JUMPSTARTING ELECTRONICS– ROADMAP 2018-22

25 Dec 2017

IESA Recommendations for NPE 2.0

This document presents industry perspective (India Electronics and Semiconductor Association) on the proposed evolution of National Electronics Policy. A vision of a self-sufficient, electronics, systems, design and manufacturing sector that carves its own niches in the global waves – and a view on enabling steps are shared in the following pages.

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  (NANO-TECH / IESA DOMAIN PRODUCTS PROFILED SEPARATELY

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Executive Summary

NANOTECH INITIATIVES

1. **Solar PV**
2. **Semiconductor Fab**
3. **Memory fab**
4. **ATMP**
5. **Display Fab**
6. **LED Fab**
7. **Energy Storage**

SOLAR PV

Background:

National Solar Mission has outlined a roadmap for 100 GW of solarization by 2022. A detailed demand analysis is shared in the annexure. This covers the breakdown of demand across the solar supply-chain for Solar PV.

At this time, the nation has seen a dramatic rise in demand for solarization – 9.74GW was installed in the '16-17 year.

Against this, the national manufacturing capacity is lagging at approx. 2GW nameplate capacity for PV cells. This includes the recently activated 1.4 GW plant of Adani's Mundra Solar PV project in Gujarat.

However, with an Anti-dumping petition in the works, it is projected that the tide will shift in favor of domestic manufacturing. A concerted focus on supporting solar PV manufacturing at the same time can ensure successful indigenization of India's solar program.

Policy Vision:

- India will drive its solarization program with indigenization at the following pace:

	2017	2021	2025
Solar PV Cells	2GW (10% indigenization)	8-10 GW (Cell-Module 80-100% indigenization)	18 GW (100% indigenization)
Poly-silicon	-	Poly-Si fab with ingot , wafering plant (40% indigenization)	Poly-Si fab with ingot wafering plant (80-100% indigenization)

- The local industry, in addition to serving the local Solar Integrator/developer demand, will achieve a 10% export target from its existing capacity in the years 2020-2022.

Support recommended

- Capital Subsidy
  - Ensure that current mSIPS applicants are cleared their dues in a timebound manner and all pending grants are disposed within 1 quarter of commencement of commercial production.
  - Continue with mSIPS subsidy for Solar manufacturing till 10GW capacity for the plan period 2018-2021. Aligning manufacturing capital subsidy with the ADD period will enable successful indigenization of the solar PV.

- Synchronize mSIPS subsidy for sector with Anti-dumping duties likely to be announced in 2018
- Balance the playing field wrt Chinese/ Asian players for domestic and export demand generation
- MNRE has proposed a Capex support of 30% (Ref Concept Paper of 15/12/17 under Capital Finance Assistance Scheme). We presume only one will apply.
- Propose one scheme, fast processing of applications and grants. mSIPS learnings in this should be leveraged, corrected – not re-invented in another ministry
- Maintain balance between past and present Capex support – additional support now should not put recent past projects to a competitive disadvantage
- Appropriate Industry Technology Roadmap for Solar harmonization for an India Technology Roadmap to ensure positioning / enablement of cutting edge-mainstream capital investments and not obsoleting projects.

o Demand Enablement
- MNRE Concept paper of 15/12/17 has proposed a 20GW committed demand for manufacturers that develop the supply-chain.
- This is a major enabler for derisking market demand. As the program unveils, across the supply-chain (module/cell- wafer-ingot-polySi) a phased manufacturing program could enable the industry evolution.
- A separate phased manufacturing program roadmap should be worked out with the industry for enabling industry evolution.
- Implementation in a WTO compliant manner will be key to the program.
- 'Made-in-India' Indigenization level star rating for consumer education and a 'Made-in-India' brand promotion program
    - Direct 'Made-in-India' star rating program (like BEE Energy star rating)
    - And Manufacturer led support 'Made-in-India' star rating program (% of CGST refunded, based on level of capex and level of advertising/ market development expenses)

o Provide for following support :
- State support is normally going to be extra – over and above the Central support.
    - State support will normally cover
        - o Incremental capex, Equity support
        - o Land, power, skill development, PF subsidy.
            - MNRE Paper has talked of:
                - Land at preferential rates, preferentially near ports
                - Power supply commit from state at APPC+5% rates
        - o Encourage Manufacturing Cluster development to enable Solar Supply-chain efficiency
        - o SGST reimbursement
- Centre Support should include:
    - BCD nil on capital imports
    - Benefit of Section 35 (2AB) for deduction of R&D expenses from P&L

- Benefit of Section 35AD investment allowance as an accelerated tax cover for leveraging investments from existing businesses
- For projects with Phase 1 investment over $0.5 bln, Ultra mega Capex project process for additional support on case basis (Phase 1 of project to be commissioned within 3 years of project approval)
- Credit Default Guarantee scheme to support existing and Indian manufacturers (Corpus of 20,000 crores as Credit default Guarantee across Solar, Electronics Manufacturing initiatives)
    - Typically, Bank financing is against collaterals – India players have a limited capacity for giving collaterals
    - CDGS scheme envisages an improved multiplier enablement for selected sectors/ investments to improve project bankability at lower collateral commit from the investor
    - Such sectors can be EMS/Components/ Semiconductor-Solar-fabless design projects
    - Since default rate is low, this is a low risk enablement of the industry by the government. The multiplier impact on enabling industry is far more than the exposure to possible defaults

- Export Programming
    - Enable MEIS support for Solar PV Cells and modules as follows:
        - Solar PV Cells 10%
        - Solar PV Modules 7%
        - Made-in-India branding and Export Marketing support
        - Ref also, section on 'Export Promotion' IESA Jumpstarting Electronics Note.

- Solar Manufacturing Investor promotions
        - Industry led point-to-point focused target global investor outreach / support
        - IESA has international desks operational in select countries / regions to drive investments into India.

- Technology Upgradation Program
    - MNRE proposal for technology upgradation on line of scheme for Ministry of Textiles scheme is laudable. It is recommended that a multiplier Credit Default Guarantee mechanism, along with appropriate preferential solar pioneer support should be given to facilitate sustainable joint ventures – and where required, exits.

- Interest subvention for global competitiveness
    - MNRE concept paper has put a conditional interest subvention for global competitiveness. Industry submits that there is a critical need to enable finance at global competitiveness. Conditional support 'will not fly' – it is relevant to look at this for select part of value chains aggressively to enable the indigenization program. A separate 1:1 discussion is requested to present overall options , intervention points and enablers for the sector.

- PSUs as catalysts for Indigenization
  - We applaud the thought of using 4 fully vertically integrated PSUs (1GW capacity each) as catalyst for the ecosystem. Specific interventions can be reviewed for upstream solar production if there is a lack of private sector investments.
  - However, PSU speed to react is relatively slow and we recommend that an appropriate selection will be critical to the final objectives.

- Relevant '2018 Budget Support recommendations

  - Eliminate MAT for Solar Units in SEZ, EOU, EHTP for next 10 years
    - Manufacturing projects shifting from abroad may want to shift to a SEZ to enable ease-of-re-export of manufactured products
    - Will not shift if there is an uncompetitive tax regime within India and wrt competing nations like Malaysia, Vietnam
    - MAT on SEZ Solar units is (18%++ ~ 23%). SEZ units have to pay MAT whether they make profit or not while units outside SEZ (in DTA) are having tax liability linked to corporate profits – since profitability is lower (currently ~nominal on Solar Mfg) – they have nominal tax liability, if at all. Thus the SEZ manufacturing is currently seriously disadvantaged for solar manufacturing.
  - Other industry inputs
    - Mission Mode ownership for Manufacturing/ R&D/ Demand Enablement with Clear Single-point Ownership and TIGHT Metrics on owners with appropriate industry partnership to make execution happen
    - Appropriate Industry Technology Roadmap for Solar harmonization for an India Technology Roadmap to ensure positioning / enablement of cutting edge-mainstream capital investments and not obsoleting projects.

Annexure: Demand analysis for Solar PV supply-chain

	Units	2010-11	2011-12	2012-13	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Comment		Gujarat 300 MW; 20 MW Rajasthan/misc	Guj 250MW; Raj 40 MW ; Karnataka 10MW; 50 MW misc	Guj 300MW; ;Krntk 70Mw; Misc400 MW (MP/TN/ Orissa/UP/others)	TN 490MW vs 1000MW; AP 140 vs 1000 MW; Raj 100 MW; Pun 300 MW; UP 200 MW; Bihar 150 MW; MP/Karnataka/Orissa/ Misc 300 MW	NSM demand estimated basis August 22 declaration of PV share of NSM II goals - can go up at expense of solar thermal / Centre NSM to integrate with State solar demand in 2014 onwards, kept at revised NSM II goals - ...also basis Rajasthan state solar thermal response being nil - current outlook has been that the market for states will shift totally to PV+ post NDA remodelling for revised demand by 2015+ PSU/Defence led EOI tenders for DCR start from Oct'2014			Estimated Figures for 18-22 are a likely scenario bringing the total solar installed base by 2022 to an installed capacity of 100GW solar PV and upto 2GW Solar thermal; This period will also see the off-grid solar applications take off and move to mainstream markets as the projected solar efficiencies rise, cost/watt drives down to grid parity (5.50/-unit by 2017) and early adapter success fuels the early majority of the mainstream market -essentially, this is likely the last major intervention by the government in catalyzing the solar market as the tipping point should be reached in this year Also, this is the period in which the domestic manufacturing is expected to start scaling up beyond government propped demand				
Total PV on ground project demand (on & Offgrid)	MW/yr	460	716	780	700	3800	11000	15000	16000	17000	18000	18000	18000
Total PV Installation (on & Offgrid) - 1 yr shift	MW/yr	25	435	716	780	1000	4000	10000	15000	16000	17000	17500	17500
c-Si Market share		60%	35%	55%	60%	58%	75%	75%	80%	85%	85%	85%	85%
India demand for Module including imports	MW/yr	15.75	159.8625	413.49	491.4	609	3150	7875	12600	14280	15172.5	15618.75	15618.75
Cell Demand	MW/yr	17	168	434	516	639	3308	8269	13230	14994	15931	16400	16400
Wafer	MW/yr	17	176	456	542	671	3473	8682	13892	15744	16728	17220	17220
Ingots	MT/yr	122	1234	3191	3792	4029	20837	52093	83349	86590	92002	94708	94708
Polysilicon	MT/yr	143	1451	3754	4462	4739	24514	61286	98058	101871	108238	111421	111421
TF mkt share	MW/yr	9	275	303	289	391	850	2125	2400	1720	1828	1881	1881
	(Assumptions: Aberration in batch 2 guidelines corrected by phase2 NSM; 7 gm Poly-si/watt till 2015 and 6gm/watt post 2015 & 5.5 gm Poly-si/wtt post 2018)												
	* 95% yield Si-ingots-wafer-cell-modules												
	* Assumes water availability will constrain Solar Thermal plant growth, PV shares factored in total Solar as above												
	(For supply-chain - we have assumed that the installation inputs are 1 year staggered before the enduser demand -realistic because timelines are for completion in Q1, calendar year)												

SEMICONDUCTOR FAB/ MEMORY FAB/ ATMP

Background

- National Policy of Electronics 1.0 provided for Semiconductor Fabs in the plan period 2012-2017.
- The shortlisted consortia for the project did not move to the show of commit stage as:
    - JP group had financial troubles. Moreover, IBM sold its semiconductor business to Global Foundries.
    - HSMC consortia – did not have financial commit to the project either. They had strong partners but failed to take off since they were only putting in limited sweat equity and demanding capitalization of the in-principle approval from Govt of India.
- On the other hand, the ISRO led Semiconductor Lab, Chandigarh was operationalized for 180nm 200mm wafer in 2016 by the government. It is in its commercial ramp-up phase with over 28 chips for various strategic applications made in it. It operates like a mini ODM – and has facilities for chip design to process to ATMP.
- At the same time, this plan period has seen the global semiconductor demand continue to grow and touch $300 bln. It is projected to continue a growth into the next plan period with inflexions coming from flow of semiconductors (logic , memory and more-than-Moore devices like Sensors) into many more industries like Automotive, Medical, Broadcast, Agricultural...In fact, the evolution of the IoT wave is expected to grow semiconductor demand many fold in the projected plan period and is expected to see semiconductors and electronics as a meta technology (like IT) pervading everywhere in the community.
- Plan period 2018-2022 will see the manufacturing capacities grow in Asia Pacific, specifically China. It is expected that India fabless industry will face increasing issues of competitive TAT wrt their design tapeouts.
- SCL Chandigarh has shown that India can do its chip manufacturing – there is a need to move it from 180 nm 200mm wafer lab to a commercial fab (300mm wafer 45/28 nm wafer fab)[1] to sustain the India's nascent effort. It is critical to realize that all arguments by 2012 naysayers have been proven wrong by 2017, viz
    - Global market has grown dramatically
    - The fab industry has grown and is growing
    - And is operating at nodes which are not necessarily cutting edge nodes
    - With a strong operating margin showing a strong capitalization
    - And Strong stock surges in 2017 are a reflection of the projected growth in the sector

- OSAT (outsource Assembly and Test) or ATMP (Assembly, Test, Measurement and Packaging of wafer dies) remains one of the most potent value-add elements of the semiconductor supply-chain. However, it cannot sustain if there is insufficient local demand for the finished chips.

- IESA estimates that select chips from sectors like 2 Wheeler Automotive Electronics, Digital Payment Systems, Smart ID card applications, Select Consumer Applications and Power Electronics will be able to load the India fab in the coming era of hyper growth of semiconductors in various sectors. (Refer: Annexure : Potential demand load from nice domestic opportunities)

Policy Vision

- Facilitate setting up of Semiconductor Wafer fab facilites and enable its eco-system for design and fabrication and ATMP of chips and chip components, including capital equipment manufacture.

- Enable an India Semiconductor Fab that is driven by demand from select niches where India can evolve a global/ regional dominant position, for example, in

    - Leverage 2 W market dominance for enabling 2W Electronics

    - Payment Security to be enabled for Indian Payment Terminals

    - IPG and India feature enabled Set Top Boxes for enabling India mass communication

- Support the India semiconductor Fab with a cutting edge Semiconductor Prototype fab in collaboration with global majors where designs and processes can be incubated for a long term India sustainable position

Support Required

- It is critical that the Government is not swayed by naysayers and the lack of commit of the previous consortia. China is creating its semiconductor industry in this plan period by sheer investment muscle power and they will be redefining the industry landscape in the years beyond – not just for chips but also for fabless design. We need to have conviction and sense of purpose to enable this key competence for national strategic self-sufficiency.

- It is proposed that Technology cess of 5% on all imports to enable investment in ultra-mega capex nanotechnology projects and build technology capabilities in the plan period 2018-2022 as a precursor to a technology leap for 2022-2028 period.

- SCL or offshoots of SCL as a PSU/ JV should be supported as an upgrade path for a facility that has proven credentials, knowhow and competent execution. This will entail upfront investments in equity by Government.

- Support for Ultra Mega Capex products to be given on case basis. Following incentive structure is proposed for the Fab/ATMP:

    - Centre Support

        - 40% mSIP Capex support (combine all multiple heads of Central support in prior scheme like mSIPS, VGF etc for simplified execution/ approval TAT)
        - BCD nil on capital imports
        - Benefit of Section 35 (2AB) for deduction of R&D expenses from P&L
        - Benefit of Section 35AD investment allowance as an accelerated tax cover for leveraging investments from existing businesses
        - For Ultra Mega Capex projects threshold defined with Phase 1 investment over 1500 crores for Fab and 500 crores for ATMP, (Phase 1 of project to be commissioned within 3 years of project approval)
        - Additional specific support to be reviewed on case basis
    - State Support
        - To be defined by state in terms of land, location, power, water and infrastructure/ labor capacity development support

- Phase 1
    - Align on India Chips program with clear aim of getting India chips for target applications designed in India fabless ecosystem with India IP.
    - To be incubated in a Virtual fab/ATMP program with technology partners who will transfer the fab process/ ATMP to India once the demand is enabled to the target levels
    - Execute a Government Owned 300mm, 40/28 nm node process semiconductor line for select India chips
    - Implement a National Semiconductor Mission that will sustain and build India chips design, ecosystem enablement and markets
    - Drive a virtual fab and ATMP program that aggregates demand and shortlists tech partners who will incubate the India chips and transfer the technology as the demand ramps up.
    - Enable a $2-$4 bln outlay for the Government owned fab/ATMP initiative
    - Build human capacity expansion, ease-of-business, demand aggregation for domestic manufacture and export marketing incentives for supporting the industry.

