GEM TOWER

The TU/e is working on a new, energy-generating, mobile tower that can be placed at festival. We asked the team behind the GEM-tower to write an article explaining the thoughts behind this very colourful structure.


Every year more than a thousand festivals take place within the Netherlands. There is a wide range of festivals: indoor or outdoor, one-day or multi-day, in urban areas or in the greenfields, 100-person capacity or 100,000-person capacity, winter or summer. The most popular ones are summer outdoor festivals which normally take place in remote areas far from urban spaces and are attended by thousands of people at camping sites in the nearby farmlands. The main purpose of these greenfields is not hosting festivals and for this reason they are normally not able to obtain power through the national grid. Consequently, festivals need to create their off-grid energy system to generate energy which is often far from being sustainable.

In this respect, there is an increased awareness, along with new regulations such as the Paris Agreement of December 2015, that it is important to reduce the CO2 emissions in all sectors in order to slow down the climate change. Festival organisers mainly focus on reducing CO2 emissions on audience transport and on-site waste disposal because these measures are more visible. Nevertheless, electricity provision receives less attention despite having similar emissions of CO2 as waste disposal. This provision is normally done by off-grid rental power which supplies energy on short term and with a high supply security, which ensures that the performances are not going to be affected by any power failures, given that the audiences’ experience is the leading factor of this industry. In addition, the diesel generators used by these rental companies are normally oversized and rarely fully used, even during peak hours, and up to fifty per cent of the fuel is going ‘up in smoke’. Thus, the current energy supply in festivals is inefficient and very pollutant thereby there is a need to find more sustainable ways to supply energy to festivals.

The Eindhoven Technology University has developed the Green Energy Mill (GEM) tower that will provide renewable energy to festivals by the end of this summer. The tower harvests the energy of the wind and sun. To do so, a vertical axis wind turbine and solar collectors have been installed. These solar collectors, which are integrated all over the structure, are a novel technology and harvest the indirect energy of the sun that is well suited to North-West Europe climate. The energy harvested is stored at the bottom of the tower in batteries and it is used when it is necessary. Moreover, the tower is dismountable, and all parts fit into containers which ease its transport to the next festival site. The tower prototype for this summer will be static and, hence, a crane for its montage will be required. Nevertheless, in the festival season 2020, the tower will be self-propelled which will facilitate its installation.

The architectural design also plays an important role in this project since visual aspects take an important role in festivals. Additionally, the tower will be very visible from large parts of the festival because it is 22 meters high and it will be located nearby the stage. The tower will also serve as an eye-catcher during day and night. In addition, taking advantage of the huge assistances in festivals, this tower would promote the attendants’ awareness about the energy consumption in festivals as well the alternative energy availability. For this purpose, several interactive activities will be undertaken at the bottom side of the tower during the festival. In conclusion, the tower not only will provide renewable energy to festivals by reducing CO2 emissions, but it also pretends to be an icon of sustainability in festivals and promote it through them.