



# SET MATCH

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Interview with Dr. Ir. Zaayer: "My really far aim on the horizon is to get to ..." - page 4

## COP22: OF AFRICA & DONALD TRUMP



Leaders from around the globe together at COP22 - Photo: COP22

Srinivasan Gopalan

**DELFT • Three days before the COP22 at Marrakesh began, the Paris agreement came into force with over 100 countries having ratified it already. This provided the perfect backdrop for the convention. While Paris was about creating a framework for climate action, Marrakesh was about the action itself. Rules were set in position to ensure that the goals of the Paris climate agreement are achieved.**

The COP22 was touted as the COP of Africa and the conference lived up to this tag. The organizing committee invited proposals for holding climate related side events as a part

*Several EU Member States cut back on investments in renewable energy and energy efficiency*

of the African Pavilion. Perhaps the most important issue for Africa is Water and the Morocco pavilion hosted a side event Climate Change and Water that highlighted the exacerbation of water scarcity due to climate change.

The climate conference started off with many opening discussions and programme launches that stressed the role of businesses in achieving a low-carbon economy. An important event was the launch of The Global Climate Action Agenda. It aims to build a new process in parallel to the main discussions, allowing non-state actors to work closer with state negotiators.

Cities were at the centre of climate change. The World Bank estimates that adapting to

climate change could cost \$80 to \$100 billion every year, 80% of which needs to be invested in cities as they are responsible for 70% of world's energy-related Greenhouse Gas emissions.

In the early hours of the 9th of November, the election of Donald Trump as the next president of the United States of America sent ripples across the COP. He had claimed that climate change was a hoax created by the Chinese during his campaign. Additionally, he appointed Myron Ebell, a climate skeptic, as the head of the US Environmental Protection Agency (EPA). With reports emerging that Trump's policies may make it harder for developing countries to obtain funds to fight climate change, the road ahead looks really rough.

The Climate Change Performance Index (CCPI) 2017 was released in line with the COP22. The Index points towards an improvement in energy efficiency and encouraging signs for renewable energy on a global scale. However, it also suggests a decline in the commitment from the EU members. Wendel Trio, Director of Climate Action Network (CAN) Europe was quoted, "This year's CCPI confirms that many EU countries, including the UK, Sweden, Denmark and Germany risk losing their leading role in renewable energy development. Several EU Member States cut back on investments in renewable energy and energy efficiency, questioned agreed long-term mitigation targets or failed to set the necessary policy frame work to deliver on their short-term goals. It will only be a matter of time before they lose the leading positions in the CCPI."

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*I attended the first week of COP22 in Marrakech with a delegation of YES-DC, an NGO from Utrecht. My trip was also supported by the Energy Club, and this has been a great opportunity. From YES-DC we had a very small delegation, in the first week it was just two of us, and it took us some time to understand how COP works. In a way this conference is a world of its own. On one side, it feels very good to see so many people from all different countries taking climate change seriously. On the other side it is frustrating to see every country and every organization pushing for a certain agenda that suits them most, because that makes the whole issue extremely complex.*

*As an energy student, it was useful to be reminded that climate change is not just about energy, but so many other things related to adaptation: human mobility, gender and indigenous people rights, infrastructure, health etc. Especially in Africa, where COP22 took place, the adaptation part is very relevant, and it has received significant attention at the conference. Also, it was surprising for me to witness the important role of the observer organizations at COP. They form constituencies based on their interests and follow negotiations, to deliver interventions if they think it's necessary.*

*In terms of energy the most notable session for me was a side-event on fossil fuel supply by the Stockholm Environment Institute. They talked about the importance of a managed decline of fossil fuels, that has to start immediately, since all the planned investments in fossil fuels at this point will already result in more emissions, than we can allow to stay below 2 degrees. We are not seeing this managed decline yet, but we already have good alternatives to coal and oil.*

*There is a lot of work for all of us to do, and it is very important, as I was reminded again, to understand perspectives of many different stakeholders, because only then we can work together to prevent climate change.*

Natalia Aleksandrova

# SOS: Tracking the Track!

Manoj Payani

**The SET Master programme is well known for attracting students from a wide variety of backgrounds: from Mechanical, Chemical and Industrial Engineering, to Applied Physics and Economics. For this reason, it is particularly difficult for new students to understand what each track offers and how to choose one over the other. To overcome this issue and help the incoming students with their choice, Delft SEA organized the TrackX event on the evening of October 13th. This event was a follow-up to the official presentation by the profile-leader professors.**

During the event, second and third year SET students gave insights of their experiences and detailed information about the tracks of their choice – subjects and electives that are recommended, information about internships, research and thesis opportunities at the university and off campus were elaborated. These presentations have been compiled by Delft SEA on their website. After the event, an informal meet & greet session was held at The /Pub. The speakers and other second year students were present to discuss and clarify the burgeoning doubts of the new students.

