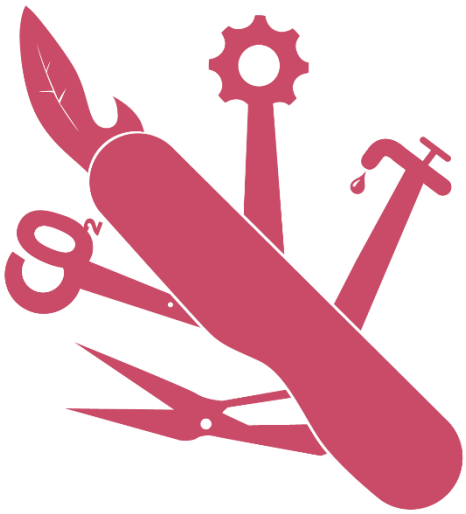
PRESOURCE project

Guide for the implementation of the EDIT Value Tool



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Introduction

Goal

The goal of the Eco-Innovation Diagnosis and Implementation Tool for Increase of Enterprise Value (EDIT Value) is to identify the most effective opportunities for improving the resource efficiency (RE) and the overall sustainability performance of small and medium-sized enterprises (SMEs) within the given framework conditions (legislation, market prices and all other "business environment"). It enables a company to choose the most effective leverage points and feasible projects leading both to an improvement of RE and the best allocation of its limited resources.

Background

To optimise actions in the field of RE, it is important to review the whole system of a business in a consistent way. With the help of the EDIT Value Tool, all levels of an enterprise are assessed in a systematic way from the perspective of opportunities for RE improvement that could enhance the value of an enterprise. EDIT Value is based on a system approach which is operationalised by the management pyramid. The management pyramid describes the different system levels of a business:

Physical levels:
- products
- processes

Information level:
- management systems

Governing levels:
- strategy
- stakeholders

The leverage points for improving RE can be identified at these system levels. By focusing on potentials within these levels, the EDIT Value Tool identifies the most effective RE innovations and projects for the given company. As all levels of a business influence RE, it is insufficient to evaluate only the physical levels of an enterprise. The core theory behind EDIT Value is explained in ANNEX 1 which provides a brief description of the management pyramid and the relationship of tools for improvement of RE.

The EDIT Value approach

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The main feature of EDIT Value is the holistic need-driven approach, which is manageable at the SME level. In contrast to other methodologies that provide a complex diagnosis in the field of RE and sustainability of industrial enterprises, EDIT Value has the following advantages:

- EDIT Value provides a **complete review** and thus does not omit any significant opportunity for improvement.
- EDIT Value is able to give a first **quantification** of RE potentials and thus points out the most effective priorities and sets up baselines
- Instead of comparing assessed enterprises from an ideal “sustainable site” assuming that all RE related tools should be utilised (as other similar tools do), EDIT Value focuses first on improvement and innovation **potentials** within the given enterprise. Only after completion of the **initial analysis** does EDIT Value assign suitable tools and measures to address these potentials (in the following step called "applications"). This way it ensures a need-driven and SME-tailored approach.

Benefits

Major benefits of EDIT for SMEs include:

- Proposals for innovation projects bring double benefit of RE, i.e. costs savings and reduction of environmental risks at the same time
- New view on business effectiveness and efficiency
- Identification of the most interesting areas for improvement
- Better control over strategic risks and opportunities of enterprises
- Involvement of enterprise staff in continuous improvements of the enterprise performance
- Increase of enterprise value

Phases

The individual phases of EDIT include:

Phase 0) Preparation

This preparatory step includes the selection of suitable SMEs for implementation of EDIT Value, approaching an SME and collection of initial information.

Phase 1) Potentials

EDIT Value implementation starts by identifying the most interesting RE potentials for a specific SME within its given framework conditions.

Phase 2) Applications

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The most effective applications such as specific eco-innovations, techniques, tools and/or their parts and concrete measures are allocated to the potentials identified in phase 1 and a cost-benefit analysis is drawn up as part of a feasibility study providing the basis for this allocation.

Phase 3) Action plan

In the last step the most effective projects in the field of RE and their financing are planned.

The implementation of EDIT Value is outlined in the following step-by-step guide.

Preparation

This “zero” phase provides guidance on how to initiate and prepare the EDIT Value implementation within an enterprise.

Who should implement EDIT Value?

Although enterprise staff can directly implement EDIT Value, the authors of EDIT Value strongly recommend enlisting **external assistance for launching the EDIT Value approach** within an enterprise and thus to ensure the necessary independent view on enterprise performance. Moreover, experience with implementing RE applications is important as well. This task can be managed most effectively from an external perspective, for example by an external facilitator, an independent expert or a coach.

Enterprise staff should be involved as much as possible in the implementation of EDIT Value for two reasons: they are necessary partners in the EDIT Value dialogue, and they should benefit from the learning experience as a basis to continue processes initiated by the first EDIT Value cycle. The term ‘EDIT Value cycle’ refers to a full application of the tool, which can be repeated several times to achieve a continuous improvement. This corresponds to the PDCA (Plan-Do-Check-Act) learning cycle as known from management systems such as ISO 14001. Many companies which piloted EDIT Value stated at the end that they will continue using EDIT Value after some time for identification of new potentials and for continuous improvement.

An optimal arrangement for EDIT Value implementation is an EDIT Value team established within the enterprise and guided by an external expert. The enterprise team should include management members and staff with knowledge about enterprise products, processes and systems.

How to select a suitable enterprise

The EDIT Value Tool was developed for industrial SMEs, independent of their sector. In a broader sense, the tool is suitable for SMEs which influence the use of natural resources through any phase of the life cycle of their products. As all SMEs influence the use of natural resources through the operation of their production processes and/or through provision of services, they may also exhibit a potential for improvement of RE. The major question is if this potential is worth being explored. Resource-intensive products and processes go hand in hand with a higher RE potential. However, the authors of EDIT Value recommend implementing at least the initial analyses of phase 1 in any site. The input-output analysis (see Form 1.2) and the indicative life cycle analysis (see Form 1.4) deliver a basic data set of possible significant flows in a relatively simple way and will already answer the question of the significant relevance of RE efforts for a given business.
General criteria for selection of an enterprise suitable for implementation of EDIT Value are:

- Commitment to increase RE
- Willingness to collect and provide data on aspects influencing RE within the whole business

The magnitude of currently perceived RE potential does not constitute a criterion on its own for the specification of EDIT Value since specification of this potential is one of the outputs of this tool and can lead to surprising results. The conviction of an enterprise that its RE potential is not significant should not be a reason for refraining from EDIT Value implementation.

Preparatory activities

General information about the target SME can be collected through internet sources and other publicly available sources of information. This information can be also utilised to check the financial health of an enterprise.

It is recommended to collect general information on RE potentials within a given industry.

Providers of technical assistance should become acquainted with specific processes and products and their RE aspects.

During the initial contact with a chosen enterprise, one should understand its perceived needs and tailor the EDIT Value Tool to these needs. Specific characteristics of EDIT Value and its outputs which can be utilised within this marketing phase are presented in the introduction.

A short report can be prepared with a tailored offer based on the initially collected information. This report can be structured according to individual levels of the management pyramid (described in Annex 1).

Agreement on the implementation of EDIT Value

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Some enterprises may wish to “pilot” EDIT Value for a specific process first. We cannot recommend such a partial approach as the purpose of EDIT Value is to select priorities for RE within the whole business. An initial analysis cannot be successfully completed with a restricted availability of data.

Implementation of EDIT Value requires firstly some detailed data on enterprise processes, products and flows, and secondly, information on enterprise relationships, strategies and management systems, etc. Therefore, an agreement on confidentiality of data will usually be an important part of the agreement on external assistance.

