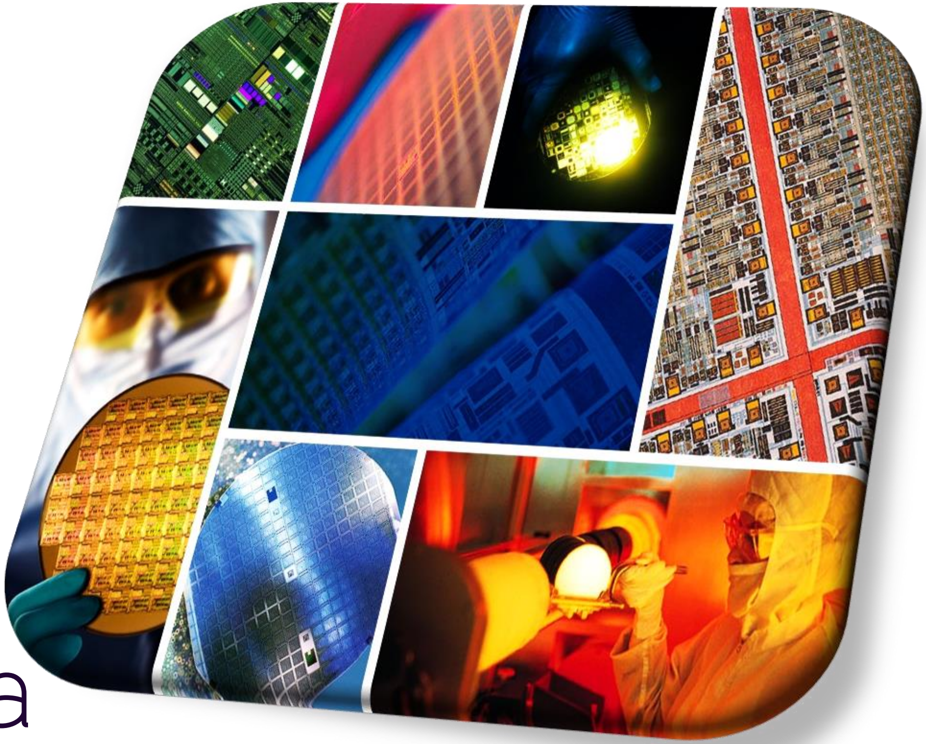


Enabling Compound Semiconductor Manufacturing in India

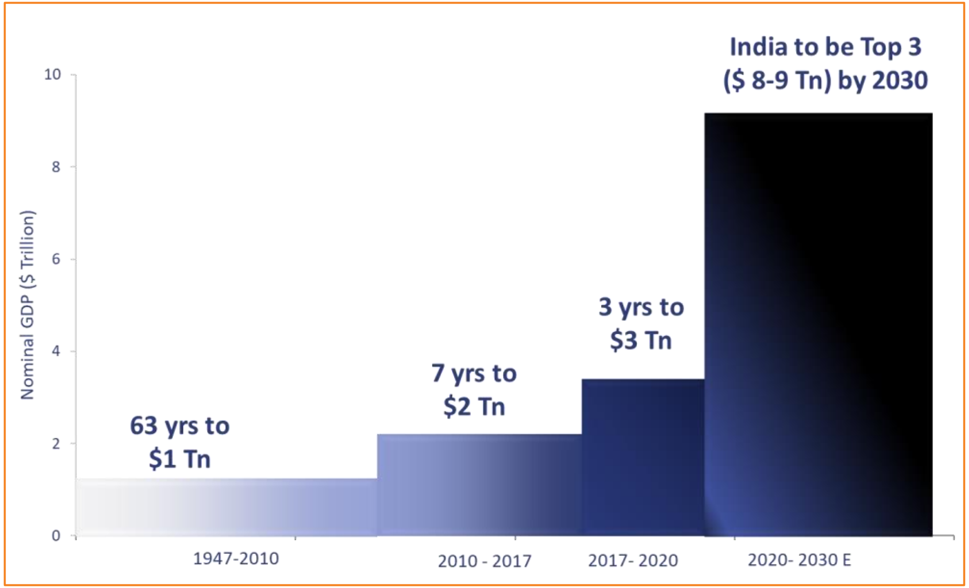
Roadmap to a Sustainable and More Resilient Compound Semiconductor Ecosystem in India

