Digitalising a sustainable future
A cleaner industry starts with pollution abatement

Sustainability in plastics is about more than feedstocks, energy consumption and resource efficiency. True sustainability also includes the process used to produce these materials, and avoiding sending pollutants into the atmosphere. As Anoosheh Oskouian of Ship & Shore Environmental, pointed out: ‘We do not have any geographic boundaries in our air.’
A noosheh Oskouian, owner and CEO of California-based Ship & Shore Environmental, founded the company, which specialises in environmental pollution abatement, in 2000 - 'so this is the twentieth year that we are active,' she said, speaking with Sustainable Plastics.

Back then, there were a great many rules and regulations starting to be enacted across the US by the EPA, aimed at reducing overall pollution and addressing pollution emanating from the industry and manufacturing sectors.

"The systems and equipment available at that time were very preliminary, very basic," said Oskouian. "Flaring was used to burn off excess gaseous material, sending pollutants into the atmosphere.

Stricter rules meant that this practice was curbed, leaving the industry to seek other solutions.

"We became very involved in designing different types of equipment suitable for different industrial sectors and all kinds of manufacturers. We saw that there was no one fits all solution, because different processes, different applications, different types of manufacturing have different needs," Oskouian said.

Ship & Shore Environmental saw an opportunity and began custom designing systems precisely tailored to each customer's requirements. As the company is located in California, it has a front-row seat when it comes to environmental legislation, and this gave it something of a head start, allowing it to 'get into the game early' and to develop the knowhow and experience to grow from an equipment manufacturer into a system supplier.

"Yes, we were one of the original companies who were doing it. I am happy to say that we have been growing steadily ever since," Oskouian asserted.

As she described it: "We have our own, full manufacturing facility, so we basically do the front-end, which is design and consulting, all the way through the manufacturing of what the equipment is required to meet. And we have a team that goes out and executes and directs the products that we manufacture. We basically refer to ourselves as a one-stop shop for all the pollution needs that people may have."

Not just filters

Pollution abatement is a fairly general description, but the systems designed by this company specifically aim to combat VOCs, Oskouian explained:

"A brief description would be that in any facility where a considerable volume of chemicals are processed in a given environment, such as plastic manufacturers making the resins, or printing facilities that print the films - all of the chemicals usually have what are referred to as volatile organic compounds, or VOCs. And these compounds generally just go up through the stack or the chimneys of the various pieces of equipment that are in place."

Ship & Shore assesses the situation, comes up with a design that collects all the compounds produced that are not only going through the stack but that are also in the work environment itself. These are then sent to a piece of equipment outside the plant.

"We get rid of all the organic compounds through the process of extremely efficient destruction," said Oskouian. "We often hear, oh, you make filters - but just filters cannot get rid of organic compounds."

What remains following this process of destruction is CO2 and water, or more precisely, water vapour - 'water doesn't last in that temperature! Every harmful organic compound is destroyed, so that the air out of the stack is absolutely clean."

"All our systems are mandated to be tested and verified by third party entities, wherever in the world. We have always met the requirements," she clarified.

The result of the efforts of this company and others

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like it are visible, she added, recalling that 20-25 years ago, the air in Los Angeles was so bad that when arriving in a plane, you could not see a few feet in front of you while today the air in California is absolutely beautiful and clear.

**Control through combustion**

Ship & Shore specialises in the regenerative thermal oxidation of VOCs. Oskouian, a chemical engineer who started her career at Fluor Daniel, a major EPC company, gained experience with projects and project management there prior to setting up her own company. She is now wholly focused on the environmental side of things, yet at the same time makes use of her engineering background - a background that has proven to be 'very helpful in building systems that save energy and help companies reduce their carbon footprint."

"In the past, she explained, this kind of equipment was called an incinerator, because combustion is one of the best-known waste treatment methods for industrial gas. Given the proper design and engineering virtually all organic gasses can be safely and cleanly destroyed."

"Today’s systems are far more efficient than the incinerators of the ‘olden days,’ said Oskouian. "We don’t use a lot of natural gas anymore - only to get the process started." This is necessary in order to bring the temperature up to the desired level, as often, the energy released during combustion of the VOCs is not enough to do so. The heat exchangers in modern-day systems keep the use of auxiliary fuel to a minimum."

Regenerative thermal oxidisers – RTOs -- are the most commonly used systems today. They make an optimum usage of energy possible, offering a thermal energy recovery that can reach 95%-97%, and destruction rates for VOCs of 96%-99%. Unlike traditional approaches to energy recovery, little, if any, fuel support is needed for most applications, saving on operating cost. The systems use direct contact ceramic heat exchangers that can tolerate the high temperatures that are needed to achieve ignition of the waste stream. The process is a cyclic one: the gases flow past the first, hot ceramic bed, react, thereby releasing energy, in the combustion chamber and pass through the second ceramic bed. When this second bed reaches a set temperature, the process flows are reversed. The incoming gas passes the second ceramic bed and exits through the first. In this way, the heat from the exhaust air is transferred back to incoming process air.

"It is important to realise that these organic compounds have heating value. What we have done is we design the systems in such a way that we capture all the heat that is released from the organic compounds emitted as part of industrial processes,” Oskouian said. "The heat can be returned to industrial facility, in colder climates, for heating purposes; hot water or steam can also be provided to the facilities,
also be provided to the facilities, if desired.

