

SEMICONDUCTORS The State-side Story

Powered by a massive Central push to bridge the growing shortage of chips that run our electronic devices, states are jostling to bag investments in semiconductor and display fab plants. **Bharani V & Dia Rekhi** navigate through state offerings and map out the frontrunners

At a recent event in Chennai for the opening of a compressor factory, Samsung executives got a nudge from Tamil Nadu's chief minister, MK Stalin. The message was loud and clear—make semiconductor chips in the state. On a fast-paced drive to draw investments, Stalin has proffered a similar pitch to Taiwan's Foxconn, which has partnered with Vedanta for a semiconductor plant, and the Tata Group to consider the space. Stalin's counterpart in Karnataka went a step further. Speaking at The Economic Times Startup Awards in March, CM Basavaraj Bommai declared the "emergence of semiconductor plants" in his state soon. Not to be left behind, Telangana dispatched its high-flying IT minister to meet with investors last week. KT Rama Rao took a delegation of senior bureaucrats and executives to the US to pitch to manufacturers there, including Applied Materials, what the state had to offer.

In the wake of a massive central government push to bridge a growing shortage for the chips that run electronic devices, states are jostling in their bid to bag investments into semiconductor and display fab plants. While the Southern states are scurrying to make a beeline to get investments in the semiconductor space, others like Gujarat, Himachal Pradesh, Uttar Pradesh and even Punjab refuse to be laggards as the Punjab that this space provides is massive.

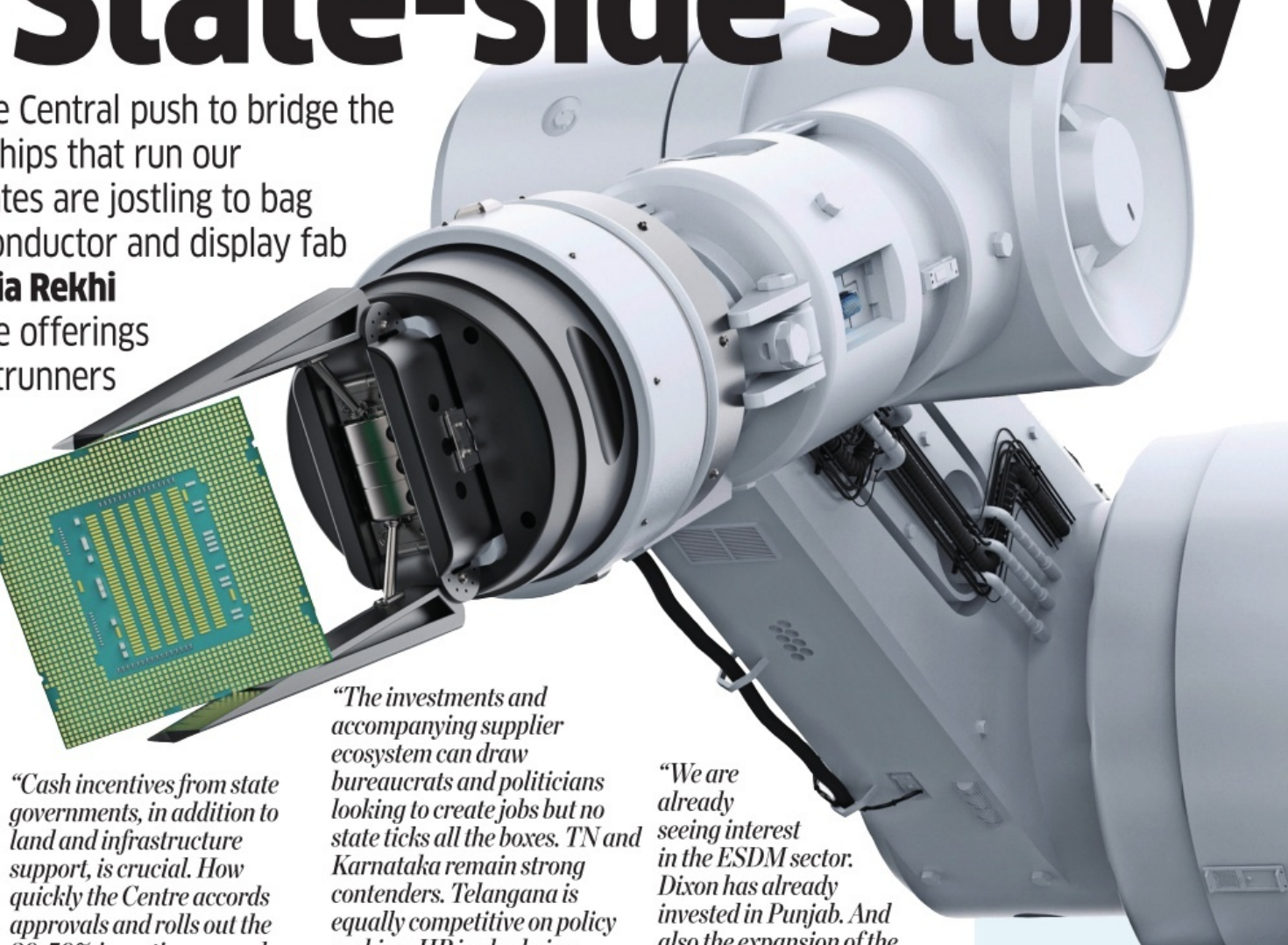
A global chip shortage after the onset of the pandemic in late 2020 had throttled supply chains across the globe, forcing its consuming industries ranging from phone makers to car manufacturers to scale down output. Currently, TSMC and other majors in Taiwan and South Korea hold 92% of the advanced semiconductor manufacturing capacity globally, research by BCG says. With the chip shortage expected to continue into 2022, its users are looking at wider supply for reliability. This may prove to be advantageous for India as it initiates the process on indigenous manufacturing.

