**NOMAD Laboratory Centre of Excellence**

*Industry Interview - Dr. Antonio Sichirollo, Greenetica*

Greenetica was founded with the goal of developing a solar concentrator capable of producing both electricity and heat. Finding materials that display the right properties for performing in these conditions was extremely complicated. As a medium size company, they decided to team up with larger establishments and ask them for materials with the right features. In the end, after discussing with various companies they decided to work with Dow Corning. As such, Greenetica does not have the capability to carry out research to discover new materials; instead they establish collaborations with universities (e.g. University of Padua), research centres (e.g. www.joanneum.at) and bigger industries, who usually make use of open-source or third-party databases, to identify appropriate materials that are already on the market or new ones in development.

In normal company practice, Greenetica research starts from materials that are already available. However, employing a database could be useful if it was designed to be very accessible and user-friendly, but more importantly, if it would enable a direct comparison of the properties of available materials to the end of establishing, for instance, which one performs better. Information about the availability on the market of a given material, as well as the sectors in which this material can be used, would be crucial for making data appealing to them.

Dr. Sichirollo considers NOMAD to be a very valuable product. Ideally, it could be considered a tool to boost research in materials science. This specific question, however, is more appropriate for companies that carry out research and base their R&D on databases (such as the ones with experimental data). The idea of integrating machine learning into a company’s research practice is easier to consider for a big company, where there are more available resources. In fact, in Dr. Sichirollo’s experience, bigger companies normally use information-theoretical techniques for commercial ends and for analysing the market in which the company works. However, for smaller size companies and companies that work in very narrow fields, developing or using machine learning methods can be a bit tricky, in particular because of the specificity of the issues these companies have to address. For instance, at Greenetica, they could use tools that help to predict how or when a given product should be used in various countries based on variables, such as weather conditions, temperatures, and technical features of the panels or specific components/materials applied for any specific product. All suppliers have many data and expertise about durability and aging effects driven by solar radiation for rubber, plastic, silicon, etc., but only a few providers can show test results for their materials after exposure to UV concentrated rays. NOMAD could be a perfect database and tool to analyze data coming from other sectors (e.g. medical and military research) to simulate and predict concentrated UV rays effect.

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Such databases and tools would be very specific in the first instance, but they might become more general and useful to more people. Again, machine learning, as well as the tools NOMAD produces, might be more useful in the research phase, which is normally carried out in Greenetica’s partner facilities (e.g. University of Padua). As a general remark, Dr. Sichirollo thinks that NOMAD should work towards providing curated, ready-to-use and certified data useful for specific problems. Companies should be able to use such data as a benchmark or a quality check for the data they produce.

Universities collaborate very naturally with a framework like NOMAD mainly because of its transferability and its content. He thinks research groups could really use the boost NOMAD could offer by gathering a large amount of data for a specific problem, providing information like how many other groups have already worked on a given material and exposing information that is already available. NOMAD could provide tools to answer questions like: “I have this material with this property, is there anything better?”

NOMAD interactions with companies should distinguish between large and medium-small size companies. Large companies have the resources to establish a dialogue with NOMAD and maybe use some inputs from NOMAD to continue research within the company itself. On the other hand, small companies need a finite product for a small price. A NOMAD spin-off could be very interesting but there are various factors to consider. Dr. Sichirollo thinks that, at least in the first phase, NOMAD might still require public funding because it would be hard to survive only with the revenue from the services it provides. If the goal is to become a competitive consultant, NOMAD will have to keep enlarging the database and the tools, at the same time as providing services for companies. This requires resources. Ideally, the same people producing the data should develop the tools.

Regarding storage duration, Dr. Sichirollo considers that NOMAD’s 10 year storage guarantee is a very solid starting point. Traceability, from the point of view of data coming from a company, can be a little tricky, in the sense that companies will not want to disclose that they have produced data for a given problem. Normally, if a company finds out someone else is working on the same subject, it prefers to team up directly with the competitor and maybe work together. Of course, for academic data, it is crucial that one can trace back to the paper associated to the data. One of the issues preventing regular use of NOMAD by Greenetica is the highly specialized training necessary to use it.

As Greenetica do not carry out direct research on materials, establishing collaborations with NOMAD is not envisioned as they do not have a strong motivation for integrating NOMAD into their company practice. However, NOMAD could be a very powerful tool to boost the research of their partners, such as universities and research centres. As a result, he would be happy to recommend NOMAD to their collaborators.

To conclude, his opinion is that NOMAD should try to place itself in a middle position between companies and research institutes. It should aim to accelerate the activity of research institutes that normally collaborate with companies and resolve problems for, and with, them. This is particularly true in Italy, where small companies strongly rely on research centres to solve their problems of interest.

The way NOMAD will evolve and interacts with industry should take into account the differences in industry sectors across countries. In some countries, it is more effective to interact with big companies, while in others it could be the opposite. Finally, it is really important to start a process of networking in which companies recommend to other companies (or to their collaborators) platforms (like NOMAD) that are considered useful or reliable. This could exceptionally boost NOMAD’s use.