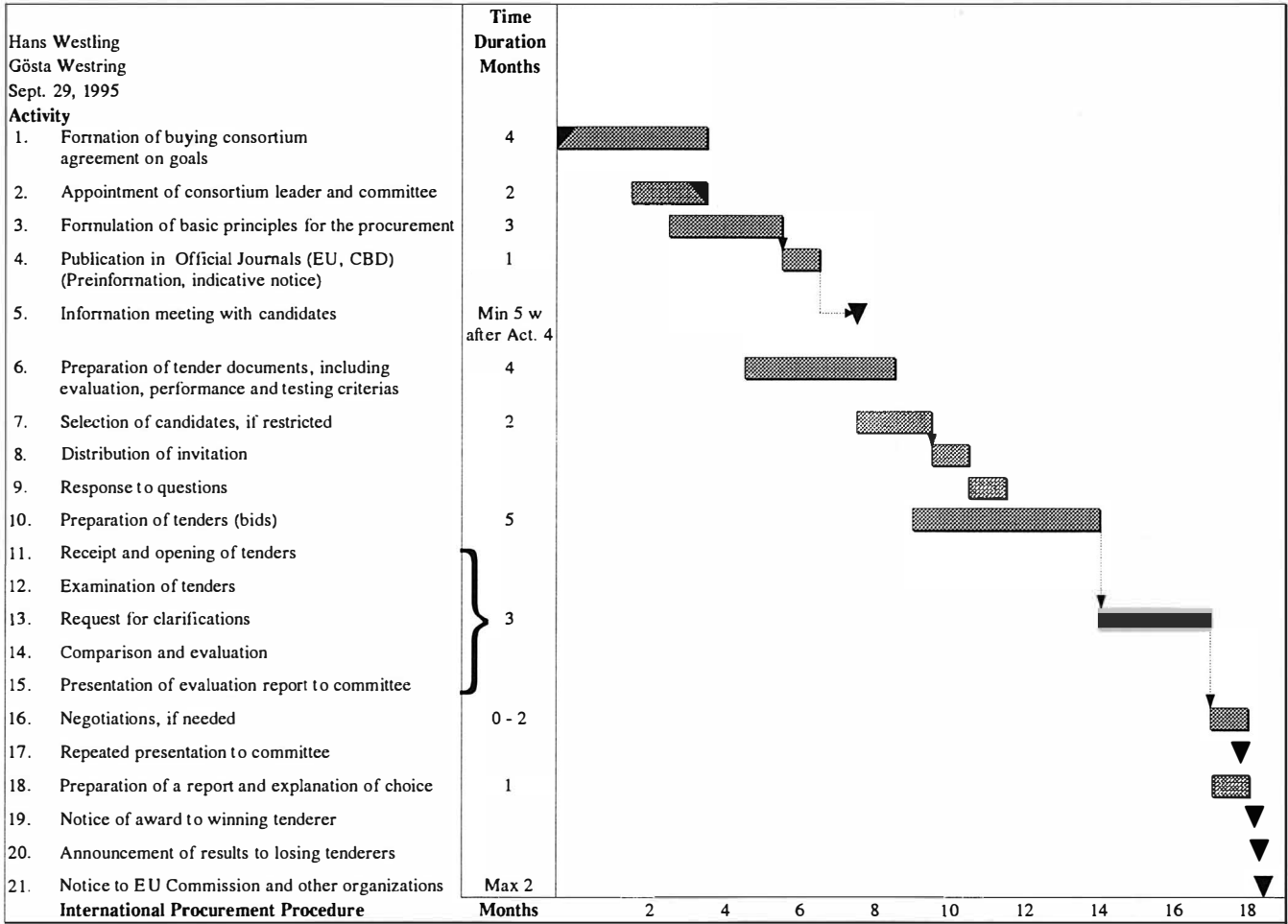
18. *Preparation of a report* (to be sent to the EU on request) and *explanation* why the winning offer has been chosen and the others not (to be sent to the non-winning tenderers, if asked for);

The *tender/proposal evaluation* containing suggestions for winners should be summarized in a memo that can be given to the tenderers/proposers and perhaps made public. (However, it must of course not contain any trade secrets.)

19. *Notice of award to winning tenderer*, normally conditional upon signature of contract incorporating terms per tender documents and tender, as clarified or amended during tender examination and evaluation period;
20. *Announcement of result* to losing tenderers;
21. *Notice to EU Commission and other organizations* on contract award for publication in Official Journal (within two months, Art. 24 and Annex XV) and other media;

Note. Above steps should be converted into flow chart assessing time estimated for each step, perhaps indicating also responsibilities of parties active in the process.

Figure App 6.1. Different stages in the tendering procedure with regard to EU and WTO regulations.



TECHNOLOGICAL AREAS CHOSEN FOR PILOT PROCUREMENT ACTIVITIES

(within Annex III "Co-operative Procurement of Innovative Technologies for Demand-Side Management")

1. Pilot areas and goals

The *pilot areas* chosen by the Experts are:

- lighting
- copiers
- "wet appliances"
- vending machines
- home electronics

All the *possible areas*, in which there is interest from at least two countries, are shown in the list "Candidate Technologies (Areas of Interest)" (Appendix 2), which includes about 50 different areas. From this list, first three, and then two additional areas - five areas altogether - have been identified. However, it is important to collect experience from different areas, since circumstances vary too much. Originally, at least one pilot project was to be fulfilled within Annex III.

It is important to point out that the *purpose of the pilot studies* is to demonstrate *how co-operative efforts can work* and draw experience from them. It is not the total energy savings potential in a specific project that is the main interest. What is important is to *involve many persons in the process*, and to have it serve as a *pedagogical example*. For instance, everybody is familiar with home electronics, lighting and copiers from their everyday surroundings and workdays.

For the future work at international and national levels, alternative *scenarios* will be worked out, based on existing data on the different technological areas.

These scenarios will include:

- scope
- functional requirements
- quality
- testing methods
- budget
- management
 - for formulation of requirements, testing, and actual procurement including legal advice, and
 - for support - information, education, labelling, incentives, etc.

The overarching objective of Annex III work as a whole must be to facilitate reduction of energy consumption, saving of the environment, and cutting-down of costs. The time schedule for the different pilot projects will be dependent on the creation of influential buyer groups, as well as on financial and other opportunities in the participating countries.

General background studies have already been completed by a number of the participating countries. A good example of principles for market research has been shown by Finland (Figure 12 in the main text).

Some interesting background information about the areas chosen has been summarized, primarily in order to arouse interest in these areas, Figure App 7:1.