Globally too, semiconductor manufacturers have been making investments to expand capacities. In March, Intel announced it would commit 17 billion euros to build a semiconductor fab site in Germany. Samsung has announced \$17 billion for advanced semiconductor chip manufacture in Texas, US, while TSMC has committed to spend \$44 billion in manufacturing investment in 2022.

INVESTMENT, JOB CREATION

Local demand is also growing. The Indian semiconductor market was \$15 billion in 2020 and is estimated to reach \$63 billion by 2026. The government said it expects the Rs 76,000 crore incentive scheme for semiconductor to generate around 35,000 high-quality jobs and indirect employment for about three times more people. And this is an opportunity no state is willing to pass up on. Considering that investment in a single semiconductor plant ranges from \$3 billion to \$5 billion, states are looking to gain not just from the prime investment from the fab facility but also the supporting ancillary and components industry around it which could mean not just more investment into the state, but also opportunities for more jobs.

Companies too are being choosy and carefully evaluating the offers from various states in a bid to derive the best incentive and support. While the central government has offered close to a 50% capital subsidy, states are providing a 10-15% subsidy over and above that, bringing down the actual project cost for a company or consortium to just 35-40%. ET reported last week how



"Cash incentives from state governments, in addition to land and infrastructure support, is crucial. How quickly the Centre accords approvals and rolls out the 30-50% incentives may also become crucial factors"

Arun Mampazhy,
Semiconductor Fab Tech Expert

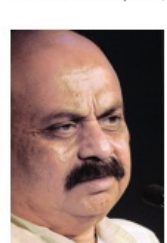
Vedanta Group has set up 10 teams to scout for suitable locations across five states to set up a semiconductor plant, with a total investment of \$8.4 billion.

"Some discussions are going on with Foxconn about this, but they haven't crystallised," said a government official in Tamil Nadu's department to draw fresh investments. Pitting itself as a destination for semiconductor chips, Tamil Nadu has history with electronic devices manufacture: Apple's high-end phones are made by Hon Hai Precision, known globally



the company"

MK Stalin, CM, Tamil Nadu



sectors. You name the field and it is there. And very shortly, we're going to have semiconductor plants here"

Basavaraj Bommai, CM, Karnataka

as Foxconn, at its plant off Chennai. Another Foxconn unit, called Bharat FIH which has filed for an IPO, makes Chinese smartphones and other devices. With a rich ecosystem, Tamil Nadu hopes to capture this adjacency. For semiconductor, however, Gujarat has taken the lead with ISMC Digital committing to build a \$3 billion plant at Dholera. The Next Orbit Ventures-backed ISMC has Israeli technology company Tower Semiconductor onboard for the venture. Ajay Jalan, founder and managing partner for Next Orbit, told ET he is optimistic about the country's semiconductor vision for two reasons:

"The investments and accompanying supplier ecosystem can draw bureaucrats and politicians looking to create jobs but no state ticks all the boxes. TN and Karnataka remain strong contenders. Telangana is equally competitive on policy making. HP is also being considered for its water; Meanwhile, UP, Gujarat and Maharashtra have an equal set of competencies"

K Krishna Moorthy, CEO & President, India Electronics & Semiconductor Association

"There has been some communication from the government now requiring us to make presentations for application approval," meaning the Centre is working on speedy approval for its application for project incentives. Second, Jalan is sanguine about the Centre speaking about upfront contributions, a revision of the "reimbursements" scheme in practice earlier.

