**Not just a circle, let do this a bubble!- A brief appreciation of the "Circular Economy weeks" in Finland.**

The last two weeks we have seen several approaches and applications of Circularity. These are bubbles. Each one of them started with a big sigh of air, the entrepreneurship, getting bigger and going up.

The bubbles are 3D, in this programme it was demonstrated that circularity is more than a 2 dimension circle. It has a lot of different dimensions.

As a chemical engineer I have to see everything as a process so, let start with the "beginning" (it can be called at this accurately because we are talking about cycles, but I have to start by somewhere).

Let go now to the first bubble, the extraction one, the one that takes the resources from nature. It was interesting to see the Finland forest management done by Pilke and how the nature bubble is in a dynamic contact with human necessities and activities as seen in the museum (that is not only very educational but also funny). It seems that the Finland forest management strategy works but I'm not sure if it can work in our country because of the differences between both biomes or ecosystems. In Argentina we don't have the same plant species and also their growing up process is slower. The soil is very different because our snowing or rain time and quantity is lower than in Lapland and also in the rest of Finland, maybe because we are not too much in the south that Finland is in the north.

Another difference between countries is that in Finland exists the “everymen’s right” (maybe it is more accurate the all’s right) which does not exist in Argentina. The land is private and the government land is not used for extractive destinations, only for services or Conservative National Parks.

But something that has nothing to do with the latitudes is the necessity of resource extraction regulation. Wish Argentina has more regulations and normatives that can guarantee the existence of our resources for the next and next generations. We have less natural resources each year and it is a need and a must for us to take into account that and do whatever is necessary to stop and repair this situation. The government, the private extraction companies and the rest of the society bubble has to take part in this change, another time, we have to join bubbles.

Also the solutions aren’t universal, because of the differences between natural and social environments. That is why all the stakeholders must participate in the solving process. The bubbles must do it together, have to join.

Now, let’s move to the next part of the “process”, the manufacturing not only of material products but also of services. It can be seen as a two lobular bubble because they can never be separated.

It is interesting to see examples of how the industry has done changes in their processes and also the way to be related not only with the environment but also with other companies in order to downsize the waste amount and the environmental impact.

Some of them for example, use another companies waste or steam to use at a row material in their production. Others, use new materials or processes as for example the 3D printer which can build big pieces with biomaterials.

The services also can work in the same direction, or on the same bubble. Is not only the final product the only important or where we can apply the circularity concept. The example of the building warming with the heat extracted from the industry equipment (compressors for example) using it as a closed cycle of water that benefits the industry in many ways: as removing the heat from the inside of certain places that is necessary for the equipment, the process and mostly for the health care of the workers; and to warm the building in winter times.

Other example is the possibility to take advantage from the technology to improve efficiency. Taking into account the possibility of increase automation in order to get more “in live” information so it can be possible to make more accurate and “on time” decisions and that, as

I have experimented working in the industry, is one of the most important factor to get less material (waste) and energy, and that's it's also more efficiency.

Then, we have a big process bubble with a lot of smaller bubbles connected inside.
We also have several examples (the soy liposomes, the biomaterials, etc.) where the industry bubble make a contact with the researching and educational bubbles because that round trip is the way to develop more and more solutions and improvements that will do both bubbles increase and also go each time upper.

Now, we have the process, the product and the waste.

The waste treatment is one example of the bubbles. Several people associate circularity only with recycling. But that's only one part of the whole treatment. it's necessary to mention and apply the upcycling and, when re or upcycling are impossible or hard to do, the downcycling must be considered.

Besides the individual initiative of each one of us in the waste separation it's necessary to join the separated waste, it's necessary to join the bubbles. And at this point the government and the companies have to be part and join their bubbles too because when the separated waste is collected something is needed to do with it. In some cases, it can be recycled (as the bottles or aluminium can be deposited in the machine in the supermarket in exchange of money, I like it very much that system that is also used in other countries or the clothes fibres) in similar products.

In other cases, the waste can be upcycled in more valuable processes, as for example in the using of streams of the soybean oil or the chemistry industries.

Otherwise, there are materials with the current technology or because of the higher cost implied in the recycling process (it can be because of the transportation, the initial investment or the energy consumption cost) are impossible or hard to recycle that must be downcycled. That is the case of the general waste of Rovaniemi and Sonka. That waste is recollected and taken to an incinerator. The heat produced is used for electricity generation or for warming buildings. That is better than throwing it to a landfill (as happens in many places in Argentina but in Ushuaia they have also the problem of the Antarctic and the planes and cruise ships who leaves their waste in the island), but it is a $CO_2$ production, which is mainly going to the atmosphere and contributing to the greenhouse effect. So, this is a hot and full of $CO_2$ bubble, and as every chemist knows: bubbles explode with heat (because gasses expand with the heat until the surface tension is defeated.

Another way of downcycling is, with organic waste, do compost to transform big molecules in smaller one that can be "upcycling" (almost a kind of) in bigger molecules in the plants and

fungi and after that in the food chain in animals and some (or many) of them used by the humans in different ways. So, this is a more “green” and size changing bubble, a dynamic one. Let go now to the first bubble, the extraction one, the one that takes the resources from nature. It was interesting to see the Finland forest management done by Pilke and how the nature bubble is in a dynamic contact with human necessities and activities as seen in the museum (that is not only very educational but also funny). It seems that the Finland forest management strategy works but I’m not sure if it can work in our country because of the differences between both biomes or ecosystems. In Argentina we don't have the same plant species and also their growing up process is slower. The soil is very different because our snowing or rain time and quantity is lower than in Lapland and also in the rest of Finland, maybe because we are not too much in the south that Finland is in the north.

Up to now there is a bubble which we haven´t go deeply on it. The social environmental bubble. And this is maybe the most important in this analysis because we are always in a society, we are the society. Besides that, we are all social individuals, each society has different history, different environment, traditions and culture.

We were knowing each other (as an “Arctic” and “Antarctic” society) so we could find our similarities and differences. We are maybe more used to be as a mass or we enjoy more spending so much time with a lot of friends or relatives and we get friends more quickly but here (as I could appreciate with few people and in short time) the people enjoy more the silence and quietly way of living, and maybe enjoy more the self-space and individuality.
That can be because of the weather and the long nights during winter, but also because of society´s cultural origins.

The diary objects are different too. We have our mate and here it is “the berry keeper”. Here it is also the “everyman’s right” and that don’t exist in Argentina.

In spite of the above mentioned both society have challenges, specially with environmental issues. So, it is a very good idea to show each other “our bubbles” and watch what can be applied in our places or society from the opposite pole one. Of course, as we have difference, the application of good ideas must previously be adapted and because of that is so necessary that every stakeholder take part in the solutions or ideas.

In conclusion, if we want that this circular bubble growing, we must join bubbles, and this exchange experience is a good way to start it, but we have to continue moving, looking for more and more bubbles to do this bubble not only grow but also go up and up. We need it as a society, as a part of our biggest bubble: the “everyone’s earth”