

Recycling Instead of Landfilling – a Contribution to Climate Protection

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Abstract

The paper starts with discussing the huge problems regarding RRR-Communication especially due to global warming effects because no one seems to consider closing landfills. The paper concentrates on asking for awareness and new essential aims in MSW management (closing landfills and its tools) and concludes in showing how the WtERT Network and its' Decision Support System could and should help in international waste management communication.

Keywords

Circular Economy, Climate Change, Landfill, Waste to Energy, Recycling, Incineration

1 About Priorities

1.1 Perception

Frequently we ask our international contacts what their top motivation is in optimizing waste management in their respective country.

They often respond that they want to keep the cities clean or would like to create a modern recycling system. When landfills need to be closed, this mainly relates to old dumping grounds and is never a matter of negotiating landfilling and the associated contribution to climate protection.

Of course, stakeholders in the EU try to do what they are told.

1.2 Public Concern

In the press release IP/05/1673 “Recycling: Europe’s New Waste Strategy” dated December 21st, 2005 the European Commission reports on its new strategy: Europe is to transform into a recycling society “which tries to prevent waste and utilizes waste as a resource”.

Years later, on June 14th, 2018 the new EU guidelines regarding the “Circular Economy Package” were published in the Official Journal of the European Union (L150) stating clear goals with respect to waste prevention and recycling. In addition to the distinct plastic strategy, the new recycling quotas of 65% for household waste and 75% for

packaging waste (each by 2030) have, in particular, become the center of attention of the public.



Diagram 1 European Waste Management Hierarchy

The fact that the EU has limited (or is it more a permission?) the depositing of household waste on landfills to a maximum of 10% by 2030 without having binding intermediate goals and, in addition, has incorporated exception clauses in the law of up to 5 years, should convey even to the last attentive observer that the closing of landfills, when compared to the significance of recycling, is a rather subordinate goal.

1.3 Different Perspective

This is so distant from the state of knowledge in terms of the real and possible contributions of waste management to climate protection as can be abstracted from the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety's status report from August 2005 regarding the "contribution of waste management to climate protection and possible potentialities".

In the report's summary there are three remarkable sentences which, in my opinion, are distinct enough to reevaluate the significance of recycling from a global viewpoint.

- 1) “In total, the disposal procedures of the waste incineration plants and the co-incineration contain the highest potential for reducing greenhouse gases...”
- 2) “All energetic procedures, considering the general conditions, have a 90% share of the achievable reduction potential.”
- 3) “Instead of producing a carbon dioxide equivalent of presently (2005) 87 m with waste management, a credit of 47 m carbon dioxide equivalent could be depicted in the future. As a result, a reduction potential of 134 m t carbon dioxide equivalent could be achieved from 2000 to 2020 for the municipal waste management of EU-15. The major portion stems from the almost 100 m t of carbon dioxide equivalents from the prevented methane emissions as a result of the role of landfilling.”

In an article from 1968 the general secretary of one of the first waste associations, H. Straub, having in mind the situation at the time in Germany, intuitively recognized the correlation: “In essence it’s a matter of reducing waste in terms of volume ... if possible by carrying out recycling”. Of foremost importance is the reduction and then – “if possible” the recycling.

And now back to the question referred to at the beginning:

Of course, it is excellent that countries are giving thought to secondary raw materials and are encouraging recycling. The fact that the anti-litter-strategies are seriously being discussed is an achievement of the European Commission.

Imagine how much faster the worldwide carbon footprint could be improved if the European Commission, in addition to the well-known waste hierarchy, would clearly identify the goal of “overcoming the landfills” and would evaluate all of the existing “tools” such as incineration (with energy recovery), recycling, and prevention based on their impact on a climate-relevant volume reduction. In this chronological order – incineration, recycling and prevention – waste management has developed in Germany.

But it seems that it has still not found its way into the minds of the law-making body that the idea of “incineration” is transforming into a concept of “powerplants” driven with waste to produce valuable steam energy and other sorts of energy recovery.