Ministry of Electronics & Information Technology
Government of India

ELECTRONICS INDIA
Billion Needs Million Chips

CS MANTECH

India Emerging as World's Economic Powerhouse



Advantage India

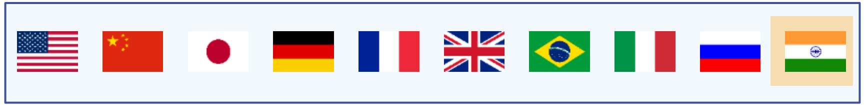
#1 Fastest Growing G20 Economy

#1 Global Fintech Adopter

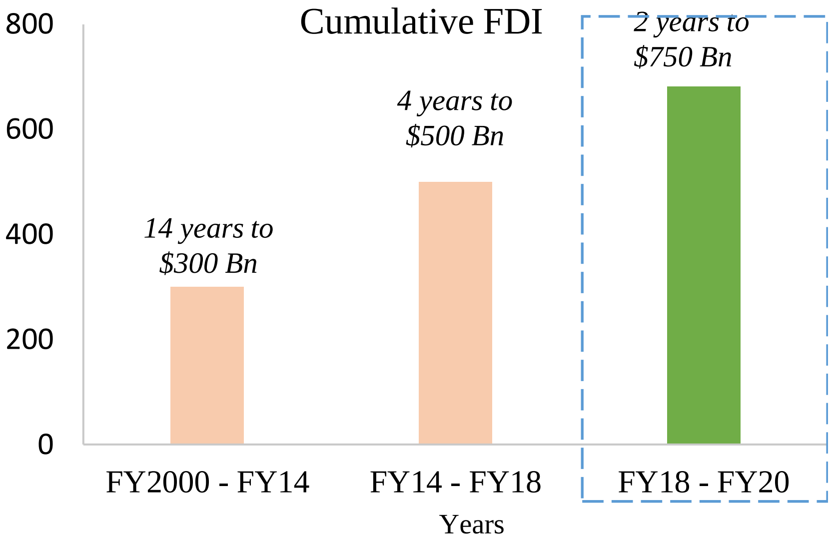
#2 Internet Users

#3 Start-up Ecosystem

2011



2030 E



Transforming India

AADHAAR
Unique Identification Authority of India
Government of India

1.25 Billion
Enrolments

Digital India
Power To Empower

750 Million
Internet Users

PRADHANMANTRI JAN DHAN YOJANA

1 Billion
Bank Accounts

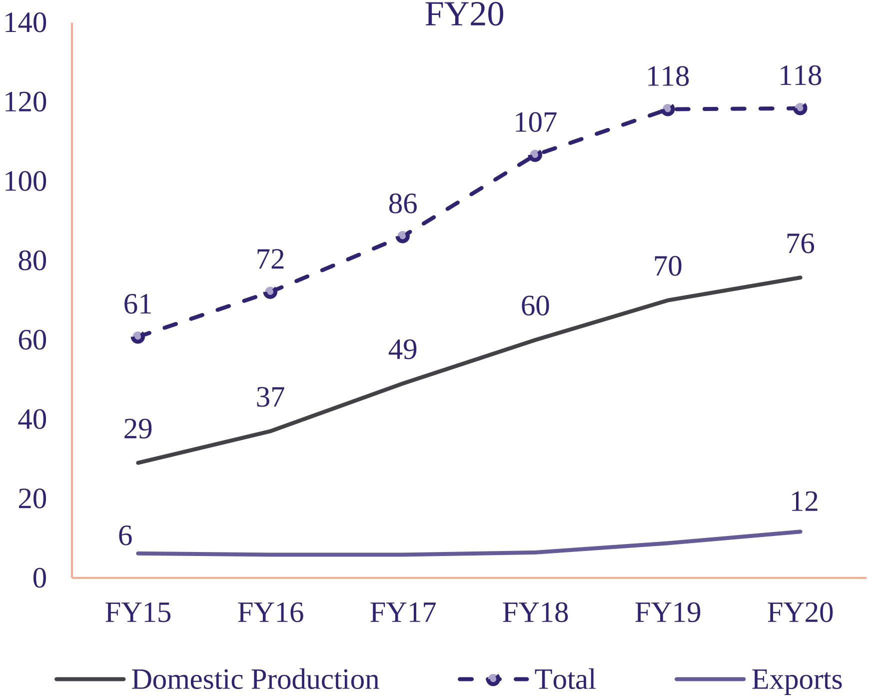
500 Million
subscription (by 2027)

1.2 Billion
Mobile Subscribers

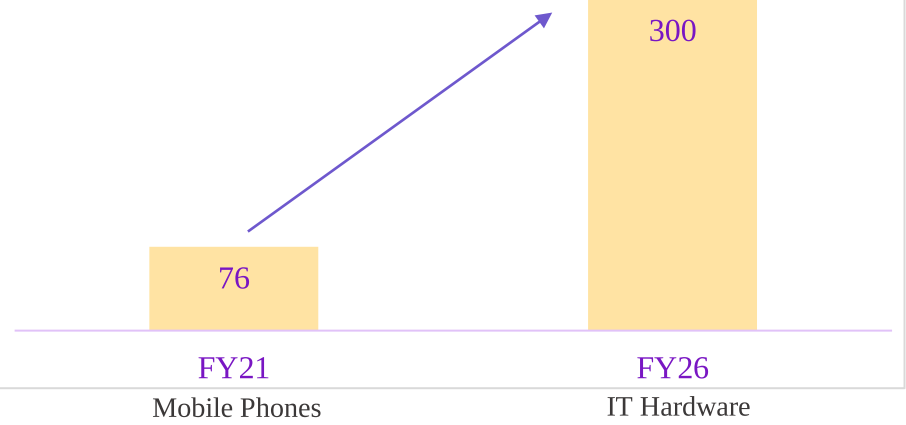
152.1 USD Billion
Market (by 2030)

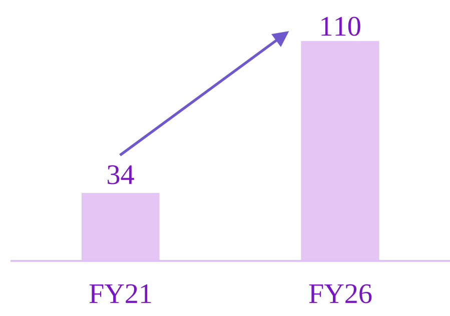
Electronics Manufacturing – Growth Story So Far and Roadmap Ahead