A TrackX evaluation survey was conducted subsequently to get feedback from the students and suggestions to improve the event for the upcoming years. More than 60% of the students appreciated the efforts taken by the SEA to conduct this event and close to 80% found the event to be well organised and rightly placed during the first quarter. Almost everyone agreed that the presentations helped them get a better idea of how and

when to choose the graduation courses. Moreover, since the Miscellaneous track is not as structured as other major tracks, many students who had confusions with it were benefitted from this event.

In addition, a few students who had some clarity about their track before joining TU Delft ended up changing their mind after interacting with the seniors and getting to know the vast opportunities in each track. For instance, Vishal Murali – a student from India who was keen to pursue Energy and Society before joining Delft has decided to take up Wind Energy as his specialization because of technical challenges and research opportunities in wind energy in the Netherlands; and also because he found the course would enable him to do off-grid electricity generation work back in his hometown.

*Somehow, it is comforting to see that senior students also had their doubts and that eventually everyone found their place in SET.*

Overall, the TrackX event proved to be a very useful complement to the official profile event. In general, the new SET students enjoyed the more informal approach and the interaction with colleagues who also faced similar problems. Somehow, it is comforting to see that senior students also had their doubts and that eventually everyone found their place in SET. •

# 'Dutch' in the wind



Dr. Zaayer in his office

Patricia Seoane da Silva & Bas Buise

His great lectures on this contemporary renewable energy producer, windmills, make him a praised Doctor among SET students. He was born in Zambia, where his father worked for the copper mines. He moved back to Oisterwijk, Netherlands at the young age of 2. After finishing high school, he pursued a bachelor degree in Applied Physics at TU Delft. He has stayed/is staying there until this very moment, working on his pièce de résistance: windmills. A very interesting conversation on more than just the technique emerged as we interviewed him on the fifth floor of the Aerospace Faculty.

**SET MATCH: When did you start to work in the field of Wind Energy?**

Dr. Ir. Zaayer: "It took me a few years to make that decision. Actually, after graduating I

worked for a few years as an assistant to a friend of mine who was doing his PhD in the field of aircraft. In the meantime, I attended the only course offered at the university related to wind energy. This allowed me to meet the people who were working in this field. In fact, since they were looking for researchers, I decided to leave my current occupation and join them."

**What has been your main research line since then?**

"At the beginning, little was known about wind energy so all the projects were mainly preliminary studies. Within this context, I studied the feasibility of offshore wind energy, which eventually led to my main research field at the moment: systems engineering for offshore wind turbines."

**How do you assess the evolution of wind energy since the beginning of your career until nowadays?**

"It is undeniable that during this time (around 16 years) a lot has happened. At the beginning just a few turbines were built to demonstrate that they could actually work and just today I read that some offshore farms provide electricity at a price of around 5 cents per kilowatt hour!"

## Interview with Dr. Ir. Michiel Zaayer

**The potential for the Netherlands is high, but the installed capacity is still rather low.**

"In the early days there were quite a few pioneers in The Netherlands. Perhaps, they were too good in the sense that they focused more on making a good technology than on selling the products. Maybe for this reason the installed capacity is low but on the other hand the Dutch are good installers and suppliers of monopile foundations. There is actually a funny anecdote about someone in the United Kingdom who has installed a lot of windparks, that said: "The Danish provide the turbines, the Dutch install them and we provide the sandwiches"."

**What do you think the Dutch energy landscape will look like in 10 years from now?**

"Well there will be more wind turbines. Wind is at the moment just one of the few options to meet the energy agreement quickly for the Netherlands. Solar energy is of course another good option for a relatively fast introduction at a reasonable price. But wind is still cheaper."