Step by step incineration plants in West Europe are being turned into waste fired powerplants, which focus more and more on energy recovery.

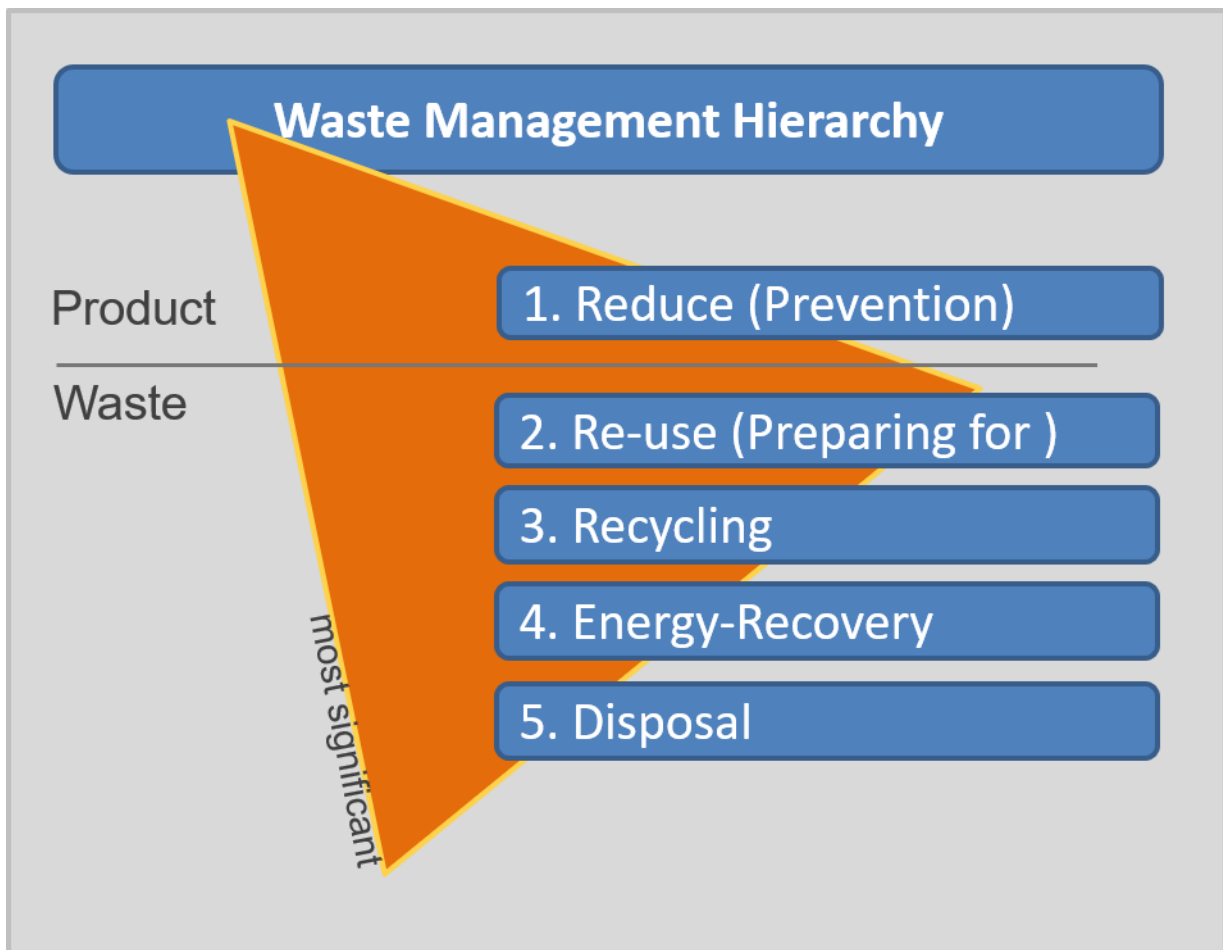


Diagram 2 European Waste Management Hierarchy from a Different Angle

Due to the prevailing landfill crisis incineration plants had to be built. The associated rise in costs of waste management enabled recycling to establish itself much faster.