An agreement on the implementation of EDIT Value - usually by signing a contract - terminates the preparatory phase.

Examples of aspects that may be considered in preparation of EDIT Value
Of course, the choice of aspects depends on the mutual trust between the enterprise and the facilitator.

- Layout of the enterprise
- Aerial photograph
- If available: vision, mission and goals of the enterprise
- Enterprise's received awards
- Established management systems
- Electricity and gas bills of the last months
- Yearly energy consumption (separated according to the different energy sources)
- Load profiles for electricity
- Illustration of the processes; short description of the core processes
- Main energy-consuming processes (with documentation)
- Inputs of raw materials, magnitude of waste, material utilisation level, recycling
- Ways of disposal
- Hazardous waste
- In/Out accounting of the annual reports of the last two financial years
- If available: environmental statement
- If available: action plans for increase of energy- / resource efficiency or participation in external programmes related to energy / resource efficiency etc.
- **Confidentiality of data** and photo permit, e.g. during the walk-through

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1 Potentials

The first phase of implementing EDIT Value is a systemic identification of potentials for improvement. This is the core phase of EDIT Value and provides the basis for its added value. It starts with the collection of data and focuses on its analysis in dialogue with the enterprise staff.

It is recommended that the collection of data follow a definite order with an internal logic (for example the data from step 1.3 are needed for implementing step 1.5).

Identification of potentials is done in consideration of a complex set of aspects, which can be the source of potentials for improvement. All these aspects are listed in Form 1.6 that creates the backbone of EDIT Value. The EDIT Value methodology is straightforward in ”switching off” those aspects with little or no potential in Form 1.6. Only those aspects which possess a significant potential for improvement are further explored in phase 2 where the most suitable applications are assigned to them.

Some important data needed for work with Form 1.6 are collected through Forms 1.1, 1.2, 1.3 and 1.5.

1.1 Stakeholder analysis

The authors of EDIT Value propose to start with the stakeholder analysis in order to better understand both the enterprise goals and, consequently, its strategy. **The key question here is how an enterprise reflects the interests of its stakeholders that provide the basis for a business.** A gap identified between the importance of a given stakeholder and the reflection of its significance in enterprise activities and communication provides the basis for the first “aha” effects (unexpected discoveries or insights into "hidden" potentials for improvement, which are not that evident without a specific analysis). Goals and strategies developed from stakeholder expectations represent the first source of RE performance. Therefore, the enterprise's relationship with stakeholders and relevant gaps in addressing this basic level of a business should be thoroughly reviewed.

Form 1.1 is outlined to implement this initial analysis. It contains, among others, a checklist of the most important stakeholders in order not to omit any important party. Form 1.1 can be completed either during a workshop with the enterprise management (one-hour workshop with a follow-up discussion can be sufficient) or individually before its results are compared and discussed with enterprise representatives in a meeting.

The outputs of Form 1.1 provide input for working with Form 1.6.

1.2 Management systems initial analysis

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This analysis is a very brief screening of existing management systems and their quality. Form 1.2 collects relevant information, also from several different persons if possible. This information will be utilised for questions with respect to management systems in step 1.6.

1.3 Input-output analysis

This step of EDIT Value enables quantification of the theoretical potentials for RE within processes through a simple input–output analysis implemented at the enterprise boundary level (not at the level of specific processes). It easily estimates total losses related to inefficient use of natural resources within processes (so-called non-product output costs).

Data on major process inputs (materials and auxiliaries, water and energy, packaging) and the estimation of the ratio of their appearance within the desired product is needed at this stage. These data are collected using Form 1.3 “TOP 10” based usually on annual figures from the previous business year.

The result of this input–output analysis is a quantification of “total loss”, which at the same time represents:

- natural resources that were wasted,
- financial losses,
- pollution and harmful substances that have an impact on the environment.

This provides:

- indication of potentials for improvement of RE and pollution prevention,
- information for identification of priority flows and areas for improvement,
- data for quantification of an initial baseline and for possible target setting.

Therefore, these results give an important insight into the efficiency of used input materials and total costs of pollution and provide background information for the estimation of potentials for improvement.

Data gathered within “TOP 10” together with data on annual production can be used in some cases for benchmarking, which may permit further insight into the quantification of the potential for improvement and a base for continuous improvement.

This quantitative analysis also tests the ability and willingness of the enterprise to provide quantitative data necessary for the identification and exploration of RE potentials.

The results of this simple analysis are often surprising for the enterprises, which are seldom used to monitor losses related to the production of waste and pollution (non-product output costs). Thus, this information can often also be utilised for boosting commitment to change at the

enterprise level as it brings the mentioned “aha” effects in revealing the real costs of pollution and inefficiency.

Note that “TOP 10” is designed for priority setting and is not a comprehensive and complex input–output analysis. It is done only for the most significant inputs within the company system boundary.

In addition, there is one important rule to be considered: ask for (even very rough) expert estimation if real data are not available or cannot be gathered easily. It is better to be “approximately right than accurately wrong”. This is valid especially for estimation of ratio of appearance of selected inputs within the product. For priority flows, the missing data will be collected later with the needed accuracy.

Labour intensity for filling in Form 1.3 can vary from company to company. If data on major inputs are available it should not take more than half a day to complete it.

Outputs of Form 1.3 provide input for working with Forms 1.5 and 1.6.

1.4 Walk-through

In many cases, the walk-through of the enterprise will be done at the beginning of the implementation of EDIT Value (or even already before signing the contract on implementing EDIT with an external assistance). We recommend carrying out a new walk-through after the data from Form 1.3 are available. This enables focusing on RE of the most significant flows identified within Form 1.3 during the walk-through.

The walk-through should be planned. A map of the production sites of the company including machinery provides a basis for planning the physical part. The map can be utilised to record the main findings and also for reporting later on.
The walk-through should be implemented when the enterprise is operational. It is recommended to follow the logic of material and energy flows if possible. Do not forget to comply with all health and safety rules. The external expert should be accompanied by responsible staff of an enterprise, and knowledgeable employees should be available at the core processes and/or machines.

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Pay special attention during the walk-through to:

- main process inputs and outputs
- production technology and its efficiency (major processes and quality of technological equipment)
- way of operating technology (good housekeeping, ratio of rejected product outputs) and its maintenance
- end-of-pipe technology and its efficiency and maintenance
- major material and energy flows (one can follow the major inputs and outputs and try to identify? major pollution sources, ask for composition and origin of waste) and their monitoring (are significant resource users also monitoring driving factors of specific flows in order to manage resource efficiency?)
- logistics with focus on storage
- any significant risks associated with environment, quality, health and safety.

Specific attention should be paid to water and energy flows in order to become acquainted with their intake (energy transformation), distribution and final use.

The walk-through can also provide empirical data for evaluation of other aspects of enterprise operation listed in Form 1.6.

One can summarise findings concerning potentials for improvement within the production process identified in the previous steps. TABLE 1 can be used for this purpose, if suitable for the given enterprise. TABLE 1 provides an overview about expert estimation of potential for improvement related to increase of efficiency and to reduction of pollution within processes. This estimation can be qualitative. Furthermore, one can use benchmarking information (general benchmarking information is provided within the MS Excel-based 'Orientation matrix for estimation of potential for savings') if more accurate benchmarking data are not available.

TABLE 1: Potential for improvement of RE within processes

Flow	**Potential**		**Observations**
	Expert estimation	Benchmarking	

Use Form 1.3 as a starting point for filling in TABLE 1. Within the processes, it is possible to comment on potential for improvement through good housekeeping or cleaner technology.

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1.5 Screening analysis of the inputs and outputs of the product life cycle

In addition to the results of Form 1.1, this screening analysis of the input and output of the life cycle of enterprise product(s) and/or services also provides an input for working with Form 1.6. In fact, the number of product-related aspects in Form 1.6 is high and one output of the work with Form 1.4 is “switching off” aspects within Form 1.6 at the product level. The reason is to simplify the work and to further investigate only areas with a possibly significant potential for improvement.