- Phase 2
    - **Leverage the Technology cess to enable Ultra-mega capex nanotech projects , attract serious nano-tech players as India's electronic demand builds up and build a larger ecosystem of logic, memory, led, display and solar fabs in India. IESA proposal here to be reviewed separately by Empowered Committee for Fab.**

- Enable Export Markets
    - By MEIS scheme of
        - 9% incentive for Semiconductor chip/ component/ ATMP services exports

Comments:

1. Please note that even a MTM commercial fab in 2021 will have to be a 300mm 45/28 mm wafer fab.

ANNEXURE: Potential Wafer Start /annum demand from Target Niches for India Chips

Sector / Chip	Wafer Starts Demand/ annum	Comments
Auto/ 2 Wheeler Electronics	50000	India is world's largest 2 wheeler market/ 2.4 mln 2 wheelers/annum demand in 2021 projected
Consumer/ SetTop box-OTB	80000	India demand pegged at 60 mln/annum; Target share of 50% of market with india STB Chip
Digital Payment/ PoS chips-tags	50000	Evolve with India Security Stack
Smart Energy Meters	37500	Projected India demand for 2020 @ 30 mln units
NAVIC GPS Chip	22000	For automotive and consumer applications
TOTAL	240,000	

- Based on 65nm process resolution/ IESA AMAT estimates// 40 nm process node will double the dies/wafer and have an effective demand load of 120,000 wspa. Detailed estimation sheets available from IESA/Carel Reports.
- Refer: IESA F&S 2017 report for India semiconductor demand and wafer fab load by sector analysis

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DISPLAY FAB

Background

- By 2021, India LCD TV demand will have reached 30 mln/annum – and there will be an upward migration of the TV display size. CRT and PDP TVs would have been marginalized out of the market.
- Globally, the industry is dominated by Korean majors like Samsung and LG. In the recent years, China has put in a significant investment to build its display industry. Taiwan and Japan have been other key centres for display fabs – but are under pressure from the Chinese onslaught. Koreans have started evolving their positions technologically with a move to OLED Display fabs.
- Mobile phone Displays are rapidly endorsing OLED technology – and this technology will be dominate the Mobile phone displays by 2022 (SID/DisplayWeek 2017).
- LCD Fabs will leverage QLED platform and feature led approach to extend the effective life of LCD TV Fabs. This can result in touch screen TVs and specialized applications for digital signage.
- India attracted one major serious display fab vendor- Vedanta group Twinstar Display, in the 2012-2017 plan period. This mSIPS application is however under process for over 9 months with serious process delays at the Government side. It is observed that the mSIPS program has been fraught with poor processing of applications and poor release of grants for approved projects. This is seriously damaging India image for serious electronic sector investments.
- Twinstar/ Vedanta group has already shown its commit to the project by acquiring AvanStrate of Japan – a glass major in the display supply chain. It is critical to move the project forward and get this key supply-chain element to India.

Policy Vision

- India will enable a LCD TV Display fab in the 2018-2021 plan period that will be upgradable in sync with industry roadmap for TV Displays and give a strong foundation for bringing the display ecosystem (including glass) into the country.
- India will also enable a Mobile display fab in the 2018-2021 plan period that will build on the phased manufacturing program for Mobiles.

Support Required

- LCD TV Fab
    - Fast track LCD TV fab project of Vedanta
    - Evolve the LCD Display ecosystem with support for Glass and related ecosystem value-chain
    - Correct payout time period with tight metrics on execution of payouts for the Ministry
    - Strong penalties on delay of application processing and approved project payouts on consultants – prevent NISSAN type EOB negating instances
    - Review LCD TV as a possible non-ITA item/ impose duties on imports of Panels (currently zero duty)
- Mobile Fab
    - Review OLED based Mobile Displays as a non-ITA item/ impose duties on imports
    - Move mobile display into a PMP item for 2018-2021 period
    - Drive a virtual Mobile display fab program that shortlists tech partners who will incubate the India Mobile displays with India based OLED products and transfer the technology/ build India Display fab as the demand ramps up.
- It is proposed that Technology cess of 5% on all imports to enable investment in ultra-mega capex nanotechnology projects and build technology capabilities in the plan period 2018-2022 as a precursor for an indigenization leap in 2022-2028 period.
- Drive a PMP for TV, Mobiles that enables display manufacturing.
- Build human capacity expansion, ease-of-business, demand aggregation for domestic manufacture and export marketing incentives for supporting the industry.
- Provide for following support :
    - 40% mSIP Capex support
    - BCD nil on capital imports
    - Benefit of Section 35 (2AB) for deduction of R&D expenses from P&L
    - For projects with Phase 1 investment over $1 bln, Ultra mega Capex project process for additional support on case basis (Phase 1 of project to be commissioned within 3 years of project approval)
- Enable export markets by:
    - MEIS incentive of 7% for display panel exports

ENERGY-STORAGE/ LITHIUM-ION BATTERY UNIT

Background

- With an estimated 2017 demand of 20 mln mobile phones in India,, the LiB batteries emerge as a potential phased manufacturing component.
- Additionally, there is a huge potential demand in the Electric Vehicles under the National Electric Mobility Mission.
- Finally, newer generation applications like drones will also drive need for energy storage in the next plan period.
- National Solar Mission is also targeting a 40 GW Rooftop Solar PV target till 2022 – which will also result in a demand for energy storage to reduce grid dependence and optimizing energy harvesting.

Policy Vision

- India will enable a LiB / SSB factory in India in 2018-2021 plan period that will leverage on the phased manufacturing program for Mobiles. It will also build the relevant infrastructure to evolve deployment of the batteries for EVs, Drones and other consumer applications
- India will source, stockpile and promote indigenous exploration and mining of Rare-earth metals required for manufacture of electronic components.

Support Required

- Evolve a position as a lead for next generation Solid-state batteries. Appropriate R&DE and Concept-to-market innovation for next generation Solid-state batteries for Mobiles, EVs, Drones – and other consumer application.

SECTOR INITIATIVES

1. **EMS**
2. **Consumer/ STB**
3. **Automotive Electronics**
4. **Mobile Handsets**
5. **LED Products**
6. **Medical Electronics**
7. **Consumer Electronics**
8. **Defence Electronics**
9. **Fabless Design**
10. **Components, PCB, LED, IT PRODUCTS, TELECOM EQUIPMENT, STRATEGIC ELECTRONICS, INDUSTRIAL ELECTRONICS, OTHERS (NANO-TECH / IESA DOMAIN PRODUCTS PROFILED SEPARATELY)**

EMS

Background:

- 2011-2017 plan period witnessed the emergence of EMS in the country
- High growth driven primarily by Mobile manufacturing and extending because of Set-top boxes and other electronic sector initiatives
- There is a projected need for 500+ high speed SMT lines in the country to meet its requirements
- However, while the EMS has come to India, all its inputs components are getting imported and India needs to look at an aggressive indigenization program to contain its imports

Policy Vision:

- To sustain and consolidate competitive leadership in the EMS segment by promoting progressive higher value addition in manufacturing and product development
- Target 10 x growth in SMT lines in India/ % 50-100% (majority share localized, depending on product categoy) of assembly in India in plan period with minimum 300 SMT lines in India by 2021

Support recommended:

- Ensure that current mSIPS applicants are cleared their dues in a timebound manner and all pending grants are disposed within 1 quarter of commencement of commercial production.
- Continue with mSIPS subsidy for EMS for the plan period 2018-2021. Build Credit Default Guarantee as a mechanism to improve bankability of projects
- Implement a Phased Manufacturing program that builds demand for non-ITA products
- PMP: Currently PCBs for only mobile phones are included in the PMP to be done locally. The same should be mandated for all electronics products, especially Non-ITA-I products
- Review non-ITA product list critically and identify items not existing when ITA1 signed and delist them/ put appropriate import duties on them to push indigenous manufacturing. Mechanism should be found out to take products out from ITA-1 and increase BCD, like it has been done for mobile phones.
- BCD on all Non ITA products and their subassemblies e.g LED Lights, Automotive Cameras should be increased to 20%. Such products to be identified.
- Deny input-tax credit on imports of PCBs (both bare and populated) in this plan period-populated PCBs immediately and bare PCBs after an announced date (2 yrs for capacity building)

- MEIS (merchandise export incentive scheme) incentives should be restored as follows:

S. No.	Electronic Item	MEIS Incentives (%)
1	Product	5
2	Component	7
3	Semiconductor/ATMP	10

1. Allow use of MEIS scrips to pay CGST/IGST as the same were utilized to pay CVD/Excise in the Pre-GST tax regime.

2. Benefit of Direct Tax Holiday for the profit made by exporting electronics items/components/PCBA's.

- Build exports by
    - ' Made-in-India' branding program
    - Marketing incentives and focus country initiatives
    - Export subsidy to offset disabilities
- Sales of all ITA-1 products should be considered as deemed exports

<u>Other recommendations from working group meeting</u>

1. Import Duty on Populated PCB's (Assembled Boards):

- Zero duty import of PCBA's discourages value addition in ESDM sector in India. This also inhibits the manufacturing of Components in the country. ELCINA recommends that 15% BCD should be imposed on all PCBA's (other than ITA-1 items) to encourage value addition in the country and growth of EMS sector.

- PCBA's used for the manufacture of Set Top Boxes, Inverter AC's, Solar, Wind energy equipments and other electronic finished goods should be identified and protected from any further FTA's.

- Another viable mechanism to encourage local manufacturing is that Zero duty Import of ITA-1 items/components/assemblies/PCBA's should be only on the basis of end use (for the manufacture of IT items only) rather than allowing them irrespective of their usage.

2. Threshold Limit for EMS vertical in MSIPS Policy:

1. MSIPS has been an important and attractive policy for inviting investments is ESDM sector. However it has faced some challenges in implementation and needs tweaking of the Scheme to make it more effective and achieve its objectives.

2. Presently, the threshold investment limit for availing MSIPS benefits for EMS vertical is INR 10 cr. This is high in comparison to average stand-alone investments in the sector by MSME units. ELCINA recommends that this threshold limit for EMS vertical for MSIPS benefits should be

reduced to a reasonable limit of INR 5 Cr. This will help in encouraging the investments in the sector, enable MSME's to participate and expansion of existing EMS companies. As NPE is under review and MSIPS will conclude in Dec 2018, this may be considered for the new version of CAPEX Subsidy Scheme under NPE 2.0.

3. **Phased manufacturing program:**

PMP has yielded satisfactory results in the mobile phones manufacturing sector and has promoted SKD level manufacturing.

Similar PMP programs should be announced for LED Lights, Set Top Boxes, Inverter AC's, Security Equipment along with various other electronics equipments as identified by stakeholders of ESDM Industry. To qualify as a domestic product, VA norms need to be defined realistically and increased within a time frame of 3-5 years to reach minimum 50%.

Encouraging EMS through PMP programs is vital as as been proposed under the PMA Policy where the entire value of locally populated PCB's are taken as domestic value.

Further, In acquisitions under PMA the L1 should be adjusted with disabilities. A weighted addition in L1 must be made to adjust disabilities.

4. **Provision of Interest Equalisation to compensate the high cost of finance in the country:**

Reserve Bank of India vide Cir. No. 1/13.05.000/2015-16 dt 11th February 2016 has announced "Interest Equalisation Scheme on Pre and Post Shipment Rupee Export Credit". Similar scheme has also been announced by DoT (Department of Telecommunication) vide Circular No.18-34/2013-IP. Dt. 28th October 2016, these schemes are offered to the exporters of selected items. Domestic manufacturing also saves/earns forex by means of import substitution.

Interest equalization should also be offered to the domestic manufacturers of all ITA-1 items (including PCBA's) on deemed export basis.

5. **Credit Default Guarantee for Electronics Manufacturing**

For Capital Goods: (For Purchase of Capital Equipment)

Electronic Manufacturing industry is facing challenges to set-up electronics manufacturing facilities in India because of high cost of investment involved and lack of adequate credit facilities.

Most of these machinery is required to be imported. Considering the significant amount of investment involved, procurement has to be done on credit basis; either by availing bank loans / bank guarantee.

The banks in India require atleast 100% of the loan / guarantee amount as collateral for extending credit facilities. Such collateral requirement poses challenges for growth and hence, there is a need for the government to enable banks / financial institutions to extend credit default guarantee for facilitating import of capital goods.

6. Electronics equipments funded through a loan from banks / FI's for a tenure of 4 - 5 years for which the Investor shall pay an upfront amount of 20% of the total value. The Government of India shall extend Credit Default Guarantee for 50% of the total value covering the entire tenure of the loan.

7. This credit default guarantee shall be extended to the financial institutions / banks who provide the lease

8. Credit Default Guarantee for Domestic Sale of Electronic Products and Components. This will go a long way in boosting investments in Electronics Manufacturing.

For Components, PCBA's and Electronic Products: (For Export)

- Similarly as there is inadequate ecosystem in India for components, hence 70-80% of all components and even final electronic goods are imported. Currently, the importers of components enjoy 3 - 6 months credit from Chinese exporters. Such facility has been enabled by SINOSURE, the China government owned insurance company to promote exports.
- This helps the importers as a working capital bridge to realize cash and effect payments for the imports over the 3 - 6 month credit period.
- Hence, the Indian industry prefers to import components and equipment rather than buying from the domestic manufacturers.
- Once the manufacturing facilities are set-up as stated above, the components can be procured locally and substantially reduce import dependence.

It is recommended that Central Government should extend Credit Default Guarantee covering 25% of the value of the sale of domestically manufactured components and electronic products for a tenure of 3 - 6 month period and support local manufacturers by incentivizing purchase of their components/products.

6. Recommendations on GST to support domestic manufacturing vis-a vis Imports:

It is recommended that in order to discourage import of complete products and PCBA's, the Input Tax credit on CGST content charged on their import should not be allowed. This will encourage manufacturing of indigenously manufactured electronic equipments by making the imported items costlier

An equally effective way to use GST to promote domestic manufacturing would be to refund the CGST paid on domestically manufactured inputs (Raw Material, Intermediate goods, PCBA's.) used in the domestic manufacturing of electronic equipment.

7. Deemed export status to domestic manufacturing of ITA-1 items

Zero duty imports of these items from the countries which have various advantages such as Economy of scale, Low cost of Finance, Better technology and significant support from their governments have become a major challenge for local manufacturers discouraging investment in the sector. It is recommended that deemed export status should be given to the domestic manufacturing of ITA-1 items in the country.

8. **Capital Goods Required for Manufacturing:**
   The manufacture of Capital Goods for ESDM sector should be incentivized. This will reduce the cost of capital goods in the country and what is even more important is to ensure that global suppliers of Capital Goods provide a robust and competitively priced after sale service network in the country to support ESDM Sector.

