# STRATEGIC BUSINESS PLAN
# ISO/TC 300

## EXECUTIVE SUMMARY

Environmentally sound waste management activities are done at various scales, including transboundary movements, and one of the key pillars in the protection of the environment and human health. It also has an important role in the fight against climate change, the efficient and rational use of natural resources and energy, as well as enhancing the circular economy. Waste management includes waste recovery, e.g. recycling or treatment of waste for reuse. One form of waste utilization is energy recovery and it is practiced all over the world in various forms.

Solid recovered material (SRM), including solid recovered fuel (SRF), is solid material with a non-hazardous waste origin that has been sampled and analyzed to meet standardized sets of specifications and classifications for a given purpose (recovery/recycling).

It should be noted that the same SRM may have the ability to be simultaneously used for more than one purpose (e.g. as a fuel and as a mineral content for the cement and lime industry or as a fuel and an input resource for chemical recovery/recycling).

Solid recovered material is prepared from non-hazardous waste, of which, the main categories of raw material being municipal solid waste (MSW), commercial and industrial waste (CIW) and construction and demolition waste (CDW).

The evidence from the World Bank indicates that poorly managed non-hazardous solid wastes are increasing and causing great impacts to the planet. This is manifesting itself in pollution of our oceans, disease transmission, more respiratory problems, harm to flora and fauna, and wasting of freshwater and other precious resources. There is still a relatively low rate of recovery of the discarded material from human use and much of this is not managed.

Having regional standards for solid recovered fuels (SRF) has already increased the confidence of regulators and waste management operators in the safe handling, treatment and storage of the discarded material, which is derived from non-hazardous waste, to be used for energy recovery. In the case of energy conversion some of this material is now being used as a substitute for fossil fuels. ISO/TC 300 believes the development of standards for SRM will lead to added confidence in the use of non-hazardous waste.

Since the start of the development of the solid recovered fuels (SRF) standards in ISO/TC 300, there has been an appreciation that resource resilience, the circular economy and the impacts of climate change, are of critical importance globally and the spotlight on non-hazardous waste being utilized in the most efficient and appropriate ways needs to have an element of standardization.

The development of standards for solid recovered fuel, which is a type of solid recovered material, is at a mature stage and ISO/TC 300 is conscious that these standards should, where at all possible, not be interrupted.

From the moment ISO/TC 300 started to discuss the expansion of scope it was clear that, if there was no clear understanding of what solid recovered material (SRM) was, that solid recovered material would potentially cover anything that is discarded, non-hazardous and solid.

The intention of expanding the scope is to increase the options for use of discarded materials, while at the same time not covering standardization of materials that other Technical Committees are working

on. It is also, not ISO/TC 300's intention to cover the reuse of non-hazardous waste or many of the recycled materials that are already standardized, such as, paper and cardboard, metals and some plastics, especially where there is already clear utilization of the material.

However, there may be cases in which such materials fall outside these standards or are not already covered and have purposes that need standards. ISO/TC 300 feels that where these are identified and are approved through the ISO process, ISO/TC 300 (in collaboration with other technical committees, where necessary), can add value to the standards development and use of the material. One example of this is for chemical recovery/recycling for liquid and gas production.

Figure 1 and its associate text provides a deeper understanding of what the scope of ISO/TC 300 *Solid recovered materials* would be.

**Business environment**

Waste management includes waste recovery, i.e. recycling or treatment of waste for reuse. Energy recovery from waste is practised all over the world in various forms. Solid recovered fuel is prepared from non-hazardous waste, main categories of raw material being municipal solid waste (MSW), commercial and industrial waste (CIW) and construction and demolition waste (CDW). Processing burnable parts of waste into fuel – to be subsequently utilized in power plants or industrial processes – is also taking place on all continents.

Preparation and use of solid recovered materials help to reduce the amount of non-recyclable waste that is landfilled today. Solid recovered materials can substitute fossil fuels and thus lower the overall emissions of $CO_2$. Uniform procedures based on International Standards will contribute to the production of solid recovered material (including SRF) in a consistent quality, to facilitate international trade, secure supplies and achieve high environmental and socio-economic goals.