2 Awareness

Often recycling is scaled down to material recycling when perceived in an abridged form.

2.1 Climate Change

In an integrated waste management, energy recovery must receive a higher evaluation when viewing the time factor related to closing landfills as rapidly as possible.

When considering the ever so important reduction of climate gases, the aim should lie on reducing landfilling and reassessing any tools available to achieve this goal.

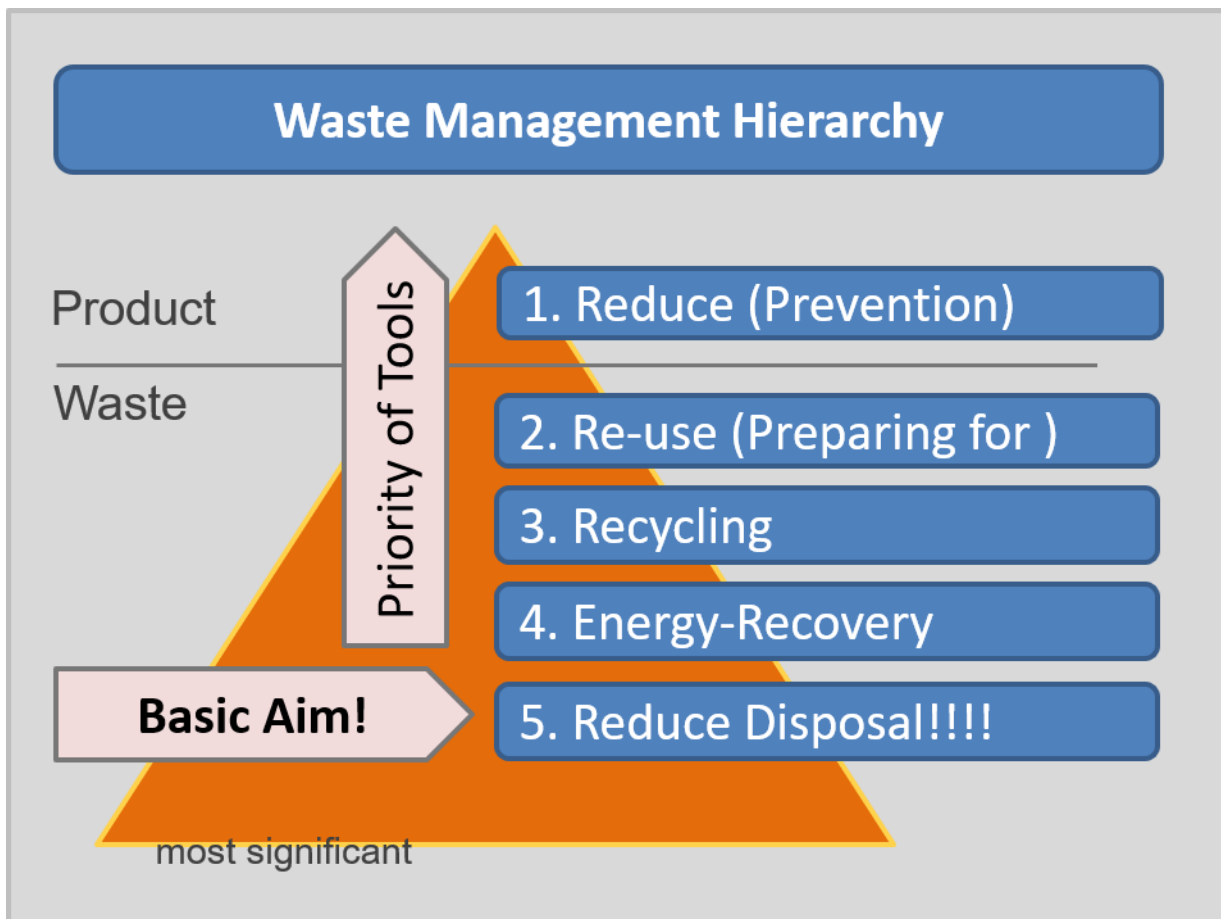


Diagram 3 European Waste Management Hierarchy for Action

In addition to the waste management objective of reducing disposal more attention should be given to the structures on waste disposal sites and the technical goal to close landfills. A significant reduction in climate gases can be achieved even in existing waste disposal sites by implementing technical measures.