SET-TOP BOX

Background:

1. CAREL initiative indigenization target – mixed success in 2011-2017
2. Domestic Demand of 60 mln set-top boxes and 380 mln STB world wide- primarily replacement in WW markets
3. Will evolve with OTT options like Amazon Firestick in 2017-21 period
4. STB is a Consumer Electronics Product , but unlike all other CE Products it does not belong to horizontal market which has open standards. STB eco-system belongs to vertical market where each STB is unique and closely connected to operator, CAS and STB manufacturer. India uses many different CASes. Fragmented market with limited intervention options for standardization.
5. Lack of minimum standard of CAS allows import of cheap STB's with weak and substandard security by DAS IV operators
6. In addition to above mentioned payTV STB's, Free-to-Air Set-Top-Box market (approx 12% of total demand) is supported by Doordarshan's FTA service. This FTA STB market is poised to revert from imported to domestic, courtesy Doordarshan presently adopting Indian conditional Access System

Policy Vision:

7. Sustain and Consolidate Competitive leadership in Set Top Box and Evolving OTT markets by driving Phased Manufacturing Program for higher local value-addition and product development.
8. Enable India manufactured STB share > 50% of overall domestic market and target exports of 5 Mln units
9. Enable minimum security standard of STB

Support recommended:

a. Ensure that current mSIPS applicants are cleared their dues in a timebound manner and all pending grants are disposed within 1 quarter of commencement of commercial production.

b. Continue with mSIPS subsidy for EMS for the plan period 2018-2021. Build Credit Default Guarantee as a mechanism to improve bankability of projects

c. Implement a Phased Manufacturing program that builds demand for non-ITA products

d. Review ITA product list critically and identify items not existing when ITA1 signed and delist them/ put appropriate import duties on them to push indigenous manufacturing.

e. Deny input-tax credit on imports of PCBs (both bare and populated) for this plan period

f. Target a STB SoC (system-on-Chip) with

i. Unique India features (Indian language Electronic Program Guide; Navic GPS, other design elements as harmonized with STB community)

ii. Created at a die resolution that is meaningful for a sustained period

iii. Policy interventions, if any, to aggregate India demand to India STB chip

iv. And then review incubating the chip in a virtual fab with appropriate control on IP – with a plan to shift to India as we build appropriate demand

g. Plug value-add violations and block imports from FTA countries (specifically, ASEAN and China)
h. Ensure minimum security standard of STB
i. Build exports by

i. ' Made-in-India' branding program

ii. Marketing incentives and focus country initiatives

iii. Export subsidy to offset disabilities, review export policy which does not allow export benefits to major markets

iv.

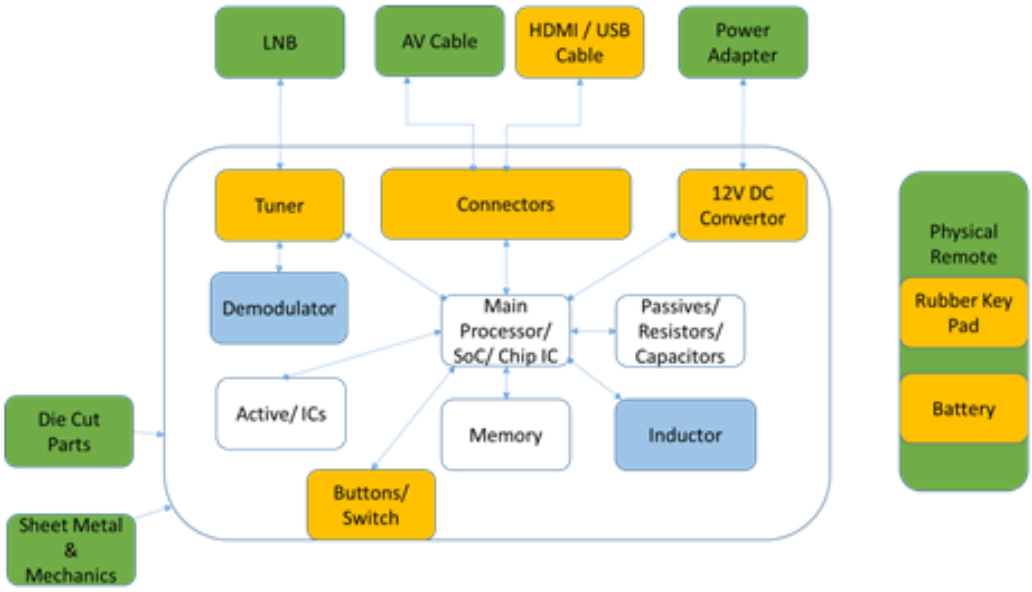
PROPOSED PLAN FOR PMP

Year	Details
2018-19	(i) Remote (ii) Power Adaptor (iii) AV Cable (current BCD is 7.5%. except Transformer, which is 10%) (iv) Die Cut Parts (v) Sheet Metal and Mechanics ** (v) Low-Noise Block Down Converter (LNB) - BCD is 10% (vi) HDMI Cable (vii) USB Cable (viii) 12V DC Convertor - (current BCD - 7.5%) (ix) Battery (x) Connector (xi) Switch (xii) Rubber Key Pad (xiii) Tuner - current BCD is 10% **Industry representation - 20% BCD on all products**
2019-20	Inductor - current BCD is 7.5% (xvi) Demodulator - current BCD is 7.5% **Industry representation - 20% BCD on all products**
2020-21	ATMP / SoC

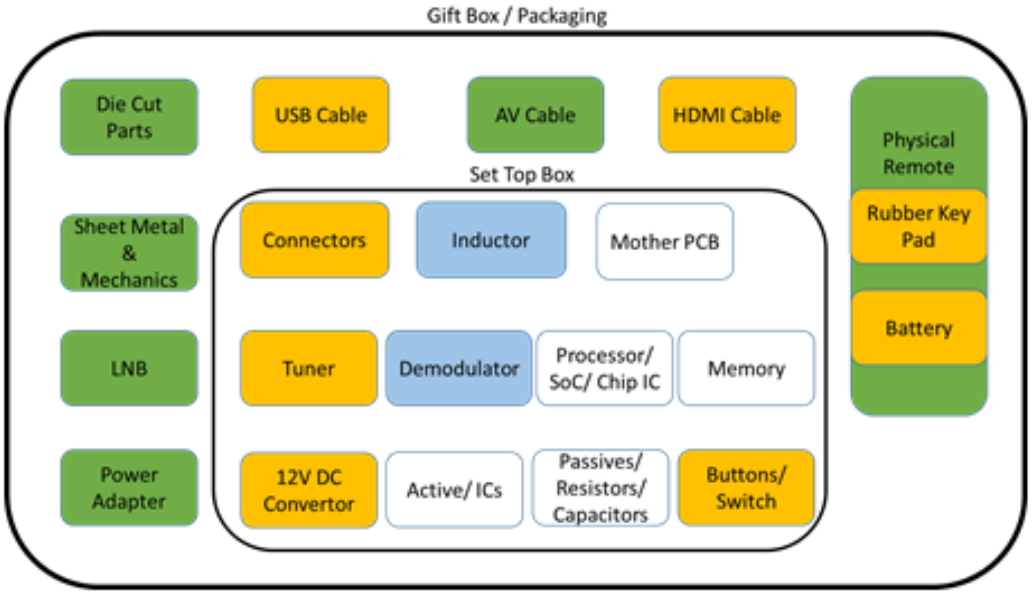
PMP should be done only if manufacturing has increased else domestic manufacturing will not sustain because manufacturing will not increase and local buying will get expensive due to duty on imports of components.

Proposed indigenization is shared visually in the block diagrams on the next page. It covers the non-ITA items. If we can implement points d, e and f, then we can improve our %age of indigenization in the STB decisively.

Block Diagram of a typical Set Top Box



Typical Arrangement of the Set Top Box and Accessories in a package sold as a kit

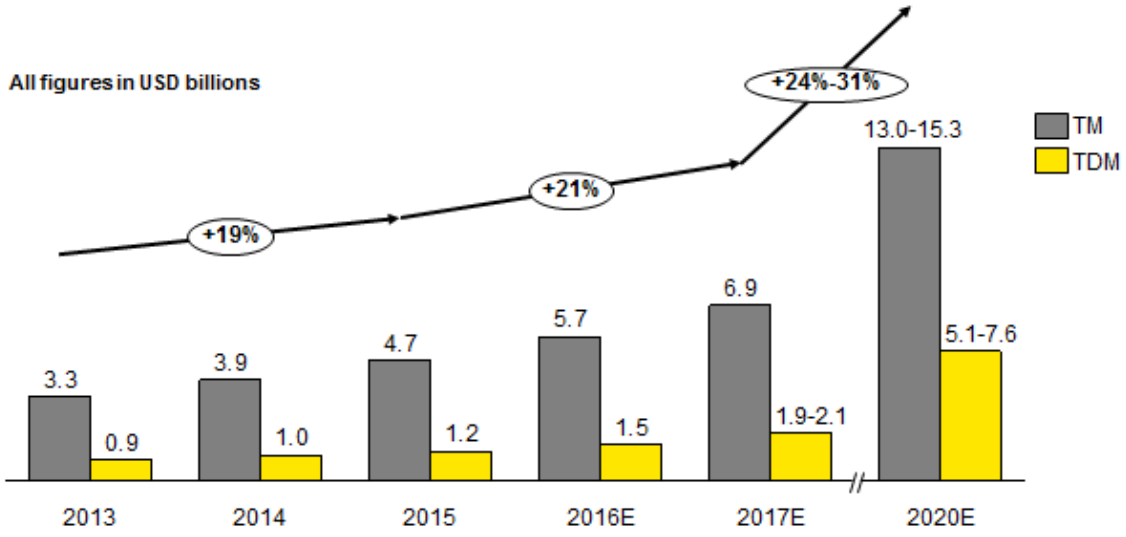


AUTOMOTIVE ELECTRONICS

Background:

Automotive Electronics in India

The Indian market for automotive electronics grew at a CAGR of 19% over the last two years to US$4.7 billion in 2015. The demand has been largely driven by increased electronic content in vehicles with increased focus on reduction in emission, safety, comfort, connectivity and infotainment. This market is expected to grow at a CAGR of 23-27% over the next five years to US$13-15.3 billion by 2020.



Key demand drivers:

- Increased demand for reduction in emission, safety, comfort, energy efficiency, connectivity, IoT is driving increased electronics content in vehicles. However, the adoption in India is currently, very slow.
- Electronics content in automobile is expected to increase from 15%–20% to 25%–30% by 2020.
- Innovation around safety, IoT such as connected cars (within infotainment and V2X technologies), real time driving behavior, vehicle diagnostics, etc., are likely to drive demand for body electronics and automotive sensors in India.
- Adoption of engine control, infotainment/navigation, ABS, ESP, advanced driver assistance system (ADAS), powertrain, body and infotainment systems etc., to drive initial uptake of electronics dominant automotive systems.
- Reducing prices and wider options across auto electronics to drive demand, given price sensitivity of Indian consumers.

- Availability of options due to reduction in prices of auto electronics (Electronics Control Unit): As the cost of ECUs is declining, the Indian consumers can now afford more electronic features in their cars.

Rising interests in electric vehicles: Vehicle electrification is expected to accelerate in the next three to five years driven by availability of electric vehicles at low prices. The Government has formulated the National Electric Mobility Mission 2020 with the aim to bring reliable, affordable and efficient electric and hybrid vehicles into the Indian market.

The total domestic manufacturing of automotive electronics has grown at a CAGR of 15% to reach US$1.2 billion in 2015. Although domestic manufacturing is increasing, 65%–70% of automotive electronics is being imported currently.

Automotive Vehicles are one of the biggest long-term growth opportunity for the semiconductor industry, with infotainment looking especially promising, given its components: include a microprocessor, audio processor, radio frequency, satellite, Bluetooth and USB interfaces, and an interface to the in-car network and memory.

IDC expects infotainment shipments to grow at a 19% compound annual growth rate, coupled with growing demand, boosted by requirements for rearview cameras, video systems, and lower prices for display screens.

Intel has a dominant market position in the PC processor and data center server markets, but it will launch its next generation processors in the coming quarters for connected car—and its interest in the sector is evidenced by its acquisition of Mobileye. BlackBerry's QNX Software System counts more than 40 automotive parts makers among its customers, Nividia has shown how artificial intelligence can be applied within the car, and Qualcomm's Snapdragon processors are key components in mid-to-high-end in-vehicle infotainment systems. Industry leaders like NxP/Infineon; STM; TI have all developed their Auto-Electronics portfolio to mine this opportunity.

It is submitted that there is a potential opportunity to leverage India's position as world's largest 2 wheeler market to flank the popular 4W automotive market and target select niche applications.

Increased investment activity in Indian automotive electronics market:

Many global OEMs are investing in the automotive electronics market to build their manufacturing capacities and focus on local R&D.

Majority of the global and local players have established themselves in India and are starting to source auto components locally to reduce costs. According to ACMA estimates, the Indian auto components sector revenues were US$34.7 billion in FY15 and are expected to grow to US$66 billion in FY16

However, automotive electronics industry in India is still at a nascent stage and lagging its foreign counterparts in terms of investments and production. Components are imported from countries such as China and Taiwan.

Sub-system assembly and final product assembly is mature in India with Tier1, OEMs and EMS providers having capacity and capabilities.

Driven by the "Make in India" initiative and government incentives through M-SIPS by the Government, a large number of investment proposals for automotive electronics have been received by MeitY.

Policy Vision:

1. Drive AE product markets for indigenous assembly and increasing value-add with competitive positioning in global market
2. Enable a range of products based on India SoC to competitively build and dominate the 2W automotive electronics market
3. Enable India's National Electric Mobility Mission Goals by driving innovation in engine powertrain and battery technology and building India standards and support for EV charging infrastructure

Support recommended:

a. Ensure that current mSIPS applicants are cleared their dues in a timebound manner and all pending grants are disposed within 1 quarter of commencement of commercial production.

b. Continue with mSIPS subsidy for EMS for the plan period 2018-2021. Build Credit Default Guarantee as a mechanism to improve bankability of projects

c. Implement a Phased Manufacturing program that builds demand for non-ITA products

d. Review ITA product list critically and identify items not existing when ITA1 signed and delist them/ put appropriate import duties on them to push indigenous manufacturing.

e. Deny input-tax credit on imports of PCBs (both bare and populated) for this plan period

f. Ensure that current mSIPS applicants are cleared their dues in a timebound manner and all pending grants are disposed within 1 quarter of commencement of commercial production.

g. Continue with mSIPS subsidy for EMS for the plan period 2018-2021. Build Credit Default Guarantee as a mechanism to improve bankability of projects

h. Implement a Phased Manufacturing program that builds demand for non-ITA products

i. Review ITA product list critically and identify items not existing when ITA1 signed and delist them/ put appropriate import duties on them to push indigenous manufacturing.

j. Deny input-tax credit on imports of PCBs (both bare and populated) for this plan period

k. Target a 2W AE SoC (system-on-Chip)/chipset with

    i. Unique India features (2W starter electronics; Navic GPS, other design elements as harmonized with AE community; Intelligent helmet)

ii. Created at a die resolution that is meaningful for a sustained period

iii. Policy interventions, if any, to aggregate India demand to India 2W AE chip/ India 4W AE chipsets

iv. And then review incubating the chip in a virtual fab with appropriate control on IP – with a plan to shift to India as we build appropriate demand

l. Invest in product innovation and R&D

i. R&D budgets for Next generation EV batteries (Concept-to-market)

ii. EV charging infrastructure

iii. Industry Roadmap for AE Technologies/products to be developed for India

m. Plug value-add violations and block imports from FTA countries (specifically, ASEAN and China)

n. Build exports by

i. ' Made-in-India' branding program

ii. Marketing incentives and focus country initiatives

iii. Export subsidy to offset disabilities

10. Build sector demand by

a. Accelerating adoption of ADAS specific measures as part of any kind of NCAP (National Car Assessment Program) system would serve following purposes.

i. First, it would help with safety.

ii. Secondly, it would help accelerate adoption of technologies that will eventually help facilitate autonomous as ADAS systems are necessary components to self driving cars.