**Benefits**

The purpose for making common standards for SRM derived from non-hazardous waste is:

- Simplifying communications between suppliers and customers of solid recovered material
- Assuring that material conversion equipment and solid recovered materials are designed for each other
- Supporting the market with standards which help with the economic valuation of the material, supporting the safe handling of the material and contributing to the protection of the environment
- Producing a common way to control and regulate safety demands and taking environmental aspects into consideration
- Providing common language and characteristics for solid recovered materials

**Priorities**

To develop standards in the following areas as they relate to solid recovered materials derived from non-hazardous waste:

- Terminology
- Material specifications and classes
- Sampling and sample reduction
- Physical and mechanical test methods
- Chemical test methods
- Safety for handling and storage of solid recovered materials

The majority of work items of ISO/TC 300 will be developed in collaboration with CEN/TC 343 under the Vienna Agreement.

# 1. INTRODUCTION

## *1.1 ISO technical committees and business planning*

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

## *1.2 International standardization and the role of ISO*

The foremost aim of international standardization is to facilitate the exchange of goods and services through a consistent quality of materials and the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 164 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard.

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

# 2. BUSINESS ENVIRONMENT OF THE ISO/TC 300

## *2.1 Description of the business environment*

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of ISO/TC 300, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards.

Environmentally sound waste management activities are done at various scales, including transboundary movements, and one of the key pillars in the protection of the environment and human health. It also has an important role in the fight against climate change, the efficient and rational use of natural resources and energy, as well as enhancing the circular economy. Waste management includes waste recovery, e.g. recycling or treatment of waste for reuse. Some forms of non-hazardous waste utilization have been carried out for decades, some very well-known and understood, while others less well known, for instance the use of SRM for their mineral content in the cement industry. With the growing need to utilize resources as fully and effectively as possible, utilization of non-hazardous

wastes is an important part in ensuring discarded non-hazardous wastes support resource substitution and the circular economy.

SRM is typically provided through the following main categories of waste:

- municipal solid waste (MSW);
- commercial and industrial waste (CIW); and
- construction and demolition waste (CDW).

Preparation and use of solid recovered material helps to reduce the amount of waste that is landfilled today. Solid recovered materials can also be substitutes for virgin resources (e.g. first used) and solid fossil fuels and thus lower the overall emissions of $CO_2$. Uniform procedures based on International Standards will contribute to facilitate international trade, secure supplies and achieve high environmental and socio-economic goals.

Until recently, the main interested parties in the standardization process are waste management companies (especially those who process waste into fuel), producers of heat and/or power, cement and lime manufacturers, manufacturers of equipment used in the value chain, trade associations, authorities and non-governmental organizations (NGO). However, SRM is being considered more widely as sustainability, resource utilization and climate change all focus on one planet living (e.g. living within the resources we currently have – such as reprocessing textile fibres and plastic chemical recovery).

One of the well-known uses of SRM is for solid recovered fuel (SRF) production, which is used in energy recovery from waste and is practised all over the world in various forms. The fuel is often called by different names like Refuse Derived Fuel (RDF), Waste Derived Fuel (WDF) or Solid Recovered Fuel (SRF). The term SRF is used especially in Europe when it refers to fuels fulfilling the requirements of European standards. The use of different terms suggests that there is a need for international standardization in this area.

Given the social drivers to minimize waste and increase resource utilization, non-hazardous waste used in the appropriate processes and facilities provides a use for some of the material that has been typically considered end-of-life. This is additional to off-setting virgin materials requirements in manufacturing. For instance, chemical recovery/recycling could provide an opportunity to breakdown single use plastics, produce hydrogen and use $CO_2$ – chemical recycling could help recovering and reprocessing textiles.

All affected stakeholders – like manufacturers and users of SRM (including SRF), manufacturers of equipment, testing houses, regulators, authorities and NGOs – will benefit from standardized terminology. Manufacturers and users of SRM benefit especially from the possibility to specify and measure the quality of the material in a standardized way. For SRF producers – often SME waste management companies – the increased use of SRF offers a good opportunity to develop a viable business. This will continue as the demand for SRM develops. Equipment manufacturers are often global actors and global standards naturally benefit them. For users of SRM it is often a cost saving alternative, and therefore they have a vested interest to increase possibilities of its use, e.g. through standardization. For regulators and authorities, standardization gives a possibility to find ways to define Best Available Techniques (BAT) and appropriate and acceptable uses, for example, to measure the renewable part of the SRF in a commonly accepted way.