Techno-logical Areas	Problems	Goals	Functional Requirem.	Testing	Buyer Group	Support	Project Managem.
Copiers							
Wet Appliances							
Lighting							
Vending Machines							
Home Electronics							

IEA DSM Annex III

Figure App 7:1 Pilot Technological Areas - Overview of key factors which will be clarified during procurement preparations

2. Lighting

In a U.S. investigation into lighting efficiency carried out by LBL (Atkinson et al, 1992), the large difference is shown between a combination with *minimum Life-Cycle Cost*, which is the maximum *economic* savings potential, and the *Research and Development combination*, the *technical* potential. The baselines are existing solutions and no actions, and the Energy Policy Act of 1992. Possible energy savings in the year 2030 for the different alternatives vary from *49 to 71 per cent* for the commercial sector, and from *21 to 64 per cent* for the residential sector, depending on the alternatives chosen, see Figures App 7:2 and App 7:3.

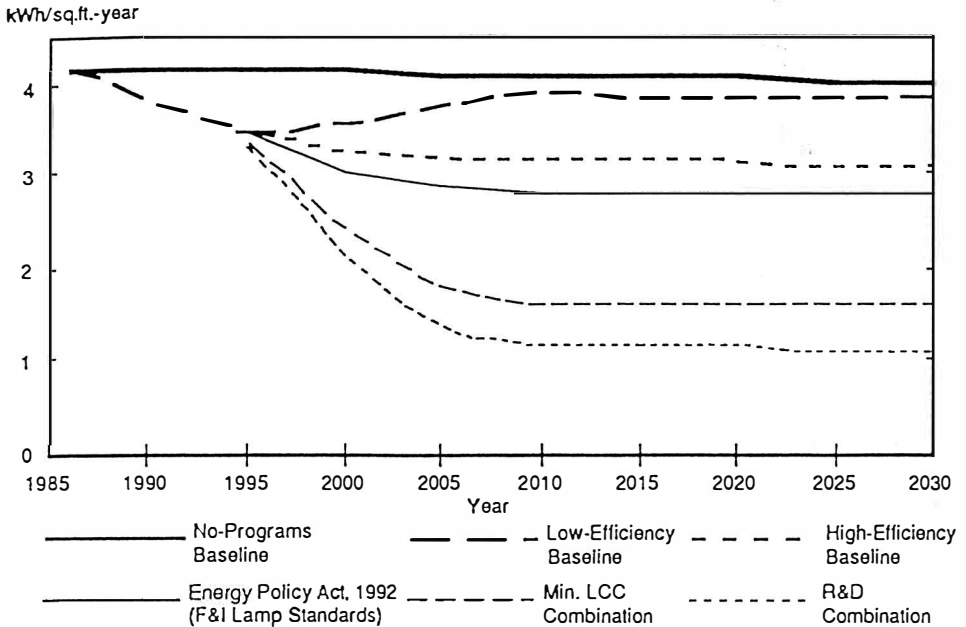


Figure App 7.2. Annual lighting energy use intensity. Baselines and illustrative policy cases. Commercial sector. (Source: Atkinson et al., 1992)

kWh / household-year

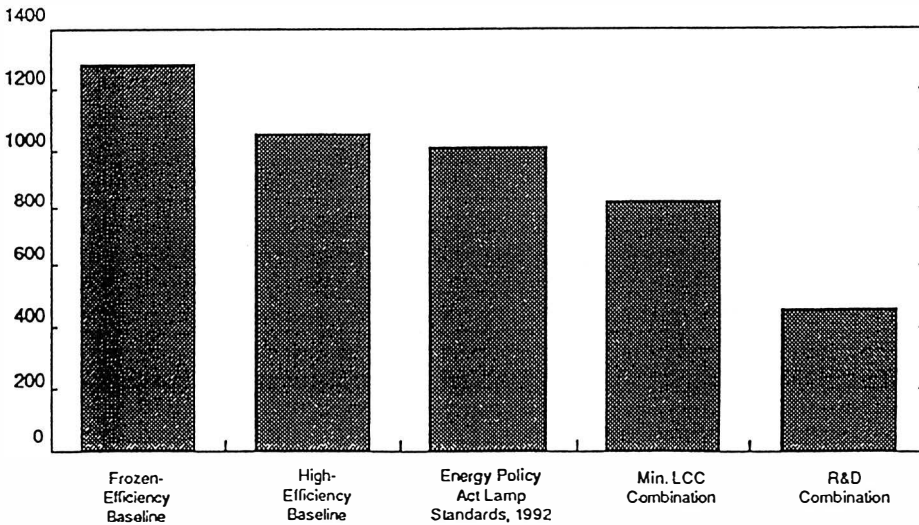


Figure App 7:3. Lighting unit energy consumption in 2030. Baselines and illustrative policy cases. Residential sector. (Source: Atkinson et al., 1992)

Figure App 7:4 illustrates the good impact on the whole market as regards sales of HF ballasts in Sweden a very short time after the procurement activity.

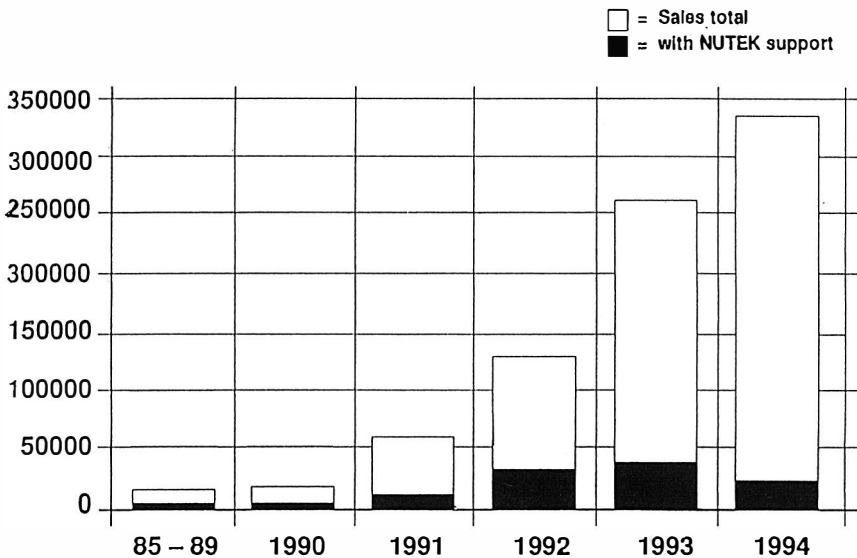


Figure App 7:4. Sales - High frequency ballasts. (Source: NUTEK, 1994)

The opportunities with halogen-IR for incandescent lamps are shown in Figures App 7:5 and App 7:6 below.

