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## Perspectives

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Rachel Carson Center for Environment and Society  
Leopoldstrasse 11a, 80802 Munich, GERMANY

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## Roundtable

### Working for Zero Waste in Germany: A Discussion across Disciplines

**Christof Mauch:** I am pleased to have with me today a group of experts at LMU's Center for Advanced Studies who, through their political and academic roles, have been involved with waste in environment and society: Eveline Dürr, a social anthropologist who has studied waste through a cultural lens; Heide Rieke, SPD council member and environmental affairs spokeswoman for the city of Munich; Martin Faulstich, the director of the environmental technology institute CUTEC at Clausthal University of Technology, who is considered "Germany's waste guru"; and the environmental ethicist Markus Vogt, who teaches Christian social ethics at LMU.

Martin Faulstich, the first person I invite to speak today, is chair of the German Advisory Council on the Environment—founded in 1972 and based in Berlin, it is the oldest environmental institution in the country. The members of this interdisciplinary advisory body include physicians, lawyers, and political scientists. Its most recent environmental report includes a large chapter on raw materials. What we're interested in this evening, to begin with, is the technical side of the connection between raw materials and waste. Our guiding question is quite provocative: Would it be possible, from a technical perspective, for us to destroy fewer raw materials in the future and, as a result, eventually end up living in a world without waste?

**Martin Faulstich:** Well, if you look at global consumption, the first thing you'll notice is that for the first hundred years after the Industrial Revolution—i.e., starting around 1850—the consumption of raw materials climbed, but only gradually. Since World War Two though, the curve has ascended steeply—nearly vertically. Second, it's important to consider that of the 118 elements on the periodic table—something you all still surely remember from grade school—we use 90 elements. When Henry Ford was alive, we only used 10 or 20 of these elements, and at that time the industrial age was already well underway. In today's society though, far more elements are being used—for cell phones, microphones, laptops, and cameras, for example.

When attempting to understand the connection between raw materials and waste, it's also important to consider a third key topic: the fact that the debate about raw materials is

mainly dominated by discussions focused on availability. The industry is asking itself: Do we have enough metals? Do we have enough soil? Can we get the raw materials we need? For a long time, we've overlooked the fact that today, nearly all high-tech materials and metals come from developing countries—from Brazil, from Chile, and from China. We're able to improve our environmental footprint here in Germany, because we let the dirty work be done by others in faraway places. Sure, we have very high social and ecological standards in Germany. But in China, it's often the children who are used to excavate raw materials—shafts are often only dug one meter high rather than two, and children are sent underground to work.

And finally, a fourth, important challenge: The demand for raw materials correlates with waste, of course, since any materials one uses and consumes will end up as trash sooner or later—with yogurt containers this life cycle may be only a few minutes, with a car, maybe ten years. It is important to keep in mind that the average American's consumption of raw materials is ten times greater than an Indian's. However, there are “only” 300 million Americans, but in a few years, three billion people will be living in India and China combined. Now imagine that in the coming years, each of those three billion people's demands for raw materials, energy, and meat will match those of an American. You don't have to be a mathematician to realize that the Earth can't handle that. In short, if we continue to manage our resources the way we do now, we can expect that the mountains of waste we create will only continue to grow.

**Christof Mauch:** Can I ask the question a bit more provocatively? How can we achieve a “future without waste”?

**Martin Faulstich:** That would only be possible if we could break down all products that currently end up as waste—from yogurt containers to cars—into their components so that we could return them to the material cycle. One hundred percent renewable energy and 100 percent recycling can be seen as two analogous goals that have not yet been met—for which there are many reasons. A 100-percent closed-loop material cycle, on the other hand, could theoretically work. We would, of course, need a global waste cycle in addition to the global raw-material cycle, since not all products are manufactured in Germany—some are produced in other places in the world—and some are manufactured in Germany but are then consumed somewhere else in the world. Without this, we can't ensure that we can close the loop. And if we want to close