**Cheaper than solar?**

"Don't pin me down on it," Zaayer smiles, "I don't keep track of solar so well. But of course the technology can be improved and become cheaper and cheaper. It is not as advanced to really implement big time. At least you can't say the same thing for tidal energy, or wind energy. Tidal energy production is limited to the amount of hydropower can be installed with reasonable consensus. If you look at the energy agreement (...) wind is probably the

largest at this moment and in these ten years as well. Solar is certainly at least a good runner-up, but not so much for the Netherlands."

**Then there is the problem of storing renewable energy, what do you think that could be done?**

"First of all, the storing problem is not going to be the first large problem. It has been studied that you can go up to about 20% of wind energy in the electricity supply and not have a very big mismatch between demand and supply. But what wasn't studied there and what will become a problem before we get there, is that you need grid enforcements because the energy generation will be more distributed. The power flows become different and therefore the cable infrastructure and security systems have to be adjusted. Also in the management of these flows, the balancing will be a more urgent problem. After that, we will probably need more and more storage at fairly high levels, for hours or days."

*"If you look at the energy agreement (...) wind is probably the largest at this moment and in these ten years as well."*

**Do you have any dream for your life or something that you would like to see being accomplished?**

My really far aim on the horizon is to get to a point where things are balanced. If you reach that state, you can always aim for improvement, but at least that state can remain forever. You're not dependent on things that will eventually disappear, so all things are cradle to cradle. You can then still make things better in life, but only at that principle.

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## ALUMNI: Jan Pieter Versluijs & Mels van Hoolwerff

Founders of Solar Monkey

Most people agree that a transition towards sustainable energy and solar power will create a better future. And although solar is a hot topic, targeted growth rates are not achieved. Solar Monkey is determined to make the transition happen more quickly by offering a guaranteed energy output and a step change improvement in how solar systems are designed.

The current paradigm is that solar panels are a product, which are bought by a customer. That puts the risks and hence the responsibility of the energy output mostly at the customer. At Solar Monkey we like to see things differently. We think it should be the supplier that is responsible for the energy output. By introducing a guaranteed energy output we achieve that. If the guaranteed output is not achieved, the customer is paid the deficit. By doing so we are shifting the paradigm from buying solar panels as a product to supplying risk-free, home-grown sustainable energy. We focus on value, the solar panel is merely a tool to reach this value. This way we aim to make solar energy a no-brainer for everyone.

In order to facilitate an output guarantee we need to be 100% certain about the calculations. Algorithms were developed in cooperation with TU Delft to design a solar power system and calculate the expected output before installation. The software that has grown from that combines aerial imagery with LiDAR 3D data. Using this data, the effects of shading due to nearby trees or buildings can be determined precisely. Also, the software enables a tremendous efficiency improvement; instead of 45 minutes, a system

design now only takes minutes.

The actual outputs of all installed systems in the portfolio are monitored actively and compared with the modelled output. This way the calculation algorithms can be continuously optimized.

When Mels had finalised his research at TU Delft Jan Pieter left his job as consultant at Newton Europe and joined him to found Solar Monkey in October 2014. In 2015 Tino, the first software developer, joined the team. We now work with a team of >10 smart people to further develop and market our products.

After conquering the Dutch market, we will expand internationally. Also in terms of product development we have a great future ahead. In 2017 we will fully automate the process of designing PV-systems. By doing so we can offer PV systems to thousands of customers at the same time, within minutes. This will all aid us in our mission to achieve 100,000 PV systems within 5 years.

Are you interested in joining this mission? We are always looking for smart software developers and marketeers. So please get in touch if you are looking for a challenging internship. •

[www.solarmonkey.nl](http://www.solarmonkey.nl); [info@solarmonkey.nl](mailto:info@solarmonkey.nl)



Jan Pieter & Mels on a rooftop - photo: Solar Monkey

## OPINION: Time for an inclusive debate

Richard Boehnke

While it can be engaging, it's probably not a useful exercise to hypothesize what will happen under the new administration of the United States. Suffice to say, the directions being taken do not align with what I believe. It may be beneficial, however, to remember that these individuals have power as a result of an election. Millions of people voted to place power in their hands. I believe that the proposed head of the energy transition in the US is a climate change denier, but his toxic rhetoric wouldn't merit even a thought if Donald Trump were not elected and appointing him to office.