If the SME provides more than one product / service, it might be necessary to decide for which product the analysis should be done. It is possible to select only the most representative product or to implement the life cycle analysis for several product groups etc.

Important sources of information for filling in Form 1.5 can include the following:

- Initial guidance can be provided by significant material and energy flows identified within analysis 1.3 which also enter the other phases of the life cycle and which can provide a basis for quantification of selected inputs and outputs at a specific stage of the life cycle. This is especially valid for the major inputs identified in Form 1.3 as these can provide a link to possible RE potential within production and transport of input materials.
- In order to fill in the boxes on the upstream and downstream life cycle phases, it is possible to ask questions on composition of products and their performance within the use phase (e.g. if it consumes energy) or within the end-of-life phase. At this stage, it is sufficient to mark areas with possible potential only. More detailed questions related to such an area (like recyclability of materials) will be asked later in Form 1.6.

While it is possible to quantify all items in Form 1.3, screening life cycle analysis in Form 1.5 can be done with qualitative estimations only. The goal of working with Form 1.5 is to mark areas with possible potentials for improvements of RE or reduction of environmental and/or social risks. This analysis can be implemented within 90 minutes of discussion and/or a workshop with knowledgeable enterprise staff. However, there might be a need to collect additional data later on.

Even if the SME is not an owner of a specific phase of the life cycle (and cannot influence it), it is still worth identifying possible potentials in Form 1.5 and, consequently, to ask questions in Form 1.6. There may be a possibility to influence these potentials (i) through changes within some other phases of the life cycle or (ii) through the relationship of the enterprise with the relevant stakeholders in that phase.

Some ideas for filling in Form 1.5 may also occur from Form 1.1 as stakeholder interests also influence stages of the life cycle.

As with steps 1.2, 1.3 and 1.4 one can also summarise findings concerning potentials for improvement identified within step 1.5. One can provide an expert estimation of potential for improvement related to increase of efficiency and to reduction of pollution within the life cycle (TABLE 2). This estimation will most probably be qualitative only.

TABLE 2: Potential for improvement of RE within product life cycle

Flow and phase of life cycle	Potential	Observations

As a starting point for filling in TABLE 2 utilise Form 1.5. Useful questions which can be asked here include:

- To which extent does the design of products influence RE within the processes (for example use of hazardous materials or water pollution)?
- To which extent does the design of products influence RE within the other stages of the product life cycle?
- Is there a potential for reduction of pollution and costs through improved product design?

It is suggested not to spend too much time with filling in Tables 1 and 2. If more information is not available at this moment, Form 1.6 can provide more guidance for estimation of potentials.

General remark: it is possible to come back to specific forms with more accurate data at a later date. However, EDIT Value is an action-oriented tool and paralysis through too detailed analysis should be prevented. One should not forget that RE potential analysis is still at the stage of priority setting and "switching off" areas with no or limited potential for improvement. More detailed and time-consuming data collection is appropriate within the cost-benefit analysis in phase 3.

1.6 Evaluation of aspects

Phase 1 is accomplished by identification of areas with possible significant potential for improvement. This important work, which represents a core activity of the EDIT tool, is guided by Form 1.6 which covers all levels of a business.

Different strategies may be applied for working with Form 1.6. Experienced professionals will utilise it only as a checklist so as not to forget to ask all important questions. It is recommended to start with discussing relevance (applicability) and importance (evaluated by the weight) of specific aspects. Importance can be understood either as general importance of a specific area for the given enterprise and/or as a general level of potential for increase of RE or for gaining any benefits from better performance of a specific aspect.

An evaluation (relevance and A, B, C for weight) for each aspect needs to be carried out. This will lead to "switching off" the irrelevant and insignificant (evaluation C) aspects from further investigation. One should not pursue aspects having low weight C.

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Specific potentials for improvement can be highlighted for each aspect within the next stage of working with Form 1.6. This is done by assigning a level of exploration of potential for improvement within a given aspect (values 1 – 4).

The aspects scoring A1, A2 and B1 can in general be considered to be areas for improvement for further investigation. It is important to note that these values are for orientation purposes only for those who do this evaluation. The final selection of aspects with RE potential is a result of their expert judgement and discussions that will evolve especially around the “problematic” aspects.

The output of this step is a specification of significant aspects based on work with Form 1.6 (for example evaluated as A1, A2 and B1). These are areas for improvement possessing a promising RE potential for further investigation. These aspects are hereinafter called Core Aspects. Final selection of significant aspects should always be an output of teamwork. The dialogue nature of EDIT Value is embedded especially within this step.

The list of Core Aspects is a necessary input for the next step. You can use Table 3 presented in the next step for listing the Core Aspects. Furthermore, an Excel-based questionnaire for all aspects is available if a computerised version is preferred.

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2 Applications

In this phase, the most effective applications, generally referred to as tools, are allocated to the potentials identified within phase 1 (in form of Core Aspects) building on:

- knowledge of leverage points within the management pyramid (i.e., the Core Aspects with the highest potential for improvement),
- knowledge of relevant applications (basic information on applications is provided within ANNEX 1),
- the feasibility study.

2.1 List of applications

Applications addressing specific aspects within the management pyramid are characterised in ANNEX 1. It is recommended to get acquainted with specific applications and implement an expert allocation of possible applications first. One can broaden the scope of possible applications to any general or specific proposal, including specific innovations (organisational or necessary investment measures), application of RE tools and/or their parts etc. The MS Excel-based matrix 2.1a 'Allocation of Major Applications' can be used for allocation of the most typical applications.

The Excel-based Table 2.1 (Selection Aid for Applications) should be consulted to check whether there is any other application which should be put on the long list for further consideration.

For completion of the list of applications, Table 3 can be used.

TABLE 3: List of applications

Core Aspect (No. and title)	Application	Remark

2.2 Company feedback

The long list of available applications should be discussed within the EDIT Value team including company members. Furthermore, the scope of the potential applications and possible projects that could be evaluated can be best defined in a direct discussion with the enterprise. The specific proposals (applications in form of specific innovations, application of RE tools and/or their parts, concrete measures etc. as listed in Table 3) should be discussed in order to get a final list of applications for investigation that is more detailed.

2.3 Feasibility study

For selected (shortlisted) applications, technical, environmental and economic feasibility studies should be implemented. Feasible applications will be implemented in the form of specific projects in phase 3.

The projects may concern also the implementation of a specific technology or process able to solve the identified priority in the company. Technologies cannot of course be included in the list of applications and one does not always need an application of the above-mentioned lists (Excel Tables 2.1 and 2.2) to identify the right technology - an expert opinion can be sufficient here.

This section contains basic information for evaluation of the technical, environmental and economic feasibility of possible applications.

Technical feasibility

The application/technology considered during the technical feasibility study should be evaluated with regard to

- product quality,
- productivity,
- choice of inputs and material consumption,
- energy consumption (availability),
- maintenance, and
- safety

Environmental feasibility

In relation to environmental feasibility, the identified application can be considered with regard to:

- use of natural resources - material consumption and energy consumption (water consumption is also included in energy consumption as it is also an energy carrier)
- emissions to air, water, soil

- shift of environmental problems to other environmental media (air, soil, water)
- use of harmful substances
- health and safety
- life cycle impacts

Applications which are not technically and environmentally feasible should not be evaluated further.

Cost-benefit analysis (economic feasibility)

A cost-benefit analysis should be performed for technically and environmentally feasible applications/technologies.

