## **Bioeconomy for capture of sun's energy and for increasing carbon removal** 2016-05-02

It must be economically advantageous to cultivate the land that now lies fallow and for which farmers receive compensation from the EU (our public funds). All crops absorb carbon dioxide (CO<sub>2</sub>) and plant nutrients and then biochemically bind solar energy, which turns into bioenergy.

Plant nutrients and bioenergy in plant biomass is essential for most living organisms in food, feed and as a substrate for microorganisms.

**Biological conversion processes** are the basis for the bioeconomy and circular economy, and should be supported by the most modern technology to help phase out fossil fuels and artificial fertilizers.

Crop residues (including forest residues), residues from food industry, food waste as well as human and animal excrements can be converted to biogas and biofertilizers in the "high-tech local biogas plants" (large or small) that are connected to modern logistics which prevents losses of energy and plant nutrients and thus prevents pollution.

**Bioenergy in biogas** is in energy-rich methane and will be converted into 30% electricity and 65% heat / cold). Carbon is released as carbon neutral  $CO_2$  as it comes from renewable organics.

**Bioenergy in biofertilizers** is of highest importance for soil fertility and productivity. Carbon in biofertilizers is in microorganisms, in carbon-rich compounds such as more or less transformed renewable organics and in humus that can stay in soils for long time - carbon sequestration. Carbon stands for about 45% biofertilizers dry matter content.

Biofertilizers contain all 16 essential chemical elements for plat growth: H, C, O, N, K, Ca, Mg, P, S, Cl, Fe, B, Mn, Zn, Cu, Mo; according to Sune Pettersson, prof. emeritus at Swedish University of Agricultural Sciences; and stimulating elements Co, Cr, Ni, V, Sn, Li, F, Se, Si etc.

Annual supply of biofertilizers increases humus content, and thus increases both the carbon sequestration and fertility of soil. With the increase in soil productivity higher amount of solar energy can be captured and converted into bioenergy.

What is today missing most is the industry willing to produce products that optimally adapts the equipment both for microorganisms that are responsible for production of methane in biogas and to the people who take care of biogas plants. Development of hygienic and easy collection toilets (without water) and hygienic collection device for food waste are inevitable components to reduce losses that pollute the air and water.

With clear political decisions that protect the environment and health opens the opportunity for innovators and businesses to find sustainable solutions and thus guaranteed jobs and even success in the international market.

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