the loop, then we need not only the right attitude and the right lifestyle, but also—and this is the key requirement—raw materials that aren't as cheap. If raw materials were more expensive, recycling would be more profitable. And these raw materials could be more expensive if the social and ecological standards in developing countries were as high as we would like them to be. The aim, and I'm saying this as an engineer, would be to have the same high standards and technical quality for waste disposal and recycling as there are in production facilities. In an automobile plant, high-tech plays a role through the whole process—right to the very end. And yet when we look at the other end of a car's life cycle, in Germany or anywhere else, they end up in junkyards, which are often mere backyard workshops—this is where the standards drift apart. But it's not just a question of technology—it's also a question of intelligent models of consumption and use. What if, for example, a cell phone manufacturer leased its cell phones rather than selling them, or if a car manufacturer leased its cars rather than selling them? These manufacturers would remain the owners of their products and would thus have a whole different motivation for making sure that they got the raw materials from their products back. Maybe then from the start, manufacturers would think about how their products could be broken down into raw materials. The way it is today though, is that as soon as a product has left the factory gates, the responsibility of the manufacturer is out of sight, out of mind. And this idea of “out of sight, out of mind” is one we need to get away from if we want to achieve closed-loop material cycles worldwide. If we could achieve that, the concept of “waste” wouldn't really exist anymore—instead, it would be a material constantly being used, constantly passing through the cycle, but never becoming waste by ending up in a landfill, landing in the street, or being tossed into the woods.

**Christof Mauch:** Martin Faulstich emphasized that the waste issue is neither regional nor national; rather, it must be discussed in a global context. As an anthropologist—Eveline Dürr is a social anthropologist whose research has focused on New Zealand, Mexico, and the United States, among others—one has an eye for the local realities. Furthermore, anthropologists have stressed again and again that waste—or more generally “dirt”—is culturally constructed (in the nineteenth century, for example, we see authors such as Charles Dickens talking about “dirt” instead of waste). What's clean to some is dirty to others. Eveline, you have researched prejudices and stigmas of waste in countries of the Global South where it is quite a sensitive topic. A future without waste—is that a vision destined to fail?

**Eveline Dürr:** Yes. Contrary to Martin Faulstich, I approach the topic not from a technical perspective, but as a cultural scientist, so I want to start by explaining how I understand the concept of waste and why this leads to my thesis that there cannot be a future without waste. If you were to define waste as a product of a social practice of classification and organization, then a future without waste is not possible. Humans will always separate between useful and useless, and waste is by definition that which is useless. Interesting to note here, though, is a temporal perspective: what appears to be useless at present can still become something useful through recycling; it can be re-integrated into material cycles, or into completely different life contexts. As a researcher who has studied garbage dumps in Mexico among other places, it's important to me that we integrate a bio-political dimension into the discussion. After all, as Martin Faulstich's example of mines made clear, there are huge imbalances between the countries of the Global South and the countries of the Global North. On the one hand, waste is local, having material reality in the space where it originated. On the other hand, it's also translocal. It's relocated, shipped to other countries, etc. There's a flourishing trade in waste, which is embedded in more than just nonpolitical material cycles—it's also tied to geopolitical power structures. Sure, we could achieve a lot technically and in theory. But I think it's problematic to assume that what we can implement in Germany as far as technology goes is always transferrable into other societal or cultural contexts. Development projects have taught us this very clearly.

**Christof Mauch:** As an anthropologist, one has a very unique view on waste—not only in terms of the wider context, but also at the micro-level: the situation of each individual actor and tangible situations. For example, your work involved people who lived on garbage dumps, as well as the tourists who visited the piles.

**Eveline Dürr:** Right. What interests me is what exactly humans do with waste and how they subsist on it. I also find it important to understand the materiality of waste and the power that is connected to it—and also the ambivalence that goes along with this. This can be made clear through examples: for instance, the fact that heavily polluted water may be viewed as pure or cleansing for ritual ablutions. Of course it's clear to humans that they're dealing with dirty water, but through cultural systems, the dirty water transcends this to have a greater meaning. The ambivalence in the perception of dirtiness and pollution cannot simply be reduced to a technical formula—cultural factors play an important role, too. On the one hand, waste piques people's curiosity; on the other hand, it generates disgust. It's important to understand the power that results from the pure materiality of waste and

the tangible dimension of its odor. It appears that waste not only represents a technical challenge, but also—especially in my field—embodies a materialization of social inequality. I don't think that social inequality can be obliterated. And thus, I don't think that waste can be completely avoided.