### *2.2 Quantitative indicators of the business environment*

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of ISO/TC 300:

The World Bank, in its recent report "What a waste 2.0: A Global Snapshot of Solid Waste Management", highlighted that there were 2.01 billion tons of MSW generated in the world (the estimated total waste per year was 24.7 billion tons). The majority (almost 80 %) of MSW is

either not formally managed or ending up in landfill. 1.6 billion tons of $CO_2$ emissions in 2016 are caused by solid waste.

The OECD Environmental Statistics database provide a unique collection of policy-relevant environmental statistics. The datasets present trends in the amounts of municipal waste generated, and the treatment and disposal methods used. OECD gathers information about the development of municipal waste worldwide. More information and the statistics can be found in this link.

The estimated quantity of SRM currently used (mainly for SRF) annually in the European Union is 13,5 million tonnes from which 12 million tonnes are used in cement kilns and dedicated waste-to-energy plants (source: European Recovered Fuels Organization and Cembureau, 2015).

## 3. BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC 300

Standardization of SRM has already started with the development of SRF standards. Standardization is seen as a key means to increase the safe and efficient use of SRM (including SRF) and for their acceptability in the marketplace. Classified SRM can be used as a substitute, particularly for fossil fuels in many sectors, such as for the production of heat and/or power, and in industrial furnaces. Different technologies for SRM can be used (e.g. for combustion, gasification, pyrolysis, chemical recycling, metal extraction and co-processing).

One of the major problems for the creation of a dynamic and sustainable market is that the quality of traded recovered materials may vary among the various producers. Users are often reluctant to buy materials whose quality and compositions are not well known. The development of standards for the sampling, testing and specifications (which may be economic, technical and environmental characteristics) of SRM could support the development of the market and help to describe the SRM in a consistent and reliable way. A reliable quality management system for the production of SRM is therefore advantageous for increasing the market and particularly for the use of new types of SRM, although ISO/TC 300 at present rely on the market using other quality management standards, such as the ISO 9000 series.

Some of the standards will be directed towards establishing criteria for safe handling and the potential for health risk exposure. Standardization would intend to reduce accidents and incidents experienced with SRM.

International Standards are of great importance especially for globally operating manufacturers of SRM and particularly SRF production and of waste-to-energy technology. Also, many users of SRM, especially in the cement manufacturing industry, are global actors benefiting from universal practices and standards. The concept of SRM production and its use in some sectors are well-known on every continent. Consequently, international research and development of SRM production and use would also benefit from standardized terms and practices.

Trans-border shipments of SRM and particularly SRF/RDF have recently increased rapidly in Europe. Although there are no statistics about the international trade of SRF, there is good reason to believe that it is remarkable and increasing as well. Global trade and shipments of SRM would undoubtedly benefit from ISO standards.

## 4. REPRESENTATION AND PARTICIPATION IN THE ISO/TC

### *4.1 Membership*

Countries/ISO member bodies that are P and O members of the ISO committee

### *4.2 Analysis of the participation*

Several factors may influence a country's willingness to participate, such as the stringency of its environmental regulations, population density, rate of waste production, rate of waste production per capita, and access to technology to process SRM. European countries provide the majority of participating P members. This is because SRM with particular emphasis on SRF and materials for the cement industry is well established. Outside of Europe, other countries have engaged with SRF work, most significantly Japan, who already use waste plastics for energy conversion. Having opened up the scope to SRM more broadly, beyond SRF, it is anticipated that other countries will engage more.

In ISO Action Plan for developing countries 2016-2020, ISO recognizes that increased and effective participation of developing countries in international standardization is of fundamental importance and that its developing country members need specific assistance to fully exploit the value of standards in support of their countries' development. In the last two decades, the number of developing country members in ISO has significantly increased and, today, over three-quarters of ISO members are from developing countries. In ISO/TC 300, developed countries outnumber developing countries both in P and O categories. However, ISO/TC 300 encourages developing countries to become members (P or O).

ISO/TC 300 has members from all over the world. An up-to-date list of participating and observing countries and a descriptive world map is available in this link.