Considering the huge investments involved — ISMC plans \$3 billion while Vedanta-Foxconn could touch \$8.4 billion — entrepreneurs were apprehensive about pumping money into projects and knocking on the government's door for reimbursements. "With the policy talking about 'upfront', we could finally see light at

INVESTMENT INC
The semiconductor and fab space could draw \$20-35 billion over the next five to six years

the end of the tunnel, now," said Jalan, who added that India's semiconductor vision has been put off twice, in 2007 once and later in 2014, due to the government's unchanging stance in favour of a reimbursements scheme.

Telangana, which has already taken executives from Vedanta to more than two sites, is also a strong contender.

INFRASTRUCTURE CHALLENGES

In itself, semiconductor manufacture can give headaches to the best factory administrators. Gases such as neon and argon have to be shipped from across continents. Water, processed to high levels of purity, is needed in huge quantities every hour. Industry estimates 10 million litres of water every day are required to roll out 40,000 silicon wafers a month. The fab unit needs continuous power supply with adequate power factor—a metric to determine efficiency of power use—and accessibility to ports and airports that can fly cargo abroad, says K Krishna Moorthy, CEO and president at India Electronics & Semiconductor Association. "The supply chain is heavy on input side, meaning a huge dependency on transport network."

The investments and accompanying supplier ecosystem can draw bureaucrats and politicians looking to create

"We are already seeing interest in the ESDM sector. Dixon has already invested in Punjab. And also the expansion of the semiconductor laboratory is an important project. We are also in touch with other players who are keenly evaluating our proposal"

Rajat Agarwal, CEO, Invest Punjab

jobs, but no state ticks all the boxes, says Krishna Moorthy. In the South, Tamil Nadu and Karnataka remain strong contenders in terms of infrastructure, logistics and a thriving ecosystem (Karnataka scores higher in terms of designer ecosystem), but Telangana is equally competitive on policy making. Himachal Pradesh is also being considered for its water. Meanwhile, Uttar Pradesh is a strong competitor in terms of manpower and accessibility to chemicals from the eastern belt. In the West, Gujarat and Maharashtra have an equal set of competencies, given their history of industrialisation. "Now, every state wants to get on the bandwagon," he said.

A representative of Invest India, a national agency for investment promotion, said it was tough to name a leader in the race, but Southern states have an edge. Nevertheless, the space could draw \$20-35 billion in the next five to six years. The longer horizon is typical of the industry. After beginning to roll out the silicon wafers, a factory would have to cross the milestone of 'commercial production', and then focus on ramping up. "It doesn't happen in a year's time. To reach 100% capacity utilisation takes two to three years," he said. Despite other states being a little ahead in the race, Punjab is not deterred. The state has earmarked up to 500 acres at Rajpura, Patiala, for plug-and-play factories for semiconductor and electronic devices makers. Rajat Agarwal, CEO of Invest Punjab, said the state was taking an holistic view of GST reimbursement to make it attractive for investors. Dixon Technologies will put up an electronics plant through a joint venture with the Bharti group in Ludhiana.

AUXILIARY INDUSTRIES

Packaging and assembly testing has turned out to be attractive for states lagging behind in the race for semiconductor manufacture. For states such as Odisha, it is aspirational to make a bid for semiconductor. In November last, the Odisha cabinet approved its first-ever electronics policy wherein Odisha highlighted the presence of a Semiconductor Characterisation Lab at IIIT, Bhubaneswar to facilitate the development of the electronics system design and manufacturing industry as well as a manufacturing cluster, set up over 203 acres at Infaoville, Bhubaneswar. No one wants to miss the semiconductor bus this time.

CHIPPING IN

₹76,000 crore
The outlay for the Semicon India Programme, approved by the Union Cabinet in mid-December last year

₹15 billion
Size of the Indian semiconductor market in 2020

₹63 billion
Estimated size of the Indian semiconductor market in 2026

FIVE applications so far on semiconductor and display fabs with a total investment of \$20.5 BILLION

THE COMPANIES

Vedanta in joint venture with Foxconn, IGSS Ventures Pte. Singapore; ISMC have submitted applications for semiconductor fabs

THE STATES

TN, K'taka & Telangana locked in a race with Gujarat, M'ashtra and UP on bagging investments

BY 2030

India's semiconductor market will be driven by wireless communications, consumer electronics and automotive electronics with 24%, 23% and 20% of the market share, respectively

The Semiconductor Industry Association (SIA) said global semiconductor industry sales were \$50.7 billion in January 2022, an increase of 26.8% over the January 2021 level of \$40.0 billion

INTERNATIONAL SCENE

American multinational Intel announced in March 2022 to commit Euro 17 billion to build a semiconductor fab-site in Germany

Korean electronic devices major Samsung has announced \$17 billion for advanced semiconductor chip manufacture in Texas, US. Plant to be operational mid 2024

World's largest contract chipmaker TSMC has committed to spend \$44 billion in manufacturing investment in 2022

Digital India: What's Next



RAJENDRA KUMAR

Aadhaar, UPI, Single Sign-on, etc. to make the development of new applications easier and faster.