Relevant costs and benefits can be linked to:

- material and energy flows and their changes (including change in quality or pollution treatment)
- change of technology (from small amendments to a complex modernisation; remember to also consider costs of installation)
- maintenance
- labour
- monitoring and information system
- transport
- compliance and environmental benefits

All costs and benefits should be transferred to a common unit of measurement, which in our case is money value.

The very basic criterion for an economic evaluation of applications/technology is the payback period. It is the period of time (in years) needed to generate enough cash flow to recover the initial investment.

Payback period (years) = capital investment / annual cost savings

Expression in equivalent money value is not sufficient for evaluation of applications, as the value of money changes over time (a Euro available five years from now is not as valuable as a Euro available now) and one should work with the interest rate in order to get a better picture of more significant investment projects. A payback period could be utilised for evaluation of measures which require low investments.

Selection of feasible applications and formulation of specific projects should be done again in dialogue with enterprise staff. Enterprises should have the right of veto in all discussions. The only way to convince staff of the usefulness of some applications is solid rationale and data.

3 Action plan

The final output of EDIT is the implementation plan for selected projects.
After defining the feasible projects for improving enterprise RE, these should be outlined in an action plan. The action plan can be as simple as the one proposed in Table 4.

Table 4. Action Plan

Action (what?)	Justification (why?)	Responsibility (who?)	Schedule (when?)	Budget (how? - source of financing)	Measurement and verification

For measures which need investments, it may also be necessary to identify possible sources of financing utilising a separate background document. An overview about available financing instruments for each country can be found at: www.resourceefficiencyatlas.eu.

The appropriate performance management and monitoring framework should be established based on specific performance indicators. Make sure that you are using the most effective indicators which are feasible for the given SME. A performance monitoring system should be embedded into the business activities. For more significant projects, a **Measurement and Verification Plan** can be developed. This is not only helpful for keeping control of the real RE, but also for showing enterprise-internal, and possibly also external, stakeholders what the enterprise implemented and which results were achieved.

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ANNEXES

ANNEX 1: Relationship of tools for improvement of resource efficiency

ANNEX 2: Terms and definitions

ANNEX 3: Basic information on an enterprise

As seperate files are available:

1.1 Form for stakeholder analysis

1.2 Form for management systems initial analysis

1.3 Form for input-output analysis

1.5 Form for life cycle analysis

1.6 Form for evaluation of aspects

2.1a Allocation of major applications

2.1b Selection aid for applications

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ANNEX 1: Relationship of tools for improvement of resource efficiency

Selection of applications for improvement of resource efficiency

The purpose of this document is to provide background information for selection of an optimal set of Resource Efficiency (RE) applications within implementation of the EDIT Value tool. It explains the background to the design of the EDIT Value tool. Resource Efficiency (RE) is influenced by all levels of a business and leverage points for improving RE can be found at each level of an enterprise.

The applications (tools) for desired RE interventions also address different levels of a business. At the same time, they have many overlaps and synergies and the structure proposed further in this document was found useful for better understanding RE applications and their functioning in relationship to RE potentials.

This document builds on the research project “New Approaches and Tools for Resource Efficiency and Sustainable Consumption and Production” implemented at the International Institute for Industrial Environmental Economics (IIIEE) at Lund University, Sweden 2001-2014 and on outputs of the research project “Support for Sustainable Consumption and Production” implemented by ENVIROS Prague for the Ministry of the Environment in 2004-05.

Scope of resource efficiency tools

Stakeholders as a starting point

Every business is based on stakeholders, their interests and values. The core stakeholders include:

- owners
- investors and financial organisations
- company staff
- customers (and their organisations)
- partners (business partners, industry associations, etc.)
- public administration and local government
- citizens, communities

Stakeholders are involved in creating and influencing framework conditions under which the enterprise operates. These conditions comprise for instance market-regulating rules, tax settings, etc. The framework conditions also involve the operation of environmental and other legislation, technical standards, etc. SMEs in particular know the importance of also the informal rules and relationships with stakeholders which determine many enterprise strategic risks and opportunities.

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External conditions determine to a great extent the limits to which it pays off for an enterprise to utilise RE tools and measures (called “applications” within the EDIT Value Tool methodology). RE can be driven by a basic need to stay in the market (for example through meeting the regulatory requirements) or is attractive for an SME because the RE applications and measures, under given or anticipated conditions, increase the value of an enterprise and bring it a competitive advantage.

An enterprise must act rationally and cannot choose such a strategy that would deteriorate its market position. Effective RE applications must enhance, at least on a long-term basis, the value of a company and its competitiveness. This is also a starting point of the EDIT Value Tool, which links RE potentials with the most effective RE applications.

The management pyramid

RE applications help an enterprise to address the conflict between desirable and undesirable impacts of enterprise activities on the interests of its stakeholders. In doing so, RE applications change the enterprise's behaviour and the structures that determine this behaviour. Currently, innovations are becoming increasingly complex and involve the entire business. While planning for an optimised set of RE applications, one therefore has to consider the enterprise in terms of its systemic nature and complexity. For this purpose, the so-called management pyramid will be used, which is generally valid for any organisation and which describes the fundamental parts of an enterprise and their relationships (see Fig.1).

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Figure 1: Management Pyramid

The management pyramid shows individual levels of the system that every enterprise must gradually build up to achieve its business objectives. Individual components of the management pyramid are derived from each other in the following order:

(1) Values of **stakeholders** and their relations with the enterprise determine the **vision, mission and principal goals** of an enterprise.
(2) These issues provide the starting point for a **strategy** which enables the achievement of the envisaged vision and goals of an enterprise.
(3) The **management systems** link the governing levels of a business with its operational levels (processes and products).
(4) Processes comprise all physical means ensuring **production** at the operational level and result in
(5) **products and services** and their parameters comprising the entire life cycle.
(6) Outputs at the level of products directly affect individual stakeholders and their relations with an enterprise, thus closing the circle of interactions of individual levels of the management pyramid.

Enterprise management involves a range of aspects: financial resources, marketing, processes, etc. One can find all these standard parts of management in the management pyramid and perceive their context. The same can be done with the RE applications whose primary purpose is to improve individual levels of the management pyramid.

Systemic approach

The features of changes in the management pyramid are as follows:

The higher the level of the management pyramid, the lower the effect of the given level is on the entire enterprise behaviour. The product, for instance, must be seen as a result of linking particular values with a vision, strategy and by means of management systems with the operational level where the product is subsequently made. The product itself thus comes from this hierarchy as its output and affects the whole system therefore minimally. One does well to remember that, for instance, the ecodesign of a product not only comprises the final composition of materials used or product performance but also the interests on the basis of which the product is being designed. The choice of materials or the product performance within its life cycle is only the result of a choice that is made at the basic levels of the management pyramid. This is why it is necessary to investigate all levels of the management pyramid to influence RE performance.

The higher the level of the management pyramid, the easier it is to make change (for example, it is easier to innovate a technology than thinking).

Only those changes are permanent that have an impact on the change of individual levels of the management pyramid. **The desired change must be consistent within the entire management pyramid at the same time**, not only horizontally but, above all, vertically. In the field of vertical impact, the most important thing is to integrate RE targets and business goals and the values of stakeholders.

Relationships of applications promoting resource efficiency

In principle, any standardised or informal tool enabling the achievement of improvement in any field of the enterprise management pyramid, including its product life cycle and leading to increase of RE, is considered as an "RE application" here.

If this broad definition is used as a starting point, the RE applications form at first sight a very heterogeneous group. There are tools that help to determine priorities (for example Environmental Management Accounting) that directly provide improvement (for example technology transfer), but also analytical tools which examine room for improvement (benchmarking, energy audit) or establish an information system on RE of specific flows (Monitoring and Targeting). There are also some tools incorporated in others – for instance, an integrated management system already involves a supplier assessment or a customer satisfaction assessment etc.