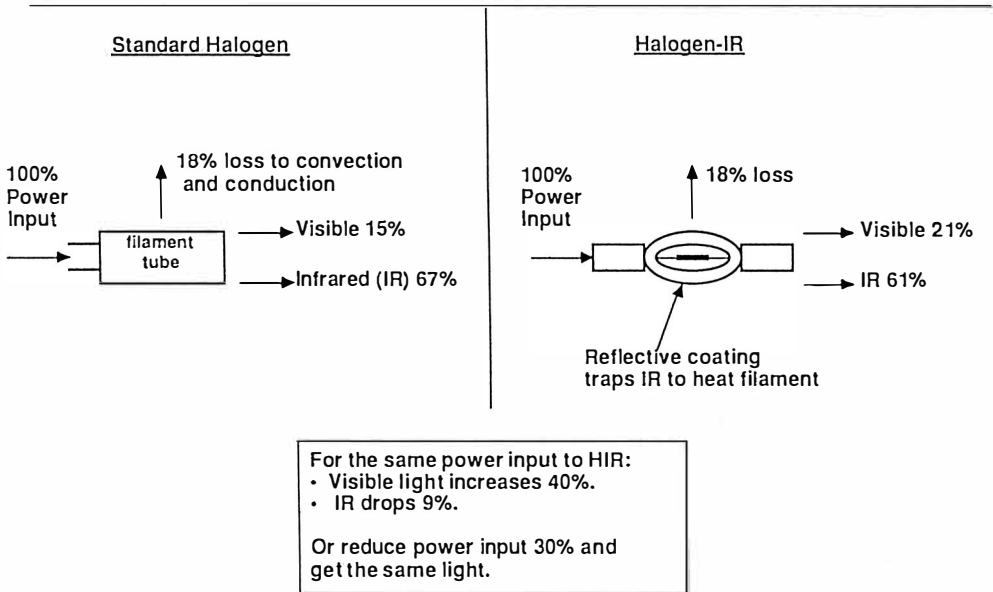
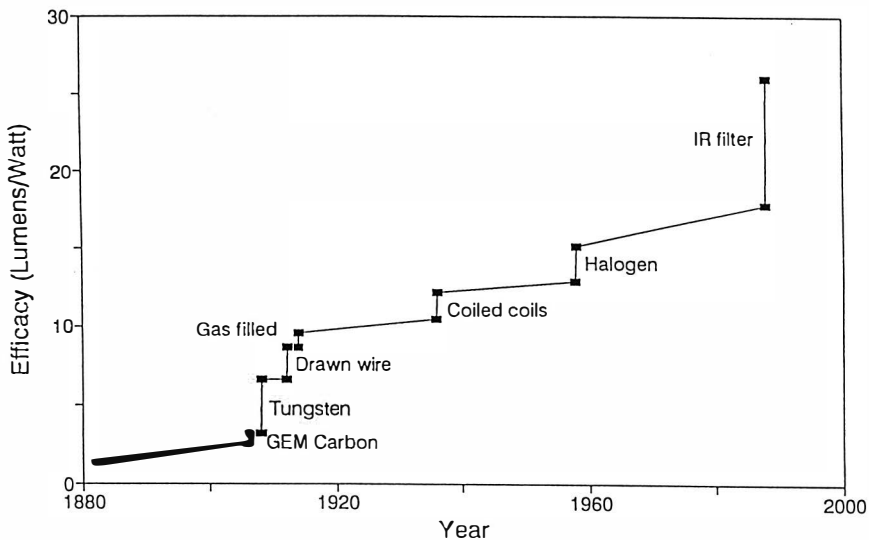


Figure App 7:5. How halogen-IR works. (Source: McGowan, 1994)

An increase in the energy efficiency of incandescent lamps by 40 per cent, and a price of USD 3, would be possible, but to achieve this, important market signals are needed, both in the United States and in Europe.

In the United States, formal information has been given that DOD will buy 30 per cent more efficient a-lamps by millions during the next three years, if these products will be available on the market. In a first stage, prototypes are asked for. European activities are now being planned to be conducted in parallel.



The two most significant recent improvements in incandescent lamp efficiency were the introduction of halogen (20%) and infrared coatings (40%).

Figure App 7:6. Historical efficacy of incandescent lamps. 60 watts, 120 watts, 3000 hour life. (Source: McGowan, 1994)

3. Vending machines

The main objectives of this preliminary project have been to estimate the total energy consumption in Denmark for these machines and to prepare a list of possible savings in order to improve their energy efficiency. And as there seems to be a lack of energy consumption data for these machines, measurements on a number of machines in operation have been carried out. In order to evaluate the sensitivity of the various design parameters (such as U-values, efficiencies of components etc.) a prototype analysis programme has been formulated.

The main results and findings are as follows:

- o Proposal of type definitions for vending machines
- o An estimate of the total energy consumption in Denmark for vending machines is approx. 44 GWh/year. The number of machines is estimated to some 20,900 units, 50 % of which is assumed to be imported. The number of exported machines is estimated to some 150,000 units per year.
- o Measurements on a number of operating machines are presented and show rather large differences between different makes of the same type of machine. There is a great need for energy consumption data from measurements.

- o A list of possible savings and some quantified examples are formulated. The cold vending machines are believed to possess the largest savings possibilities. A typical cold bottle vending machine has an electrical energy consumption of some 10 kWh/day compared to 1 kWh/day for a refrigerator with the same net volume.
- o Prototype energy analysis programmes have been worked out as a tool for evaluating savings potentials.

The findings above will be a valuable background for future planning for co-operative activities including procurement.

4. Home electronics

As regards *home electronics*, we know that the number of appliances is accelerating, both in offices and homes. With a fairly high energy use also in sleep mode, ten to twenty of these appliances represent a high amount of electricity. The consumption is increasing, and according to rough estimates in Finland, it is now representing 15 per cent of the average household consumption of electricity.

During the summer of 1995, the Project Manager of this area has met with representatives of International Hotels Environment Initiative (IHEI) and some hotel chains. It is evident that the environmental consciousness is great among hoteliers and that they have a keen interest in acting accordingly. Actions have been taken according to savings potential and ability of specifying and controlling shipment of energy-efficient devices. Although the savings potential for each television set is rather small and the purchasing is distributed geographically and calendarwise, a procurement programme could be motivated according to the preliminary findings. The drafting of specifications and testing procedures have started for energy-efficient TV sets.

5. Copiers

Active copying accounts for only about 15 % of the "on"-time of most copying machines. Instead of using the definitions "sleep" and "off" modes, Jacques Roturier in France has suggested the redefinitions "nap" and "coma" modes, which is similar to their counterparts in personal computers. The Swiss target values have already been mentioned in Chapter 10.3.5 and are shown in Figure 15 in the same Chapter.