Here one can differentiate between the closing of landfills resulting in a reduction of gas emissions and the additional benefit of conducting energy recovery by utilizing gas.

It is unlikely that this will occur with the measures of the CDM Joint Implementation Initiatives through the purchase of Certified Emission Reductions (CERs) when viewing the still low prices of CO₂ certificates.

2.2 Wording

Extending the term “Reduce Disposal” to “Close Landfills” is an important new wording, which, in addition to the greater weight on the technical components, can be fixed in the minds of those concerned.

Those who read the following wording in law texts

- a. Recycling and Reduce Disposal

or

b. Recycling and Close Landfills

and who want to implement these will set other priorities and act differently.

Using the right words is very important, because it is strongly connected to your inner motivation for doing things.

You can feel the difference by using the two harmless words “Climate Warming” against “Climate Heating”. “Heating” has nothing to do with cozy feelings.

And even more, let us start to avoid the term “landfill”, which sounds as if there is a hole in the earth waiting to be filled.

Some specified wording is anchored to a vague labeling of our childhood. So, it might feel that a term like “Incineration” is deeply connected with the uncertainty of technical discussion longing to the past.

Therefore, to use the Word “Power plant, run by scrap” instead of using “Incineration” makes a great difference.

3 Necessity of a New Communication on a Global Scale

Those who are following the dimension of the climate change with interest, but without apprehension are likely to conclude that all measures taken to counteract this phenomenon must be conducted on a global level.

3.1 The 80/20 Principle

The “80/20 Rule“ (Vilfredo Pareto) says that 80% of the results are achieved with 20% of the total effort. The remaining 20% of the results with 80% total effort require quantitatively the most work.

Taking the time component of climate change into consideration, it is understandable that we must begin where we can achieve the most with the least amount of effort (20%). Here, too, reduction in mass and the closing of landfills have priority.

3.2 Dissemination of Knowledge without Preconceptions

If one follows the statements of this speech so far, then it is evident that a global dissemination of knowledge without preconceptions is essential.

The following diagram is intended for public discussion to help develop an unbiased side-by-side of activities in place of the often ideologically struck counterparts of material and thermal recycling – and that apart from EU hierarchy.