## 5. OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

### *5.1 Defined objectives of the ISO/TC*

ISO/TC 300 will standardize solid recovered materials, including SRF, prepared from non-hazardous waste to be utilised for recovery and recycling purposes, including power plants, gasification plants, pyrolysis plants, chemical recycling, mineral utilization such as for industrial processes (like cement and lime manufacturing). ISO/TC 300 excludes standards for solid biofuels (ISO/TC 238) and excludes the actual use purpose of the material (e.g. the conversion to energy or the chemical transformation of plastic during the chemical recycling process).

### *5.2 Identified strategies to achieve the ISO/TC's defined objectives*

After creation of ISO/TC 300, it was decided to take existing European standards regarding SRF as a basis for its work. With the scope expanded in 2020, ISO/TC 300 will also consider new work items on basis of the need to classify SRM for other purposes. The practical drafting work is conducted in ISO working groups according to the Vienna Agreement.

The work has been organized through six working groups (see link for structure, chapter 7) based on experiences of a similar structure in European standardization work within CEN/TC 343. The structure may alter with the expansion of scope to enable SRM for different purposes to work at different rates and for different aspects of the material.

The work of ISO/TC 300 and its working groups will be conducted through correspondence, physical meetings, teleconferences and e-mail, utilizing as much as possible modern electronic communication means.

To ensure avoiding duplicate work, ISO/TC 300 will establish all relevant internal and external liaisons that are needed. An up-to-date list of liaisons can be found in this link.

The main target of ISO/TC 300 is to develop International Standards but, when appropriate, also other deliverables, e.g. Technical Specifications and Technical Reports, are an option.

### *5.3 Clarification of scope and key terms used in ISO/TC 300, including practical examples*

While waste-collection of the SRM-input and the utilization are not within the scope of ISO/TC 300, input-control, waste-processing / production of SRM and output-control are the important considerations of ISO/TC 300 standardization.

Figure 1 illustrates the proposed new scope by mentioning all relevant steps of the SRM chain.

Waste processing/SRM production may not be a requirement within the boundaries of ISO/TC 300 standards. This is due to the fact that there may be instances where the non-hazardous waste received (input material) is provided to a specification (e.g. particle size, particle density, mix of type of material, etc.) that does not need processing or production.

There are various different SRM grades and qualities for different applications. SRM can be utilized in many ways for many purposes. Currently one of the major uses of SRM is as SRF, however, the same material may be used for other purposes, such as, to convert to chemicals, synthetic gases, or liquids.

The distinction between non-hazardous wastes (input) and solid recovered materials (output), which may require processing/production, as well as requiring sampling, analyzing and compliance with the requirements established in ISO/TC 300 standards is described in Figure 1.