In terms of practical RE applications within companies, the most interesting point is how these tools affect the management pyramid and the process of its desired improvements. If the perspective of an enterprise is known and in which parts of its management pyramid the best opportunities for improvements are allocated, it is possible to tell which RE applications could best meet its goals and strategies within the given enterprise situation. This is the basic principle of the EDIT methodology.

In the text below (as well as throughout EDIT), the RE applications are structured according to their primary focus on the four basic (simplified) management pyramid levels:

1. Enterprise strategy and its relations with stakeholders
2. Management systems
3. Processes
4. Products and their life cycle

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This will allow us to better understand the purpose of RE applications, their mutual relationships and feasibility of their applications within the specific enterprise.

Applications at the level of an enterprise strategy and its relations with stakeholders

If the objective of starting new RE activities effectively is to be reached, one has to start with stakeholders and their interests (customers, owners, etc.). It is increasingly important for companies to communicate with people who are affecting or can affect their operation (whether positively or negatively).

The more efficient and precise the technologies are and the faster they spread, the more companies compete with each other on the "soft" platform of communication, emotions, relationships, reputation, etc., at the level of stakeholders and relations with them. The main RE application that is effective at this strategic level of the management pyramid is **Corporate Social Responsibility (CSR).**

CSR is a management concept for the integration of social and environmental concerns in enterprise operation and into interactions with its stakeholders in order to reflect in an integrated way all important economic, environmental and social concerns and to produce an overall positive impact on society. The triple focus of CSR represents all areas of sustainable development and is also called the “Triple-Bottom-Line Approach”. RE can be a core approach to achieve synergies especially between the economic and environmental goals (more efficient use of natural resources has positive impacts on environmental performance, such as conservation of natural resources and reduction of pollution) while improving economic performance and reducing strategic risks). Enterprises can utilise the ISO 26000 guidance document to implement CSR. For an SME it can be sufficient to focus on specific areas for improvement within overall CSR given the findings of the EDIT Value Tool. The earnest introduction of CSR should start with a stakeholder analysis (the EDIT Value Tool includes an indicative analysis at this level of the management pyramid).

CSR can be considered as an umbrella tool providing the starting point for all other RE applications. CSR could not exist without communication, which must be mentioned at this level as an individual RE application. Communication with stakeholders involves **external reporting**.

External reporting is a specific strong feature of the European Commission Standard Eco-Management and Audit Scheme (EMAS), which belongs to RE applications primarily aimed at management systems. EMAS "competitive advantage", compared to the very similar ISO 14001 standard, is the verified environmental statement (communication on environmental profile with the public verified by a third party). However, EMAS has not yet established itself more significantly in the competition with ISO as the public sector has not yet been able to appreciate sufficiently this openness of enterprises. (More significant positive feedback for companies choosing EMAS and therefore verified external reporting is still lacking).

For interventions at the strategic level of a business, a large portfolio of **business planning applications** can be used (starting from a simple SWOT analysis or using, for example, the Balanced Scorecard for creation of a systematic framework for strategic planning and for implementation of an enterprise strategy).

There are two basic reasons why business planning applications within the EDIT Value tool itself need to be dealt with:

- an enterprise cannot operate without a sound business strategy (and therefore cannot engage in desirable RE initiatives if it fails to have this level of a business under sufficient control)
- business planning and enterprise strategy should include RE and sustainability concerns whenever it helps to increase enterprise value.

Hence, business planning applications can also be utilised to maximise positive and minimise adverse impacts in line with RE principles. In some cases, an explicit integration of RE principles into these tools occurs.

The Sustainability Balanced Scorecard can be used, for example, to integrate RE goals into business planning. To build a business on the principles of sustainable development (or for checking their feasibility for a given enterprise) the Eco-Innovation Manual developed by UNEP in 2014 might be utilised.

Applications at the level of management systems

If an enterprise have considered at the guidance level of the management pyramid what it wants to achieve and what strategy it will choose (related values, priorities and targets can be formulated in the form of a policy), it must be able to put its policy into practice. Management systems serve this purpose by linking the governing levels of a business with its operational levels (processes and products). Among RE applications, the management systems have a privileged position as they provide needed vertical integration within the management pyramid. Enterprises usually prefer standardised management systems such as ISO 14001 for environmental management to address this level.

System-oriented tools involve for instance **Internal Information System, Supplier Assessment System, Audit of Compliance with Environmental Legislation, Health and Safety Management System** (OHS following usually the standard of OHSAS 18001), etc.

There is a natural tendency to integrate elements of management systems into the stand-alone applications which focus on another level of the management pyramid. For example, **Total Quality Management (TQM)** has significantly extended the original system orientation of quality management to the level of stakeholders and enterprise strategy. **Total Productivity Management (TPM)** focuses on processes. As an example of a management system application targeting also the product level there is the **Product Oriented Management System (POEMS).**

SMEs in particular are overloaded by the requirements of different management systems they have to or want to comply with. Therefore, a natural trend of introducing an **Integrated Management System (IMS)** can be observed**.** It combines all related parts of separate management systems into one system for easier management and operations. Most often, IMS integrate the core management systems: Quality (QMS), Environmental (EMS) and Health and Safety (OHS). These are not separate systems but rather integrated systems based on their natural linkages; therefore, similar processes are managed and executed without duplication while keeping separate policies and goals for each area managed. Common IMS components include, for example, resources (people, facilities and equipment) or processes. IMS were chosen as a core application within the EDIT Value Tool at the level of management systems.

Process-oriented applications

A wide range of RE applications has been developed by the industry for process optimisation. These applications have one common goal: Process-oriented RE applications are aimed at management of material and energy flows (and associated financial flows) with a view to increasing RE (minimising losses and transforming maximum inputs into a desirable product). Another target is usually also to minimise use of hazardous materials. Increasing efficiency and substitution can also be considered basic RE principles. Which type of applications can help to implement them?

The simplest activity applied not only at the level of processes is the development of **Key Performance Indicators (KPIs)** and related **benchmarking** which helps an enterprise to identify and control its priority flows and their RE potential. An instrument called "TOP 10" utilised within the EDIT Value tool for an initial input-output analysis can be applied to develop KPIs and for basic benchmarking on its own. As

benchmarking has some drawbacks related to differences of specific processes and to availability of reliable and up-to-date data, the use of KPIs can be recommended for comparison of an enterprise performance in time in order to facilitate continuous improvement of its performance (and inter alia provide information for reporting etc.).

One of the oldest and most widespread RE applications utilised at the process level is **Cleaner Production Assessment (CPA)**. This approach has been applied in various methodologies for more than 30 years mainly for industrial processes and it comprises, besides organisational procedures, the following steps:

- priority setting (based on identification of RE potentials; KPIs are utilised here)
- detailed analysis of sources and causes of pollution (losses) for the priority flows or cost centres (utilising material and energy balances)
- generation of RE (cleaner production (CP)) options
- feasibility study
- implementation of a set of feasible RE (CP) measures, evaluation and continuation

There is a limited number of CP techniques which can be utilised to address specific factors influencing environmental risks and losses within production processes. An overview is provided in Annex-Table 1.