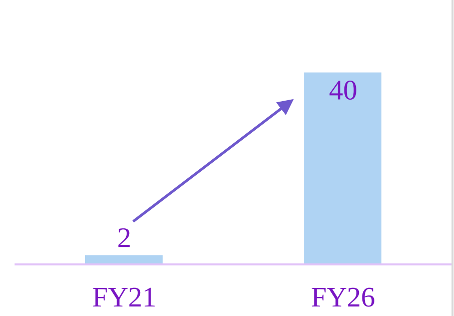
Total Electronics Production (USD Bn) FY15 to FY20



Projection for Electronics Production (USD Bn) FY21 to FY26







Source: Ministry of Electronics and Information Technology (MeitY)

Making India a Global Hub for Electronics Manufacturing

US$30 Bn in Fiscal Support

Support for Electronics Manufacturing

1. Production Linked Incentives	Mobile Phones, Components, IT Hardware
2. Capex Linked Incentives	Components, Sub-Assemblies
3. Development of Electronics Manufacturing Clusters	All Electronics Manufacturing

Incentive Outlay ~ $7 Bn

Support for Semiconductor and Display Ecosystem

1. Semiconductor Fabs and Display Fabs
2. Compound Semiconductor and ATMP
3. Design Linked Incentive (DLI)
4. Modernization of Semi-conductor Laboratory (SCL)

Incentive Outlay ~ $10 B

Support for Allied Sectors

Production Linked Incentives for

1. Advanced Chemistry Cell
2. Automobiles & Auto Components
3. Telecom & Networking
4. Solar PV Modules
5. White Goods

Incentive Outlay ~ $13 Bn

Cascading Incentives – "Incentive on Incentive"

Components

- SMT Components
- Actives
- Passives
- PCBs
- Electromechanicals
- Sensors, Transducers, Crystals
- MEMS / NEMS
- ATMP

Production + Capex Linked

Subassemblies

- Camera Modules
- Vibrator Motor
- Data Cables
- Mechanics
- Display Assembly

Capex Linked

- Advanced Chemistry Cell Battery Storage

Production Linked

Finished Goods

- Mobile Phones
- Tablets
- Servers
- Laptops
- All-In-One PCs

Production Linked

+ State Incentives

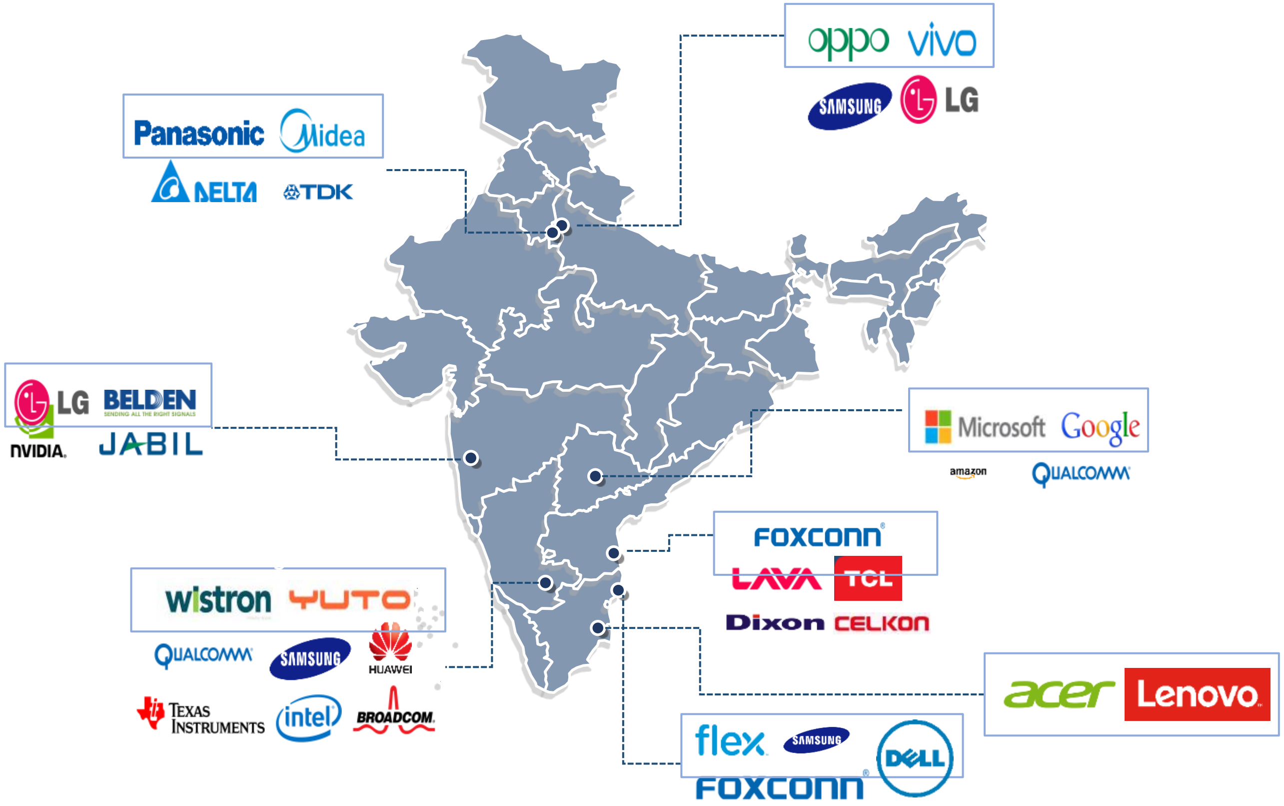
(Capex @ 15-25% / power / land subsidies / tax refunds)

