

## **GCRI INTERVIEW**

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### **Can you elaborate on the difference between bioenergy and renewable energy?**

Bioenergy is a specific renewable energy carrier that is storable and applicable in all energy sectors, like heat, power and transportation. Biomass, which is used to produce bioenergy, is limited. Therefore, bioenergy should only be used for those energy systems in which other renewable energy options are too difficult or too expensive to use (for example, as a supply for power in times when the wind is not blowing and the sun is not shining or as fuel options for a specific transportation sectors, such as long distance freight transportation or aviation).

### **What are the challenges of and opportunities with using bioenergy systems?**

It is a great advantage that bioenergy can be integrated into the energy system in many different ways, especially the option of combining geothermal, solar and wind energy with bioenergy. At the moment, precise controllable bioenergy units are being developed. These units are needed to compensate the fluctuation in energy levels from different sources in order to make the energy system use all of the renewable energy carriers in the most resourceful and efficient way.

Furthermore, there is a need to develop an integrated overall energy system and infrastructure to provide additional services from bioenergy, since effects of bioenergy go beyond the energy system: bioenergy, when produced from residue and waste, can support waste management and close nutrient cycles.

The challenge of bioenergy is the resource: the biomass. Only if sustainability issues are taken seriously in the biomass production and provision can the intended positive effects of bioenergy be realized. Therefore regulations for the use of biomass are necessary, especially for energy crops. Certification, which has already been established for biofuels, would be a good way to help track the sustainability issues.

## **Why is the bioeconomy so vital for sustainability?**

Substituting fossil fuels with bioenergy is one important element to realize the Paris agreement on earth temperature stabilization. But the bioeconomy is much more than bioenergy. It is the transformation of our resource base to renewables and the improvement and innovation in products and services. For example: new bio-based building materials can provide living space with lower material and energy demands. This improves the environmental performance of houses. When producing chemical compounds or pharmaceuticals from microorganisms, in many cases the effort is significantly lower. The greenhouse gas reduction potential is huge. For example, a worldwide substitution of the fossil-based PHA by the bio-based PHA production (fermentation of sugar) could save 160 mill tons CO<sub>2</sub> per year; the replacement of worldwide fossil-based acetic acid production by the bio-based one could mitigate 10 mill tons CO<sub>2</sub> per year. If ligno-cellulosic or sugar cane feedstocks would be used instead of today's cornstarch feedstock the GHG reductions could be even more than doubled. (To have a comparison, the worldwide emissions of CO<sub>2</sub> in 2015 amounted to 32,000 mill tons).

## **What is the state of the bioeconomy in Germany, and what type of international framework would need to be in place for the bioeconomy to be viable?**

The bioeconomy is fostered in different sectors (food, energy, chemicals, building materials, pharma etc.), but this is not enough. Bioenergy value chains are often cross-sectoral and need a lot of experts. One way to support this is the establishment of bioeconomy clusters. A big hurdle in Germany are missing incentives for new bioeconomy products.

The international framework should focus on three aspects: (1) security of food supply is a priority of the global bioeconomy, (2) the provision of sustainable biomass is key, and this calls for more coherent international policies and (3) an on-point greenhouse gas reduction policy - for example through stable and increased CO<sub>2</sub> prices - could reduce the market barriers for many bioeconomy products in many countries.

## **Why is the bioeconomy important for companies and consumers, and how, if at all, should they change their behaviors accordingly?**

The bioeconomy provides opportunities for innovation and smart products. The joint development of the bioeconomy and digitalization is filled with lots of room for innovation. But we have to keep in mind that biomass is limited and reduction of consumption is necessary. So, for a sustainable bioeconomy and in order to stay within the natural and physical limitations of our planet for humanity, we not only need new solutions, but also need to fundamentally reflect our needs.