A programme for technology procurement activities for copiers is suggested in Figure App 7:7.

Program Goal	Buyer-oriented Strategies	Manufacturer/Seller-oriented Strategies
Shift buying to "best-practice" products	Government purchasing criteria, specifications	EPA Energy Star label Swiss E-2000 Label
Create entry markets for new technology	Cooperative Technology Procurement (IEA)	Target Values (Switzerland, Canada)
Improve stock-in-place and operating practices	Procurement for external auto-off switches	Upgrade machines with auto-off, duplexing - routine service or refurbishment

Figure App 7:7. Elements of a program strategy for energy-efficient copiers. (Source: Harris et al, 1994.)

Activities in this area could be carried on in different stages:

1. Technology procurement - perhaps of after-market auto-off controls, based on the Swiss "smart switch".
2. Co-operative technology procurement of redesigned copiers.
3. Introduction of additional advanced copier technologies and features.
4. Multi-function machines for the future (copier/fax/computer printer).

6. Wet appliances

Requirement levels for energy, water and detergent consumption are being discussed for washing machines, see [Figure App 7:8](#)).

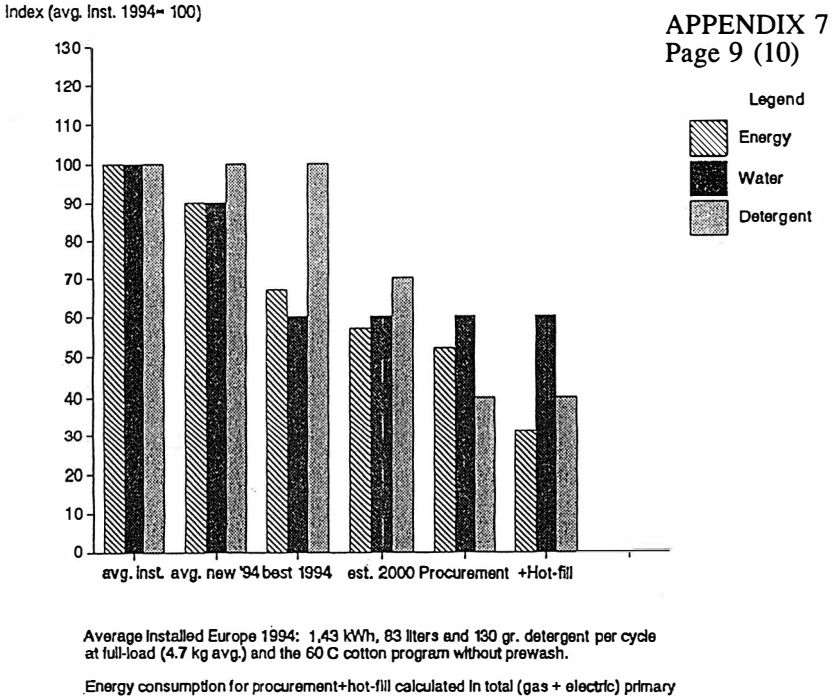


Figure App 7:8. Washing machines (EU). Energy, water, detergent consumption. (Source: Kemna, 1994)

Drying appliances and a low-price heat pump drier would be of interest (Figure App 7:9).

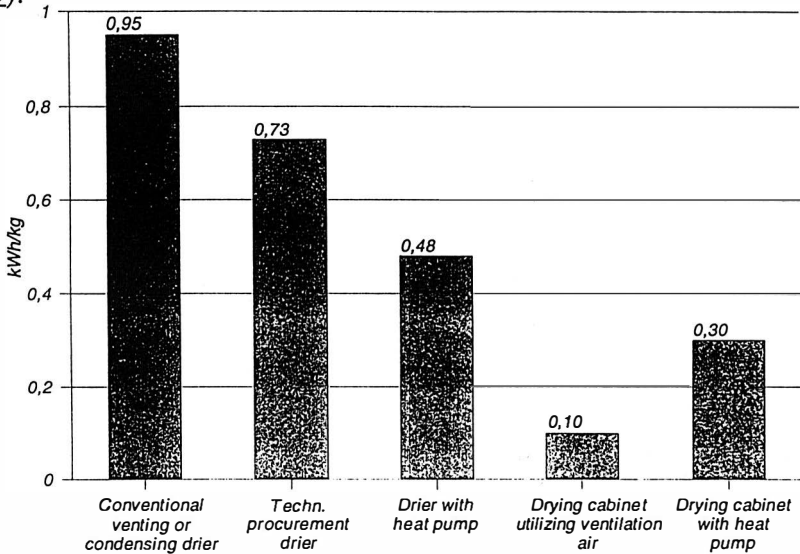
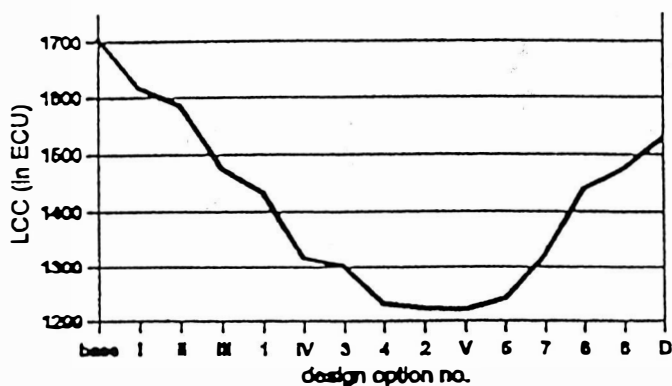


Figure App 7:9. Energy use for drying from 70% humidity. (Source: Horowitz, 1994)

In this area, identification of buyer groups and other distribution channels is now being intensified.

The Life-Cycle Costs of different development options in the technological field of washing machines have been illustrated in Figure App 7:10.



Calculation basis for the Life Cycle Cost:

Basecase- machine cost: 450 ECU
 Product Life: 15 years
 Discount rate: 5%
 Cycles/year (basecase): 230
 Load/cycle (basecase): 3 kg (rated cap. 4.5 kg)

Real-life Basecase consumption:
 Electricity: 1.28 kWh/cycle
 Water: 73.5 l/cycle
 Detergent: 135 g IEC-A/cycle

Prices:
 Electricity: 0.13 ECU/kWh
 Water: 0.77 ECU/m³
 Detergent: 1.92 ECU/kg
 Repairs: 5 ECU/year (avg.)

Verification of performance of options: CTTN experiments/tests
 Option costs: Through expert interviews, prices by OEMs
 Option savings: Literature, tests, engineering calculations,
 interviews with washing machine and detergent manufacturers.