+ Remission of Duties and Taxes on Export

ESDM Landscape

Key Clusters/ Hubs

1. **NCR -** Noida, Greater Noida, Gurgaon
2. **Tamil Nadu -** Chennai, Sriperumbudur
3. **Andhra Pradesh -** Tirupati, SriCity
4. **Maharashtra –** Pune
5. **Karnataka -** Bangalore, Mysore
6. **Telangana -** Hyderabad

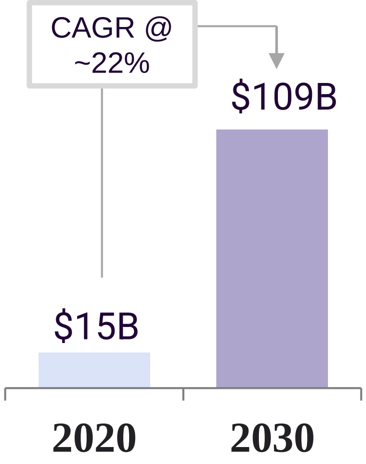


India | Semiconductor Manufacturing Opportunity

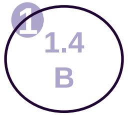
~$110 B Semiconductor Market Opportunity by 2030

India Semiconductor Market

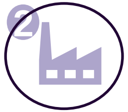
~10% of Global by 2030



Key Growth Drivers



Large untapped domestic market

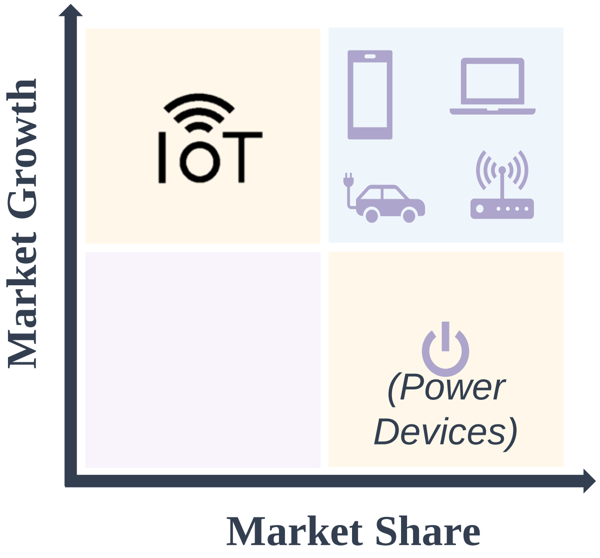


Mature domestic EMS Industry

Emerging Tech Incl. 5G, IoT, EV

Target Market

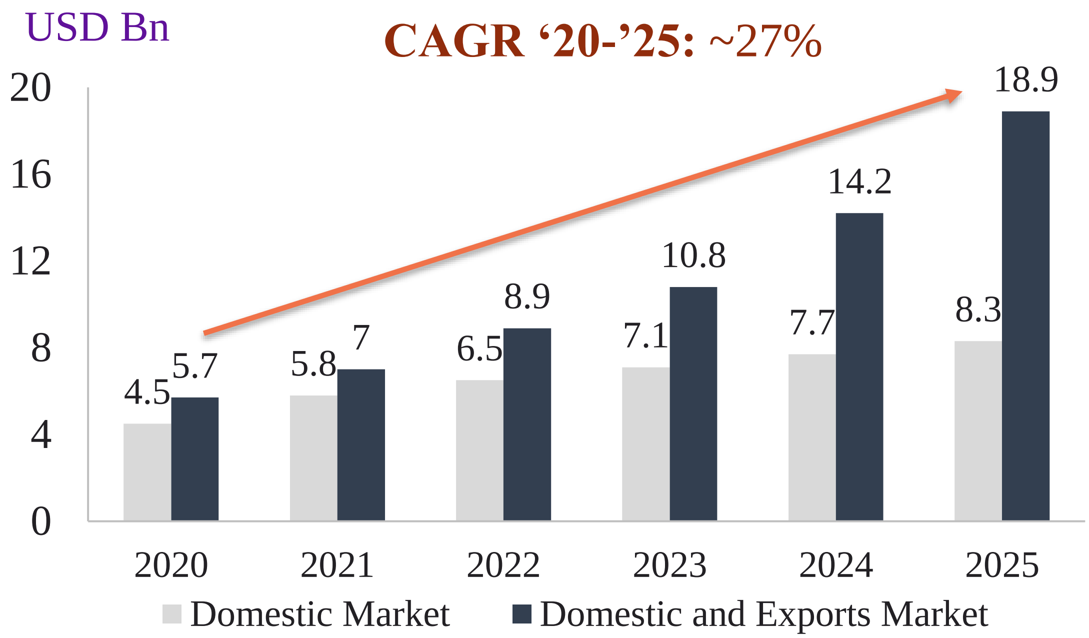
Auto + EV + Mobile + IT Hardware + Telecom



Source: IBS

Display Market: ~$19 Bn by 2025

(A US$60 Bn display market* opportunity till 2025 in India)