ANNEX-TABLE 1: Cleaner production techniques which can be utilised in order to apply resource efficiency to processes

	CP Technique	CP options (examples)
1	Input substitution (substitution of input material, water or energy carrier)	Replacing toxic or harmful materials with less dangerous ones, using renewable materials, choosing a better quality material (or purifying it before use)
2	Good housekeeping	Improving working instructions and procedures, proper scheduling of production, training and incentives programmes, adequate process control operations, proper maintenance and cleaning
3	Product modification	Design improving RE within production process (for example design requiring less harmful surface treatment), more RE packaging, reduction of harmful substances (more options addressing the whole product life cycle are listed in Table 2)
4	Technology modification	Replacing an old technology, modifying equipment, improving process control, ensuring optimal process conditions, using more automation, improving logistics and equipment layout
5	On-site reuse and recycling	Introducing on-site recovery and re-use of wasted raw materials, water or waste heat in the process, transforming waste into a useful by-product

CPA was intended as an ongoing process of continuous improvement. However, in practice it was often utilised also as a one-stop solution for specific problems building on a static picture of RE in time (results of detailed material and energy balance quickly become outdated if there is no information system on important flows and their RE). In some SMEs, this one-stop improvement can also be the optimal intervention and is sometimes called **CP Audit**.

The well established application of **Energy Audit** is positioned at this level of a one-stop improvement as well**.** It differs from the CP audit usually by a set of predefined energy conservation options which are applied to a specific problem area. Traditional Energy Audit can be weak in generating some of the good housekeeping measures as it usually does not allow more detailed analysis of sources of losses as does

the CP Audit. A similar problem applies to traditional **technology transfer** which, when used without a detailed analysis of causes of losses and of all innovation opportunities in the given process, can lead to implementation of a measure which is not optimised and is usually overdimensioned, thus leaving part of the RE potential unexplored.

The condition for integration of RE and CP into the enterprise management system and for achieving a continuous improvement of its environmental profile is creation of an information system on material and energy flows. This field is covered by **Environmental Management Accounting (EMA).** The advantage of EMA consists in its wide scope and in its integration of monitoring of flows and their costs) into the enterprise accounting system. EMA traces the flows and stocks of materials within an enterprise and quantifies them in physical units (e.g. mass, volume). However, EMA is oriented on assessment only (internal reporting on financial flows associated with material and energy flows) and it needs further applications to bring desired RE improvements (an enterprise with EMA can for example utilise an EMS for planning and organisation or CP procedures for identification of causes of pollution, development of RE options and implementation of feasible measures). Guidance for EMA implementation most relevant for RE can be found for example within the ISO 14051 standard on Material Flow Cost Accounting (MFCA). MFCA is a method to quantify non-product output costs within an enterprise, and it promotes RE as well. In order to bring tangible results it needs to be integrated with other tools at the operation and management system levels. As EMA (and its practical methodology of MFCA) is quite a robust application it is often recommended within EDIT Value to utilise specific applications on the input-output level only, or to focus on one or two selected priority flows or on selected cost centres.

Monitoring and Targeting (M&T) is, similarly to MFCA, oriented towards establishing an information system on material and energy flows. Simultaneously to monitoring absolute consumption of a concerned resource, it also monitors factors affecting its consumption at a given place within the process. This enables continuous tracking of real efficiency of material and energy use at specific cost centres. It should be stressed that only an information system based on M&T principles is able to control RE and can provide a solid basis for development of effective conservation measures and for monitoring and verification of their actual RE performance.

Product-oriented applications

Similarly to process-oriented applications, the product-oriented applications are also aimed at substitution and at efficiency improvements – two fundamental RE principles. The main characteristics of product-focused applications are their orientation on the whole life cycle of a product, which can include mining, production of materials, manufacturing, transport, sale, use and end of product life. Most of the environmental impacts of a product are already determined during its design phase through choice of materials or way of operation.

An important trend is that more and more environmental impacts are generated in the other phases of product life cycle than in the manufacturing phase. One can see a paradox here that manufacturing - the phase of the life cycle with on average the least environmental impacts - is the most regulated. Therefore, there is a growing tendency to address the most important issues in terms of RE within the other phases of the life cycle as well, resulting for example in the regulation of packaging or the end-of-life of products. Another example of this trend is compulsory labelling of energy-consuming appliances, adoption of the EU Ecodesign Directive (Directive 2009/125/EC) or, recently, the goal of circular economy.

Eco-design can be taken as the most significant and comprehensive approach to practical application of RE at the enterprise level. Eco-design is not a standalone application but rather a broad area of specific approaches and tools. Practical ways to address eco-design are eco-design strategies as specified by

Brezet and Van Hemel, presented in Table 2. Eco-design strategies are widely utilised today and they provide basic structure also for specification of improvement potentials at the product level within the EDIT Value Tool.

If, in addition to economic and environmental aspects, eco-design takes into consideration the social aspects of the product life cycle, one can speak of **Design for Sustainability**. To provide examples of specific applications for instance, **Consensus Design** focuses on conceptual insight into a given problem and on communication with stakeholders. **Environmental Design** focuses on planning and implementation of measures for lower environmental risks (utilising eco-design strategies presented in Table 2).

To assess environmental impacts within the entire life cycle of products, **Life Cycle Assessment (LCA)** is used as a basis for evaluation and comparison of different products. The results of such studies are communicated in different forms, the most popular being different foot printing. For SMEs, labelling applications are usually the most convenient form.

Environmental Labelling is designed for communication of the environmental performance of products with enterprise stakeholders. LCA-based **Environmental Product Declaration (EPD)** enables communication between manufacturers in terms of environmental impacts of their products (EPD can be classified among standardised life-cycle data declarations described in ISO 14025 Environmental labels and declarations - Type III).

Eco-labelling is utilised for communication with consumers. Among the ISO standards, eco-labelling schemes are described in ISO 14024 for environmental labels (Environmental labels and declarations - Type I). In Europe, there are different national eco-labelling schemes as well as one EU based scheme known as the EU Flower. An enterprise does not have to wait for a product-specific eco-label standard and can make a **Self Declaration** (as described in self-declared environmental claims in ISO 14021 (Environmental labels and declarations - Type II)).

The development of a new product concept has a specific position within particular eco-design strategies (as outlined in Table 2). **New product concept** seems to be an application of growing importance and it can also be considered in relationship with RE potentials identified within SMEs. New product concept promoting RE means an idea of product and its life cycle described from the perspective of a customer. This approach satisfies customer needs in a new way which can bring significant RE benefits. For instance, **Product – Service Systems (PSS)** can – in searching alternatives for existing products and business models – reach the point where it is advantageous for both the producer and the customer to substitute the product (partly) by a service.

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TABLE 2: Ecodesign strategies

Han Brezet and Van Hemel formulated the following eco-design strategies which can be followed in order to reduce environmental impacts within the entire life cycle of products. Each strategy is illustrated by specific actions which can be taken.

	Strategy	**Eco-design options (examples)**
0	**New product concept** *the most innovative strategy which can produce the most positive effects*	New concept of how to satisfy consumer needs leading for example to dematerialisation, shared use of product, integration of functions, functional optimisation of product components
Production of raw materials and components		
1	**Selection of low impact materials**	Cleaner materials, renewable materials, lower energy content materials, recycled materials, recyclable materials
2	**Reduction of materials usage**	Reduction in weight, reduction in transport volume
Processing Product		
3	**Optimisation of production techniques**	Alternative production techniques, fewer production steps, lower/cleaner energy consumption during production, less production waste, fewer/cleaner production consumables (for more examples see Table 1)
Packaging and Transport		
4	**Optimisation of distribution system**	Less/cleaner/reusable packaging, energy-efficient transport mode, energy-efficient logistics
Use		
5	**Reduction of impact during use**	Lower energy consumption during use, cleaner energy source, fewer consumables needed, cleaner consumables, no waste of energy/consumables
6	**Optimisation of initial lifetime**	Reliability and durability, easier maintenance and repair, modular product structure, classic design, strong product-user relation
End of life		
7	**Optimisation of end-of-life system**	Reuse of product, remanufacturing/refurbishing, recycling of materials, safer incineration

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Selection of an optimal resource efficiency improvement package

Enterprises are bombarded daily with offers from consultants and suppliers who believe that it is precisely their product or service that the enterprise needs. So how to recognise which of the offered applications are relevant to the given enterprise?

