Patent on sustainable energy

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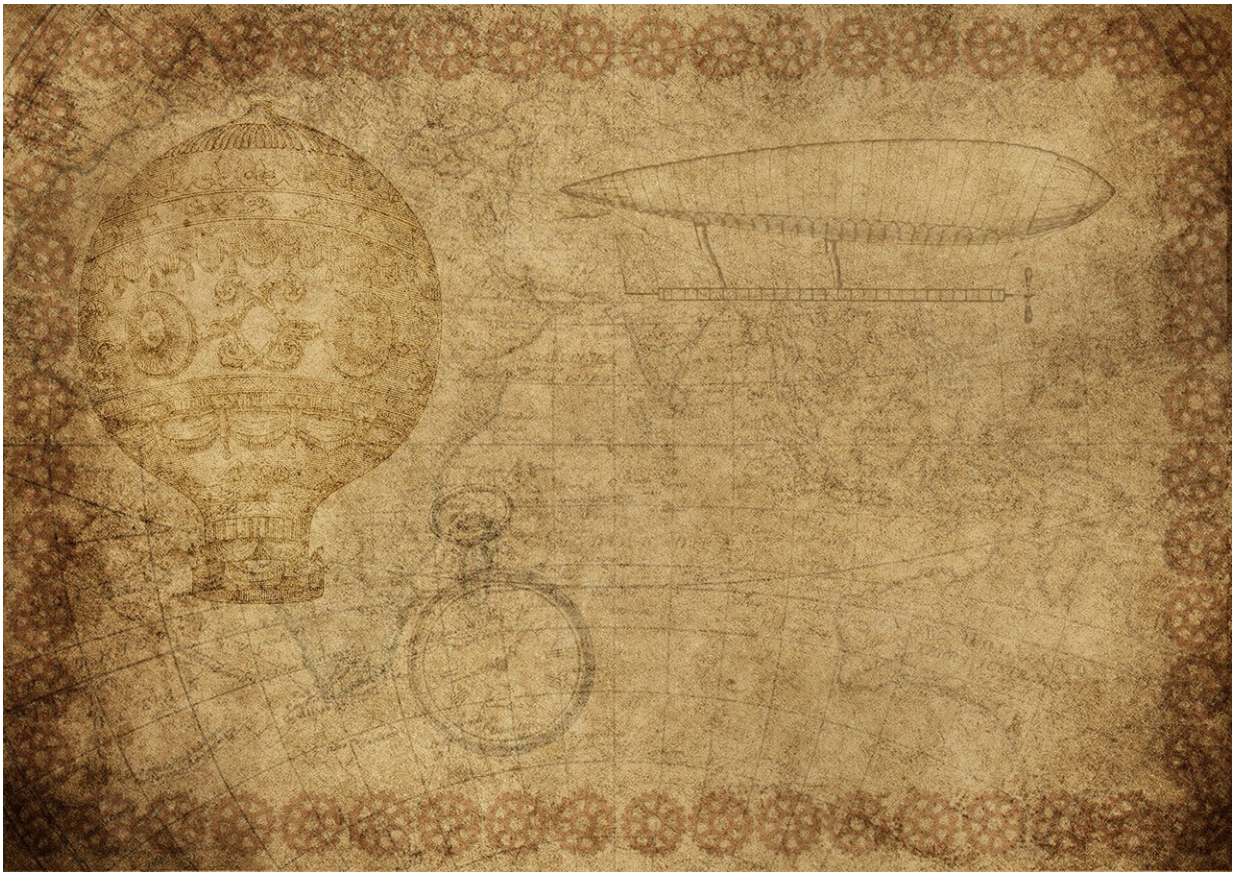

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If we want to reach the climate goals set for 2030 and 2050, we are going to have to do our utmost to continue developing sustainable energy technologies. In order to make appropriate government policy, it is important whether a technology builds primarily on earlier technology or

depends on scientific research. This is the contention of doctoral candidate Peter Persoon.

Hundreds of thousands of patents relating to energy technology are registered with the European Patent Office. By referring in turn to other patents, each of these documents forms part of a huge technological knowledge network, in some way comparable to academic publications within a specialty. "Not every technology is patented and many patents will never be used," explains Peter Persoon. "But the great thing is that every patent offers a detailed description and has been put through a quality check."

And so patents can shed light on the knowledge structure underpinning sustainable energy technologies such as wind turbines and solar cells, Persoon points out. For his doctoral studies at Technology, Innovation & Society (TIS), the physicist delved into this mountain of patents. "What does a technology like this need in order to be taken further? What kind of parties are involved in this development, and where can they be found?"

Database

Not that he has read all these documents from cover to cover. "That's would be impossible, of course it would, even without considering the readability of the content. But our department, TIS, has a digital database of patents. Each patent has been classified by the patent office and is linked to other patents via citations. The database is searchable and so with the right algorithms you can pull out relevant statistics."

Looking at the extent to which technology depends on new academic insights, you'll notice, says Persoon, that the dependency of sustainable energy technology is much higher than that of fossil energy technology. In the latter case, progress is driven primarily by technical development

within the industry. "If we want to stimulate the development of sustainable technology, the government must take this difference into account."

Although it was a smart move by the Netherlands to use the Top Sectors to focus on those sectors in which we already excel, where the provision of grants is concerned, he believes, it is still too much a case of one size fits all. "Which financing instruments are available depends on how far a technology has already been developed; the Technology Readiness Level or TRL, as it is called. But both wind turbines and solar cells have a high TRL—both technologies are already pretty mature. Nonetheless, it is also evident that academic research still has a strong hand in improving solar cells, whereas the new generations of wind turbine, by contrast, build on technical developments in industry. So in this respect, wind energy more closely resembles fossil energy technology and for grant purposes what you should be doing, in fact, is classing solar cells as a technology with a lower TRL."

Distinguish

It would therefore be advisable, believes the doctoral candidate, to distinguish not only by sector, but also by technology when applying grant policy. "At present, where a technology with a lower TRL is concerned, the party is routinely referred to NWO grant schemes, and where higher TRL technology is concerned, to various other schemes not geared to academic research, like DEI+." This is less than ideal for solar cell technology, a field whose links with academic institutions are so fruitful."

Another of his research findings is that technologies are more 'mobile' when they depend on academic knowledge rather than technological progress. To put it simply, it is easier to start up a country's solar cell industry than to build wind energy from scratch. "For the latter you

really do need an ecosystem of sorts at a particular location, whereas the solar cell field lends itself more to swapping knowledge with other countries. This is something else, I believe, that policymakers need to take into account."

Nobel Prize

To date, Persoon's career has progressed in something of a zigzag, to use his own words. After a broad-ranging bachelor's at University College in Utrecht, he did a specialist research master's in theoretical physics; while supervised by Nobel Prize winner Gerard 't Hooft he wrote his master's thesis on the interpretation of quantum physics. He then spent two years as a trainee at TNO, but he returned to science to start his doctoral study at TU/e, as described here.

After gaining his Ph.D. he will continue in academia as a postdoc at Oxford University. "In the end, what I enjoy most is pottering about building models as well as thinking in a formal way about how systems work. I love being able to do these two very different things. In Oxford I'll probably be working again with patent data."

More information: Dancing on the shoulders of giants: knowledge dynamics of renewable energy technologies, pure.tue.nl/ws/portalfiles/por … 20211001_Persoon.pdf

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