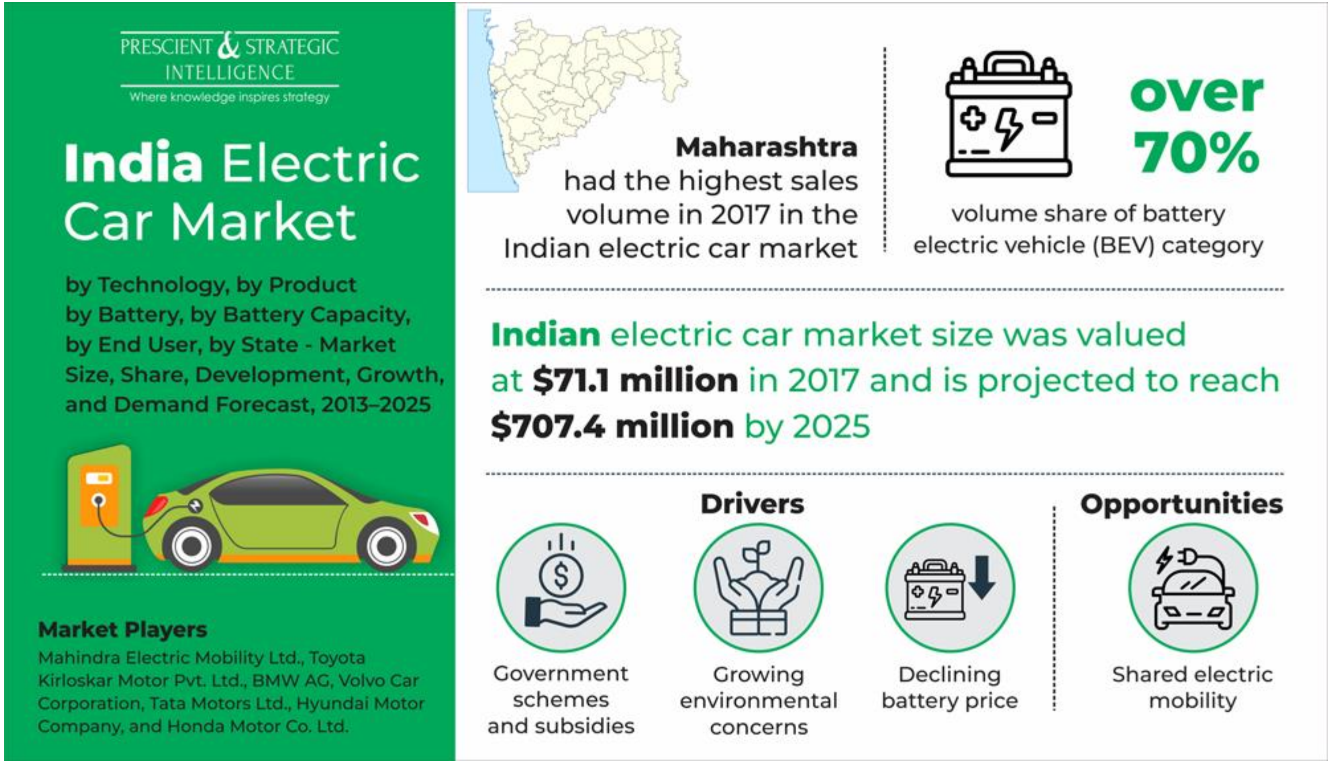
Cumulative Indian display market demand from 2021 to 2025

Source: ICEA, Grantwood Technologies

Note (*): Feature phone displays and automotive displays are not included

India EV Market: ~$707.4 Mn by 2025

(~ CAGR forecast of 94.4 % from 2021 to 2030 in India)