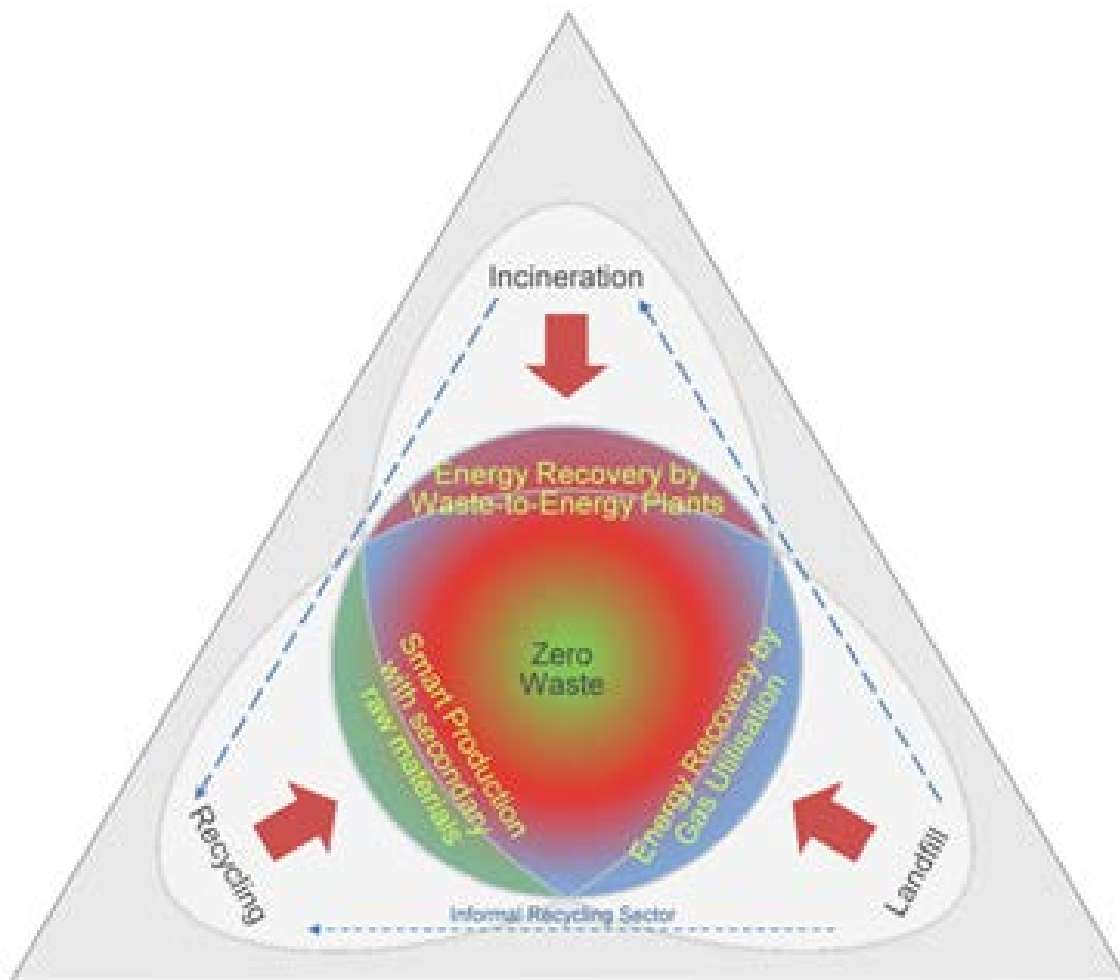


Diagram 4 Recycling, Landfilling and Incineration to Achieve Zero Waste
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The collection of materials from waste, their energy recovery, and their recycling in smart production are processes that go hand in hand. Especially in modern countries with a high rate of energy recovery, recycling is growing in importance and becoming a significant economic factor.

3.3 Integrity of Creation

The waste community must be developed into a sharing community with the aim to find out its part for the integrity of creation.

3.3.1 Free Your Mind

If we free our mind and

- talk about recycling with additionally emphasizing the issue of landfill problems while looking for better solutions for the entire system,
- encourage people to be interested in new ways of solution making and if
- we have an open-minded approach towards a diversity of thinking

then we need a new slogan where we can embrace all the methods and activities in an integral waste management.

Till we find something better – we shall continue to use the slogan *Waste to Energy (WtE)*.

3.3.2 Way of Acting

We pursue our keen interest to identify and provide outstanding practical examples of the Waste to Energy concept and to consolidate practical and expert knowledge and experience. We do this on a very broad level because we want to demonstrate that the concept of transforming waste to energy offers valuable solutions in all areas of the waste and resource industry. Furthermore, unlike in the hierarchies of other common waste management programs the sectors of landfill, incineration, and recycling are given equal status and presented free of bias.