Separately, due focus would have to be given to build appropriate standards aligned to India needs and to enable driving public to acclimatize to these new technologies without facing a plethora of different HMI (Human-Machine interfaces).

b. EV charging infrastructure/ leveraging India demand potential to create an India EV charging standard and products

11. Enable a CoE on Open Engineered Controls, Electronics and Software (CES) for xEVs

Development of xEV technologies is hindered lack of technologies in India for the critical subsystems like ECU, ABS, AMT etc. They are purchased by OEMs from global Tier 1 suppliers (dependence is near total today). We can drive the cost down significantly by developing Open Engineered CES platforms for the complete vehicle control and management functionality,

Sensor based software technologies such as object/ signal recognition, Driver Assist, Real Time Energy Management, Integrated Vehicle Health Management (IVHM), smart navigation etc. are needed to o improve passenger comfort, safety, fuel economy and pollution of the Indian roads at affordable costs. There is R&D competence in India in areas like controls, vehicle dynamics, instrumentation and signal processing, embedded electronics and communication, software engineering etc. The OEMs have expertise and infrastructure in IC engines, transmissions, vehicle integration and testing.

The Mission will utilize commercially available embedded software and hardware components and associated tools and open standards. This would enable the suppliers can build competitive and cost effective products, which can be integrated into a custom architecture, configured or tuned by OEMs and Tier 1s for commercial xEV design and implementations.

Program Objectives

- To develop open engineered CES sub-systems and benchmark with global state of the art and standards on test beds and vehicle subsystem prototypes for maturing up to TRL 6.
- To develop tool chain for design and configuration, development, test and validation of CES subsystems for target custom vehicle specifications
- To establish resources, facilities and competencies to continue globally competitive R&D in the above areas
- To develop IP and disseminate, transfer the same following principles of Open Engineering.

Structure:

A hub-and-spoke model is proposed. The hub would be a Centre of Excellence (CoE) on CES for xEVs that will focus on Directed Basic Research, and it will be established at a premier academic institution. The CoE will also coordinate the activities of the Program. The spokes will be technology consortium of industries and institutions. Additional technology partners may be inducted from national and international organizations.

Two broad streams of activities:

(a) System Controls, Monitoring and Autonomy, & (b) Embedded Hardware, Software and Networks.

Target xEVs sub-systems would be:

(1.) Battery Management System (BMS), (2.) Motor Control Unit (MCU), (3.) Vehicle Control Unit (VCU), (4.) Engine Control Unit (ECU), (5.) Vehicle Energy and Health Management, (6.) Driver Assist and Advisory.

ANNEXURE: 2 WHEELER ELECTRONICS OPPORTUNITY

Following applications are seen as potent electronics opportunity.

S.No	Application	Comments
	Electronic Chips	
1	Integrated Starter Motor driver (MCI)w/immobilizer	Potent ROI for industry
2	Tyre Pressure Monitoring system	Metrology(engine, battery-fuel, speed)
3	Collision Alert/ Helmet sensors	Impact sensors, alerts
4	Security Alarms/ Immobilisers	GPS alerts, alerts, immobilizers, Tag/Toll
5	GPS/ Telematics	Maps
6	Power Train Management	
	Display	
7	Front Panel	
8	Helmet Display – AR	
	Energy	
9	LED Based Headlamps	
10	Batteries	Next generation batteries, beyond LiB to be explored - including solid-state batteries

Opportunity of approx. 2 mln vehicles / annum- largest market for 2W in the world. Potentially, 2W electronics strategy for India can give it a larger share of the global market in this niche. Just Integrated starter motor driver electronics could give a load of 2 mln wafer starts a year. NAVIC based GPS could be another opportunity. Selecting appropriate device strategy can see India leverage 5 mln wafer starts in short run and eventually even more from this sector...

Annexure: NOTES FROM AUTOMOTIVE WORKING GROUP MEETING

Salient Points:

- 80% of the automotive electronics in India is manufactured by Tier 1 suppliers like Bosch, Continental, Delphi, Magneti Marelli etc...all of which are foreign MNCs, hence the IP mostly doesn't reside in India
- Entry barriers for 4W electronics, except for infotainment is very high
- For 2W, entry barriers are lower as compared to 4W, since OEMs are open to sourcing Electronics design and manufacturing from Indian companies
- Clear Opportunities exist for –
    - Bharat Stage VI norms – push for electronic fuel injection systems
    - Electric Vehicles –
        - Can act as a trigger to hardware development
        - Will give boost to power electronics ecosystem.
        - Currently norms are not so strict- even industrial grade parts can be used
        - Right steps taken by government for aggregated procurement of EVs
        - Charging infrastructure
    - 2W Electronics (because of high volumes and increasing electronics content for new features)

  - Driver Assistance Systems
  - Autonomous driving (10-15 years) as a long term technology investment.
- Focus on electronic modules

Recommendations

- Govt. should focus on 2W Electronics as a low hanging fruit, followed by 4W Electronics
- With the push for Electric Vehicles, the standards need to be in place. Alignment with the right standard is required – CCS (European Standard) or CHADEMO (Japanese Standard) as examples
- The charging station infrastructure needs to be put in place. Policy is required for standardization of charging stations
- BLDC motor development ecosystem will be a critical part of the EV ecosystem and hence should not be ignored.
- Govt. should initiate adoption of electric buses with an increased value addition, where entire demand can be aggregated as it will be a complete govt. initiative.
- The EV buses can replace the existing diesel buses and the model can be structured on the lines of the ESCO model
- For the EVs also, the initial push should be provided by the Govt, through demand aggregation and exit at a later stage once the market is matured.
- Top up subsidy on M-SIPS should be provided to the suppliers for EV.
- Higher incentives (like M-SIPs subsidy, if provided in the NPE 2.0) should be extended to 1st few investors, as the 1st mover advantage
- Sensor manufacturing should be focused and incentivized
- Skill development for upcoming areas like AI, Machine learning etc should be looked at – at the faculty level and the student level.
- Start-ups working in the EV domain in govt. recognized incubators should be supported to participate and win the tenders e.g. EV Chargiing start-up at EP
- On the semiconductor side, Govt and Industry should co-develop design for India devices for 2W electronics and upcoming applications line augmented driving etc., on the line of the NavIC Chip development initiative.
- IP creation in India should be focused at subsystem level
- Powertrain components of Electric Scooter: Battery, Controller and Charger already undergo through testing during qualification from ARAI and ICAT. They are having one automotive standard that is required by CMVR /RTO Registration process and they further have been requested for BIS on the same components. Only one certification test should be followed.

COMPONENTS, PCB, LED, SET-TOP BOXES, IT PRODUCTS, TELECOM EQUIPMENT, STRATEGIC ELECTRONICS, INDUSTRIAL ELECTRONICS, OTHERS
(NANO-TECH / IESA DOMAIN PRODUCTS PROFILED SEPARATELY)

Background

1. Rapid growth in digital payments and Pt of Sale terminals with the national initiatives of De-monetization and Digital India
2. Coincides with increased vulnerability to threats to the financial system and rise of cyber-attacks and cyber-crimes

Policy Vision

3. Build an India Security Stack standard for hardware and drive 'Made-in-India' PoS terminals with 100% indigenization in the plan period

Support Required

a. Align on India Security Stack
b. Target a PoS Terminal SoC (system-on-Chip) with

    i. Unique India features (Indian Security Stack;, other design elements as harmonized with Financial/ CyberSecurity community)

    ii. Created at a die resolution that is meaningful for a sustained period

    iii. Policy interventions, if any, to aggregate India demand to India PoST chip

    iv. And then review incubating the chip in a virtual fab with appropriate control on IP – with a plan to shift to India as we build appropriate demand

c. Execute other elements for cost competitiveness, demand aggregation and export markets as shared in the document.

(Salient points from wkg group meeting at MEITy):

- Component industry will not grow unless there's a 8-10% cost benefit
- Cost of finance:
    - Currently interest rates are fixed by the monetary policy committee, only keeping the inflation rates in mind and can't be brought to the level of interest rates in ASEAN countries
    - Components importers enjoy a credit period of 3-6 months
    - Importers get a LC of 180 days which can be discounted further for 180 days at an interest of 4% whereas domestic manufacturers can only get a LC of 90 days @ 12%
- Job creation in components is 10X job creation in products
- Import logistics from far east have improved significantly which offers a threat to the domestic manufacturers
- Rs 250 Cr worth of MSIPS proposals from IPCA
- China has advantages of economies of scale, finance cost and accelerated depreciation
- Higher Domestic Value Addition means higher disability for domestic manufacturers; 2% disability for every 10% value addition.

Recommendations:

- The overarching policy statement should mention the below statements with the incentives/interventions bucketed under these 3 points:
    - Making Electronics Industry Competitive
    - Development of Domestic Demand
    - Ease of doing business
- Apply 10% BCD on all Non – ITA components (ELCINA to provide a list)
- BCD should be charged on all components including electromechanical, PCB and passives. The ITA-1 product manufacturers should provide an end use certificate to claim re-imbursement/ credit. (A mechanism should be devised to allow duty credit in such cases within the next shipment)
- Disallow GST credit of 9% CGST on import of components including PCBs
- Difference in indirect taxation should be created for domestic manufacturers v/s traders
- The policy should look to curbing imports of PCBAs.
- Availability of non-electronic materials should be at China equivalent prices

- Cost of Finance:
    - International level of inflation should be considered
    - Electronic Manufacturing Fund should be set-up (on the lines of EDF) to be lent to the component manufacturers
    - CGST cash component should be retained by manufacturers for a period if 7 years (few states have policy in this regard)
- OPEX based incentives, linked to value addition should be provided to domestic manufacturers in the form of Tax Benefits
- Income Tax Holiday should be provided on both Domestic and Export Profits as follows-
    - 100% exemption for first 5 years
    - 50% exemption for next 5 years
    - Benefits of Income tax should also extend to companies under MAT
- MEIS benefit should be increased to 5% (for textiles it is increased to 4%)
- Non-Tariff Barriers like stricter standards w.r.t safety and performance for components should be enforced
- Tie-ups should be done with the design companies for using make in India components
- Identify 4-5 focus components e.g. PCBs, wire wound components etc. and create zones where all inputs should be available
- M-SIPS should be extended to units relocating their facilities to India, based on the CE certificates
- Added incentives under MSIPs should be provided to areas where ToT is required (e.g. PCBs)
- M-SIPS: Revised Capital Subsidy proposed as below:
    - SMD Components and passives: 40%
    - Other components: 30%
    - Products: 20%
- Product development should be incentivized
- Price preference of 20% should be allowed under public procurement policy
- PMA should be implemented and also extended to private procurement: Declaration of value addition should be done by private players for a sentiment boost and cultural shift

- Sale of all Zero Duty Products should be considered as deemed exports
- Labour laws should be eased for electronics manufacturing companies. E.g. industrial land/facilities should be allowed to be used for lodging of employees
- Technology fund should be set-up for commercialization of technologies
- A mechanism should be devised to utilize underutilized capacities
- National Electronics Mission should be set-up
- Incentivize OEMs for indigenization of components
- Salaried Class should get Income Tax rebate for buying Make in India Products
- Li-ion batteries: All PCBs in mobile phones including BCM for Li-ion batteries should be brought under PMP
- Adoption of SBIT scheme: All existing units should be considered as soft bonded units
- Scale of MSMEs in India different from those in China; incentivise MSMEs suitably to raise their level
- Linkages of National Programs to promote manufacturing like Demonetisation and GST created opportunity for POS Terminals, EESL's Lighting Program for LEDs
- Effective implementation of policies like Public Procurement (PMA)
- 60% of R&D budget should be on industry spend (applied R&D)
- Stimulate India demand
- Promote India Brand / Create a 'Made-in-India' Star program that drives indigenization and promotes 'Made-in-India' buying behaviour with Consumers as today most consumers do not even know the domestic content of their purchase. T
- Weighted deduction under MAT on electricity, interest and depreciation, in case, IT holiday is not acceptable
- Incentivise Anchor companies if they bring their Tier-2 vendors as it leads to strengthening the supply chain
- Provision of Accelerated depreciation to attract investments
- MEIS suggested as follows-
  - For SMD components/Semiconductor/ATMP 10%
  - For other components 7%
  - For products 5%

MOBILE HANDSETS AND RELATED PARTS/COMPONENTS

Background:

1. Notes from Mobiles working group is shard here.

2. IESA inputs will evolve from and align into ICA inputs for the Mobile demand/ vision.

3. Semiconductors in Mobiles are dominated now by global majors and there may be limited opportunities to capture this value chain for India. However, we will need to review this in line with the overall India plan and target global players appropriately.

- Mobile Displays are a relatively lower hanging fruit and with the OLED displays likely to grow rapidly and capture the mobile display market in next 5 years, there is a major opportunity for India to review its plans for mobile displays. IESA notes on this are shared separately in the Display fab vision/ options and recommendations elsewhere in the note.

- **IESA has requested ICA/ Ministry for its demand forecasts by screen sizes for doing appropriate recommendation on the display fab capacity, feasibility.**

4. **Moreover, we request Ministry/ ICA to discuss and then publish a PMP for Mobiles for enabling our industry members to align with the desired programming**

5. Here we are sharing the salient notes from the working group meeting on Mobiles.

Discussion from the working group:

- After the first protection provided by PMP, there has been an onslaught by the Chinese Manufacturers and Indian Brands have shrunk further. Domestic Market is not sufficient for and export incentives are minimal.
- Global Competitiveness is the only option. Tariff barriers, created by PMP are only 1st step. In fact, PMP is driving the SMEs out of business.
- China is taking deep strides in Nanotech and Semiconductor components through big investments.
- Tariff protection should be there for the 1st 3-5 years only – component industry to be developed with increased duty on components
- BOM cost for Indian and Chinese Manufacturers is the same. The overhead absorption rates, financing costs and depreciation costs is what hurts the Indian Manufacturers.
- Direct Taxes in India are highest.
- R&D in Brazil and Design in Brazil policies should be looked at. China also as similar design incentives.
- Future Goals: 500 Mn phones manufacturing in India, 15 Lakh jobs, 120 Mn phones export, 50000 cr manufacturing

Recommendations:

- NPE 2.0 should aim at creating Level Playing field for Indian Brands.
- If any Chinese manufacturer has to come with equipment, it has to be a JV with an Indian Partner (following the automotive model) – FDI route and Security Controls
- A National Institute for Mobile Design should be set up, which should be run by the industry.

- Instead of providing capital subsidy under MSIPS, the govt. should look at providing income tax exemptions, which in fact defers the incentive to be provided by the Govt. and happens only when the actual income is generated by the manufacturer.
- Tax holiday should be provided for Exports.
- The definition of R&D should be broadened and should not be confined to original design only but also to modification of an existing design. R&D incentives should be increased under NPE 2.0. Outsourced R&D should also be incentivized.
- Skill Development should be subsidized
- Funding for IPR procurement
- Interest subvention for cost effective loans should be introduced (instrumentality to be worked out)

LED PRODUCTS

Background:

- Notes from LED working group is shared here.
- IESA will seek demand inputs from sector association to build its interface inputs.

Policy Vision:

1. Build a LED chip packaging and driver assembly program for India
2. Enable Indigenous lighting solutions demand to promote manufacture of LED and LED lights
3. Enable an India LED Fab that leverages local demand and evolves a global/ regional dominant position[1]

   (Strictly speaking should come from LEDMA/ sector association; this is only a suggested position. It appears that the LED fab for india in this plan period may be a distant hope unless we look at a larger, overall program leveraging technology cess).

Salient Points:

- As per ELCOMA report, 70% of LED products are found to be illegal and substandard, out of which 90% are imports. These are either smuggled, or manufactured in SKD form by very small players. They don't even have a brand/manufacturer name
- As per the trade map data

Imports 2016

- 8539 (LED Lamps) 162M$ China 92M$
- 9405 549M$ China 466M$

Exports 2016

- 8539 90.9M$ USA 19.7M$
- 9405 153M$ Germany 44M$

Recommendations:

- Policy should focus on stopping imports from neighbouring countries and promote domestic manufacturing.
- Identification of LED chips should be used as a mechanism to check spurious LED products coming to India
- PMA should be implemented.
- For large Govt. projects, e.g. Smart Cities etc. Price preference should be provided to domestic manufacturers and domestic value addi
- Smart Lighting being the biggest IoT enabled product in this segment, should be included in Digital India
- India should be looking at the exporting to the world. Re-instate export incentives which have been coming down over the past few years.