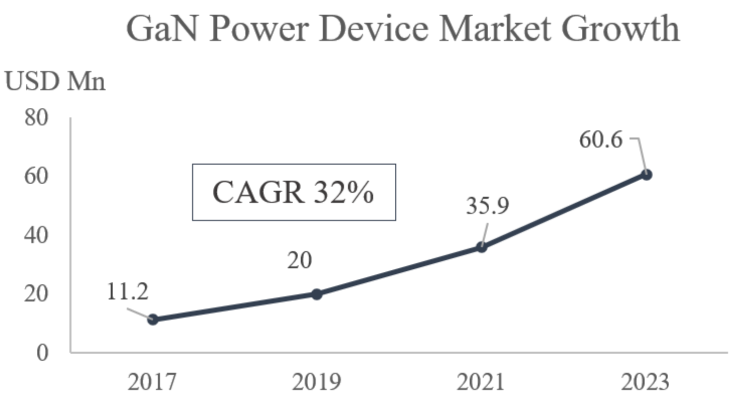


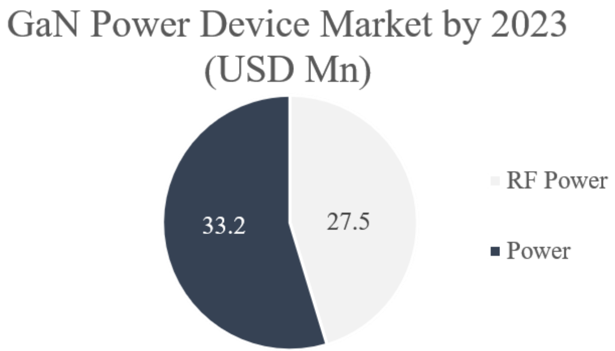
~$ 704.4 Mn

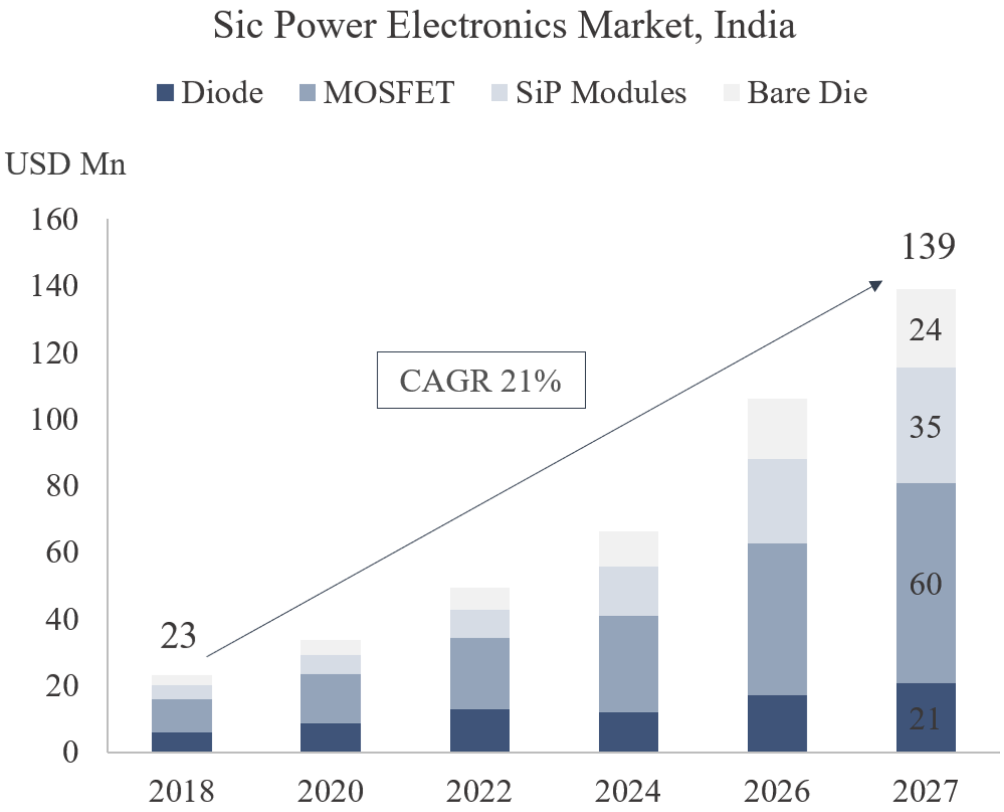
Cumulative Indian EV market demand from 2021 to 2025

Source: ICEA, Grantwood Technologies
Note (*): Feature phone displays and automotive displays are not included

Compound Semiconductors –Emerging Market, Large Export Potential







Source: Markets and Markets, EY

Indian Solar Energy Market (Growth, Trends & Forecast)

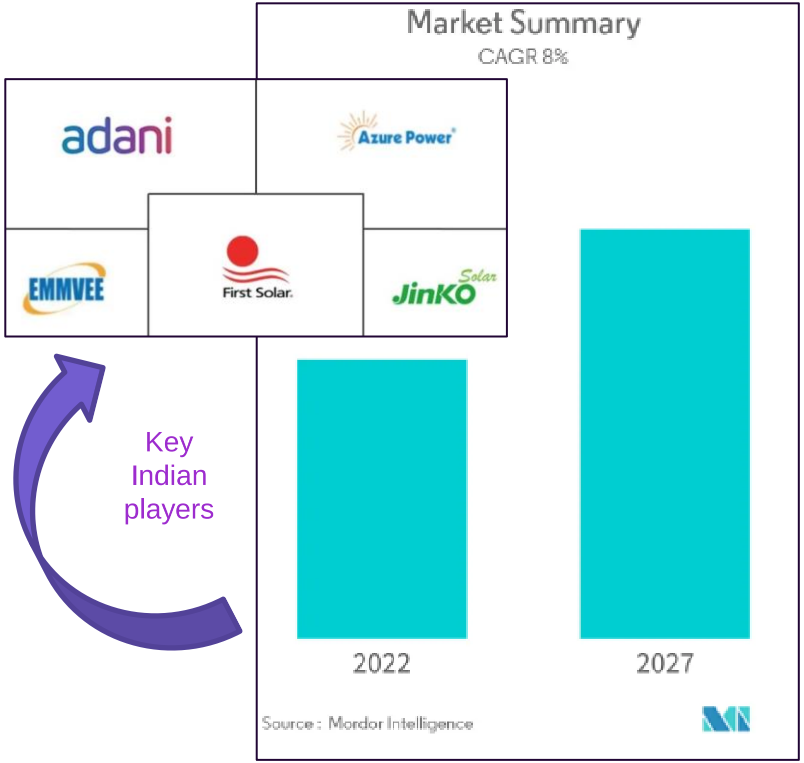
Installed Solar PV capacity in India (2020) : **38.98 GW**

Growth of ~ 11 % in a year

Installed Solar PV capacity in India (2019) : **34.86 GW**

Key market segment for Solar ESS devices !!