*Figure App 7:10. Life-Cycle Costs of different options.
 (Source: Kemna, 1994)*

ABBREVIATIONS

ACEEE	American Council for an Energy-Efficient Economy (USA)
ALTENER	European Union programme for alternative energy sources
CCAP	Climate Change Action Plan (USA)
CEE	Consortium for Energy Efficiency (USA)
CFL	Compact fluorescent lamp
CTI	Climate Technology Initiative (USA)
DG	Directorate General (within the Commission of the European Union)
DOE	Department of Energy (USA)
DOD	Department of Defense (USA)
DSM	Demand-Side Management
ECU	European Currency Unit
EEC	European Economic Community
EDF	Electricité de France
EFTA	European Free Trade Association
EPA	Environment Protection Agency (USA)
ETIP	Experimental Technology Incentives Program (USA)
EU	European Union
FCCC	Framework Convention on Climate Change (from the UN Environment Conference in Rio 1992)
FMV	Swedish Defence Materiel Administration
GATT	General Agreement on Tariffs and Trade
GMD	Gemeenschappelijke Medische Dienst (Netherlands)
HF	High frequency
HIR	Halogen infrared
HLM	Association of municipal housing companies (France)
IEA	International Energy Agency
IFB	Invitation for bid
IHEI	International Hotels Environment Initiative
IR	Infrared
IVA	Swedish Academy of Engineering Sciences
JOULE	Joint Opportunities for Unconventional or Long-Term Energy Supply (European Union research programme)
LBNL	Lawrence Berkeley National Laboratory (USA)
LCC	Life Cycle Costs

MIT	Massachusetts Institute of Technology (USA)
MITI	The Ministry of Industry (Japan)
MTI	Ministry of Trade and Industry (Finland)
NASPO	National Association of State Purchasing Officials (USA)
NIST	National Institute of Standards and Technology (USA)
NRDC	Natural Resources Defense Council (USA)
NUTEK	Swedish National Board for Industrial and Technical Development
NYCHA	New York City Housing Authority (USA)
NYPA	New York Power Authority (USA)
NYSEO	New York State Energy Office (USA)
OECD	Organization for Economic Cooperation and Development
OTA	Office of Technology Assessment (USA)
PACE	Efficient Electricity End-Use Programme (European Union)
PBX	Central Network Agency
PERU	Regional and Urban Energy Management Programme (European Union)
PG&E	Pacific Gas & Electric (USA)
QFD	Quality Function Deployment
R&D	Research and development
R/F	Refrigerator/Freezer
RFP	Request for proposal
RFQ	Request for quotation
SABO	Swedish Association of Municipal Housing Companies
SAVE	European Union energy-efficiency promoting programme
SERP	Super Efficient Refrigerator Program (USA)
STU	former Swedish National Board for Technical Development
TED	Tender Electronic Daily (USA)
THERMIE	European Union programme for innovative technology
TIPP	Technology Introduction Partnerships Programme (USA)
TP	Technology Procurement
UNCED	United Nations Environment Conference in Rio 1992
WTO	World Trade Organization
WTO/GPA	World Trade Organization Agreement on Government Procurement

REFERENCES, BIBLIOGRAPHY AND EXAMPLES OF CASE STUDIES

(also as of value to other future researchers and innovation-interested managers)

Text in brackets / / = author's translation and explanation. For abbreviations see Appendix 8.

Reports specially prepared for Annex III by Experts and organizations in the participating countries are included on pages 8-9.

ACEEE, American Council for an Energy-Efficient Economy: *Proceedings from the energy conference held by ACEEE in August 1994 in Asilomar in the United States*. 1994.

Aebischer, B & Pain, D: *Market-Pull Actions in Switzerland for Energy Efficient Copiers*. Summary presented at the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris, 2 November 1994. In Conference Documentation Part 3 and Documentation from Workshops. NUTEK, Stockholm, Sweden, 1994.

Alexander, L: *"Golden Carrots". Working Together to Encourage Super-Efficient Products*. Summary presented at the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris, November 1994. In Conference Documentation Parts 2 and 3. NUTEK, Stockholm, Sweden, 1994/95.

Allen, T J: *Managing the Flow of Technology - Technology Transfer and the Dissemination of Technological Information within the R&D Organization*. Cambridge, Mass. (MIT Press), USA, 1985. (1977).

Alston & Worthington & Guldsmann: *Contracting with the Federal Government*. Third Edition. USA. 1992.

Arrow, K.J: *The limits of organisation*. W.W. Norton & Company. New York, USA, 1974.

Atkinson, B A & McMahon, J E & Mills, E & Chan, P & Chan, T W & Eto, J H & Jennings, J D & Koomey, J G & Lo, K W & Lecar, M & Price, L & Rubinstein, F & Sezgen, O & Wenzel, T: *Analysis of Federal Policy Options for Improving U.S. Lighting Energy Efficiency: Commercial and Residential Buildings*. Lawrence Berkeley Laboratory, LBL-31469, UC-350. Berkeley, USA, 1992. (Also included in Documentation from the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris, November 1994. In Documentation from Workshops. NUTEK, Stockholm, Sweden, 1994.)

Bertoldi, P: European Commission Efforts to Promote More Efficient Use of Electricity: The PACE Programme. In *Energy in Europe*. Energy Policies and Trends in the European Union. No. 23. 1994. European Commission. 1994.

Bertoldi, P: *European Union Energy Efficiency Policy*. Speech held at the 3rd European Conference on Energy-Efficient Lighting, "Right Light Three Conference", Newcastle, June 1995. European Commission, DG XVII. 1995.

Blomqvist, C: *Torkning av tvätt i badrum. /Drying of laundry in bathrooms./ Memorandum*. KTH, Stockholm, Sweden, 1994.

Civildepartementet Ds C 1983:8: *Teknikupphandling inom dataområdet med offentliga sektorn som beställare. Betänkande av datadelegationen.* /Technology procurement in the computer and data processing area with the public sector as buyer. Report of the Delegation for Data Matters, Ministry of Public Administration./ Stockholm, Sweden, 1983.

Climate Change Action Plan, CCAP. Clinton, W J & Gore Jr, A. Washington D.C., USA, October 1993.

Costello, S: *Energy-Efficient Procurement Collaborative. Summary Findings and Initiatives.* Paper presented at the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris, November 1994. In Conference Documentation Part 2. NUTEK, Stockholm, Sweden, 1994.)

Danish Energy Agency: *Følg pilene. ABC for sælgere af køl og frys. Et hurtigt overblik over EU's nye energimærkning.* Energistyrelsen and Energi-Spareudvalget. /Brochure from the Danish Energy Agency on the new energy-marking for refrigerators and freezers of the European Union/. Denmark. 1994.