**Christof Mauch:** In this discussion, it's interesting not only to obtain differing assessments of whether there can be a "future without waste," but also to become more familiar with various academic approaches—on the one hand, approaches that are more technical and look for solutions, and on the other hand, culturally oriented approaches that explain why reality often prevents technical solutions from being effective. Both Martin Faulstich and Eveline Dürr spoke to the topic of environmental justice as seen from a global perspective. The topic of justice is crucial to Markus Vogt as an ethicist. Markus Vogt formerly worked for the German Advisory Council on the Environment and was head environmental advisor to the Council of the European Bishops' Conferences. As a professor of Catholic theology and as a social ethicist, he has looked at the ethical questions of waste—urban mining, for example—again and again. We're excited to now hear from the expert on environmental justice.

**Markus Vogt:** Gladly—I can certainly contribute some thoughts on the question of justice. The statements from Martin Faulstich and Eveline Dürr present us with a thesis and antithesis. Martin Faulstich believes that under certain conditions, a future without waste is possible; Eveline Dürr, however, is more skeptical. This discussion is a fortunate situation for an ethicist—on the one hand, it can be established that a future without waste is a worthy goal; on the other hand, it can be assumed that we will not reach it. Yet this does not mean that it is not worthwhile trying. In the realm of technology in particular, advances have already been made regarding how waste is dealt with. In the social sector though, there is still injustice; problems are displaced elsewhere in the world—waste, noise pollution, toxins. For a long time, we have turned a blind eye to the living conditions of those who suffer most from these problems. And if we keep doing so, we will only further distance ourselves from the goal of a world without waste rather than get closer to it. Nevertheless, the goal proclaimed in the title of this event isn't a complete *fata morgana*. In February 2012 with the enactment in Germany of the Closed Cycle Management Act, which requires manufacturers to take responsibility for the disposal of their products, the promise of a society "without waste" was made official. And we actually have made a significant amount of progress towards this goal in many areas.

Landfills today are the resource deposits of the future and are especially important for a country like Germany. According to current estimates, 25–100 million tonnes of iron and scrap steel may be lying unused in Germany’s landfills, and there is certainly a struggle for access to these resources. At the same time though, this promise of “zero waste” is very abstract. This development is obscured by other trends in opposition to it; for example, consumer behavior and the rise of consumer expectations. And of course, waste is the other side of production and consumption. The “rebound effect” is also a problem. The promise of a paperless office was never realized due to the increase in expectations. In affluent cities like Munich, 50 percent of food is thrown away, and that is a problem that cannot be solved technically. On the contrary.

**Christof Mauch:** So from a socio-ethical perspective, the waste issue is marked by a great deal of ambivalence.

**Markus Vogt:** Yes, exactly. I can illustrate and analyze that point using these eight theses:

**First:** Viewed from an ecological, political, and ethical perspective, the waste problem is no less controversial than the scarcity of resources is. But because waste is such an awkward topic and burdened by taboos, we are still far from being able to give it the serious attention that it demands. We won’t be rid of waste very quickly—the existence of nuclear power plants alone means that waste will continue to be a concern for several thousands of years to come.

**Second:** Cultural patterns shape how people deal with waste, but this is an area that has not yet been extensively researched in academia. Without an analysis of cultural behavior, for example, we only scrape the surface, treating only the symptoms and not the causes. And yet the causes are usually cultural factors.

**Third:** Waste and trash are the flip side of ideas of social order. As Eveline Dürr so cogently explained already, there can never be a society without waste, since there will always be the idea of the useless. In a way, it’s a result of limited concepts of usefulness, and because of that, definitions of waste vary. We often have very narrow definitions of waste, and so we don’t perceive things that are actually waste as waste. That’s why we always need to consider the various cultural perspectives.

**Fourth:** A significant part of what we consider to be waste disposal is covering it up and sending it to other places for other people to process, and because of this, waste is always connected to social hierarchies and segregations. Today, waste displacement occurs on a global scale—this includes the masses of Germany’s electronic waste that end up in Ghana, for example. The NIMBY principle—out of sight, out of mind—appears to be true here. Yet in reality, the problem hasn’t actually been solved.

**Fifth:** The most highly charged waste issue, which often isn’t interpreted as an issue at all, is CO<sub>2</sub> and climate change. For many years, the atmosphere has served as a dumping ground for emissions; free of charge, or so it seemed. The environmental and financial implications, however, are clear today. The issue of cost could be seen as an opportunity though, if certificate trading worked. Unfortunately, the European certificate trading system has not been adequately reformed.