- FTAs should be signed with countries where India is exporting and not with countries from where India imports.
- Income Tax exemption on export profits should be provided
- Design incentives should be re-stored and both in-house and outsourced R&D should be included.
- Guarantee fund to support commercialization of R&D
- Inverted duty structure should be corrected – currently GST on finished product is 12% and components is 18%, which leads to blocking of working capital.
- For Non-ITA-1 products, raise the duty to 20%
- Disability of 8-10% faced by the domestic industry should be addressed
- PMP program should be evolved for encouraging localization
- Domestic LED packing should be encouraged. Production subsidy should be provided for LED packaging.
- ATMP for LED driver - 8 pin SOP should be encouraged.
- LED labs should be set-up in 2-3 universities across the country
- CRO compliances should be provided to Indian companies free of cost as against the high costs to foreign manufacturers.
- Joint PR initiative by Govt and industry to promote 'Make in India' sentiment
- Global Tenders should not be mandated when local capacities exist

MEDICAL ELECTRONICS

Background:

- Notes from Medical working group is shared here.
- IESA will seek demand inputs from sector association to build its interface inputs.

Policy Vision

- To consolidate the design and development of affordable medical electronic device industry and to develop downstream manufacturing activities through sector specific cluster.
- To evolve an institutional mechanism for promotion of innovation in medical electronics
- And to promote the marketing/ manufacturing of innovations in Indigenously developed medical electronics

Support Required:

- IESA notes for support required covering ideation, incubation and acceleration of innovation are covered in the Innovation Initiatives
- IESA notes on Ease-of-business, Market Access, Demand Aggregation and Export Marketing are covered in other sector notes

- **The recommendations of the Working Group as discussed during its first meeting held on 17/11/2017 which are to be addressed through NPE:**

Version 1

- Lack of Electronics Ecosystem, Chips and Skilled labour is a barrier. NPE should aim at developing a strong ecosystem for PCBs and Components
- Currently R&D and Innovation are not being incentivized. Need to increase R&D incentives and broaden the definition of R&D – to include outsourced R&D and also include LLP firms.
- Testing & Certification costs are very high. Set up a Common testing and certification facility with certification labs.
- Access to technology should be subsidized.
- Indian Standards should be adopted but should be same as IEC Standards.
- Currently only 26 medical devices are standardized under the BIS. More number of medical devices should be brought under the mandate.
- CRO type scheme should be evolved for medical devices
- Currently companies spend lot of cost in buying and keeping standards locally. Such costs should be reduced.

Version 2

- A strong ecosystem of the electronics industry at system level is missing in the country and needs to be addressed suitably.
- R&D through PPP model with the funding support from Industry and Government needs to be promoted. Commercialization of technologies available with Academic/R&d institutions.
- Creation of Infrastructure for carrying out test, evaluation, accreditation and compliance by upgrading existing laboratories. Subsidized access of these facilities to MSMEs.
- Creation and enforcement of Indian Standards on Medical Electronics Devices.
- Companies needs to be provided a free sale certificate for Indian manufacturers without which they are not able to export to many countries though the market is available.
- Strict enforcement of Preferential Market Access Policy with at least 30% local content.
- Import of refurbished medical electronics to be restricted, for ensuring quality norms.
- Startup support/ leveraged Common Manufacturing Facilities, open labs programs.
- Local component manufacturing is a weakness. Consider very specific and critical ones (vital organs of medical devices) – for example, invest in magnet, RF amplifiers, scintillators, X-ray tube etc.

Version 3

- R&D status for Limited Liability Partnerships (LLPs) doing R&D.
- Adoption/creation and enforcement of globally harmonized Indian Standards on Medical Electronics Devices by BIS. Notification of Medical Electronic Devices under Compulsory Registration Order (CRO).
- Creation of Infrastructure for carrying out test, evaluation, accreditation and compliance by upgrading existing laboratories. Subsidized access of these facilities to MSMEs.
- Cluster Status for existing Medical Electronics Manufacturing hubs.
- Support for manufacturing of specific critical component/submodules for Medical Electronics Devices. For example: magnets, RF amplifiers, scintillators, X-ray tubes etc.
- Support for Skill development/enhancement of the manpower required for this industry.
- Strict enforcement of Preferential Market Access Policy for Medical Electronics Devices.
- Single window clearance for Medical Electronic Devices.
- Companies needs to be provided a free sale certificate based on pre-requisite documents for Indian manufacturers without which they are not able to export to many countries though the market is available.
- Import of refurbished medical equipments should be permitted only by OEMs except critical care equipment (as defined by MoEF), for ensuring quality norms.

CONSUMER ELECTRONICS

Background:

- Notes from Medical working group is shared here.
- IESA has asked demand inputs from the CEAMA/ FICCI/ Consumer Electronics associations to build its interface here.

Notes/ Recommendations from the working group for Consumer Electronics:

- Production subsidy should be provided for consumer electronics to subsidize the operational costs. In phase-1, the production subsidy should be provided at the product level instead component level
- ATMP should be incentivized and included in the PMA for specific areas identified. This will give a boost to the domestic value addition.
- Encourage Domestic Manufacturing of finished products. Currenly imports have become more attractive by 4-5% with the GST introduction.
- Tariff Interventions
    - Duty should be imposed on Panels (currently at Zero Duty)
    - Duty on finished product first.
    - PMP for select products.
- GST on TVs is 28%, whereas parts for TV are at 18%. This should be at same level.
- GST on 32" or smaller TVs should be 18% as they are not luxury items.
- GST on Open cells should be 28%
- Freight subvention scheme for exporters
- Coastal SEZs should be developed
- Export Incentive under MEIS is insignificant
- Private Sector Banks should be encouraged for financing of consumer durables.
- Aggregation of demand should be done.
- Brownfield EMC/CFC focused on consumer electronics should be developed
- R&D exemptions, currently being withdrawn w.e.f. 1st Feb 2018, should be continued and in fact increased.
- PMA should be applicable.
- The definition of R&D should be broadened and should not be confined to original design only but also to modification of an existing design. R&D incentives should be increased under NPE 2.0. Outsourced R&D should also be incentivized.
- Projects like Twinstar Display Fab should be fast tracked.
- MSIPS incentive should be applicable for a period of 2 years only, i.e. the Phase 1 has to come up within 2 years.
- A dedicated fund should be set up to protect Indian brands and promote Make in India sentiment.
- Different branding for Assembled in India v/s Make in India
- Interest Subventions should be introduced
- A dedicated cell for monitoring evasion of standards

DEFENCE ELECTRONICS

Background:

- Total Defence Electronics Market size estimated at $70-72 Bn till 2030 (broken down as $10-12 Bn system of systems; and $ 58 Bn platform electronics

Vision:

- To create a holistic ecosystem and capabilities for the Indian defence electronics industry to be globally competitive and design and manufacture world-class products and make India as a global defence electronics design and manufacturing hub.

Mission

I. To promote indigenous product design, development and manufacturing in the entire value chain of the Defence Electronics for economic development and self-sustainability.
II. To develop capacities for manufacturing of strategic electronics within the country and with increasing domestic value addition

Objectives

I. To develop indigenous product development and manufacturing capabilities with domestic companies getting a significant share of ~USD 70-72 Bn of India market projected in next 10-12 years, and exports to leading countries.
II. To Increase the number of jobs, even at MSME level, by including large OEMs for integration and MSMEs for component manufacturing and MRO
III. To strengthen the service industry in the country by creating a fair environment for ESOs for participating in the defence programs.
IV. To reduce the obsolescence of technology and equipment in the Indian defences services by allowing simpler ToT methodology
V. To improve the overall visibility of defence equipment needs to the domestic industry, thereby reducing the lead time from AON stage to production stage
VI. To reduce forex outflow that is spent on 'Buy' programs and equipment, thereby strengthening domestic economy
VII. To create world-class companies and capabilities that address not only Indian opportunities but also leverage from integration into global value chains of OEMs

Support Required

For detailed recommendations, Refer:

- Defence Electronics Policy Draft Sep 17–IESA Whitepaper/ now in process of review and adoption by MoD

FABLESS DESIGN

Background:

- The *National Policy on Electronics (2012)* commendably covers the intent of the government to nurture the domestic ESDM sector.
- The 2012 policy, though talks of attaining "global leadership in VLSI, chip design" by 2020 as one of the core objectives, somehow omitted to make any specific provision to support the fledgling Indian fabless semiconductor start-up community.
- Semiconductor industry has very different dynamics, be it chip design or manufacturing, compared to other ESDM verticals in terms of it's large capex needs and gestation period. Hence it is imperative to address the concern of semiconductor industry with specific policy clauses. Commendably NPE-2012 does includes policy statement on chip manufacturing fab, it missed calling out specific policies for fabless semiconductor design.
- There have been intent and some efforts by MeitY to support fabless ecosystem in country, from the point of view of the IESA fabless CIG, however, the implementation and net effects of the notified 2012 policy yielded far less spectacular results than hoped for.
- The experience of implementation of the 2012 policy during the intervening years till date suggests that specific policy provisions and closely focused implementation strategies are needed to empower this rising aspirational sector that shows clear potential to enable India leapfrog into the exclusive league of nations that lead cutting-edge silicon-centric technology innovation. This will also offer India a high degree of self-reliance in core semiconductor technology to support every modern industry sector in the country.
- Fabless Design and IP needs to be recognized as a key focus area to be competitive in the global markets, bring more value added work that takes advantage of the current eco-system and skill availability.

Policy Vision

- Build India as a preferred destination for fabless design by enabling ease-of business for startups and global MNCs by delivering competitive operational TATs
- Go beyond academic fabless incubation to grow commercial startup incubation and commercial MSME incubation thru infrastructure and demand
    - Enable a 10-fold growth in India fabless design entities by building Commercial Design Incubator/ Centre of Excellence with appropriate libraries of EDA/IP tools
    - Drive indigenization of all microchips used by strategic defense, space and aviation sector – leverage India Chip demand for indigenization, self-sufficiency and boosting Indian fabless ecosystem

Policy Mission

- Deliver Ease-of-business by enabling competitive operations TAT (ref Annexure) :
    - Implement Risk Mgt System for imports of equipment by MNCs, support hand-carry norms and eliminate CE certificate requirement in used equipment imports.

- Facilitate a rather sedate fabless startup landscape to become a thriving ecosystem by nurturing at least 100 fabless MSME during NPE2.0 policy period.

- To facilitate the growth of at least 10 fabless MSME companies to achieve turnover of USD$50mn by providing funding support and through aggressive positive market intervention. (cumulative t/o of $500 mln targeted)

- To achieve 50% indigenization of all the microchips used by strategic defense, space and aviation sector in the next 5 years.

- Cut the import of microchips by at least 30% in next 5 years by ensuring Indian and MNC ESDM companies to use chips produced by Indian fabless industry by incentivization and strict PMA adherence

- Enable a Commercial Design Incubator/COE for Fabless Design with appropriate libraries of EDA/IP tools for leveraged use by MSME fabless companies.

Support Required

Necessary requirements for creating a successful Fabless Chip Design ecosystem

Infrastructure

a. Efficient & cost-effective Access to cutting edge design tools and flows from EDA vendor such as Synopsys, Cadence, Mentor Graphics, etc.
b. Efficient & cost-effective Access to process technology and Fab for production
c. Efficient & cost-effective Access to process collaterals such as process file, Libraries, Runsets, foundational IP, Design Kit
d. Efficient & cost-effective Access to Fabs/Foundry for Test Chips in early days
e. Efficient & cost-effective Access to diverse IP ECO system
f. Efficient & cost-effective Access to Architecture and Micro-Architecture
g. Efficient & cost-effective Access to Software design and software
h. Efficient & cost-effective Access to tester and testing facility
i. Efficient & cost-effective Access to packaging and board design capability
j. Efficient & cost-effective Access to working reference designs for HW/SW/FW

Ease-of-Business

k. Efficient & cost-effective Access to tested, validated & qualified catalog of components for building BOM
l. Efficient & cost-effective Access to rapid prototyping facilities: Electronic, Physical, Product ID, etc
m. Efficient & cost-effective Imports of tools, equipment required for executing projects (competitive global TAT reqd)
n. Efficient Availability of mentors – design choices, product ideas, community
o. Funding – for Test Chips, Test equipment, simulation
p. Skilled Manpower

Demand

q. Access to Markets- domestic as well as global

Multi Product Test Shuttle (MPTS) Service

While the design community in India has become mature in some key areas and continues to improve in other areas, the pace should be accelerated significantly.

Engineers graduating from Indian engineering colleges take VLSI design courses, but they do not get any real world experience of designing a chip. Even after they join a company, it might take 2-3 years before they complete a design, tape out, get silicon and test it to get real world exposure of designing a product that gets deployed in production volume. This cycle can be reduced considerably by getting the engineers exposed to the real world fab experience as early as possible. One good example worth emulating in this aspect is the MOSIS program that is run by University of Southern California's Information Sciences Institute. Majority of MOSIS' customers are students from universities all over the United States. MOSIS combines customers' orders onto shared multi-project wafers (supported by multiple fabs) that speed production and reduce costs compared with underutilized single-project wafers.

Running a similar program (under the aegis of MeitY or an IIT) would help improve the skillsets of the students tremendously and they would be able contribute from Day 1 after they graduate and join a fabless company. Startups in the Fabless space would be able to take advantage of this program as well to defray the costs of doing test chips before taking up full-fledged designs. This would also alleviate to a large extent the issue of not having a fab india as educational institutes/starts up would have access to multiple fabs through such a program.

It is also relevant and important to realize that the global MNC driven fabless ecosystem is also under pressure because of uncompetitive operational TATs and there is a visible shift of projects to other Asian Economies. India needs to address this and ramp up its skilled fabless manpower base to deliver the opportunity from the fabless ecosystem.