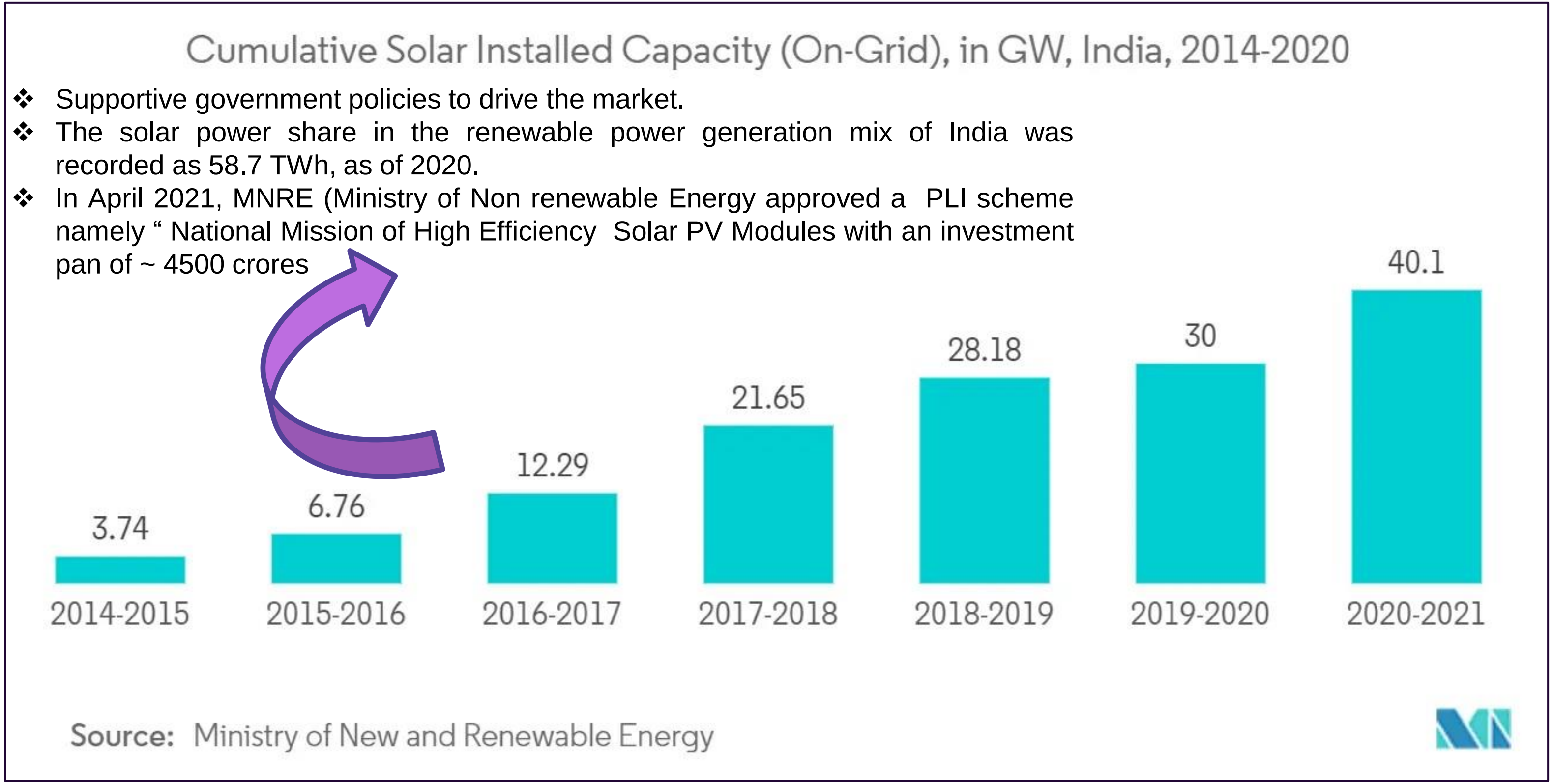
Key Indian players



Source: Mordor Intelligence (Indian Solar Market overview and forecast)

Most appropriate time to invest in India's Solar PV market : GaN is the key player

Indian Solar Energy Market (Growth, Trends & Forecast)



- Supportive government policies to drive the market.
- The solar power share in the renewable power generation mix of India was recorded as 58.7 TWh, as of 2020.
- In April 2021, MNRE (Ministry of Non renewable Energy approved a PLI scheme namely " National Mission of High Efficiency Solar PV Modules with an investment pan of ~ 4500 crores

Source: Mordor Intelligence (Indian Solar Market overview and forecast)

Risk, Resilience and Realignment in Value Chain

New Capacity

~10 M WPM additional capacity by 2030

Resilience

Supply chain diversification to reduce risk of geographical concentration

Talent Curve

Workforce pipeline to drive next stage of innovation

India performs well on all critical criteria for determining Fab location

	India
Government Incentives	✓
Labour Costs	✓
Access to talent	✓
Ease of Doing Business	✓
Security of IP / Assets	✓
Supporting Infrastructure	✓
Geopolitical Consideration	✓

Source: BCG Report

Program for Development of Semiconductor & Display Ecosystem

Outlay Approved: **INR 76,000 crore (~ USD 10.10 Bn)**

Semiconductor & Display Fabs

- **Fiscal Support:** Up to **50% of project cost** on pari-passu basis
- **Additional Support:** Infrastructure Support, Demand Aggregation, R&D & Skill Development
- **Companies :** 2 + 2

Compound Semiconductor & Packaging

- **Fiscal Support: 30% of Capex**
- **Additional Support:** Infrastructure Support, Demand Aggregation, R&D & Skill Development
- **Companies :** 15+

Semiconductor Design

- **Product Design Linked Incentive:** 50% of Capex
- **Deployment Linked Incentive:** 6% - 4% on Net Sales
- **Design Infrastructure**
- **Companies :** 100+

Semi-Conductor Laboratory (SCL)

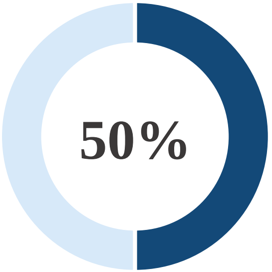
- **Transfer of SCL to MeitY**
- **Modernization of SCL**
- **Explore JV for commercial operations**