Within the EDIT Value tool we offer an effective approach to identifying an optimal set of RE applications which will bring the best benefits for the given enterprise within its current situation. The EDIT methodology described within the guide shows how to come to these solutions step by step. The important thing is that the assessment within phase 1 is made from the evaluated entity's perspective in which the first key leverage points are identified with improvement potential in the entire management pyramid. Only subsequently is a set of optimised applications for exploration of the potential identified recommended in phase 2. The following represents some experience concerning how to select an optimised set of RE applications:

The starting point for selection of RE applications is knowledge of aspects with improvement potential within the whole management pyramid which result from implementation of phase 1 of the EDIT Value Tool (answers to the question "Which parts of the management pyramid need to be affected in order to explore the potentials identified?").

While selecting a set of RE applications which are most feasible from the perspective of a given enterprise (as is done in phase 2 of the EDIT Value Tool), the following should be considered:

- which applications are eligible for implementation of desirable improvements,
- how these applications interact with each other (applications can be simplified for instance by their integration),
- how they promote completion of the whole learning cycle (if any further actions would be necessary to complete the learning cycle), and
- what their feasibility is in the given enterprise situation.

Within the following two sections experience is provided on how to link applications with specific potentials and how to facilitate organisational learning.

Linking applications with specific potentials

The eligibility of applications can be judged based on the characteristics of a specific potential identified within a given aspect. For example, if a potential for conservation of a specific material input has been identified, one should indicate its magnitude based on

- the knowledge of an absolute value of the theoretical potential for RE (in money terms) as a result of the input-output analysis (utilising the TOP 10 table), and on
- an estimation of actual potential for improvement (in % based on an expert estimation, benchmarking or statistical analysis of historical data).

Based on this magnitude expressed either in monetary terms (with the goal to reach economic savings) or in terms of an environmental risk (with the goal to improve environmental performance), a suitable application can be allocated and applied.

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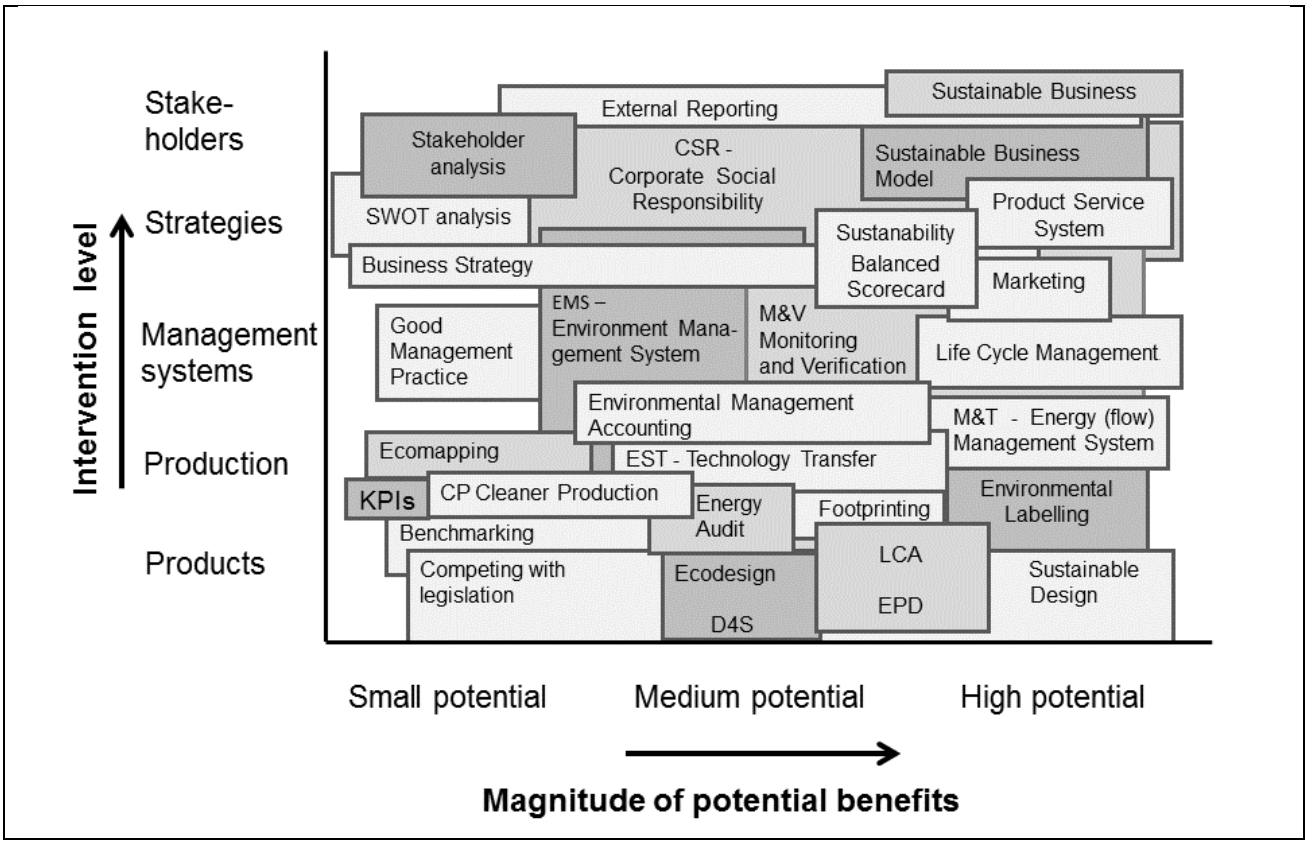
For a relatively small potential, it could be sufficient to utilise a performance indicator derived from TOP 10 (for example in the form of use of material input per unit of product produced) in order to establish a basic control over a given flow.

For medium-sized potentials, it could be possible to also apply (in addition to the already mentioned performance indicator) an audit or Cleaner Production Assessment focusing on specific improvements feasible at the given moment (and therefore probably based on organisational or low investment improvement measures).

If a high potential is identified, the feasibility of introducing a flow management system based on Monitoring and Targeting (M&T) could be explored. M&T enables control of RE related to the given flow within all important cost centres. Experience shows that if such an information system is installed, for example for managing a specific energy flow (just through establishing accountability of enterprise staff over real RE), around 5% of the given input can be saved through better operation of the existing technology. Such a more robust solution also has higher introductory and operational costs (for Monitoring and Targeting, for example, costs of sub-meters or software for data processing). The information gained has to be regularly evaluated and corrective and preventive actions need to be taken.

The same pattern can be found for example at the level of an enterprise strategy. For simple situations with low potential, a simple SWOT analysis is appropriate. For more complex situations with high potential for improvement, for instance a Balanced Scorecard can be utilised. More examples of this approach are shown in Figure 2.

Figure 2: Examples of applications covering possible necessary interventions at different levels of the management pyramid depending on magnitude of potential identified



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Facilitating learning

Here the focus lies on the learning process which is useful for understanding a mechanism of desired change at particular levels of the management pyramid. This change is a result of repeated completion of the learning cycle which is important to keep in mind while selecting the right set of applications. Some additional applications or amendments of applications might be needed in order to facilitate desired organisational learning in the field of RE.

The source of an on-going learning process is repeated completion of the learning cycle and its four particular steps:

- PLAN – existing guiding ideas, goals and strategies are utilised for planning (within the management pyramid, this is a top-down process linking a company's strategic and operational levels);
- DO – the plans are implemented (this step is mainly linked with the operational and management levels of the management pyramid);
- CHECK – the results of practical implementation are evaluated (bottom-up link within the management pyramid that requires an effective information system and involvement of people at all levels);
- ACT – practical experience is reflected, which can lead to changes in policies, strategies, concepts, or even of the guiding principles (this is the strategic level of the management pyramid that provides the basis for new planning and continuation of the learning process).