So, what can we do? Complain? Protest? Demonize those who voted for a candidate we did and do not support? Is any of that actually productive? Perhaps protest will galvanize some, but it will likely feed the fears and anger of those "others", the people who did not vote like you. You may despise the candidate, and perhaps rightly so, but those other voters are not necessarily surrogates for all his/her views. I can honestly say that I have no idea why some voted for Donald Trump. Of course, there are a variety of articles detailing a range of hypotheses, but have I, personally, spoken to anyone? No. Have you? What about someone who voted for Brexit or Geert Wilders? If you have, was it actually a discussion where you both listened and exchange ideas, or did you just ignore them once you heard what they had done?

I recently visited a Dutch secondary school and was asked what I thought of Zwarte Piet. I began to respond and was immediately interrupted by an 12-year old who told me,

"stop interfering with Dutch Culture!" This view was echoed by only a few in the class, but none spoke up to even listen to, let alone try to understand, my opinion though I had been explicitly asked. When questioned, no student could say they had discussed Zwarte Piet with any Dutch national who disagreed with themselves, or, even, perhaps someone who did not share their same race, wealth, or opportunities. These students are not the problem, but they do illustrate how it is acceptable to act within society today: remain insulated by surrounding ourselves with like-minded individuals and rabidly opposing any opposition.

The conservative movements sweeping the world are attractive to voters. They must be, otherwise their parties would not consistently win elections. But why? I hope you do not believe it is a result of every one of their supporters being a climate change denier or ignorant, racist, sexist, xenophobic, stupid, angry, cruel, etc.

If we are to learn to compromise or even to simply have discussions to understand each other, we must be willing to listen to opposing views. Belief is not binary, but, rather, it exists on a spectrum. So, to start, what if we began to have conversations with other reasonable people, who are interested in having a *discussion* but do not believe as we do? Perhaps then we can begin to understand *why*. •

*Would you like to share you opinion? Mail us at [setmatch-etv@tudelft.nl](mailto:setmatch-etv@tudelft.nl)*

# Did You Know...

# Polder Politics

Bas Buise

Francisco Galnares & Manoj Payani

*Tesla made more money last quarter than the entire US oil industry last year? Tesla announced a profit of \$22 million whereas the US oil industry lost \$67 billion due to its inability to adapt to lower gas prices. (1)*

*Most of the Arctic Ocean is about 20C warmer than normal! According to Jennifer Francis, an Arctic specialist at Rutgers University, this is the result of record-low sea-ice extent and plenty of moist air from lower altitudes being driven northward. (2)*

*Scientists reckon that if it were harnessed properly, all the sunlight that falls on the planet in just one hour could power the world's energy demands for an entire year! (3)•*

1: electrek.co; 2: Washington Post; 3: ovoenergy.com

Discussing politics is always an interesting thing when you're in such an international group of people like we are, at SET. Quite often, I hear questions like: "You guys in The Netherlands also have some Trump-like guy right?" Well, yes, there are differences but yes we also have a populist party here. This party, the PVV, is doing well in the opinion polls of the upcoming national "Tweede Kamer" elections to be held on March 15. Still, a lot of things can happen before that time so it doesn't really say something about the outcome for now.

The "Tweede Kamer" is properly translated as "House of Representatives". This House consists of 150 seats that are filled through elections. It is the main chamber of the parliament (the other one is the Senate). Here, proposed legislations are discussed and the cabinet is thoroughly reviewed. All joining parties have a list of candidates for the House, which are all put on a ballot. Every adult Dutch citizen is than able to vote for an individual from a party. Most of the time people just vote for the person that is on top of a party's candidates list, the "lijsttrekker".

Since there are a lot of parties to vote for, the chance to win 76 chairs is really small. Winning parties always have to work together to get 76 chairs at least to form a coalition government. In the elections of 2012, the People's Party for Freedom and Democracy, VVD, and the Labour Party, PvdA, won the largest share of votes and formed the government and cabinet together. The VVD got the most votes, so they delivered their lijsttrekker as minister president, Mark Rutte. It was the second time Rutte and his VVD won so the current government is called "Kabinet Rutte II".

Next time there will be explanation on the Senate!•

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## COLOFON

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