Demand-Side Technology Report. Vol. 3, No. 7, July 1995. Ira Krepchin, Editor. Cutter Information Corp. USA, 1995.

Domotique: *Appel à candidature. Interface domotique collective. Cahier des charges fonctionnelles d'une base domotique pour l'habitat collectif.* /Material describing the Domotique System for residential buildings./ HLM, EDF, France Telecom, Gaz de France, Plan Construction et Architecture. Paris, France, July 1990.

Edquist, C: *Technology Policy.* Tema teknik och social förändring. /Technology Policy. Theme technology and social change, Memorandum./ Linköping, Sweden, 1990.

Energistyrelsens Faglige Udvalg for Vindkraft: *Status og Perspektiver for Vindkraftudviklingen i Danmark - Oplæg til udviklingsprogram for vindkraft i Danmark.* /Danish Energy Agency: Status and perspectives of the wind power development in Denmark./ Denmark, December 1991.

Energy Policy Act (EP Act), US Public Law 102-486, Washington D.C., USA, 1992.

Eriksson, O: *Miljonprogrammet - en förebild för teknikupphandling.* /The 1 million housing units in 10 years programme - a model of technology procurement./ IVA-NYTT, No. 9, Sweden, 1982.

ETSU: *EU and Energy.* Brochure. ETSU, Harwell, Oxfordshire, United Kingdom.

European Commission: *Public Procurement in Europe. The Directives.* ECSC-EEC-EAEC, Brussel-Luxembourg, 1994.

Executive Order from the President of the United States on Energy Efficiency and Water Conservation at Federal Facilities. White House, Office of the Press Secretary, Washington D.C., USA, March 8, 1994.

Feldstead, C: *Demand-Side Management Success Story: Ontario Hydro's Energy-Efficient Lighting Program.* In *Strategic Planning for Energy and the Environment*, Vol. II, No. 2, 1991.

GMD: *The market approach of the Gemeenschappelijke Medische Dienst*. Publication from Gemeenschappelijke Medische Dienst, Amsterdam, The Netherlands, 1990.

Gore, A: *From Red Tape to Results. Creating a Government that Works Better & Costs Less*. Report of the National Performance Review. Washington D.C., USA, September 1993.

Granstrand, O & Sigurdsson, J: *The Role of Public Procurement in Technological Innovation and Industrial Development in the Telecommunications Sector - The Case of Sweden*. Chalmers University of Technology, Gothenburg, Sweden, 1985.

Harris, J & Aebischer, B & Clark, J & Dandridge, C & Molinder, O & Nordman, B: *Developing Markets for Energy-Efficient Copiers*. Workshop Issue Paper presented at the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris November 1994. In Documentation from Workshops. NUTEK, Stockholm, Sweden, 1994.

Harris, J: *Energy-Efficient Products Challenge in the United States. Program Summary*. LBNL, Washington, United States, 1995.

Hebert, R & Hoar Jr, R W: *Government and Innovation: Experimenting with Change. The Final Report of the Experimental Technology Incentives Programme*. Washington D.C., USA, December 1982.

Hippel, E von: Successful Industrial Products from Customer Ideas. *Journal of Marketing*, 42(1). USA, 1978.

Hippel, E von: Lead Users: A Source of Novel Product Concepts. *Management Science*, Vol. 32, No. 7, July 1986. Cambridge, Mass., USA. (The Institute of Management Sciences) 1986.

Horowitz, A: *Drying Appliances. Co-operative Technology Procurement Subject Proposal*. Report presented at the IEA Conference/Workshops on Market-Pull and Co-operative Procurement of Innovative Technologies, Paris, November 1994. In Documentation from Workshops. NUTEK, Stockholm, Sweden, 1994.

Håkansson, H (ed): *Industrial Technological Development. A Network Approach*. Worchester (Billing & Sons Limited) 1987.

IEA, International Energy Agency: *Implementing Agreement for Co-operation on technologies and Programmes for Demand-Side Management*, signed September-November 1993.

IEA, International Energy Agency: *Energy Technology and R&D International Collaboration*. Dr. John Tilley ed. Brochure, 1994.

IEA, International Energy Agency: *Documentation from the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris November 1994*. Conference Documentation Parts 1-3 and Documentation from Workshops. NUTEK, Stockholm, Sweden, 1994/1995.

IEA, International Energy Agency: *International Energy Agency. Implementing Agreement on Demand-Side Management Technologies and Programmes. 1994 Annual Report*. NUTEK, Stockholm, Sweden, March 1995.

IEA, International Energy Agency, Implementing Agreement for Co-operation on Technologies and Programmes for Demand-Side Management, Annex III "Co-operative Procurement of Innovative Technologies": Several *Minutes of Meetings* from November 1993 - June 1995.

Industridepartementet Ds I 1982:3-4: *De små och medelstora företagen - Nuläge och utvecklingsbetingelser. En rapport upprättad inom struktursekretariatet.* /Small and medium-size companies - Present situation and development conditions. A report from the Secretariat for Structural Changes, Ministry of Industry./ Stockholm, Sweden, 1982.

IVA: *Technical Capability and Industrial Competence.* A Comparative Study on Sweden's Future Competiveness. Swedish Academy of Engineering Sciences. IVA Meddelande 224. Stockholm, Sweden, 1979.

IVA: *Konferensmaterial vid symposium om teknikupphandling. Mars 1982.* /Conference material from a symposium on technology procurement. Sweden, March 1982./

IVA: *Teknikupphandling. Dokumentation från ett symposium.* IVA-Rapport 233 (i samarbete med STU). /Procurement of technology systems. Documentation from a symposium./ Stockholm, Sweden, 1983.

IVA: *Exploatering och finansiering av ny teknik - medel för förnyelse i svensk industri.* IVA-Rapport 368. /Exploitation and financing of new technology - means for innovation in Swedish industry./ Solna, Sweden (Teknisk Litteratur) 1989.

Johnson, K: *Achieving Energy-Effective Lighting with an Integrated System,* in *Proceedings from 3rd European Conference on Energy-Efficient Lighting,* Right Light Three, Newcastle, UK, 1995.

Kemna, R: *Wet Appliances. Trends and Opportunities in Technology Procurement.* Report presented at the IEA Conference/Workshops on Market-Pull and Co-operative Procurement of Innovative Technologies, Paris November 1994. In Documentation from Workshops. NUTEK, Stockholm, Sweden, 1994.

