DP CleanTech Co., Ltd.

Waste 2.0: It's Time to Stop Wasting Resources

Defining 'waste'?

In the coming months and years, what we think of as 'waste' will be redefined.

When we talk about 'waste' and 'waste management' today, we think of household waste, industrial/ construction and demolition waste etc., Waste is seen as a problem and the 'solutions' we have developed reflect this. Landfill/mass burn incineration are the lowest cost, and therefore most prevalent, methods for dealing with the problem of waste.

Broadly described as Municipal Solid Waste, the big picture is that every year, over 2.2 billion tons of household, commercial and industrial waste is dumped, and the volumes are increasing every year. Overall, more than 80% currently still goes to landfill, and much of it is left untreated, releasing methane, heat, CO_2 and air and ground pollutants.

Much less recognized is that roughly an equivalent amount of waste is generated from the global agricultural industry [1] - crops and livestock. As part of the agricultural production process, nearly all of the agricultural waste residue produced globally is left to decompose or is burned in the fields (rice paddies, sugar plantations, wheatfields, palm oil plantations, forestry residues). If we consider the other end of the food chain, food waste is also a huge contributor to the carbon cycle.

Municipal Solid Waste (MSW) is generated in our own homes, and as such it is an obvious and immediate problem that can rapidly become a direct hazard as it decays, producing odours and inviting disease. The physical impact of biomass waste is less ubiquitous, but the impact of poorly managed biomass waste is directly felt by a proportion of society - in countries where field burning is widely practiced, toxic air pollution is an annual ordeal for the surrounding region.

If MSW is sorted and recycled (stripping out metals and plastics), the organic matter remains. This is, in fact, biomass by another name. For the non- organic fraction of MSW, correct treatment can also derive energy.

So, if we reframe the conversation; the similarities between municipal waste and agricultural waste are apparent, both in terms of energy potential and the current negative impact on the environment. A key point is that if we think in this way, total waste volumes are vastly greater (more than double), and this fact should change the whole nature of the response. We need to be thinking in a different way – we need to think 'carbon' not 'waste', and from this 'resource' perspective we need to re-think the ways in which we can most efficiently exploit it. The many Government announcements in the build up to COP 26 indicate that we are starting to understand and to focus much more on the carbon cycle and its central role in managing climate change.

1 We exclude Virgin Wood pellet from this as it is not a waste resource. Unless one stretches the point extensively, it is not renewable either. Plants such as the 1GWe biomass plant shipping wood from North and South America, may have its advocates. We make no comment other than to expressly exclude this type of plant from the topics addressed in this note.

Waste as a Resource

MSW waste that has been properly separated, and biomass waste are both "organic matter". "Organic matter" is a renewable store of the sun's energy and is basically nature's answer battery storage.

And yet, for MSW we currently either dig a hole to hide it (landfill), use its energy to burn off moisture (mass burn Waste to Energy); or in the case of agriculture we set light to it in the fields or simply leave it to decompose releasing its energy into the atmosphere (ignoring momentarily, the pollution in each case).[2]

At the same time, we are also spending billions and drawing extensively on scarce natural resources to build batteries which will enable us to regulate the delivery of intermittent renewable power from wind and solar. But Nature has beaten us to it - nature and the carbon cycle 'builds the batteries' in time for each harvest.

What needs to change?

If we are to make the necessary changes, we must reinforce fundamental concepts that will drive different approaches and attitudes:

- ***Waste is not an 'end product', it is 'part of the cycle'.***
- ***Within that cycle, waste has value and therefore is not a problem but an opportunity.***
- ***It is a 'global' problem that requires 'local' solutions, which, in turn are part of a coordinated global response.***
- ***"Environmental Freeloading" must be recognized and accounted for.***

Waste is not an 'end product', it is 'part of the cycle'.
The concept of 'reduce, reuse, recycle' is well accepted, and in this construct, the 'end' waste product is actually 'less waste'. However, the concept and practice of capturing 'stored' energy from organic waste, and from inorganic waste that cannot be reused or recycled must become a ubiquitous and integral part of a cycle that ends in 'zero waste'.

Within that cycle, waste has value and therefore is not a problem but an opportunity.
Every household and community – village, town, and city - generates waste and will continue to do so to a greater or lesser extent. As the carbon cycle takes its course, so the CO_2 and the energy will be released. The only question is whether we capture and use this energy rather than simply releasing it to the atmosphere and then producing additional energy from alternative sources to compensate.