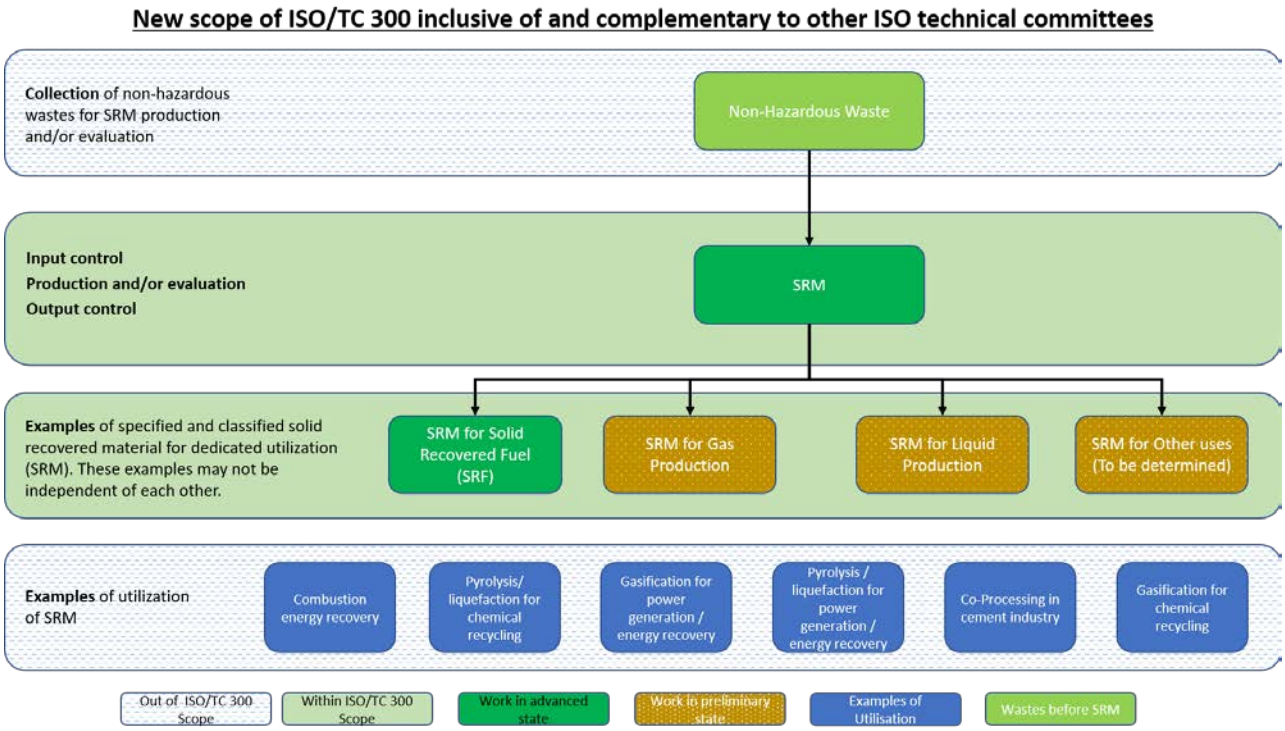


**Figure 1 - New scope of ISO/TC 300 and some examples of material covered, materials produced and utilisation, as of 2020**

The input material for SRM may be supplied as mixed commercial or municipal waste, source separated waste, sorting residues from recycling processes (i.e. sorting of paper, plastics, etc.) or systematic sorted fractions (e.g. high calorific fractions of MSW or bulky wastes). Depending on the requirements of the users of the SRM, it can contain organic and inorganic materials, combustible and non-combustible material, from a wide range of industries.

The term 'SRM' can be taken literally to include any and all solid recovered materials. However, for the purposes of ISO/TC 300, SRM input material does not cover materials that are already adequately covered in other standards committees (e.g. glass, metal, paper and cardboard, etc.). SRM within the scope of ISO/TC 300 should be considered as Solid Recovered Materials - that are not covered by other ISO Technical Committees.

Therefore, just because a non-hazardous waste has been discarded, it does not mean ISO/TC 300 will be the custodian of standards development. Many single source waste streams, particularly from commercial and source separated wastes, already have recycling standards associated with them, e.g. PET and HDPE (ISO/TC 61 Plastics), thus contributing to higher recycling rates and it would not be

necessary to develop further standards by ISO/TC 300. Other single source materials are also well covered with standards, such as paper, board and pulp (ISO/TC 6), cast iron and pig iron (ISO/TC 25), copper and copper alloys (ISO/TC 26).

Where other Technical Committees adequately cover the handling of the SRM, ISO/TC 300 does not need to be involved in the standardization, except as a liaison (where required). However, there may be other occasions when there are either no standards for the SRM or there are gaps in the standards covering SRM, e.g. chemical recycling of plastics is already covered by ISO/TC 61/SC 14. Also, there may be different standardization needs between single-source, source-separated (monostreams) and certain mixed (multi-layer, multi-component or mixed household) wastes. In such a case ISO/TC 300 will collaborate with other TCs, by either working with the relevant TC under their work items (e.g. as liaison) or have an agreement about what ISO/TC 300 scope of the specific standard should include.

In order to reduce the negative climate effects globally, outdated and most common waste management practice, in particular landfilling, can be reduced by tools like standards for SRM, but ISO/TC 300 standards do not include landfilling. Energy conversion is an important example of non-recyclable wastes being used to facilitate energy efficient and sustainable applications like co-incineration and co-processing thus contributing to a reduced use of primary resources like fossil fuels. Standardization of plastic waste recovery and recycling may also significantly help with the reduction of plastic wastes and therefore reduce the pollution, landfilling and even marine littering of such products.