Kjaer, T & Andersen, J: *Implementing af vedvarende energikilder i Norden.* /Implementing existing energy sources in the Nordic countries./ Nordiske Seminar- og Arbejdsrapporter 1993:536. Roskilde, Denmark, January 1993.

Latham, L: *Concept of efficiency.* In Summary of the IEA DSM Annex III Experts Meeting in Paris, France, December 1, 1994.

Lundvall, B Å: *Product Innovation and User/Producer Interaction.* TIP Workshop Paper, Stanford University. 1984. Rev. ed. Aalborg, Denmark (Aalborg University Press) 1985.

Lundvall, B Å: *Innovation as an Interactive Process: From User-Producer Interaction to the National System of Innovation.* In Dose, G et al: *Technical Change and Economic Theory.* 1988.

Lundvall, B Å: *Innovation, the Organised Market and the Productivity Slowdown.* For The Technology Economy Programme. In *Technology and Productivity. The Challenge for Economic Policy.* OECD, Paris, France, 1991.

Marquis, D G: The Anatomy of Successful Innovations. *Innovation Magazine 1*, No. 7, Nov. 1969.

McEachron, N B & Hali, D C & Lewis, L F: *Assessing the Results of the LCC Water Heater Experiment, Volume 1: Main Report*. SRI International, Menlo Park, USA. September 1977.

McGowan, T: *Advanced Lighting Technology*. Picture material presented at the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris November 1994. In Conference Documentation Part 3, NUTEK, Stockholm, Sweden 1995.

Millhone, J: *DOE's Historical Role and Future Activities*. Material presented at the NIST/Green Buildings Conference, February 16, 1994.

Ministry of Energy, Danish Energy Agency: *Technology Procurement for Household Appliances*. Draft. Copenhagen, Denmark, 1994.

MIT: *Government Involvement in the Innovation Process: A Contractor's Report to the Office of Technology Assessment*. Massachusetts Institute of Technology, Cambridge, USA, 1978.

MOTIVA: *Market research of the energy using equipment. Example of method of working*. In Summary of the IEA DSM Annex III Experts Meeting in Paris, France, December 1, 1994.

Mowery, D C & Rosenberg, N: The Influence of Market Demand upon Innovation: A Critical Review of Some Recent Empirical Studies. *Research Policy*, No. 8, 1978.

Munter, P: *Cold & Hot Drinks Automatic Vending Machines - Preliminary Project on Improved Energy Efficiency*. Report prepared for Danish Energy Agency by SEAS, Denmark, May 1995.

Nadel, S & Bourne, D & Shepard, M & Rainer, L & Smith, L: *Emerging Technologies to Improve Energy Efficiency in the Residential & Commercial Sectors*. American Council for an Energy-Efficient Economy, ACEEE. February 1993.

National Research Council: *Building for Tomorrow. Global Enterprise and the US Construction Industry*. Washington D.C., USA, 1988.

NUTEK: *Specification of Requirements for Electricity-Efficient Laundry Rooms of Apartment Blocks*. Stockholm, Sweden, 1992.

NUTEK: *Purchasers' Requirements Dictate Development: A Study of Technology Procurement*. Brochure. Stockholm, Sweden, 1993a.

NUTEK: *Specification of Requirements for Energy-Efficient Washing and Drying Equipment for Apartments*. Stockholm, Sweden, 1993b.

NUTEK: *Utvärdering av programmet för effektivare energianvändning. /Evaluation of the programme for a more efficient use of energy./ R1993:5*. Stockholm, Sweden, 1993c.

NUTEK: *Utvärdering av programmet för effektivare energianvändning.* /Evaluation of the programme for improving the efficiency of energy use./ R 1993:39. (Second edition). Stockholm, Sweden, 1993d.

NUTEK: *Projektbedömning: Marknad och ekonomi.* /Project evaluation: Market and economy./ R 1993:79. Stockholm, Sweden, 1993e.

NUTEK: *Programmet för effektivare energianvändning.* Energianvändningsrådets rapport 1993/94. /The programme for improving the efficiency of energy use./ B 1994:8. Stockholm, Sweden, 1994a.

NUTEK: *Att påverka marknader effektivt - en effektkedjeanalys av NUTEKs satsningar på högfrekvensdon.* /To influence markets efficiently - an analysis of NUTEKs concentration on high-frequency ballasts./ R 1994:45. Stockholm, Sweden, 1994b.

NUTEK: *Technology Procurement. Examples of Specifications of Requirements. Part 1 and Part 2.* Stockholm, Sweden, 1994c.

NYSEO: *New York State Energy Office Energy-Efficient Procurement Collaborative. Phase 1 - Working Group Meeting. Final Report.* August, 1994. (Also included in Documentation (Part 2) from the IEA Conference/Workshops on Market-Pull Activities and Co-operative Procurement of Innovative Technologies, Paris, November 1994. NUTEK, Stockholm, Sweden, 1994.)

OECD: *Policies for the Stimulation of Industrial Innovation.* Vol. 1-3. Paris, France, 1978.

OECD: *Public Sector Procurement Policies in OECD Member States: Potential Impact on Technology Development and Economic Growth.* Draft. Paris, France, 1989.

OTA: *Delivering the Goods.* Public Works Technologies, Management, and Financing. Washington D.C., USA, 1991a.

OTA: *Energy Efficiency in the Federal Government. Government by Good Example?* Washington D.C., USA, 1991b.

Overmeer, W & Prakke, F: *Government Procurement Policies and Industrial Innovation. Report prepared for the Six Countries Programme on Government Policies towards Technological Innovation in Industry.* Staffgroup Strategic Surveys TNO, Delft, The Netherlands, December 1978.

Prop 1994/95:35: *Sveriges anslutning till Världshandelsorganisationen*, del A, 20 oktober 1994. /Sweden's accession to the World Trade Organization, Part A, October 20, 1994./1994.

Report to Congress: *Resource Conservation and Recovery Act: A Report on Agencies' Implementation for Fiscal Years 1992 and 1993.* Executive Office of the President. Washington D.C., USA, July 1994.

Rothwell, R & Freeman, C & Horsley, A & Jervis V T P & Roberts, A B & Townsend, J: SAPPHO Updated. Project SAPPHO, Phase II. In *Research Policy*, Nov. 1974.

Rothwell, R: Characteristics of Successful Innovators and Technically Progressive Firms. *R&D Management*, Vol. 7, No. 3, 1977.

RWTUV: *Klimatgeräte getestet und optimiert*. In Jahresbericht 1991. /Air-conditioning units tested and optimized. In Annual Report 1991./Germany, 1991.

Skinner, R G: *Global Energy Trends and Environmental Implications*. Background paper presented at the 10th International Symposium on Petroleum Economics, Quebec, Canada, 10-20 June 1995.