**Sixth:** Living in and around trash is tied to social exclusion and discrimination. Those who are involved with trash are often the socially disadvantaged. At present, about one billion people live in slums and are surrounded by trash. While this is partially tied to opportunity, since the value of trash is increasing, it is also problematic due to the toxins in trash. This issue, by the way, is a main focus of the work of church-based charities.

**Seventh:** A constructive way to reduce waste in our affluent society is through shared use: the sharing economy. The sharing of goods as a new social movement could give rise to many opportunities.

**Eighth:** Urban mining, i.e., digging for raw materials in dumps, is a new form of mining. Through this, some resource problems could be reduced. Interestingly enough, there are connections between the technical discovery of waste as a raw material and the use of it for artistic purposes. It’s not unusual for art to have a subversive view—a view from below—of waste and, through that, break down taboos.

**Christof Mauch:** Thank you for this fascinating list of topics and perspectives. We’re very pleased that Heide Rieke is able to join us here today as a representative of the city of Munich—even in our small working group, the city of Munich is highly important. We want to involve the city (we have Günther Langer here today, as well as Helmut Schmidt, the

director of waste management). Heide Rieke is our expert in the political sphere; she has been interested in the topic of the environment for a long time, since her time in Hamburg in fact, where she was the first environmental affairs spokesperson for the city. She was also the one who had to report on the radio every morning how many becquerel had been recorded in Hamburg after the 1986 Chernobyl disaster. She has worked as a lawyer in Hamburg, and in Munich she has been a council member and SPD environmental affairs spokeswoman for many years. Yet she is not only involved in environmental questions, but also in municipal planning. And you could say that these areas are all related. After all, many environmental issues can often be dealt with more effectively in the planning process than in the environmental committee.

So how does Munich measure up in terms of waste management? Markus Vogt reminded us that in Munich some 50 percent of food is thrown away. However, at the same time we often hear how Munich is in the vanguard in terms of its waste recycling and management programs, as well as in the production of biogas from organic waste using dry fermentation plants. Would it be accurate to say that Munich is moving closer to a “future without waste”? Or are we moving away from this ideal?

**Heide Rieke:** I’m going to suggest something that may surprise you: in my opinion, the beginnings of a future without waste in Munich go back 120 years. In 1891 the city administration passed a waste law that required all citizens to put out their garbage for collection. Special horse-drawn carts known as “Harritschwagen” were built for this purpose. They drove through the streets and collected the garbage, which was initially buried in trenches, until it became evident that the resulting stench would be quite unpleasant for the residents in the vicinity. Subsequently, a location outside Munich, in Puchheim, was selected for depositing and sorting the waste. Thus, even before the turn of the century all kinds of garbage were already being recycled in Munich. Small organic particles, for example, were spread on fields or on the moors as fertilizer. Larger pieces of waste, for example leather, paper, and bones, were sorted out by hand and reused. This was of course a very labor-intensive process that we can scarcely imagine doing today. In any case, only a small portion of the waste remained after the sorting. Much as today, this waste was then burned. This waste-management concept, as we might call it, continued through approximately the end of the Second World War. In terms of household waste, then, one could say that Munich reutilized nearly 100 percent of its waste up until the immediate post-war period, and thus came very close to achieving the ideal of an economy without waste. With

the development of an affluent, consumer society after the war, the situation changed. Up through the 1970s about two-thirds of the waste was landfilled and one-third was burned; since then the proportion has gradually reversed.

**Christof Mauch:** Recently Munich has begun to develop an ecological waste-management concept again...

**Heide Rieke:** Correct. The first ecological waste-management plan was proposed in 1989. Sorting garbage and reducing waste were already important elements in it. As it has continued to develop, a “future without waste” has surely been one goal. I don’t believe that it can be achieved 100 percent, but after all this is the case for many environmental goals that we set for ourselves, even though we know perfectly well that they cannot be reached so quickly or easily. Nevertheless, it is important to have these goals so that we can motivate people to join the cause.