Current status of Indian Fabless Design ecosystem

Area	Status	Assistance Needed
Infrastructure	Mature	Startups will need help with business model
Tools, Flow & Methodology	Mature	None
Architecture	Low	Activity low in this area as companies are focused on services & not products.
Logic Design	Mature	None
Logic Verification	Mature	None
IP Design & Sourcing	Medium	A few companies doing Design, but Startups will need help with upfront license cost on sourcing
Physical Design	Mature	None
Performance Validation	Mature	None
Tape In/Tape Out	Mature	None
Post Silicon Validation	Medium	Encourage companies in test/post silicon Infra
Operational / logistics TAT	Very Poor	Correct regulatory aberrations that disable TAT competitiveness (refer annexure)

RECOMMENDATION - FABLESS DESIGN

	Area	Background	Recommendation
1	Market Opportunity/ Seed Funding	Total semi consumption in India is ~$4B and companies will be able to address a part of this only in specific segments. So, companies need to target both Indian and global market (~$400B) in target market segments to get to critical mass of volume shipments and be globally competitive.	Go beyond the current open ended funds (EDF etc.), identify select 3-4 segments where there is enough local consumption (ex. STB, Point-of-sale terminals, Energy meter, GNSS, 2W automotive electronics, IOT) and provide seed funding to get 3-4 companies to kick-start the eco-system.
2	Market Assurance	It is very difficult for startups in the Fabless Space to break into the market as established companies (especially from China) enjoy cost advantages either due to huge volumes from the	The govt needs to devise policy so that startups that take the risk of designing a product targeted at a big enough domestic market segments (ex. STB, Smart Card, GNSS/Navic, IOT etc.)

		domestic china market and/or support provided by the Chinese govt.	do not get impacted due to competitors whose costs are lower due to non-mkt reasons.
3	People/Skills	Skill set in Academia is hampered by not having access to any fabs to do test chips. Skill set in Industry has matured over the past decade and there are enough engineers in India now proficient in all domains, albeit focused only on services.	Fund a MOSIS like program to give first hand experience to students so that they can be productive from day one when they start working. Startups/companies can use this program as well. Drive a network of academic fabless incubators that in turn support virtual fabless academic incubates in India
4 A	EDA Tools for Startups	EDA Tool cost is one the biggest cost for a fabless MSME/ startup entity.	Designate an IIT to be the single point of negotiator with EDA tool companies and host the tools in cloud to be accessible for all startups. Govt to fund this upfront until production and companies will pay royalty to the EDA companies after they start production.
4 B	EDA Tools for MSME	It is relevant to note that MSME license will be a commercial license and Indian Fabless MSME are not able to cross the commercial investment threshold.	Government needs to fund this upfront to enable Indian MSME fabless entities to enable localization and Indian IP for india Chips
5	Emulation / Rapid Proto	This is also a significant upfront CAPEX cost for	Govt to fund this as a common Infra at one or two

	Infra	fabless startups.	locations that is accessible to any startup from anywhere in the country.
6	CPU IP	Indian govt has already funded open source royalty free RISC V implementations (IIT Chennai, CDAC). There are implementations by private companies as well. All these are completely Designed in India.	Govt to continue the development of this effort and also pay for porting of these cores to major fabs so that startups can readily use this for production.
7	Non-CPU IP	Startups have to negotiate with each IP company separately and that does optimize time or money.	Two points. 1. Designate an IIT to be the demand aggregator and be the single point of negotiator with IP companies 2. Govt to fund commonly used IP (create an IP bank) that will reduce the cost of development. Similar to the EDA tool model, companies can start paying royalties after production starts.
8	OSAT (Assembly & Test) or ATMP (Assembly Test , Measurement & Packaging)	OSAT (Outsourced Assembly & Test) companies handles assembly and testing for fabless companies across the world. Having these companies setup facilities in India will help fabless companies offer end-to-end services to customers and maintain parity with their global peers. It is relevant to understand that it is not viable to look at	Govt should have a focused effort to engage the major OSAT companies and bring them to India. As Phone vendors are already doing system level assembly, this will be next level of value addition for the industry and does not need heavy lifting. Government to enable demand for select India Chips and get it incubated

		a long term ATMP operation where the wafers are imported and the finished products are exported. The need is to create a substantial local demand for ATMP to be enabled.	in a virtual fab and virtual ATMP to enable demand aggregation as it drives the ecosystem shift to India.

Further Recommendations:

1) To classify all semiconductor products and offerings – Integrated Circuit, Module-on-Chip, System-on-Chip, semiconductor IP license, and all associated system and application software products including software IP license – of Indian fab-less semiconductor start-up companies as Domestically Manufactured Electronic Goods as per the terms of the government policy on Preference for Domestically Manufactured Electronic Goods, even if physical chip fabrication is carried out outside India.

2) Set up a "National Fabless Semiconductor Mission" which under its umbrella co-ordinate and operate following activities:

    a. Promote sustained business connections between Indian electronics and semiconductor start-up companies (hereinafter "Startups") and user groups within Indian government and defense sectors (hereinafter "Strategic Users") and their tier 1 vendors, contractors, and system integrators (hereinafter "Strategic Suppliers"), and to monitor and track the implementation of the policy.

        i. Work with Strategic Users and startups to align their roadmaps and ensure that Strategic Users procure a mandatory minimum percentage of their specific electronics and semiconductor products and IPs from Indian start-up companies, provided that the products meet specified functional requirements and financial budgets. The mandatory minimum percentage may be set and periodically revised as per the norms of the government policy on Preference for Domestically Manufactured Electronic Goods.

        ii. To encourage and incentivize Strategic Users to proactively explore, partner and fund design alternatives that use products from Startups in pre-production prototypes and trials wherever feasible.

    b. Setup and operate fabless semiconductor CoEs in several Indian cities with a presence of fabless semiconductor companies and with proximity to academic institutions working in related areas (such as Microelectronics, VLSI design). The CoEs should act as primary connect points to the fabless entrepreneurial ecosystem in these cities. The proposed fabless semiconductor CoEs will have all the infrastructure to incubate/accelerate the fabless companies physically or remotely.

    c. Co-ordinate foundry relations for all semiconductor companies with external foundries and leverage its position with foundries to advantage of Indian fabless companies by collating

all the needs under one roof. Drive demand aggregation for India Chips with Indian IP in a virtual fab/ATMP model as a precursor to enabling India Fab.

d. Closely works with MeitY, Strategic Users, private ESDM players to create and execute strategies for positive market intervention to promote the interest of Indian fabless companies.

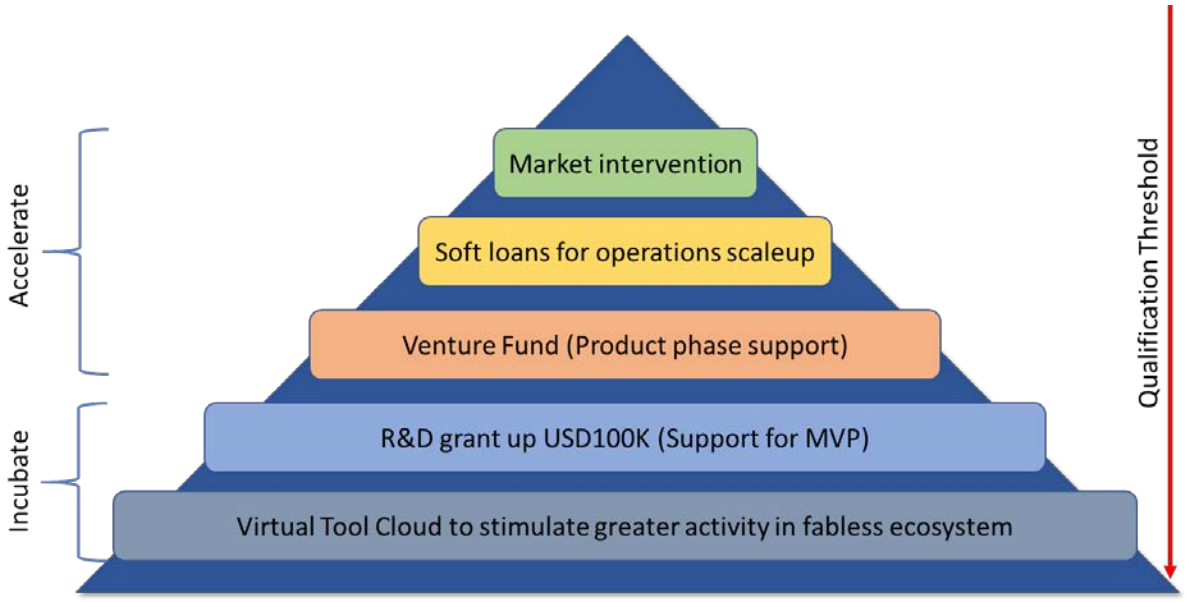
e. Closely work with proposed "National Fabless Semiconductor Venture Fund" and other private angel and VC funds to enable the capital inflow in Indian fabless ecosystem.

3) To set up a sector-specific "National Fabless Semiconductor Venture Fund" to directly invest early-stage seed capital and venture equity capital exclusively in Indian fab-less semiconductor companies with special focus on companies creating indigenous semiconductor-centric IPs. The fund should be setup with a total initial investment corpus of Rupees Two Thousand Crore to be invested over the next 5 years. Structure a Daughter Fund under EDF in which the Govt should take equity higher than 50% and the Fund provides more than 75% of its fund to fabless companies

4) Provision a mechanism of soft loan for fabless companies through SIDBI or any other relevant agency with extended repayment terms and low interest rates. Existing provisions require company promoters to furnish their personal guarantees in order to avail such loans which must be done away with by including them into "Credit Guarantee Scheme for SMEs".

5) The provision to fund/reimburse upto 50% the cost incurred towards R&DE. Appropriate funding by the government, in identified critical microchip requirements of strategic sector. to early stage Indian fabless MSME/startups for enabling India chips with India design.

Annexure 1: Proposed Support Structure



Proposed 5-Tiered Fabless Support Structure

- Salient points of proposed five-tiered fabless industry support structure:

1. Stimulate Fabless startup ecosystem, which otherwise stands very sedate today, by providing a "Tool-on-Cloud" framework at a nominal cost to pretty much every fabless startup with a product plan to achieve 100 fabless startups in next 5 years.

2. Provision for a grant of USD100K-USD150K to a fabless semiconductor company with a CAD proven design to support it to achieve a silicon proven design. A fabless company assumes no value till it has a silicon proven design and hence can't go for funding round. Since taping out a chip is a expensive affair such grants will help a fabless company to cross the barrier. Target for supporting at least 50 tape-outs in next 5 years.

3. All tech VC funds including EDF focuses on entire ESDM & SW sector and owing to high capex/risk/gestation, no fabless company could ever raise fund from EDF daughter funds. Therefore, a portion of the EDF should be earmarked as dedicated semiconductor venture fund owing to its high capex/gestation nature. Target to extend fund support to at least 50% of post MVP companies in next 5 years with "National Semiconductor Venture Fund".

4. Indian fabless companies, even with successful products are still operating at smaller scale and struggling to scale up to compete at global scale. Provision of a soft loan for extended periods will help them scale up. The provision of such soft loans should also be extended to established large Indian ESDM companies who wish to invest in fabless semiconductor operations. Through such provision, target to help enable at least 10 fabless startups to up their valuations to $50M.

5. Indian fabless companies pretty much solely rely on global markets to sell their products competing with big boys which in turns get imported by spending forex. No level playing field in global semiconductor market makes it more difficult. We must provision for a facilitation mechanism wherein a funded co-development by PSU company along with a fabless partner leads into Indian IC product and IP portfolio, jointly co-owned by PSU and fabless company. A similar aggressive push which is combination of incentives and pre-agreed PMA policies by private parties too would result in local development of microchips in India. This would require a comprehensive due-diligence however such positive market intervention is need of the hour. We should target to reduce reliance on imported chips for strategic sector by 50% and at least 30% reduction in microchip import overall in next 5 years.

Annexure 2: Proposed Budget Outlay

- In order to set up a National Fabless Semiconductor Mission and create the support structure for fabless companies, we seek a budget outlay of USD $67.5Mn which amounts to INR 439 Crores. The breakup of the same is given as follows:

Item	Avg Spend(USD)	No. of beneficiaries	Incubation period	Plan period	Total(USD)
Fund allocation for National Fabless Semiconductor Mission					
Tool support for 100 fabless startups	200,000	100	2	5	40000000
Tapeout Grant	150,000	50	NA	5	7500000
CoE Infrastructure & Operations Cost	1,000,000	4	NA	5	20000000
Grand Total over 5 years (USD)	67500000				
Grand Total over 5 years (INR)	4387500000				

- In addition to the above, we also seek that "*National Fabless Venture Fund*" with kitty of INR 2000 crore pledged over next 5 years, which is 20% of total EDF size in order to support at least 50 fabless companies in next 5 years.
    1. Typical need for seed VC capital for a fabless company can vary somewhere between USD 5Mn to USD 10Mn.
    2. The proposed fabless VC fund, thus, would be able to fund about 50-60 fabless semiconductor companies in next 5 years.

- If proposed recommendations can be successfully implemented, the following RoI can projected to come out of the investment made:
    1. 10-12 Indian fabless semiconductor companies with cumulative revenue turnover of USD 500Mn i.e. about INR 3200 crores.
    2. The direct/indirect import bills spent on microchip will have the potential to reduce by 20%-30%.
    3. The reliance of strategic sectors on imported microchips will be come down by 50%.
    4. Entire ESDM ecosystem will see a boost as Indian fabless companies will grow because he system companies will be able to work with local fabless chip companies on custom design bringing the cost per functionality down due to customization.

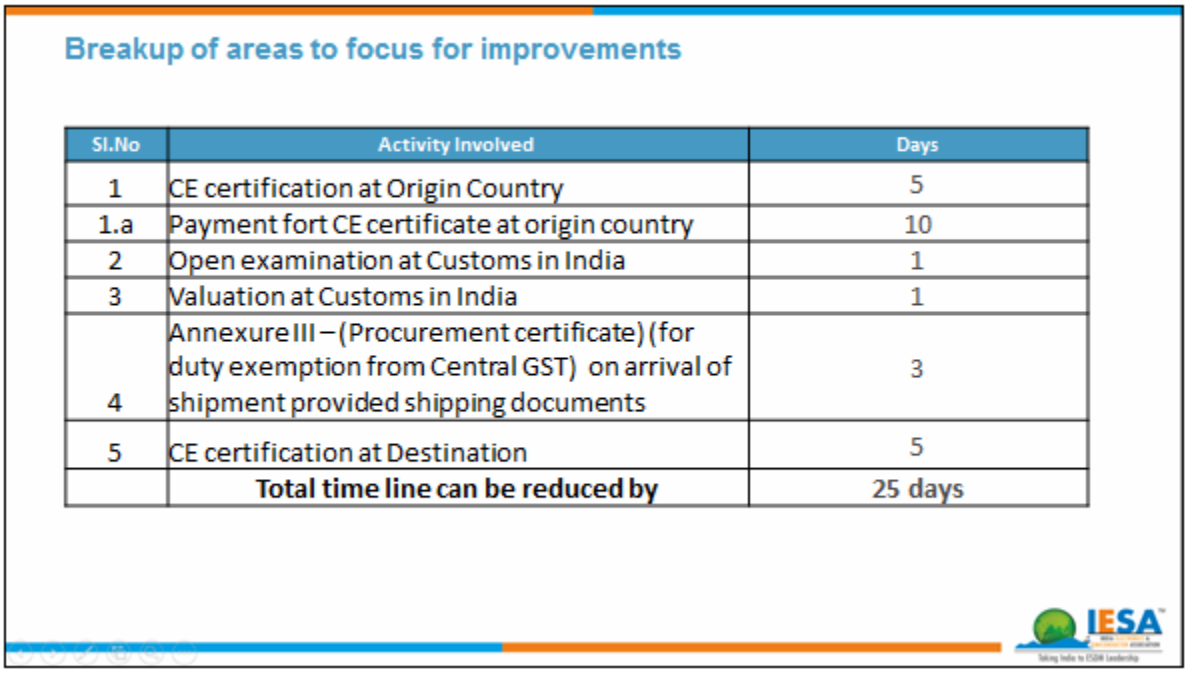
Annexure 3 – Import TAT vs competing ASIAN Countries and suggestions on interventions

Workings on Used Electronics and Electrical Equipment's

Activity Involved	Bangalore Used import	Mumbai Used import	Taiwan	Singapore	Korea
Transit Time	3	3	3	3	3
Documentation(IGM manifestation)+. Pre-Approved checklist	1	1	1	1	1
Open examination	1	1	0	0	0
Valuation	1	1	0	0	0
Procurement certificate requirement	3	NA	0	0	0
Assessed BOE Generation and clearance	1	1	0	0	0
Duty payment (Basic duty/IGST)+(internal SPR process +IBM process)	3	3	0	0	0
CE certification at Destination	3	5	0	0	0
Advance payment to Vendor for CE certification	10				
For Used electronic/electrical item CE certification at origin	5	15	0	0	0
Total cycle time	16+15=31	15+15= 30	4	4	4
Total Cycle time - If Customs duty payment process streamlined by importer	13+15=28	12+15=27			

Explanations

Activity Involved	Background and problem	Proposal
Open inspection/ other processes	3- 5 days overhead	RiskMgtSystem/ ECP (green channel) Ref. IESA representation attached
CE certificate at origin (required as per MOEF)	Upto 15 days	Benchmarking with other countries has shown that CE certificate is not mandated. Ideally, IESA recommends that CE certificate is waived in toto. If it is required, it can be invoked on request by customs at destination thru a customs approved CE. It is requested that the CE certificate at origin is waived off as a requirement as it adds a substantial TAT, results in unneccessary forex outlay in a foreign country and anyways is over-ruled by the CE certificate at destination. Ref. IESA representation on CE certificate shared here.
CE certificate at destination (required as per customs)	Upto 3 days	