This learning cycle is also known as the Deming scheme utilised in the ISO standards.

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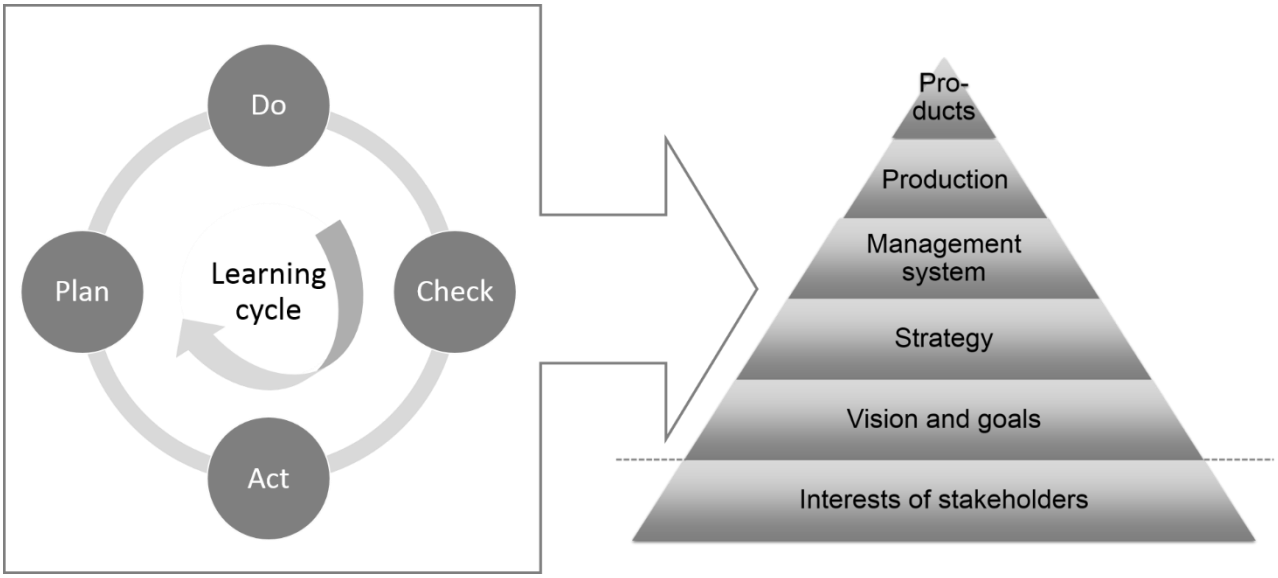
Figure 3: Learning cycle as a wheel of change within the management pyramid. Particular aspects at specific levels of a business are changed through learning. To be sustainable the change must be consistent within the entire management pyramid.



For example, information systems for the management of flows (like Monitoring and Targeting) facilitate desired organisational learning in the field of RE by providing feedback on real performance in RE at the level of specific cost centres. If integrated into an effective energy management system, these two applications enable companies to see the potential for improvement (gaining insight within the "Act" step), making people accountable for its exploration (ensuring completion of the "Plan" and "Do" steps of the learning cycle) and obtaining verified results of implemented RE measures ("Check"). It therefore results in completion of the learning cycle at the enterprise level. On the other hand, for example within the Energy Audit, the desired organisational learning is usually blocked by limited information on RE potential because of the static nature of this tool and by the usual lack of feedback on real performance of implemented measures and improvements achieved. This does not mean that Energy Audit would not be a useful application also on its own; however, its ability to address a larger energy conservation potential is limited. This needs to be taken into account when a set of suitable applications is chosen. For the achievement of continuous improvement and of a permanent change, the learning cycle must turn repeatedly and be completed.

Right at the beginning of the EDIT Value Tool application, one may encounter one of the greatest obstacles to learning and for exploration of RE opportunities within SMEs. A number of enterprises are convinced that their enterprise has already exhausted its economically effective RE potential and that no further significant opportunities for improvements exist. Experience from implementing RE in SMEs shows that, as a result of this false conviction, significant RE potential is left unexplored.

Therefore, it needs to be stressed here at the very end that enterprises have difficulties recognising existing potentials for savings as shown for example in the input-output analysis implemented within the EDIT Value Tool. Savings potential also rises with new RE techniques and their availability. An absolute potential for savings increases when prices of inputs rise. What is even more important: new interest and strategies are emerging, the number and power of stakeholders is growing as well as the importance of communication. Some of the unexplored RE potential merely results from a lack of an effective management system.

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Furthermore, a number of RE measures that can be found in totally new plants often result from poor communication between investor, engineering firm, supplier and operator.

ANNEX 2: Terms and definitions

Action Plan - output of EDIT Value composed of the most effective projects (applications) based on the implementation of EDIT Value

Application - specific eco-innovation, technique, tool and/or their parts which address identified **potentials** addressing significant **aspects**

Aspect - a specific area within a business which can be a source of a **potential** for improvement and over which a given enterprise can have direct control

Core Aspect - aspects possessing a **significant potential** for improvement

EDIT Value - Eco-Innovation Diagnosis and Implementation Tool for Increase of Enterprise Value

End-of-pipe technology - technology designed for treating pollution (for example filters, waste water treatment plants or dumping sites)

Framework conditions - given cultural and institutional environment of a business (including economic and legislative standards).

Key Performance Indicators (KPIs) - indicators utilised for measurement of enterprise performance within areas identified as most important. General information on KPIs is available at http://en.wikipedia.org/wiki/Performance_indicator; for RE specific information is recommended the following guide:
http://www.unido.org/fileadmin/user_media/Services/Green_Industry/Enterprise_Level_Indicators_for_Resource_Productivity_and%20Pollution_Intensity.pdf

Measurement and verification plan - plan for measurement and verification of real performance of an implemented measure. Plan should be developed before implementation of a measure in order to record baseline for monitoring of performance of an implemented measure. An example of energy conservation measures which can be extended to any RE measure can be found at:
http://en.wikipedia.org/wiki/Measurement_and_Verification

Non-Product Output (Costs) - pages 45 and 79 in the following book by Christine Jasch - "Environmental and Material Flow Cost Accounting"
(a brief version can be downloaded at http://www.env.go.jp/policy/kaikei/sympo/04.pdf)
or the complete book at
(http://books.google.cz/books?id=se6TreyGSyUC&pg=PA79&lpg=PA79&dq=Non+Product+Output+costs+%2B+wiki&source=bl&ots=UkenerM_Ic&sig=XAX_JhnbgmS9e6X5N4Xztk0Zmlo&hl=cs&sa=X&ei=VS_dUv03iJrtBri2gOAP&ved=0CFYQ6AEwBQ#v=onepage&q=Non%20Product%20Output%20costs%20%2B%20wiki&f=false)

PDCA learning cycle - learning cycle known from the ISO standards as "Deming Scheme" Plan - Do - Check - Act, utilised in business for the control and continuous improvement of performance? (more info at http://en.wikipedia.org/wiki/PDCA)

Potential – expected positive economic, environmental or social effects which are promising and interesting for further exaploration by a specific SME within its given framework conditions

Resource Efficiency (RE) - In the EDIT Value context RE is defined as “Reducing the use and costs of energy, water, material in the production process and life cycle” as we want to stress the economic effect of RE for an enterprise.

Resource Efficiency (RE) Principles There are two basic ways to achieve RE: (1) through more efficient use of natural resources or (2) through substitution of material and energy flows.

ANNEX 3: Basic information on an enterprise

Company name	
Address	
Contact person(s) Contact detail(s)	
Ownership & legal form	
Year founded	
Industrial sector	
Product(s)	
No. of employees	
Turnover (previous 2 years)	
Hours of operation (monthly/yearly)	
Location	