**Christof Mauch:** This is connected with the question of our attitudes towards waste.

**Heide Rieke:** Markus Vogt mentioned that it is a taboo topic. However, I think that the situation is slowly starting to change. The commercial sector is a different matter. But in individual households, sorting garbage seems to me to be a commonly accepted and practiced behavior. In Munich, the recycling rate is 58 percent, which is quite high. The federal government is aiming for 65 percent by 2020; I think that in Munich we will reach this goal significantly sooner. One reason for this of course is the fact that we have a good basis already—in principle we have already been recycling for 25 years. This type of waste-management system is carried by three main principles. First: it must always be cost-effective, since ultimately everything is paid out of funds that come from fees charged to residents. Second and third: we want to protect the climate and conserve resources, and at the same time remain socially responsible—this includes both the working conditions of the people who are employed with the local waste-management companies, as well as the working and living conditions of people abroad where waste is exported to. Therefore it is particularly important for the municipal governments to assume responsibility for the city’s waste. Of course, municipal waste departments often work closely with private service providers, but they continue to be monitored by the municipal authorities.

**Christof Mauch:** You also mentioned the question of cost-effectiveness. Can you say a bit more about the specific fees and services in Munich?

**Heide Rieke:** Since 2007 the fees for waste have steadily dropped, even though the fees are actually only charged for non-recyclable garbage. Bins for paper and organic waste are provided free of charge. Every building has these three bins on site. There are also 12 collection points for large or difficult to dispose of materials. Previously they were called “bulky-waste disposal centers”; the new name is intended to indicate that society has changed and we are now capable of valuing items that do not seem useful to us at present, but may have some use in the future. We have more than one thousand containers for recyclable items, such as glass. Our current focus is on collecting used clothing. Currently (in 2015) there are approximately 600 containers for depositing clothing; these replaced the commercial containers that had been used until 2013. The commercial containers did not offer sufficient control over what happens to the clothing that is deposited, and we would like to ensure that it is put to good use. Charitable organizations are, of course, an exception, as we are well informed about what they do with the collected items.

**Christof Mauch:** But plastic and synthetic materials are also problematic.

**Heide Rieke:** We have carried out a study on this topic. We were curious what happens to all the synthetic waste—whether it is a rubber duck or a broken plastic flower pot. Our study showed that 90 percent of the plastic waste produced by households cannot be recycled. Our recovery rate here is extremely low. However, Munich makes use of a number of other ways to extract value from various types of household garbage. Waste-to-energy plants, for example. For organic waste, the dry fermentation biogas facilities that you mentioned earlier are particularly important. We have become a producer of soil. The quality soil that we produce is composted using the Munich dry fermentation plants, which, in addition to creating excellent soil, also capture a large amount of biogas that can then be converted into electricity.

**Christof Mauch:** Thank you very much for your interesting and detailed explanations. Eveline Dürr and Markus Vogt suggested that there will always be things that are useless. In addition, Markus Vogt mentioned the problem of the rebound effect. I would like to return to this issue and direct my question to Martin Faulstich—what can you tell us about the rebound effect?

**Martin Faulstich:** Basically the rebound effect describes what happens when a product is made very efficient and inexpensive: as a rule this results in greater total consumption rather than less, because people use more. A typical example is energy use. We require 20 percent less energy to heat one square meter of living space in comparison with 20 years ago. This sounds like progress. However, in these 20 years, the average living space per individual has increased by 20 percent. This means that in reality the absolute use of energy for heating has not been reduced at all. It is similar with automobiles: although cars have become heavier and their motors larger, the average gas usage at a speed of 100 km/h has dropped. But we drive a lot more. Since 1960 the average number of kilometers driven per person has quadrupled. I had a discussion once with the US industrial researcher Amory Lovins, who is a promoter of the ultra-fuel-efficient vehicle. I told him “if we had cars in Germany that required only a liter of fuel to drive 100 km in an hour, and if fuel cost only €1 per liter, which would indubitably be a tremendous engineering accomplishment, there would be no public transportation anymore because everyone would be driving instead.” This, too, is an example of the rebound effect. The only way to suppress it would be to set absolute limits. The cell phone is another typical example. If you receive a letter, say, every two years from Telekom or Vodafone offering you the chance to purchase a new phone for only €1, it is very difficult to be a moral hero and most likely you will happily accept the offer. However, if the phone were to cost €1,000, which is a more accurate reflection of the value of the materials, people would probably use the phone for five, six, seven, even eight years, and perhaps it would be constructed to last that long as well. These are all examples of the rebound effect. It has to be admitted: 40 years of talking about environmental protection, 20 years talking about climate change—ultimately, all our efforts have only made things worse. In the past year the CO<sub>2</sub> emissions were the highest ever in the history of humankind, even though we have been taking climate protection measures for 20 years. In all areas—raw material consumption, water usage, the number of McDonald’s branches—everywhere the rate of increase has risen dramatically, creating the famous “hockey-stick curve.”

