

[REVVING UP]

THE TRANSFORMERS

SEDEMAC is helping engines work smarter with its innovative technologies

SHRUTI CHAKRABORTY

The telecom sector in India spends about \$2 billion (₹10,810 crore) on diesel in a year. That works out to about 2 billion liters of diesel. "Every liter of diesel, when used, emits 2.5 kg of carbon dioxide," says Shashikanth Suryanarayan, Professor at the Department of Mechanical Engineering, IIT-Bombay.

In 2006-07, the professor and a group of his students were researching on some projects around engine and automotive control problems. "We worked on these projects for different devices, using electronics which are governed by software," he explains. A year later, SEDEMAC Mechatronics Pvt. Ltd. was formed, at first only as a way to keep the students and their professor together once the former graduated.

The founders of the company are Suryanarayan, Pushkaraj Panse, Amit Dixit and Manish Sharma. "We realized that our research, and the products we were building at IIT, worked well with

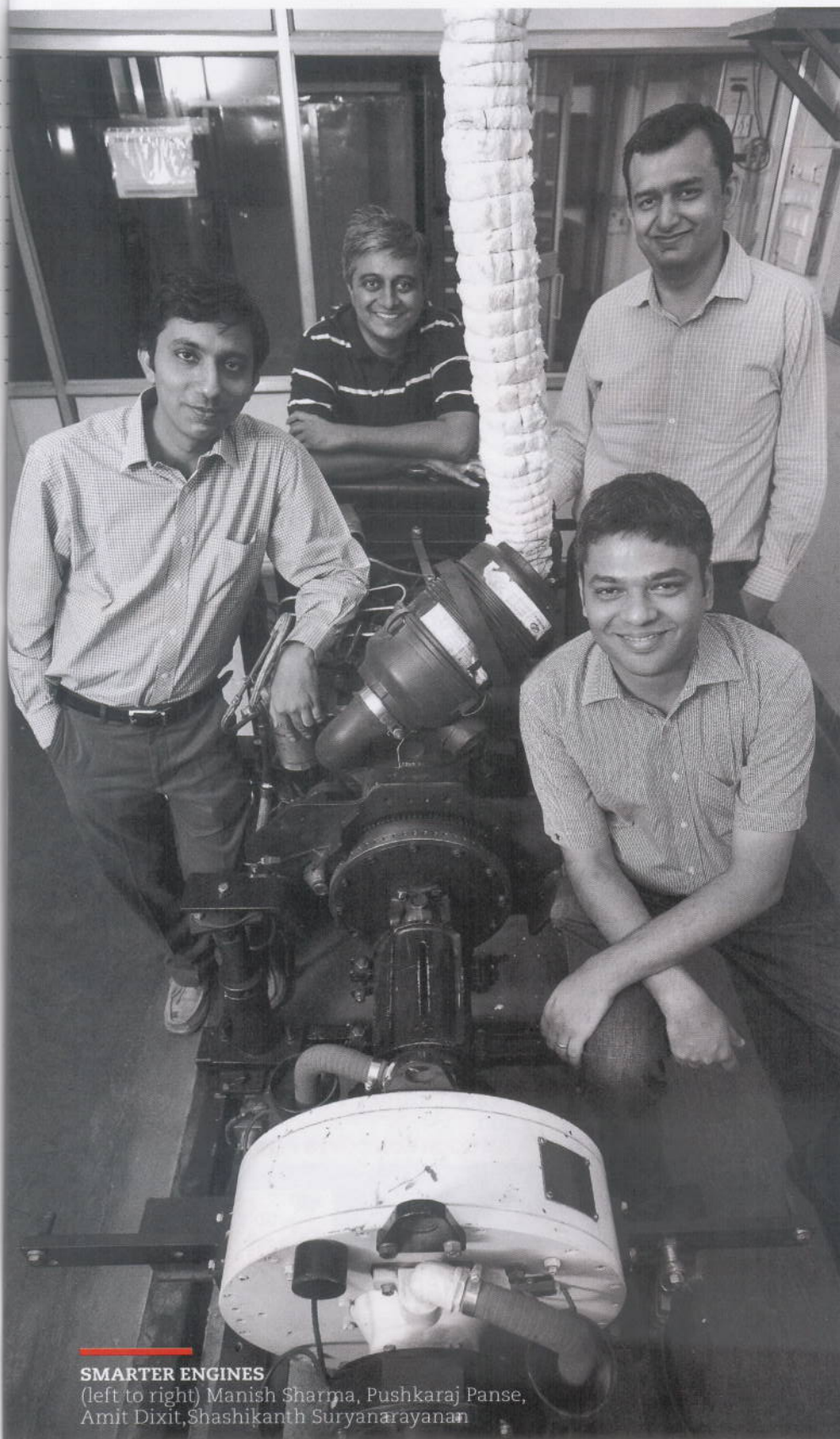
the industry," says Suryanarayan, who is also the Chairman at SEDEMAC. Once active operations began in 2008-09, one of the projects they were working on—engine controls in two-wheelers—evolved into SEDEMAC's first product. In an effort to generate revenues quickly, the company began scouting for other possible customers, which eventually brought them to an unlikely industry for their products.

THE SOLUTION DESIGNED BY SEDEMAC, SOLD UNDER THE BRAND NAME ECONOSEEK, CALCULATES WHAT THE OPTIMAL SPEED OF AN ENGINE SHOULD BE IN REAL TIME

Talking to telecom

In 2009, the team began looking at diesel engine manufacturers as possible customers. One of the first companies that came on board as a customer was Mahindra Powerol, a diesel generator sets manufacturer. They developed a technology and supplied their first product to the company in 2010, which improved fuel efficiency significantly, reduced the amount of expenditure on fuel in diesel generators and reduced emissions.