“A particular area in the plastics industry in which we are involved and for which we have done a very significant number of the units here in North America and in Europe is the EPS industry,” she continued.

That industry uses a lot of steam in its processes. Ship & Shore has successfully designed systems that generate steam from the VOCs that are emitted as waste. “So they are using steam almost for free – we are simply taking the waste, burning it and giving steam back in return.”

Growth ambitions

Currently a medium-sized company, Ship & Shore has ambitions and a definite strategy for growth. And with the current focus on sustainability and pollution, this should surely be the right time to realise those ambitions.

The increasingly stringent environmental legislation is indeed a growth driver, as is the growing awareness of consumers, especially regarding the products they buy, said Oskouian. Questions such as: “Where was the product made? Is the company sustainable? Does the company have rules and regulations in place about responsible production, sustainability and pollution prevention?” - these are all influencing the purchasing decisions of today’s consumers.

“One of the largest sectors we work with is the flexible packaging industry. Food packaging is more attractive and convenient than ever, but what about all the inks produced to print all these films?,” she asked. “It’s a process that produces VOCs. Many companies are starting to use labels and logos that identify their products as having been produced in an environmentally friendly facility or using a sustainable process. I think consumers are also driving the market and seeking out companies that have adopted sustainability programmes. Obviously, not everyone will do so voluntarily, but knowing that they will have to do so eventually definitely can be a motivating factor,” she explained. “In addition, many new manufacturing facilities are coming on line that built in pollution abatement equipment from the very start.”

The issue of climate control, the effects of climate change and environmental consciousness have taken hold in the population, and even a factor such as a less supportive polit-

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The lucky winners will be announced on 28th October 2020.

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ical climate cannot change things back to the way they were. “That train has left the station,” said Oskouian. “We do not have any geographic boundaries in our air, so we are all responsible for everything that happens elsewhere.”

That is one of the driving forces behind the company’s ambition to expand its presence in countries where air pollution remains a major issue. “Or in any geographic area, that we either identify as being geographically desirable or technologically desirable,” she added.

Already well represented in the USA and in Canada, where the company works through a representative, in 2015, Oskouian started exploring the opportunities in China, as the burgeoning industrial development in that country meant that it was also being confronted with severe pollution issues. The country was implementing very tight rules, that were being strongly enforced. Her approach to establishing a footprint in any new region is straightforward: find partners – companies and entities – in the targeted area and build collaborations and partnerships. In China, this ultimately led last year November to the company’s setting up its own manufacturing facilities in that country.

“We had assembled a team we were very comfortable working with and can now manufacture all the products for the Chinese market in China, instead of having to ship everything from California. And we are now doing the same thing in Thailand, where there is also a need to address the pollution problem, as well as India,” Oskouian explained.

Ship & Shore is also hoping to grow its presence in Europe as well. Although it had previously been relatively active there, since around 2007, when the financial crisis hit, those activities had been dialled back. Now, as the European Union of different packaging materials on the environment, how many people know, for example how the production and use of a plastic bag truly compares to a paper bag?

“We need to educate people on how to handle things, rather than banning things. We work with resin societies, we work with chemical producers, we work to address chemical pollution out of the facility; but becomes increasingly serious about the need for a greener, more circular economy, the company sees more opportunities in these countries as well.

Collective responsibility

Regarding sustainability issues, such as the circular economy and plastic waste, Oskouian is adamant about the need for a better informed public, and even agencies. “As much as we like to adhere to rules and regulations and do the right thing, I often find that there are areas and segments where agencies are not aware as to what is feasible and what is not feasible, for example, with rules that are more stringent than technology could ever address,” she noted.

“The public is also largely unaware, especially when it comes to plastics, and the true impact we have always been a big advocate on behalf of the industry because we don’t want to kill the industry: you can’t kill the industry and expect growth in any country,” she said.

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Anoosheh Oskouian

Ship & Shore Environmental

“People need to know that we are taking measures, that we are taking responsibility. This should be communicated to the world, to the public, to consumers and it is something we must play an active role in,” she said. “Yes, people have businesses to run, and obviously they should make sure they do so. But at the same time, we need to remember that consumer education is really very important. We have to work to gain the trust of today’s consumers and, while it may take a little bit of work, I am convinced it is something we should stay focused on and just do. There is no other way to get the facts, figures and the scientific information out. And if we don’t do it, the scaremongers will—and those are the ones we really have to watch for!”

She continued, noting that circularity may well be feasible, but “the issue which I try to address in these discussions is where do we draw the line of responsibility?”

In her view, consumers are responsible, producers, equipment suppliers – all have a share of the responsibility. It is the gaps between where the one stops and the other takes up that must be narrowed.

“For example, imagine I am an equipment supplier selling a piece of equipment that causes pollution. Don’t I have a responsibility to ask this customer how the company is going to take care of that – does it have a policy in place, instead of doing what still often happens, which is saying ‘that’s not my responsibility’ – I sold the equipment and I don’t care what happens next? We’ve had situations where we’ve had to deal with just that: equipment suppliers saying, well, that has nothing to do with us,” she recalled.

Short-term thinking is something society can no longer afford to do.

“I don’t have the perfect answer,” she concluded. “But I think we are on a road trying to find the way forward. But we need to think on the longer term if we want to have a world we can leave for the next generation. Companies with that mindset are the ones that will adapt and be successful—and ultimately survive.”