**Christof Mauch:** Those are quite discouraging conclusions.

**Martin Faulstich:** They are indeed. We have these amazing technical systems. But the anthropogenic factors that are causing so much harm to nature have not declined globally. They continue to increase every year. Part of this is due to the fact that people in many other parts of the world are striving for our material standard of living. This is under-

standable and we cannot refuse them the opportunity. Modern media technology makes many things possible. A television powered by a car battery brings CNN and its images of modern consumer society to people everywhere in the world. And the fact that we have come to see that our lifestyle was the wrong path to take doesn't give us the right to refuse people in other parts of the world a chance to enjoy material comforts. I am very worried indeed about the continuing increase in the amount of environmental pollution. Even though our education levels, our knowledge, and our insight into the problems we are causing have increased, the trends continue to be negative.

**Christof Mauch:** Can I return the discussion to the subject of plastic? Isn't it necessary to distinguish between natural resources, which are finite and can be depleted, and artificial substances which we can always synthesize more of?

**Martin Faulstich:** Yes. The Earth is a ball of matter, after all, and as such its resources are limited. The atmosphere that we are polluting is also limited. Metals, and in particular rare earth metals, are only available in fixed quantities. Plastics are a different matter: we can always develop and manufacture synthetic or bioplastic alternatives. But once copper, iron, or phosphorus reserves are used up, they have been used up forever. Unless—as some US scientists have suggested—we were to capture asteroids from space to mine them for materials. But even as an engineer I can't imagine that we will be technologically capable of such a task in the next hundred years.

**Eveline Dürr:** I'd like to add a comment to this. Sorting garbage and the vision of a "city without waste," that we are close to being able to achieve sounds like a success story. We are recycling more waste all the time and citizens have grasped the idea that waste can be capitalized and turned into something economically valuable. And so waste is a good thing, because henceforth we can recycle it. But I wonder what it is that we are actually sorting. Of course it gives me a good feeling to sort my garbage, and afterwards I don't have to think about it anymore because I've given someone else responsibility for what happens to it. The municipal waste management of Munich reinforces this attitude with their posters proclaiming "Your Waste—Our Responsibility." That means, I don't assume any responsibility—in fact, I'm emphatically handing over my responsibility. However, I think that the correct thing would be for us to accept responsibility for our waste instead of giving it to someone else. Seen as a whole, one might suggest provocatively that this whole business of sorting garbage is only a minor improvement at the local level. Considered in a global context, we're actually taking a step backwards.

**Christof Mauch:** Perhaps this should be a message for a new poster: “Your Waste—Your Responsibility”?

**Eveline Dürr:** (laughs) It is interesting how there are such widely divergent ways of looking at the situation.

**Heide Rieke:** Of course this is true. The waste problem has a global dimension. We must keep this in mind and accept responsibility for our waste. But the only way to solve anything is to start by realizing it at the local level. If we only look at the wider, global perspective, it won't help us move towards solutions. In the context of the entire world the contributions of individuals disappear from view. Therefore we need local responsibility. And here, in Munich, in Germany, it is particularly important for us to assume responsibility, for we are relatively rich. We can afford to take the lead, and we can afford to develop new technologies to deal with the problem.

**Christof Mauch:** But shouldn't we be doing even more to prevent things from being thrown out in the first place?

**Heide Rieke:** The Munich waste department provides residents with information about where items can be repaired instead of throwing them away. In addition to our own second-hand shop with still-usable items that have been brought to our waste collection points, we also publish a list of local second-hand shops and host an online flea market. The service life of manufactured goods is an important factor in this context: Why, for example, does my electric toothbrush have a built-in battery instead of a removable one, making it necessary to replace it after three years? Shouldn't there be regulations concerning the quality of manufactured products? Cell phones, cheap t-shirts, shoes? Is this really the only way we can achieve economic growth—by selling as many new products as possible in rapid succession? Is this why so many products have such a short lifespan? In this light, are initiatives that are supposedly designed to reduce pollution—such as the German scrappage scheme, which incentivized giving up older, high-emission vehicles and buying a new model—really such a good idea? Does it make sense to dispose of old refrigerators in order to replace them with energy-saving refrigerators? There are many such trade-offs, cases where efforts to improve the environment in one area cause problems in other areas. The important thing, I think, is to develop an awareness of reusable materials and their value.