Bio-organic wastes, such as, agricultural yard waste, food waste and livestock waste from household and industrial source are converted to soil improver or fertilizer by composting and/or to biogas by anaerobic digestion. These kinds of waste are also considered as materials for SRM and may be covered by ISO/TC 300.

Figure 1 also provides some examples of how the SRM may be utilized. The figure does not cover all the various uses that the SRM may be put to.

Some utilization processes may be a single step (e.g. combustion of SRF for energy conversion or in multiple steps (processes)), if for instance the SRM was converted to a synthetic gas or liquid and transported to another plant for further conversion into the final product. Some processes may use the same SRM for more than one purpose (e.g. using SRM in cement and lime kilns as an energy source and for its mineral content). The same lot of SRM can be utilized for multiple different purposes, therefore, figure 1 is illustrating the purposes and not individual uses.

As figure 1 also illustrates, standardization activities of ISO/TC 300 for SRF are in advanced state, whereas for applications like gasification and pyrolysis additional work is necessary. Other applications that are not specifically mentioned may be the use of minerals in the cement industry and of SRM`s produced from glass fibres, i.e. from re-powering of wind turbines.

Although reuse is not in the scope of ISO/TC 300, some explanations are added here below to demonstrate the difference between recovery, recycling and re-use. For the purposes of ISO/TC 300,

- **recovery** means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.
- **recycling** means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;
- **re-use** means any operation by which products or components that are not waste and are used again for the same purpose for which they were conceived;

***EXAMPLE 1 – Reuse versus recycling***

If a pair of Jeans (trousers) were placed in a collection bin and then repaired, cleaned and resold, this is *reuse.* However, if the same pair of jeans were taken apart and the material used to make other clothes, this would be *recycling* – in this case it is sometimes called *upcycling*.

***EXAMPLE 2 – Reuse versus recycling***

If a building was being renovated or demolished and the internal walls were made out of gypsum paneling and these panels were carefully taken out of the building and used directly for walls in another building, this is *reuse*. However, if the gypsum panels were removed from the building and the panels broken apart and the gypsum recovered and added to the production of plaster of paris, the gypsum would be *recycled* as it was reprocessed to make the plaster of paris.

***EXAMPLE 3 Reuse versus recovery***

Pneumatic tyres are made up of many components, such as metal and nylon threads (bead and belt), rubber tread and casing or carcass (base tyre).

Many of the components in part or worn out pneumatic tyres can be *recycled, i.e. a form of recovery,* individually (after the tyre is deconstructed, e.g. metal threads, fabric, rubber, etc.) or used in their original state as a pneumatic tyre for a different road condition or for producing the remould (retreaded) tyre. When pneumatic tyres or the casings and carcasses are used in their original state, this can be considered as *reuse*. If the components of the deconstructed pneumatic tyre are recovered and used for making new pneumatic tyres, these components are *recycled* into new pneumatic tyres.

However, the pneumatic tyres can be used as a fuel and mineral content in the likes of cement and lime kilns – this is considered *recovery* for the organic part and *recycling* for the inorganic part.

The utilization of the solid recovered material is not in the scope of ISO/TC 300. For example, the creation of methane from SRM is not in the scope of ISO/TC 300. However, if there were to be SRM for methane standards developed, these would provide the methane producer with a specified and classed material with a known quality and material characteristics for the production of methane.

It is therefore important, for not only the environment and circular economy but also to avoid trade barriers that where the non-hazardous waste resources are already separated for material use in another process that standardization is carried out in the context of its ongoing use.

## 6. FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME

The completion and implementation of the ISO/TC 300 work programme depends, first of all, on the activity of stakeholders. The premise of the expansion of scope to SRMs other than SRF is that it should not hold up the current development work for SRF. During the development and expansion of the standards, research and validation might be seen necessary. In case research and validation will be required it may affect the schedules of the new work items.

## 7. STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC

### Information on ISO online

The link below is to the TC's page on ISO's website:

ISO TC 300 on ISO Online

Click on the tabs and links on this page to find the following information:

- About (Secretariat, Secretary, Chair, Date of creation, Scope, etc.)

- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Tools
- Work programme (published standards and standards under development)

**Reference information**

***Glossary of terms and abbreviations used in ISO/TC Business Plans***

***General information on the principles of ISO's technical work***