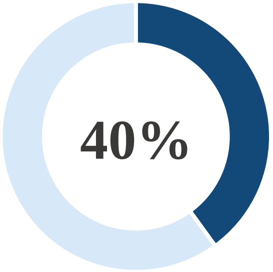
India Semiconductor Mission

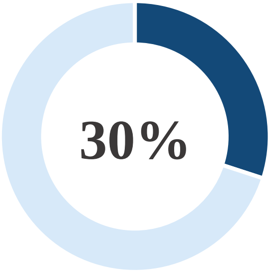
Dedicated institution for **scheme implementation** and to **drive long term strategy**

Fiscal Support – Semiconductor Fabs

Incentive
(% of Project Cost)







Node Size	28nm or lower	Above 28nm to 45nm	Above 45nm to 65nm
Wafer Size	300 mm	300 mm	300 mm
Installed Capacity (in wspm)	40k+	40k+	40k+

Eligibility Thresholds

~$3 B

Min. Capital Investment

~$1 B

Min. ESDM Revenue

2

# of Companies

Till 15.02.22

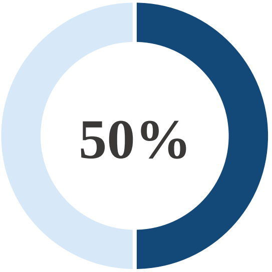
Application Window

6 years

Tenure

Fiscal Support - Display Fabs

Incentive
(% of Project Cost)



	TFT LCD	AMOLED
Technology	Generation 8 or above	Generation 6 or above
Installed Capacity (in panels / month)	60k or more	30k or more

Eligibility Thresholds

~$1.3 B

Minimum Capital Investment

~$1 B

Minimum Revenue

2

# of Companies

Till 15.02.22

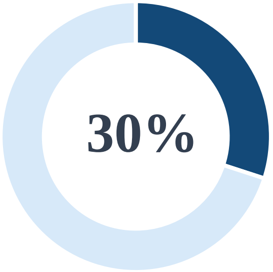
Application Window

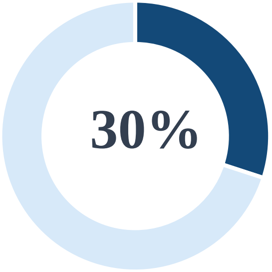
6 years

Tenure

Fiscal Support - Compound Semiconductor and ATMP

Incentive (% of CapEx)





	Compound Semiconductor / Silicon Photonics / Sensors Fab	ATMP / OSAT Facilities
Technology	Wafer Size: 150 / 200 mm Installed Capacity: > 500 WSPM	Flip-chip, Embedded Die, 2.5D / 3D, Fan-outs Packaging, SiP, Chiplet etc.

Eligibility Thresholds

~$13 Mn

Minimum Capital Investment for Compound Semiconductor / Silicon Photonics / Sensors Fab

~$6.5 Mn

Minimum Capital Investment for ATMP / OSAT Facilities

20

# of Companies

5 Yrs. for Incentives

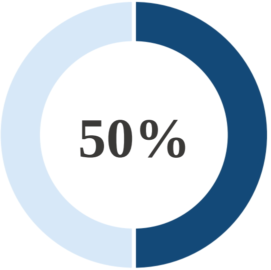
Tenure

Till 01.01.25

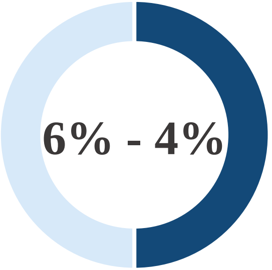
Application Window

Fiscal Support - Design Linked Incentive (DLI)

Incentive



(% of Eligible Expenditure)



(% of Net Sales)

	Product Design Linked	Deployment Linked
Ceiling	INR 15 Crore	INR 30 Cr
Infrastructure Support	National EDA Grid, IP Core Repository, Prototyping, Post Silicon Validation	

Eligibility

Design Infrastructure support	Startups and MSMEs
Product Design Linked Incentive (P-DLI)	Startups and MSMEs
Deployment Linked Incentive (DLI)	Domestic companies, Startups and MSMEs

100

# of Companies

5 Yrs. for Incentives

Tenure

Till 01.01.25

Application Window

Additional Government Support

Development of Infrastructure / Common Facility Centers

Benefits of EMC 2.0 for development of infrastructure / Common Facility Centre

Demand Aggregation

Purchase preference in by the Government under the **PPP-MII Order 2017**

R&D, Skill Development and Training

Roadmap for R&D, Skill Development and Training, up to 2.5% of the scheme outlay

+ State Incentives *(Capex / power / land subsidies / tax refunds)*

India Semiconductor Mission (ISM)

Dedicated Institution

- Independent autonomous institution
- Expert leadership
- Industry-driven approach to policy implementation

Implementation Agency

- Application appraisal
- Negotiations with applicants
- Approval letter

Drive Long Term Strategy

- Sustained engagement with industry
- Partnership with State Governments
- Enable pre-competitive research & capacity building

Talent and R&D Ecosystem

23 IITs

25 IIITs

30 NITs

1k Universities

33 Mn Graduates

Established Partners for Collaborative Innovation

ceNSE

SITAR™

Semiconductor Laboratory

GAETEC

Centre for Materials for Electronics Technology (CMET)

DRDO SSPL

Government Programs for Skill Building

INUP

Special Manpower Development Programme for Chips to System Design (SMDP-C2SD)

ESSCI
Skilling India in Electronics

सत्यमेव जयते
Ministry of Electronics
& Information Technology
Government of India

THANKS!

For more information, please contact the India Semiconductor Mission Team (ISM), MeitY:

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