**Christof Mauch:** The challenges are tremendous. It seems that we have to be active at a local level and simultaneously not lose sight of the global perspective. We must develop an awareness of the environmental consequences of our consumption, and in the future we should perhaps, as Martin Faulstich noted, pay prices which more accurately reflect the damage that is caused by throwing away products. Have we really made no progress at all in environmental protection?

**Martin Faulstich:** Actually there have been some big successes. Germany can boast a number of major accomplishments in the last 50 years. I am a child of the Ruhr industrial region, which in the 1960s was so notoriously polluted that the houses had to be repainted white every year. And you couldn't hang up your laundry outside to dry either. It's rather sobering to note that the first environmental protection measure undertaken in the steel mills in the 1960s was to put a roof over the parking lot because employees had complained that by evening their vehicles were covered with a layer of dust. No one was particularly concerned about the health effects of this dust. In 1968, German Chancellor Willy Brandt declared that "the sky over the Ruhr must become blue again"; today it is in fact blue. We also see this progress in the fact that today, nearly everywhere in Germany—with very few exceptions—the water is safe to drink and the air is clean. Practically all lakes and rivers are okay to swim in. And trash isn't left lying around in the streets. In other words, we have gotten very good at end-of-pipe measures, i.e., finding ways to manage the waste after it has been produced. All the same, if we direct our attention to the beginning of the chain instead—to production processes—and ask ourselves about the amount of raw materials and energy that we are using...well, not much has changed. And therefore it is important to start turning our attention to the products we consume.

The mention of refrigerators reminds me of an anecdote that illustrates the "rebound effect." It goes something like this: A woman says to her husband, "Why don't we buy a new refrigerator? The new model is so wonderful, look at its efficiency rating," and so forth. The man replies: "But it would really be a shame to throw away the old one. We'll put it in the garage and I can use it to cool my beer." This is the rebound effect.

**Christof Mauch:** But what can each of us as individuals do? Buy more durable shoes?

**Martin Faulstich:** This is going to sound a bit vain and arrogant: the suit I am wearing was made by a tailor; the shoes are handmade. But of course all of this costs a pretty packet.

If one were to go to people and say, “Here’s the deal: we’ll give you an interest-free loan if you pay to have your furniture made by a carpenter,” many people would probably be happy to accept, rather than have to make ten trips to Ikea instead. This would reduce waste, and it would still be financially beneficial by helping the economy grow: hand-made furniture is expensive, and the carpenter earns money from it. I think it would really be possible to set our sights on quality, long-lasting products, if only we could find a solution for the expense of the initial investment. When a young family starts furnishing their new house, usually they cannot afford to buy sturdy handmade furniture, so they end up at Ikea. We really need financing methods to enable people to go to the carpenter or the tailor from the very beginning—not out of conceitedness, but because such products really do last forever. Why isn’t this done? Interestingly enough, if we look at industry, this is exactly what they do: a manufacturer would never buy a lathe or other machine that will only last 10 years. Their machines last 50 years and are constantly upgraded: a replacement control board, a new regulator, a fresh coat of paint, etc. It’s only consumer products that don’t last; often, they’re even designed not to last. Therefore I advocate expensive but high-quality and durable products instead.

**Christof Mauch:** It is clear that awareness of the problem of waste and even ideas about how to reduce it are not at all new. Since we know what we should be doing, why don’t we, in fact, do it? What can the study of ethics tell us about this phenomenon?

**Markus Vogt:** This is a really fascinating matter, where we have successes coinciding with failures. Success and failure are ideas conveyed through moral communication. In this context, I think that it can be productive to tell success stories, such as that of Munich, for example. Success stories motivate us. Here we see how garbage can be a valuable material. These stories cause us to reflect on how else we might contribute to further successes. It is a huge motivation. At the same time, it is important not to forget the flip side: the fact that we displace or hide many things. For example, a large part of our e-waste is dumped in other countries, where it has immense health and environmental effects. In other words, it is crucial to maintain the right balance between stories of success and failure. And of course, because people’s expectations are constantly becoming higher, we also need to talk about exercising more moderation.

For the ancient Greeks, moderation or frugality was the most important virtue—not in the sense of “doing without,” but rather as something that improved one’s quality of life. It

has to do with creativity, with communication, and it permeates deep into our ideas about lifestyle and affluence. It is precisely these deeper dimensions that we must discuss.