Breakup of areas to focus for improvements

Sl.No	Activity Involved	Days
1	CE certification at Origin Country	5
1.a	Payment fort CE certificate at origin country	10
2	Open examination at Customs in India	1
3	Valuation at Customs in India	1
4	Annexure III – (Procurement certificate) (for duty exemption from Central GST) on arrival of shipment provided shipping documents	3
5	CE certification at Destination	5
	Total time line can be reduced by	25 days

References:

IESA White Paper "Designing in India – Fabless Chip Design Whitepaper Nov 2017

IESA M&M Study on India Fabless Chip Design Ecosystem 2017 (official release Jan 2018)

IESA F&S Study of Indian Semiconductor Demand & Fab Opportunity 2017 (official release Jan 2018)

INNOVATION INITIATIVES

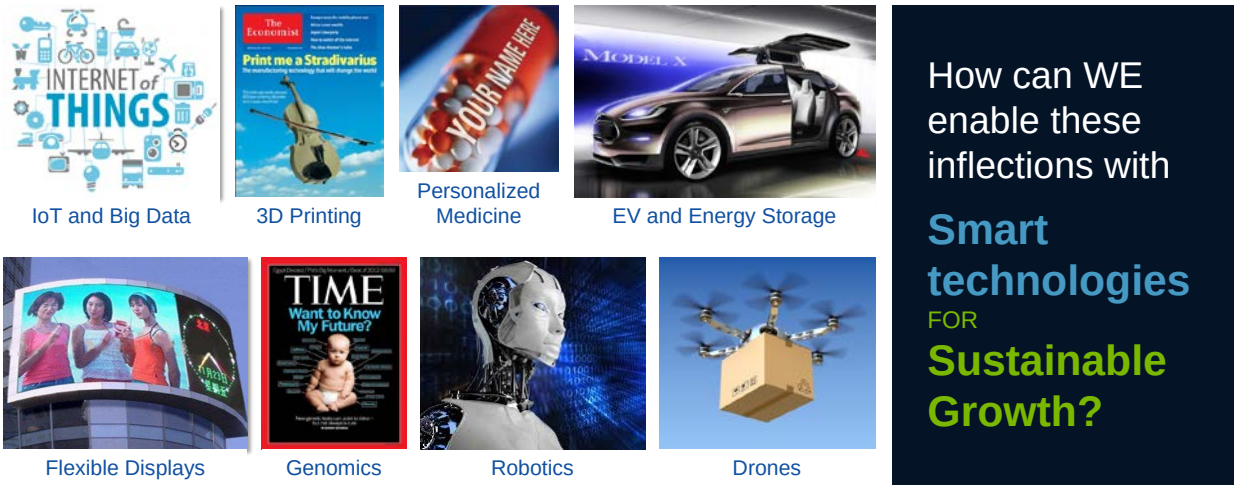
4. **Emerging DeepTech Opportunities**
5. **R&D Ideation**
6. **R&D C2M**
7. **Startup Acceleration**
8. **Startup Incubation**
9. **Startup Ideation**
10. **Human Resource Deployment**

EMERGING DEEPTECH INNOVATIONS

Background:

- 2017-2022 plan period will see the evolution of electronics industry from sand-to-cloud with the new generation products actually leveraging new generation (IoT) devices interfacing their data with cloud and creating new applications with emerging deeptech.
- The resulting era will see an explosion of end-applications for all spectrums of human activities including agricultural, medical, consumer, automotive, strategic...
- Moreover, new technology platforms will also evolve rapidly, driving a need for continuous innovation in the ecosystem

We are Living in Exciting Times



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- IESA leadership see the electronics hardware converging rapidly with newer deeptech via sensors, via IOT, via internet clouds leveraging analytics and AI...creating newer opportunities and niches for mining India's talent...
- This note would like to inject the policy / vision thoughts relating to the innovation ecosystem from the industry side.

Policy Vision

- Evolve a nation-wide network of innovation eco-system with

- An Ideation Engine touching 500 engineering institutes across India with a thruput of 100,000 students touched with a hands-on Engineering Exploration Pedagogy (IESA INNOVATION INITIATIVE therefore visualizes industry driven 500 Tinkering labs/ EP@Univs by 2021)

- An Incubation Engine with Open Lab/COEs for IOT and COEs for other Deeptechs spread out across the country to enable rapid prototyping and cross-functional skill leverage (IESA would like to evolve 7 COEs / Open Labs for IoT – one each in Delhi, Chandigarh, Pune, Bangalore, Hubli, Hyderabad, Calcutta by 2021)

- Also in the plan period – grow COEs for EV/ Flexible Displays/ Drones/ AR-VR/ EVs/ Medical/ Defence/ Fabless Design (as per IESA Innovation Roadmap)

- An Acceleration Engine with Common Manufacturing Facilities for an asset-light execution for entrepreneur startups leveraging tool rooms and CMFs under EMC programs (IESA would like to evolve 4-7 CMFs with Mechanical Finishing Workshops and SMT lines in Delhi NCR, E, W, S region ; and another set of specialized CMFs from NC FLexE labs at IIT Kanpur and SCL/IISc Bangalore for Semiconductor devices).

Support Required

- As shared in the following pages
- Creation of technology expert pool to drive the COE creation

R&D IDEATION AND R&D CONCEPT-TO-MARKET PROGRAM

Background:

- Appropriate investment will need to be made in building innovation in India lest it loses out in huge royalties on technology acquisition.
- And there will be a need to build R&D ecosystem and Global Engineering Centre base in India.
- As per Zinnov, over 800 companies are operating their GEC/ R&D Centres in India.
- There is a need to keep on expanding on this position of India as a preferred R&D/ Innovation Centre
- However, This position is under evolving threats from Singapore (despite higher costs/ policy pull) and China (demand and policy pull)

Policy Vision:

- India will consolidate its position as preferred R&DE centre for global corporations with its ease-of-business, IP protection and talent
- It will create a talent pool of 2500 PhDs in the plan period 2017-2021/ retaining a cutting edge thruput which will not be less than Singapore (as a benchmark)
- It will enable an innovation portal with matchmaking technologies and innovations with industry and global markets at competitive terms
- Become a global leader in IP creation in ESDM sector by increasing fund flow for R&D, seed capital and venture capital for startups in the ESDM and nano-electronics sector

Support Required:

- Ease of business
    - RMS Facilitation for competitive TAT on imports
    - Waiver of CE certificate (ideally both at origin and destination/ definitely for origin) for used EEE imports
    - Hand-carry of goods
- Aggressive Policies for capturing key deeptech R&DE opportunities in India thru competitive grants wrt Singapore and other Asian countries
- Demand Aggregation for Products based on Indian IP/ Innovation
- 'Made-in-India' branding/ Marketing program for India Innovations
- Export Marketing support as documented elsewhere

STARTUP IDEATION, INCUBATION AND ACCELERATION ENGINE FOR ESDM

Background:

- Emerging startup wave has seen IoT startups grow @CAGR of 50% from 350 to 980 by 2018 November in 2 years time.
- There is a need to grow the startup ecosystem with:
    - Increased Quantity of Startups
    - And Increased Deeptech Quality of Startups
    - Growing beyond the conventional IoT hardware to emerging deeptech
- Electronic Development Funds created by GoI – yet to hit ground. Original policy provided for use for promote innovation and IP/ R&D. In reality – it's deployment is for commercial products as determined by the daughter fund managers.

Policy Vision:

During the Plan period 2017-2022

- India will target a CAGR of 40% growth in ESDM startups reaching to a projected thruput of
- 100,000 engineering students /annum by 2021 in ideation phase
- Approx. 8000 startups/ annum in innovation phase (proof-of-concept development phase) by 2021
- Approx 2000 startups/ annum in acceleration phase (scaling PoC to market by 2021)
- It is expected that the collective employment of the acceleration phase startups and innovation phase startups will be 225,000 per annum
- To develop core competences in strategic and core infrastructure sectors like Telecommunications, Automotive, Avionics, Industrial, Medical , Solar, I&B, Railways, Smart Cities, Homeland security etc thru use of ESDM in these sectors.

Support Required:

Industry proposes to work with government and industry CSR to create this engine. Support will be required to create

- a network of tinkering labs,
- COEs/Open Labs with complete controller boards, sensor libraries, communication chips, industry tech experts for facilitating rapid proto-typing

- Common manufacturing facilities for asset-light startup acceleration

Improved Deployment of Electronic Development Funds with clear execution metrics and enablement of startup ecosystem .

Common Manufacturing Facilities at EMCs to be leveraged for an asset-light acceleration of startups to enable concept-to-market execution

HUMAN RESOURCE DEVELOPMENT

Background:

- 2017-2022 plan period visualized creation of capacities within academic institutions to enhance the production of adequate number of PhDs and Postgraduates for supporting the growth of chip design/ embedded software/ board-hardware design industry in the country.
- Programs envisaged industry multiplier support for industry for each sponsored PhD
- However, the scheme has had a mixed success with substantially underperforming #s of part time Phds – investigations indicate that there were PhD students from allied fields leveraging studies pertaining to ESDM who were not even heard in the scheme (guided back to University on direct application) – and no engagement from the University
- Moreover, the scheme implementation failed to realize that the evolving landscape is seeing dramatic merger of electronics with various fields creating opportunity for fresh innovation and interventions.

Policy Vision

- Build a pool of 2500 PhDs in the plan period covering ESDM topics relating to use of electronics in electronics engineering and related fields
- And build an improved thruput of 100% utilization of PhD grants for Part-time industry applicants
- Developing capabilities in all sectors of ESDM including original named electronic/semiconductor design sectors and expanding to solar, display, LED, energy storage, IoT, Flexible Electronics, AR-VR engineering and India markets

Support Required

- Flexible PhD policy responsive to applicants
- Timely review and approval of applicants, including earlier applicants who are doing their PhD
- With a focus on enabling Knowledge base in the country on the markets and technologies
- Encourage setting up of skill-oriented courses and training programs for electronics design along with hands-on laboratories enabling graduates from other disciplines to migrate to ESDM
- Evolve IISc and SCL to be the fountainhead institutes for specialized institute for semiconductor design and IIT Kanpur for Flexible Electronics
- Leverage emerging SMT capacity at CMF to expand trained operators/ engineers for enabling EMS growth
- Extending Special Manpower Development Program for VLS chip design to include larger number of Colleges and students leveraging the National Knowledge network (Chips-to-system Design)

- Collaborate with National and International institutes for developments of new skill, courseware on latest manufacturing technologies & products in ESDM sector

ECOSYSTEM INITIATIVES

11. eWaste management
12. Cyber/IoT security
13. 5G programming
14. Attracting FDI in ESDM
15. Export Promotion

E-WASTE MANAGEMENT

Background:

- E-waste rules implementation has seen mixed results and controversies on industry impediments
- There is a need to facilitate implementation of Extended producer Responsibility for manufacturers and recyclers

Policy Vision

- E-waste collection will be streamlined thru creation of an industry-led Producer Responsible Organization (PRO) which will be a SPV with industry , Government stakeholders and recycling community. The entire process of ewaste collection will be digitized to enable brand-wise, recycler wise collation of e-waste processing in the country
- E-waste rules will be simplified to:
    - Take the e-waste collection liability from the participating manufacturers to the PRO
    - And to ensure that the ease-of-business of large business is not impacted
    - It will be the PRO which will build the reverse supply-chain networks and reporting into the system

Support Required

- Policy support to create the first SPV PRO and to give it a 3 year startup run to design, stabilize and sustain the reverse supply-chain program
- Promote development of ewaste recycling industry for domestically produced ewaste
- Streamline procedures to prevent e-waste dumping in the country without stifling ease-of-business for good actors
- Streamline implementation of ewaste rule implementation including restrictions on usage of hazardous substances as per global best-practices

CYBER/ IOT SECURITY

Background:

- 2011-2017 has seen an increasingly vulnerable digital world with increased number of incidences of cyber attacks and cyber crimes on both individuals and institutions
- With the explosion of IoT devices in the coming plan period, there is an increasing risk that the vast canvas of emerging digital world will be open to vulnerabilities that can be exploited by criminals. This sets the tone and need for an IOT Security policy.

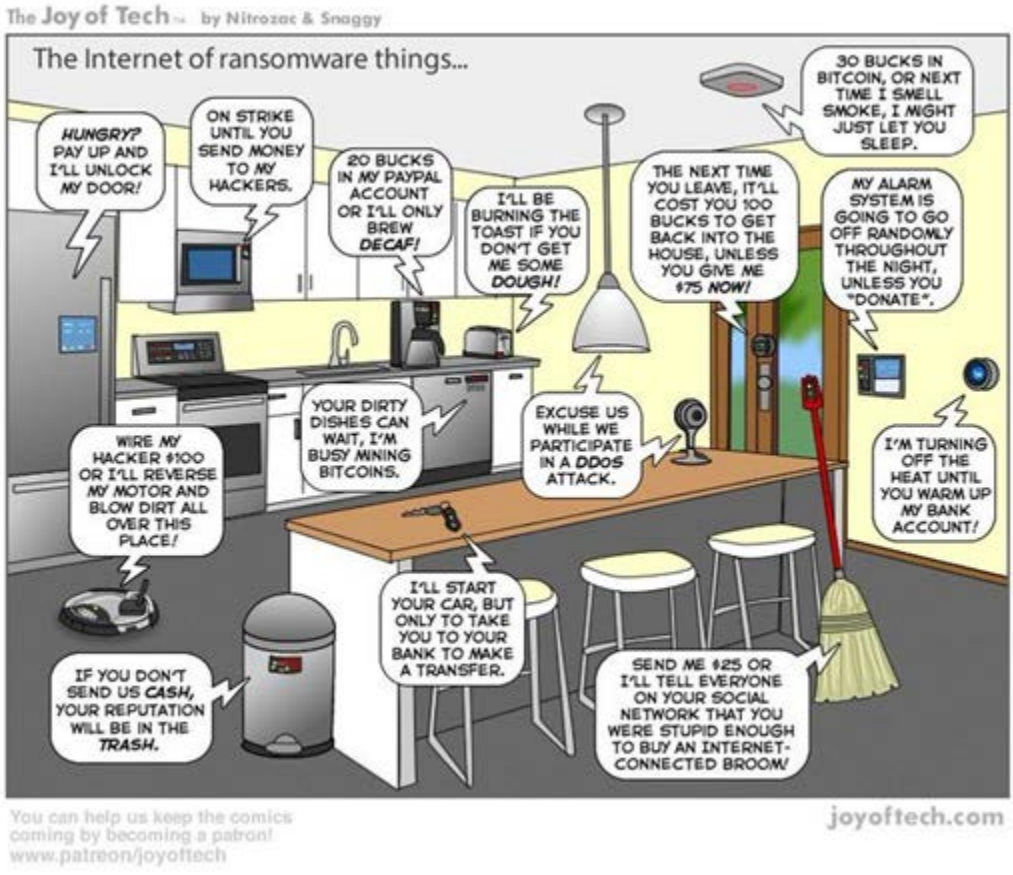
Policy Vision:

- India will design and implement a comprehensive IoT / Cyber Security program that will protect its individuals from cyber attacks and will limit the damage by isolating any incidence from mainstream users
- Zero incidence of 'significant damage'/ downtime of key national institutions in the plan period
- Create a complete secure cyber eco-system in the country, care and due attention to be given for creation of well-defined technology and systems, use of appropriate technology and more important ly development of appropriate products and solutions.

Support Required:

- India security stack to be defined and standardized
- Development of India hardware for PoS Terminals, key equipment
- Cyber Police / Healing network to isolate, contain and correct damaging incidents
- The priorities for action will be suitable design and development of indigenous appropriate products thru frontier technology/product oriented research, testing and validation of security of products meeting the protection profile needed to secure the ICT infrastructure and cyber space of the country

"WELL, I *TOLD* YOU NOT TO OPEN THAT ATTACHMENT!"