Mahindra Powerol's major market has been the telecom sector and its generator sets were and are still being used to power many telecom towers around the country. "Mahindra Powerol's growth story was around telecom. At that time, we didn't completely understand the pain points of the industry," Suryanarayan says. Until this point, the firm was not making the product with the telecom sector in mind. But having understood



SMARTER ENGINES

(left to right) Manish Sharma, Pushkaraj Panse, Amit Dixit, Shashikanth Suryanarayanan

the space and the size of the opportunity, the company made specific changes to the product taking into consideration tower infrastructure and energy requirements of the sector.

"Diesel generator sets are used to power telecom towers. In the remote areas of India where power is unreliable, the towers almost entirely depend on these generator sets," Panse, COO at SEDEMAC, explains. "The design of the generator sets made the engine consume more fuel. This is because these engines run at a speed that is more than necessary," he adds. The cost of running the tower sites are borne by the telecom operators.

The product

The solution designed by SEDEMAC, sold under the brand name Econoseek, calculates what the optimal speed of the engine should be in real time.

The generator set is fitted with sensors, a controller and an actuator and charges a battery which then powers the telecom tower. As the battery gets charged, the engine in the generator set does not have to work at a higher speed. The sensors measure the amount of load that the tower site is imposing on the generator set. An aluminum box, which contains an electronic card, processes this and the actuator reduces the engine speed accordingly. This improves fuel efficiency by about 15 percent in the set.

SEDEMAC's two major customers in this space are Mahindra Powerol and Kirloskar Oil Engines Ltd., a manufacturer of diesel engines, agricultural pump sets and generator sets. So far 10,000 generator sets have been fitted with SEDEMAC's product which comprises of three parts that are sent to the manufacturer and fitted by them in the generator sets during production.

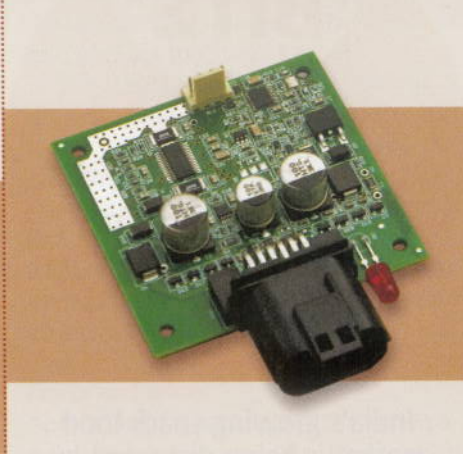
Alternatively, the product can also be taken to a site and fitted to the generator sets that are already powering telecom towers. SEDEMAC also has a similar product for non-telecom generator sets, which improves the quality of power from the generator set.

ELECTRONIC READER BOARD



In the Econoseek system, an electronic reader board senses the electrical load

PROCESSING CIRCUIT



The sensor then sends the signal forward to the processing circuit

INTEGRATED ACTUATOR-CUM-PROCESSING CIRCUIT



The integrated actuator-cum-processing circuit then reduces the engine speed to improve fuel efficiency

Creating the right spark

The first technology SEDEMAC devised was for spark-ignited two-wheeler engines. "To produce power in the two-wheeler engine, fuel is exploded in a controlled manner by introducing a spark," explains Dixit, who heads R&D for SEDEMAC. "Sensors in the engine sense the time at which the spark must be introduced. Most two-wheelers use two or three such sensors. We managed to develop a technology that efficiently assesses the same thing using only one sensor," he adds.

Suryanarayan says this technology improves fuel efficiency up to five percent for two-wheelers and helps the manufacturer reduce costs on the sensor. This translates to a saving of about ₹50 to ₹70 per vehicle for the manufacturer. "A two-wheeler manufacturer makes about 60 lakh vehicles a year, and so this translates to almost \$6 million (₹32.43 crore) in savings," he adds, revealing that TVS Motor Company is their major customer for this product.

"We sell a license to the company to use this technology. This business generates revenues for us, but we

have no ongoing cost in this business," Suryanarayan says, adding that this is a small business for SEDEMAC.

Only about one lakh two-wheelers use this technology. SEDEMAC's solutions are such that their customers belong to the category that only have large requirements, which works in their favor, Suryanarayan believes. Both the two-wheeler and generator manufacturing sectors have big players producing a large number of units. SEDEMAC, therefore, does not need to spread its bets across many players.

Riding high

The company, which is generating revenues of about ₹60 lakh per month, started out with a few lakh of rupees in 2008 before it got its first investor. After being incubated at the Society of Innovation and Entrepreneurship at IIT- Bombay, SEDEMAC got Nexus Venture Partners to invest in the company very early in its journey.

In 2011, India Innovation Fund came on board as its second investor. Sandeep Singhal, Co-Founder of Nexus Venture Partners, says, "We see very few academicians looking

to build large companies. Most don't have a background in business either." Suryanarayan had worked at GE in the US after completing his Ph.D from the University of California. "Shashi and the team at SEDEMAC were strong on academic research and had what it takes to build a large company," Singhal says.

"Building credibility was the biggest challenge initially," Suryanarayan says. He adds that SEDEMAC had to go through a phase of about two years when it delivered initial products and went through a process of validation and due diligence by its customers.

Singhal says gaining credibility in the global market could in fact be the next challenge for SEDEMAC. They plan to look at international expansion next year. Though no other Indian company directly competes with SEDEMAC, it has competitors in the international market. Woodward, which is a giant in this space, offers solutions in the same category. But the focus on telecom is not something competitors have looked at, and Suryanarayan says it will be the bull on whose back SEDEMAC will ride forth. ■