STU information nr. 809-1990: *Simultaneous Engineering*. Sweden, 1990.

Tassey, G: The Technology Policy Experiment as a Policy Research Tool. In *Research Policy* No. 14, 1985.

Teubal, M & Yinnon, T & Zuscovitch, E: Networks and Market Creation. In *Research Policy* No. 20, 1991.

Transportation Research Board/National Research Council: *Innovative Contracting Practices*. Transportation Research Circular, Number 386, December 1991. Transportation Research Board, Washington D.C., USA, 1991.

Trepte, P A: *Public Procurement in the EC*. (CCH Editions Ltd) Great Britain, 1993.

Vedin, B-A: *Innovation Organization. From Practice to Theory and Back*. IMIT. Lund, Sweden, (Studentlitteratur), 1980a.

Vedin, B-A: *Large Company Organization and Radical Product Innovation*. IMIT. Lund, Sweden, (Studentlitteratur) 1980b.

Vedin, B-A: *Technology, Tumbling Walls of*. Metamatic & IMIT. Kristianstad, Sweden, (Kristianstads boktr.) 1990.

Vine, E: *INDEEP Annual Report 1994-1995. Report from the International Database on an Energy-Efficiency Programmes Project*. IEA DSM-Agreement, Lawrence Berkeley National Laboratory, USA, April 1995. 1995a.

Vine, E: *International DSM and DSM Program Evaluation: An INDEEP Assessment*. Lawrence Berkeley National Laboratory, USA, April 1995. 1995b.

Westling, H: *Teknikupphandling i byggbranschen. Förstudie*. /Technology procurement in the construction sector. Preliminary study./ BFR R128:1982. Stockholm, Sweden, 1982.

Westling, H: *Technology Procurement for Innovation in Swedish Construction*. BFR D17:1991, Stockholm, Sweden, 1991.

Westling, H: *Task Status Report September/October 1994*. IEA DSM Annex III. 1994a.

Westling, H: *Case study. Clothes Washers and Dryers for Laundry Rooms in Apartment Blocks - Sweden*. For IEA DSM Annex III. 1994b.

Westling, H: *Buyer Co-operation for Energy-Efficient Appliances. Creative Buyer Groups with Goal and LCC Orientation - New Project Management Area*. Paper presented at the Project Management Institute Conference. Vancouver, October 1994. 1994c.

Westling, H: *Task Status Report September 1995*. For IEA DSM Annex III. 1995a.

Westling, H: *Co-operative Procurement for Innovative Energy-Efficient Solutions*. Paper to be presented at the International Workshop in connection with the IEA DSM Agreement Executive Committee Meeting in Fukuoka, Japan, October 18, 1995. 1995b.

WTO, World Trade Organization: *Agreement on Government Procurement*, Marrakesh, Morocco, April 15, 1994. In Annex 4, Plurilateral Trade Agreement of Uruguay Round of Multilateral Trade Negotiations, Volume 31. Marrakesh Agreement, Establishing the World Trade Organization. Published by the GATT Secretariat, Geneva, Switzerland, VI-1994-600. 1994.

Reports specially prepared in connection with Annex III by Experts and organizations within the participating countries:

- U.S. Participation in IEA Annexe III: "Technology Purchasing". Briefing and Discussion Notes by Jeffrey Harris, LBNL, United States, November 1993.
- Act on Standards for Energy Efficiency in Energy-consuming Equipment. English translation of the Danish Act no 94 of 9 February 1994, by the Danish Energy Agency.
- Product Specifications in the Netherlands, in terms of energy-efficiency, relevant to Annex III. Van Holsteijn en Kemna, Netherlands.
- Draft report dated February 23, 1994, 'Federal Policy Options for Cooperative Development and Deployment of Advanced Appliances and Equipment', by Jeffrey Harris, LBNL, United States.
- 'EPA Public Hearing on Guidance for Environmentally Preferable Products and Services', statement by Jeffrey Harris, LBNL, United States, February 7, 1994.
- Material for overhead projection with a summary of U.S. activities update about technology purchasing prepared by Jeffrey Harris, LBNL, United States, March 1994.
- International procurement program for Copiers. Draft and framework for specification and project, by Olof Molinder, NUTEK, Sweden, May 1994.
- Energy Efficiency: Procurement, Habits, Technologies and International Policies. Material by Cyane Dandridge, MIT, United States.
- Information about duplex copying from Recent Research from the Building Energy Analysis Group, LBNL, United States, December 17, 1993.
- Progress Report: Wet Appliances, by René Kemna, Van Holsteijn en Kemna, Netherlands, May 1994.
- Technology Procurement for Household Appliances, draft report by the Danish Energy Agency, May 1994.

- Accelerating the Development of High Efficiency, Dedicated Residential Compact Fluorescent Fixtures, draft by Michael Siminovitch, Francis Rubinstein and Evan Mills, LBNL, United States, August 29, 1994.
- Market research of the energy using equipment, by H. Lempinen, MOTIVA, Finland, September 1994.
- Developing Markets for Energy-Efficient Copiers, draft report by Jeffrey Harris, LBNL; Bernard Aebischer, ETH; Jim Clark, Energy Efficient Programs Div, Resources Canada; Cyane Dandridge, EPA; Olof Molinder, NUTEK; Bruce Nordman, LBNL, November 1994.
- Comments on the experience of initiating a technology procurement programme in Finland, by Heikki Härkönen, MOTIVA, Finland, November 1994.
- Wet Appliances (Track II of the Workshop), summary by René Kemna, Van Holsteijn en Kemna, Netherlands, December 3, 1994.
- Workshop Summary: Technical Opportunities and Market Development for Energy-Efficient Copiers, by Jeffrey Harris, LBNL, United States, February 12, 1995.
- Electricity demand for domestic appliances in the rest state. Reducing standby power demand. Proposal for an international project, by Olof Molinder, NUTEK, Sweden, February 1995.
- Request for a proposal to the IEA DSM III agreement regarding planning for technology procurement of a light source, by Egil Öfverholm, NUTEK, Sweden, February 1995.
- Preparing for Pilot-Projects - Product Group: Wet Appliances, memo by René Kemna, Van Holstein en Kemna, Netherlands, May 12, 1995. (Further reference to a number of GEA reports.)
- Energy Efficient Entertainment Electronics for International Hotels, Project overview by Olof Molinder, NUTEK, Sweden, May 1995.
- Cold & Hot Drinks Automatic Vending Machines - Preliminary Project on Improved Energy Efficiency, report by Preben Munter, SEAS, Denmark, May 1995.

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ISSN 1102-2566
ISBN 91-7318-294x