3.3.3 Sharing Community

In 2002 the Waste-to-Energy Research and Technology Council (WtERT) was founded by the Earth Engineering Center of Columbia University, New York, and the U.S. Energy Recovery Council. The goal was to identify and help develop the most suitable means for managing various solid wastes research, and to disseminate this information by means of publications, the web, and technical meetings. At the end of 2011, the Global WtERT Council (GWC) was created as a U.S. non-profit organization. Today GWC is the umbrella organization for 19 WtERT organizations in 18 countries, which consist of Brazil, Chile, China, Colombia, Cuba, Czech Republic, France, Germany, Greece, India, Italy, Korea, Pakistan, the Philippines, Serbia, Singapore, UK and the USA.

With all the above-mentioned arguments in mind, in January 2017 WtERT Germany was assigned by GWC to collect and showcase knowledge from all WtERT organizations.

Through many discussions on the topic of WtE we developed the vision to succeed in not only compiling the knowledge of our WtERT Partner Organizations, but also in uniting this with the experience of multiple partners in research organizations, industry and municipalities. To reach a high credibility of the whole WtE System, we believe it to be important to show existing solutions (case studies) and share personal recommendations from international WtE experts.

In August 2017 we relaunched www.wtert.net and thereby offer the opportunity to join the WtERT Decision Support System (WtERT-DSS).

The WtERT DSS provides a platform for stakeholders from all over the world to

- get informed and inform about state-of-the-art methods and technologies for sustainable waste management,
- inform about the status of waste management in their country and learn about solutions in neighboring and other countries toward approaching sustainable waste management,
- to provide a database of realized solutions by means of case studies from all over the world,
- to get in contact with scientists, local decision makers, associations and companies who may assist with the implementation of the required technology.

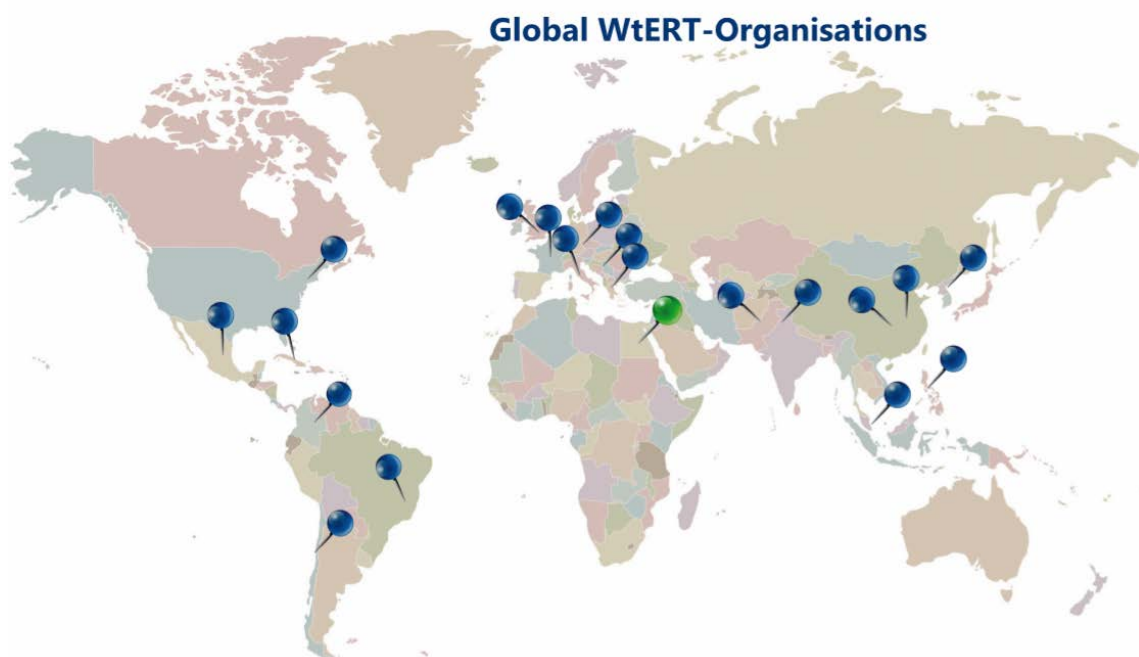


Diagram 5 Locations of Global WtERT Organisations

3.4 EU Including Candidate Countries

Looking at the chart below depicting the quotas achieved for the treatment of municipal waste up until 2017, one can identify the vast potential of reducing landfills merely in the European Union including the current candidate countries.