5G – NETWORK FOR THE IOT WAVE

Background:

- 2017-2022 plan period will see the evolution of electronics industry from sand-to-cloud with the new generation products actually leveraging new generation (IoT) devices interfacing their data with cloud and creating new applications with emerging deeptech.
- 5G will need access to various spectrum ranges in order to meet the envisioned usage scenarios
    - Low (~ 1 GHz: e.g. 2x 20 MHz per operator)
    - Mid (~3-5 GHz e.g. 100-200 MHz per operator)
    - High (~20-40 GHz e.g. 1 GHz per operator)
- 5G Spectrum in other countries
    - US: 600 MHz, 3.5-3.7 GHz, and 27.5-28.35 GHz, 37-40 GHz for licensed use plus 64-71 GHz unlicensed
    - China: 3.3-3.6/ 4.4-4.5/4.8-4.99 GHz plus tuning range of 26 GHz/28 GHz and 39 GHz under study
    - Japan: 3.6-4.2 GHz/4.4-4.9 GHz and 27.5-29.5 GHz as MIC candidate bands. Japan has been using L-band for a while as their low-range spectrum.
    - Korea: 3.4.-3.7 GHz, and 26.5-29.5 GHz

e. Europe: 700 MHz, 3.4-3.8 GHz, and 24.25-27.5 GHz as pioneer 5G bands

Policy Vision

- Enable deployment 5G systems along with other leading countries, ensure spectrum with sufficient bandwidth of enabling applications harmonized with the global ecosystem to maximize first mover advantage

Support Required

- Ensure spectrum availability to enable deployment with leading countries
    - Make spectrum available in all three ranges (low, mid, high) for 5G
    - Harmonization of spectrum bands for 5G
    - Harmonization of radio tuning ranges in case exact bands cannot be allocated.
    - Harmonization is crucial for :
        - Global roaming
        - Leverage economies of scale
    - Align with Key first markets moving forward with 28 GHz
        - 28 GHz Radio tuning range also supports 26 GHz
    - Radio tuning range also within 37-43.5 GHz

-
- Make spectrum and sufficient bandwidth available expeditiously for 5G
    - Technical rules (power, OOBE, etc.) harmonized with that of first movers such as the US to take advantage of the coming products.
    - 600/700 MHz: ~2x 20 MHz per operator
    - 3-5 GHz : at least 100 MHz per operator
    - 28 GHz (first deployments) and 37/39 GHz tuning ranges: at least ~1 GHz per operator

- Apart from Optical Fiber network, crucial for 5G success is ensured availability of spectrum for next generation wireless technology like WiGiG for High Bandwidth Backhaul and Access.
    - This is required to ensure that the network will be able to handle the enormous amount of data that the network will need to handle plus to provide new and rich user experience.
    - DoT is yet to take a call on the V Band (57-66GHz). TRAI has already provided its recommendation to delicense/lite license this band
    - The Ministry should consider allocating 57-66Ghz contigiuous spectrum to accommodate 4 channels of operation.
    - This spectrum should be Unlicensed (for mass market consumer devices) & may be lite licensed for high power outdoor, e.g. P-P, usages.
    - Should allow maximum flexibility in rules
    - For 60 GHz, follow Recommendation ITU-R M.2003, which is aligned with 802.11ad. Re EIRP, higher than 40 dBm only for applications such as P-P and mesh.

ATTRACTING FDI FOR ESDM/ PROMOTING ECO-SYSTEM FOR HIGH-VALUE ADDED MANUFACTURING

Background:

- 2017-2022 plan period will see the evolution of electronics industry from sand-to-cloud with the new generation products actually leveraging new generation (IoT) devices interfacing their data with cloud and creating new applications with emerging deeptech.
- There is a need to build India's basic ESDM industry – as well as catch the wave in emerging deeptech by leveraging leaders. Moreover, select economies may be targeted as a preferred source of such FDI/ innovation.

Policy Vision

- Target $1 bln investment from Taiwan, Japan and Korea in select ESDM Sectors – evolve as a preferred, low risk, high-opportunity market for Regional ESDM industry

Support Required

1. Electronic Component Manufacturing Fund:
   A dedicated Venture fund for the development of Component Manufacturing ecosystem should be floated. This fund may be on the lines of EDF and/or as a separate Venture fund with government's equity and monitoring mechanism. This Venture Fund should be eligible for Income Tax breaks on its earnings and thus provide low cost capital to high value added electronics manufacturers.

2. Specialized EMCs
   Leverage emerging opportunities like Display fab in Nagpur to drive creation of specialized EMCs or a potential Semiconductor Fab to create supply-chain relevant clusters.

   To encourage manufacturers, specialised testing and R&D/Prototyping facilities should be provided in these Clusters.

3. Government campaigns such as Digital India should be used to spur domestic manufacturing capacities:
   Demonetization created a demand for PoS machines and Micro ATM's. Bharat Net, Smart cities, IoT, Electric vehicles initiative etc. are big government programs which boost the demand for electronic hardware. Advance planning to launch these programs would help in boosting domestic electronics manufacturing rather than depending on imports.

4. Credit Default Guarantee for Electronics Manufacturing
   - Electronic Manufacturing industry is facing challenges to set-up electronics manufacturing facilities in India because of high cost of investment involved and lack of adequate credit facilities.
   - Most of these machinery is required to be imported. Considering the significant amount of investment involved, procurement has to be done on credit basis; either by availing bank loans / bank guarantee.

- The banks in India require atleast 100% of the loan / guarantee amount as collateral for extending credit facilities. Such collateral requirement poses challenges for growth and hence, there is a need for the government to enable banks / financial institutions to extend credit default guarantee for facilitating import of capital goods.
- Electronics equipment funded through a loan from banks / FI's for a tenure of 4 - 5 years for which the Investor shall pay an upfront amount of 20% of the total value. The Government of India shall extend Credit Default Guarantee for 50% of the total value covering the entire tenure of the loan.
- This credit default guarantee shall be extended to the financial institutions / banks who provide the lease
- Credit Default Guarantee for Domestic Sale of Electronic Products and Components. This will go a long way in boosting investments in Electronics Manufacturing.
- Similarly as there is inadequate ecosystem in India for components, hence 70-80% of all components and even final electronic goods are imported. Currently, the importers of components enjoy 3 - 6 months credit from Chinese exporters. Such facility has been enabled by SINOSURE, the China government owned insurance company to promote exports.
- Another option is to tie-up with JBIC (Japan Bank for International Cooperation) to enable low-cost capital for funding capital equipment into India.
- This helps the importers as a working capital bridge to realize cash and effect payments for the imports over the 3 - 6 month credit period.
- Hence, the Indian industry prefers to import components and equipment rather than buying from the domestic manufacturers.
- Once the manufacturing facilities are set-up as stated above, the components can be procured locally and substantially reduce import dependence.
- It is proposed that Central Government should extend Credit Default Guarantee covering 25% of the value of the sale of domestically manufactured components and electronic products for a tenure of 3 - 6 month period and support local manufacturers by incentivizing purchase of their components/products.

5. Build ESDM investment facilitation agencies and Country engagements via in-country desks and CRMs for structured marketing/ engagement

PROMOTION FOR EXPORTS

Background:

- 2017-2022 plan period has seen the Sector Exports grow to $ bln, with % of domestic production.
- Typical product exports have covered:

Policy Vision

- Build a global footprint for India ESDM products by enabling appropriate export incentives to neutralize disabilities
- Target $ mln investment from Taiwan, Japan and Korea in ESDM Sectors
- Build ESDM investment facilitation agencies and Country engagements via in-country desks and CRMs for structured marketing/ engagement
- Enable at least one major relocation of an electronics hardware manufacturing unit facing cost pressure in developed countries with min $100 mln/ annum re-export potential

Support Required

- DTA sales of ITA -1 / zero duty electronics products to be treated as physical exports and extended all the benefit of export schemes
- Globally market and showcase chip design, India product design and embedded software industry capabilities
- Build a 'Made-in-India' branding program for innovations and successful executions (Electronic Voting Machines; Space Program products etc)
- Promote export of electronic products to all countries , including emerging regions like Africa, South America and Asia, among others, by entering into suitable bilateral/ multi-lateral agreements
- Streamline procedure and logistics to facilitate import of components / sub-systems and export of products
- Implement export incentive program, MEIS, with incentives suggested as follows-
    - For SMD components/Semiconductor/ATMP 10%
    - For other components 7%
    - For products 5%

EXECUTIVE SUMMARY

Policy Vision & Mission

SOLAR

- India will drive its solarization program with indigenization at the following pace:

	2017	2021	2025
Solar PV Cells	2GW (10% indigenization)	8-10 GW (Cell-Module 80-100% indigenization)	18 GW (100% indigenization)
Poly-silicon	-	Poly-Si fab with ingot , wafering plant (40% indigenization)	Poly-Si fab with ingot wafering plant (80-100% indigenization)

- The local industry, in addition to serving the local Solar Integrator/developer demand, will achieve a 10% export target from its existing capacity in the years 2020-2022.

SEMICONDUCTOR FAB & ATMP

- Facilitate setting up of Semiconductor Wafer fab facilites and enable its eco-system for design and fabrication and ATMP of chips and chip components, including capital equipment manufacture.
- **Enable an India Semiconductor Fab** that is driven by demand from select niches where India can evolve a global/ regional dominant position, for example, in
    - Leverage 2 W market dominance for enabling 2W Electronics
    - Payment Security to be enabled for Indian Payment Terminals
    - IPG and India feature enabled Set Top Boxes for enabling India mass communication
- Support the India semiconductor Fab with a cutting edge Semiconductor Prototype fab in collaboration with global majors where designs and processes can be incubated for a long term India sustainable position

DISPLAY FAB

- India will enable a LCD TV Display fab in the 2018-2021 plan period that will be upgradable in sync with industry roadmap for TV Displays and give a strong foundation for bringing the display ecosystem (including glass) into the country.
- India will also enable a Mobile display fab in the 2018-2021 plan period that will build on the phased manufacturing program for Mobiles.
-

ENERGY STORAGE/ LiB-SSB Fab

- India will enable a LiB / SSB factory in India in 2018-2021 plan period that will leverage on the phased manufacturing program for Mobiles. It will also build the relevant infrastructure to evolve deployment of the batteries for EVs, Drones and other consumer applications
- India will source, stockpile and promote indigenous exploration and mining of Rare-earth metals required for manufacture of electronic components.

EMS

- To sustain and consolidate competitive leadership in the EMS segment by promoting progressive higher value addition in manufacturing and product development
- Target 10 x growth in SMT lines in India/ % 50-100% (majority share localized, depending on product categoy) of assembly in India in plan period with minimum 300 SMT lines in India by 2021

Set Top Box

- Sustain and Consolidate Competitive leadership in Set Top Box and Evolving OTT markets by driving Phased Manufacturing Program for higher local value-addition and product development.
- Enable India manufactured STB share > 50% of overall domestic market and target exports of 5 Mln units
- Enable minimum security standard of STB

Automotive Electronics

- Drive AE product markets for indigenous assembly and increasing value-add with competitive positioning in global market
- Enable a range of products based on India SoC to competitively build and dominate the 2W automotive electronics market
- Enable India's National Electric Mobility Mission Goals by driving innovation in engine powertrain and battery technology and building India standards and support

Point-of-sales Terminals

- Build an India Security Stack standard for hardware and drive 'Made-in-India' PoS terminals with 100% indigenization in the plan period

LED Products

- Build a LED chip packaging and driver assembly program for India
- Enable Indigenous lighting solutions demand to promote manufacture of LED and LED lights

- Enable an India LED Fab that leverages local demand and evolves a global/ regional dominant position[1]

Medical Electronics

- To consolidate the design and development of affordable medical electronic device industry and to develop downstream manufacturing activities through sector specific cluster.
- To evolve an institutional mechanism for promotion of innovation in medical electronics
- And to promote the marketing/ manufacturing of innovations in Indigenously developed medical electronics

Defence Electronics

- To promote indigenous product design, development and manufacturing in the entire value chain of the Defence Electronics for economic development and self-sustainability.
- To develop capacities for manufacturing of strategic electronics within the country and with increasing domestic value addition

Objectives

- To develop indigenous product development and manufacturing capabilities with domestic companies getting a significant share of ~USD 70-72 Bn of India market projected in next 10-12 years, and exports to leading countries.
- To Increase the number of jobs, even at MSME level, by including large OEMs for integration and MSMEs for component manufacturing and MRO
- To strengthen the service industry in the country by creating a fair environment for ESOs for participating in the defence programs.
- To reduce the obsolescence of technology and equipment in the Indian defences services by allowing simpler ToT methodology
- To improve the overall visibility of defence equipment needs to the domestic industry, thereby reducing the lead time from AON stage to production stage
- To reduce forex outflow that is spent on 'Buy' programs and equipment, thereby strengthening domestic economy
- To create world-class companies and capabilities that address not only Indian opportunities but also leverage from integration into global value chains of OEMs

Design-in-India/ Fabless Design Industry

- Build India as a preferred destination for fabless design by enabling ease-of business for startups and global MNCs by delivering competitive operational TATs
- Go beyond academic fabless incubation to grow commercial startup incubation and commercial MSME

incubation thru infrastructure and demand

a. Enable a 10-fold growth in India fabless design entities by building Commercial Design Incubator/ Centre of Excellence with appropriate libraries of EDA/IP tools

b. Drive indigenization of all microchips used by strategic defense, space and aviation sector – leverage India Chip demand for indigenization, self-sufficiency and boosting Indian fabless ecosystem

Objectives

- Deliver Ease-of-business by enabling competitive operations TAT (ref Annexure) :
  a. Implement Risk Mgt System for imports of equipment by MNCs, support hand-carry norms and eliminate CE certificate requirement in used equipment imports.

- Facilitate a rather sedate fabless startup landscape to become a thriving ecosystem by nurturing at least 100 fabless MSME during NPE2.0 policy period.

- To facilitate the growth of at least 10 fabless MSME companies to achieve turnover of USD$50mn by providing funding support and through aggressive positive market intervention. (cumulative t/o of $500 mln targeted)

- To achieve 50% indigenization of all the microchips used by strategic defense, space and aviation sector in the next 5 years.

- Cut the import of microchips by at least 30% in next 5 years by ensuring Indian and MNC ESDM companies to use chips produced by Indian fabless industry by incentivization and strict PMA adherence

- Enable a Commercial Design Incubator/COE for Fabless Design with appropriate libraries of EDA/IP tools for leveraged use by MSME fabless companies.

Emerging Deeptech Innovation Ecosystem

- Evolve a nation-wide network of innovation eco-system with

  - An Ideation Engine touching 500 engineering institutes across India with a thruput of 100,000 students touched with a hands-on Engineering Exploration Pedagogy (IESA INNOVATION INITIATIVE therefore visualizes industry driven 500 Tinkering labs/ EP@Univs by 2021)

  - An Incubation Engine with Open Lab/COEs for IOT and COEs for other Deeptechs spread out across the country to enable rapid prototyping and cross-functional skill leverage (IESA would like to evolve 7 COEs / Open Labs for IoT – one each in Delhi, Chandigarh, Pune, Bangalore, Hubli, Hyderabad, Calcutta by 2021)

  - Also in the plan period – grow COEs for EV/ Flexible Displays/ Drones/ AR-VR/ EVs/ Medical/ Defence/ Fabless Design (as per IESA Innovation Roadmap)

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Startup Ecosystem

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- 100,000 engineering students /annum by 2021 in ideation phase
- Approx. 8000 startups/ annum in innovation phase (proof-of-concept development phase) by 2021
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- It is expected that the collective employment of the acceleration phase startups and innovation phase startups will be 225,000 per annum
- To develop core competences in strategic and core infrastructure sectors like Telecommunications, Automotive, Avionics, Industrial, Medical , Solar, I&B, Railways, Smart Cities, Homeland security etc thru use of ESDM in these sectors.

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5G – Network for the IoT wave

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FDI Investment in Electronics

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Promoting Exports

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    - For other components 7%
    - For products 5%