2 There are exceptions to this (Denmark's utilization of its straw biomass and more recently so too in the UK. Europe's limited experimentation with separate treatment of organic fractions of MSW). We have also seen for some years industries such as pulp and paper/ sugar mills using their waste byproducts as part of their internal processes, but this taps only a fraction (and the lowest hanging fruit) of the potential.

It is the subject of another article as to why, to date, this opportunity has not yet been seized. But the reality is undeniable:

- The carbon cycle exists
- CO_2 is naturally released and, with it, a massive energy transfer - that we currently do not harness
- By not harnessing it, we must produce additional energy elsewhere.

Waste is a 'global' issue that requires 'local' solutions which, in turn are part of a coordinated international response.

Historically, almost everywhere, 'waste' has been tackled at a very local level. Not just country by country, but even town by town or country. Of course, at one level this is correct - if you generate waste, you should be responsible for dealing with it. But the impact of uncoordinated local responses combined with NIMBY-ism has been disastrous for the climate and has created even bigger problems in waste management around the globe. A global response must be founded on coordinated efforts to design and implement 'zero waste' solutions that sustainably exploit local waste resources.

"Environmental Freeloading" must be recognized and accounted for.

To date, whether through a lack of understanding, alternative priorities or an 'out of sight, out of mind' attitude, the huge reservoir of energy released in the natural carbon cycle is lost every year. And this is before we discuss the massive implications associated with this "environmental freeloading".

The obvious answer is that capturing the energy from the renewable carbon cycle is not a cheap option. It costs more than 'digging a hole' to remove the immediate problem and it may cost more than using fossil fuels. But, as we illustrate clearly in this article, the energy is going to be released whether we harness it or not. We are not starting from 'zero' and the release of CO_2, methane and other gases from the carbon cycle already puts us way into negative territory. If we pursue an objective to extract all the benefits we can from the process and optimize this natural cycle, then the means and methods to do so will surely become focused on efficiency, and economic and environmental sustainability.

We are beginning to really see governments and society at large addressing this problem of environmental freeloading. Free markets work when the real costs assert themselves. Today, the structure of the financial ecosystem, and the current taxation and incentives systems are all factors that combine to prescribe that almost all forms of organic waste have limited, or even negative economic value. The prevailing waste infrastructure today reflects this situation. We would argue that 'necessity is the mother of invention' and that we must recognize and align the true long-term economic cost and benefits to change the approach. The time to change this situation is well overdue.

As governments begin to recognize the central role of the carbon cycle in all aspects of environmental management, sustainability, and climate change, so the waste industry will be completely transformed. And when it begins, it will happen quickly.

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So, what does it all mean?

- A dramatic shift is imminent. All nations have been sitting on and burying a 'problem of waste disposal' rather than tapping into a replenishing resource.

- When waste is viewed through the prism as a resource and an essential component of the carbon cycle, so the discussions will become about efficiency; increased waste sorting, separation, re-use, recycle and recover. Today's markets of landfill, large centralized mass burn MSW plants, field burn will be gone.

- Proactive waste management is not about renewable energy, it is not about environmental management and emissions reduction, it is not about pollution. An active waste management strategy is all the above and more.

- It will bring **decentralized** heating/ cooling and **distributed** power. There will be multiple solutions depending on the type of waste, the location, the local needs. But each continent, each country will create proactive strategies that release the potential from the carbon cycle.

- These strategies must be in line with a united and unified global approach. As demonstrated, while 'waste' may be a local issue, the implications of managing waste is very much a global one.

- COP 26 seems to be the point of convergence. Renewable energy sources such as wind and solar have key roles; but this is the lowest hanging fruit with lesser impact. Harnessing the power of the carbon cycle is where the benefits will really happen.

What does this have to do with DP Group?

Since 2007 we have been building a portfolio of technologies and expertise that enable us to be THE platform for all aspects of waste management. Our driving focus has been on developing and acquiring solutions that maximise overall efficiency in waste management throughout the process and across different technologies. Whether in sorting, separating, pre-treatment solutions; in thermal conversion and biological conversions in management of emissions reduction we apply our knowledge and experience to determine the most efficient and effective waste management solutions for the client and the environmental situation.

We consult, we design, build, construct. We can also operate and develop projects on all these technologies across three continents. Our technologies, our knowledge and experience are well founded, and our commitment to being an integral player in the waste management industry is well demonstrated through our strategic acquisitions and global footprint to date.

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