**Christof Mauch:** What does this mean for us in practice?

**Markus Vogt:** It is important that we focus our activities on clearly defined problems and set priorities. The potential to motivate people is also significant: collecting garbage has a ritual quality. It is attractive because it offers us a way to purify our guilty conscience, as it were. By contrast, it is much more difficult to develop a concept or model in which everything could be reused. And it would make little sense to do so.

**Christof Mauch:** Let's go back a bit and look again at the economic aspects. What role is played by capitalism, the state, and businesses?

**Eveline Dürr:** I don't think there is necessarily a conflict between waste avoidance and capitalism. The power of social discourses should not be discounted, particularly in connection with these topics. Businesses that are known to be big polluters create negative publicity for themselves. Likewise, companies can increase sales by being committed to environmental protection.

**Christof Mauch:** And how much should the state be involved?

**Martin Faulstich:** I think we need a very intelligent relationship between businesses and the state. The state needs to impose strong and strict parameters. It must also ensure that pollution and environmental damages are factored in. In other words, if I may use a sports analogy, the state determines the boundaries of the playing field and establishes the rules. But on the field what matters is creativity and mobility; the players can move about freely and their gameplay is not predetermined. In the same way, I wish for a diversity of products and a free market economy, but there must be penalties for causing environmental damage.

**Christof Mauch:** And how about growth? Where does the state come in?

**Martin Faulstich:** The state has the ultimate responsibility for guaranteeing services; thus, it should determine which sectors should grow and which should shrink. If public transit is

growing, if recycling is growing, if waste reduction is growing—this is a wonderful type of growth. But for this to happen, other sectors have to shrink. As a society, we must be more active in determining which sectors we want to grow. After all, we want positive things like the cultural sector to grow. And taking charge of this is a collective task.

**Christof Mauch:** I hear an objection from the audience...

**Audience member:** Garbage, or what is considered garbage, is a purely human problem. But we could use the example of biological cycles as a model for more intelligent material research and usage. I believe that we should look more critically in general at the technical cycles and the demands of industry. Wouldn't it be possible to approach our production more like a biological cycle? Couldn't we dramatically reduce our waste by orienting ourselves more towards nature, where waste doesn't exist?

**Markus Vogt:** From a philosophical perspective I agree with the audience member. Nature provides us with a tremendous number of examples of amazing creativity in finding ways to reuse materials. Petroleum-based products such as plastics cause the most problems since they are not biodegradable. Here we must actively develop new technologies: ways to create plastics that are biodegradable and easily recyclable so that we don't cause so much harm to nature. Indeed, it makes sense here to think in terms of life cycles and to investigate more closely the nuances of how nature functions, how it is structured. We could think of this as a sort of social biomimicry. This is a fascinating topic, but we should be careful not to proceed according to the idea of having only closed cycles; rather, it will be a development that profits from variety and tensions. There will always be waste, but if we are creative, we will be able to keep embedding it into new cycles.

**Heide Rieke:** Of course we can talk about all the things that we can reinvent with new technology. But in the end we will have to be more frugal. I am convinced that we can still live very comfortably even while reducing our demands. But above all, as Markus Vogt has noted, it requires a certain amount of fantasy. That's precisely it, fantasy. I am convinced that creativity and fantasy will allow us to move forward. It is not enough to simply urge people to "be green and think about the environment"; we need to generate the right attitudes that will set us on the path to the future.

**Christof Mauch:** This makes me curious and I would love to know what each of you thinks the situation will look like a hundred years from now. But perhaps we can discuss this together during the reception after this talk. Your comments have made it clearer to me than ever how important it is to look at the problem of waste from a variety of perspectives. We looked at some of the successes and failures on the path towards a “future without waste”; we saw some of the instruments for adjusting our lifestyles and economy to bring us closer to this ideal. Please give a big round of applause to our four panelists for their interesting and informative contributions. And to all of you in the audience, for spending this beautiful day inside learning about what may seem to be a rather unpleasant topic. I hope this panel has changed your outlook!

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This text is condensed from a roundtable discussion organized by the Rachel Carson Center and the Center for Advanced Studies at LMU Munich on 8 May 2013. The talk was transcribed by Nora Taleb and translated from the German by Laurianne Posch and Brenda Black.