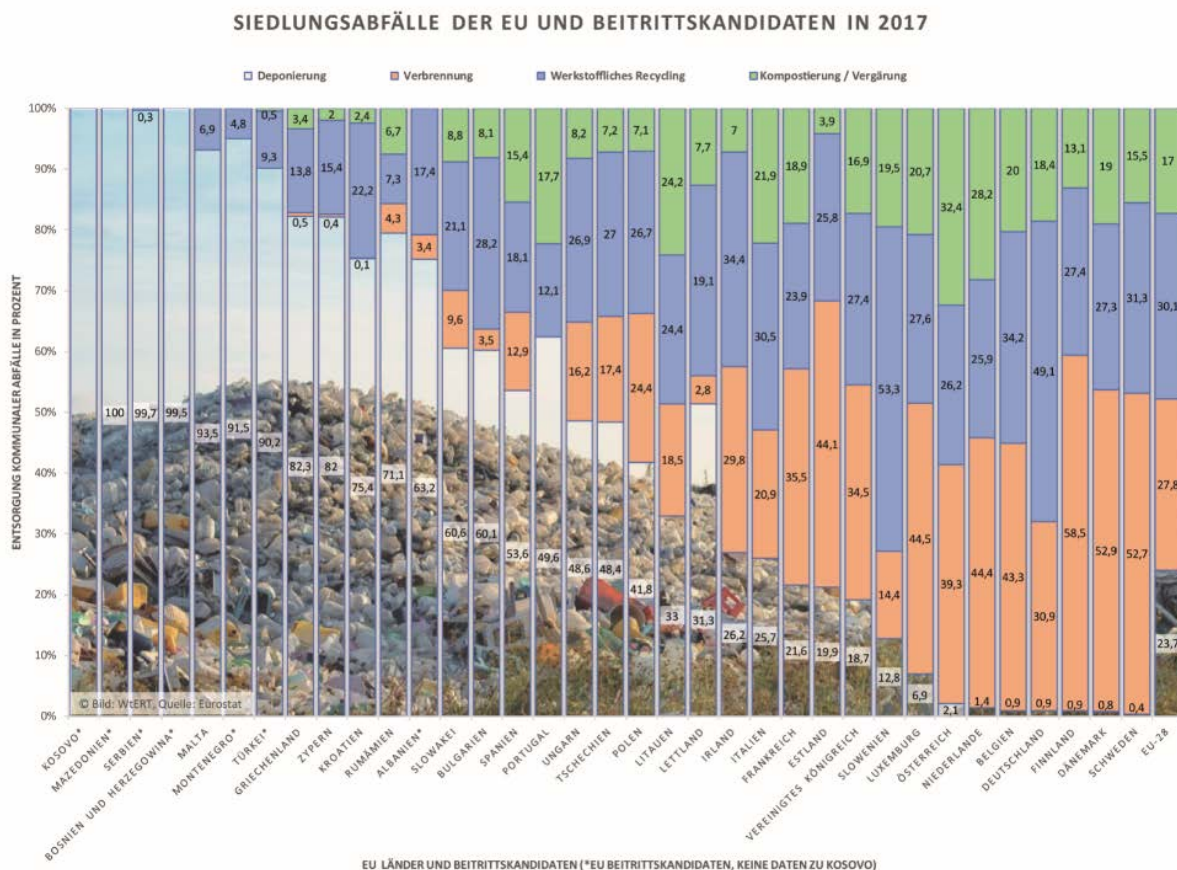


Diagram 6 Current State of Waste Management in the EU

With the *Waste to Energy – Support for Decisions* as an offer for stakeholders, we will continually bundle a wide range of possible waste management solutions and show them with the goal of doing our contribution of reducing CO₂ emissions.

4 References

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