The third major area is in accelerating the growth of our digital economy to at least \$1 trillion in the next four to five years. This requires ensuring high and sustainable growth in electronics manufacturing, IT-ITeS and emerging technologies, such as artificial intelligence, machine learning, Internet of Things, 5G, etc. Creating a vibrant start-up ecosystem in these areas holds the key to achieving the trillion-dollar digital economy goal.

Fourth, we need to modernise our digital laws to support the rapid growth of the digital economy and address the growing concerns on accountability of online platforms and increasing cyber security threats. Enacting the Personal

NEED STRATEGY, FUNDS
A major area of focus should be on rapid advancements in strategic and emerging tech with ownership of IP

Data Protection Bill would help in addressing the privacy concerns. The new statutes would be helpful in creating trust and confidence amongst the users in the online world, which is crucial for digital inclusion as we need to focus now on bringing the remaining 40% of the population into the digital world.

Another major area of focus should be on rapid advancements in strategic and emerging technologies with ownership of intellectual property. We need to quickly formulate national strategies in these areas and fund the flagship initiatives. Recently published strategies by MeitY on blockchain and additive manufacturing are steps in the right direction. A national policy on data governance also needs to be formulated so that access to data, so crucial to advancement in these technologies, is made easier for our researchers, start-ups, etc.

Last, but not the least, there needs to be a strong push for skilling and capacity building in digital technologies at all levels in partnership with the industry and academia. India should rightly aim at becoming the skill and talent capital of the world.

The author is Additional Secretary, MeitY. The views are personal



US Co Trimble Opens India Research Centre

Nasdaq-listed Trimble has announced the opening of an R&D centre in Chennai. The American industrial technology company offers a range of connected hardware and software solutions across industries from agriculture to transport.

150+ eTransition Projects from TCS, Freshworks

Software exporter TCS has said its two-year partnership with Freshworks on digital transformation has completed over 150 projects, helping customers make their sales, marketing and support functions more efficient.

Processor Play: Cool Blocks that Make Devices Hot

Aabhas Sharma

Gadgets have become ubiquitous. From mobiles and laptops to headphones and smartwatches, they are an integral part of people's lives. Powering these gadgets are processors that are at the heart of their function: computing. These are some of the most popular processors that are used in phones, laptops, smartwatches and true wireless earbuds:

APPLE'S A-SERIES: ACE IN THE PACK
You will find the A-series of bionic processors in every iPhone in the market. The A-series of processors are also found in certain iPad models. In smartphones, the A-series is arguably the fastest processor you can find. It ensures lag-free performance and can last for



a few years without breaking a sweat.

QUALCOMM SNAPDRAGON SERIES: HERE, THERE, EVERYWHERE

From premium Android phones to entry-level devices, you will find a Snapdragon processor powering them. Not just that, certain tablets and smartwatches too deploy the Snapdragon series of processors. If there's a commonly

used device, chances are that it would be running on a Qualcomm Snapdragon processor.

INTEL CORE SERIES: THE STAPLE ONE

If you have a Windows laptop, there is a great probability it would be running an Intel Core series processor. Intel makes its Core series—under different subsets—across the price range of Windows PC.

Even Apple had used Intel processors until the next processor we'd mentioned made its arrival.

M1 SERIES: DIAL M FOR MORE POWER

The M1 series from Apple has been quite a game-changer. In the last two years, Apple has given M1 processors across all Mac devices and introduced two variants of the iPad as well. The M1 Macs are

capable of delivering strong computing and gaming performance and improving the battery life of devices as well.

MEDIA TEK SERIES: THE BUDGET CHOICE

MediaTek's processors are primarily found in budget and entry-level smartphones. You can find them in certain Chromebooks as well. MediaTek has been making inroads in mid-range phones as well, but dominates the budget and entry-level phone space.

H1: LOUD AND CLEAR

The Apple AirPods are by far the most popular wireless headphones in the world. It might be a lesser-known processor but the H1 processor is found in AirPods and AirPods Pro—which means millions use it across the world on a daily basis.