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2020

Clean Energy Policy Landscape

IN THE SME SECTOR



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Clean Energy Policy Landscape

IN THE SME SECTOR

INDIA CAN REDUCE 1200 MILLION TONNES OF CARBON DIOXIDE ANNUALLY BY 2032



EXECUTIVE SUMMARY

India has an opportunity to reduce 1200 million tonnes of carbon dioxide annually by 2032, if it takes the appropriate steps to decouple GDP growth and GHG emissions¹. Much of this reduction depends on the country's ability to adopt clean energy solutions, including building renewable energy capacities, constructing green buildings, converting waste to clean energy, etc. This transition to clean energy has led to the emergence of various start-ups in this space. Small and medium enterprises (SMEs) have always been critical to India's economic growth; these new-age clean technology start-ups too, should be instrumental in India meeting its clean energy targets.

In this context, it is necessary to assess the policy landscape, as well as the institutional mechanisms in place, to support the growth of the SMEs within the different clean energy segments, i.e. solar rooftop, energy efficiency, Waste to Energy, energy access, smart energy, and electric mobility.

Nearly 140+ interventions that include missions, policies, schemes, etc. have been formulated by the government. These are meant to act as catalysts for the clean energy segments and to provide support to SMEs in the country. However, only a fraction of these focuses specifically on the SMEs and start-ups operating in the clean energy segments. Key interventions by the government include National Mission for Enhanced Energy Efficiency (NMEEE), National Electric Mobility Mission Plan (NEMMP), Smart Cities Mission (which creates indirect opportunities for SMEs); as well as initiatives such as Atal Innovation Mission (AIM) and Global Innovation & Technology Alliance (GITA) which focus on providing innovation support to start-ups.

Also, 80+ private and government financial institutions and accelerators/incubators² are offering financial and business development support to the start-ups and SMEs operating in the space. This provides a fillip to the capacity of the overall ecosystem.

Even as the market progression of the different segments in the clean energy sector continues, the potential for SMEs as manufacturers or service providers is restricted as the thrust on the policy front is muted to a large extent. The slowness in the growth trajectory of clean energy segments is hampering the scale of SMEs compared to other start-up focused sectors such as fin-tech or e-commerce.

1 cKinetics analysis, IESS Model version 2
2 ckinetics analysis

CLEAN ENERGY LANDSCAPE FOR SMES IN INDIA: MARKET GROWTH NECESSITATES INNOVATIONS TO ADDRESS STRUCTURAL BARRIERS

REPORTED MOMENTUM

- Explicit opportunities and policy support for SMEs in emerging segments such as EVs are resulting in heightened activity.
- A key parameter for a vibrant SME sector is state-level implementation in the ecosystem. Karnataka and Maharashtra have been recognized for good policies for start-ups in upcoming segments.
- Several clean energy start-ups have started exploring multiple segments to ensure a minimum level of growth. E.g. EVs used as an extension for several of the solar rooftop players, IoT as an extension for several of the EE players, etc.

KEY GAPS

FINANCE

- Low project financing expertise (and alternate preference for collateral backed lending) at branch levels in the banking institutions inhibits the raising of appropriate debt for new age service-based models.
- Limited risk capital and innovation funding also limits the scale and R&D initiatives within SMEs.

POLICY

- There is limited policy support mechanisms for R&D and innovation for clean energy segments.
- SMEs are unable to fully tap into the provisions such as priority sector lending, Suryamitra.
- Provision for SMEs not explicit in certain segments (such as WtE).

MARKET-BASED INTERVENTIONS

- Long-term (patient) capital is critical for innovators to scale up.
- Building project finance capacity
- Augmented funding under public sector, CSR and other avenues would enable incubators to provide early-stage risk capital to start-ups.

GOVERNMENT-DRIVEN INTERVENTIONS

- Definitive targets should be put in place for public procurement from SMEs in the clean energy space.
- Credit guarantee and risk-mitigation mechanisms should be established under public financing
- Government should increase policy support around new/emerging business models, such as irrigation as a service, etc.

SPECIFIC INTERVENTIONS

ABOUT THE REPORT

This report is part of an ongoing initiative of WWF-India's 'Climate Solver' programme. The programme helps develop cleantech innovations that promote decarbonization of the economy and provide sustainable energy access for all. It provides an interface between cleantech innovators and other stakeholders, such as investors, the government and incubation centers.

The report presents an overview of the clean energy ecosystem (including perception of the stakeholders), a segment-level analysis, and an outline of key challenges and recommendations.

A snapshot of the study methodology is provided below.

1. Mapping policy landscape for the clean energy innovations ecosystem

Keeping in mind the areas where there is natural opportunity for SMEs to engage in the clean energy segment, the policy landscape covers:

- Central and State Policies impacting specific segments in the clean energy sector. These policies have a focus on mapping provisions for financial and non-financial support for SMEs.
- The nature of enterprises supported under the policy and whether the policy impacts the SMEs as: a) Manufacturer, b) Service-provider or c) End-user.

For the analysis, the government interventions have been classified as below.



Mission

Long-term programmatic vision formulated by the government for a segment



Policy

A plan specifically announced as a policy by the government



Rules/Guidelines

Explicit principles and regulations governing implementation of policies



Programmes/Schemes

Arrangements with specific targets, budget and timeline undertaken by a government agency



Market development programme

A programme that entails market procurement/aggregation intervention outside a ministerial body

Each of the above interventions are further assessed and bucketed into three categories:

- **Direct interventions:** Interventions which have explicit provisions for both SMEs and clean energy; or the nature of the segment inherently creates opportunities for SMEs.
- **Indirect interventions:** Interventions that do not have any specific provisions for either SMEs or clean energy but create indirect opportunities for SMEs.
- **Sector-specific interventions:** Interventions, which have provisions for SMEs and clean energy, but target only a certain industry/sector, such as textiles.

2. Mapping the institutional landscape

The study also maps over 80 key institutions including private equity firms, impact investors, NBFCs, commercial banks, international donors and foundations, incubators and accelerators active in the space. The institutional mapping covered:

- Areas of focus across different segments, to understand their overall experience of supporting SMEs in clean energy, for each of the institutions
- Type of support provided - financial in the form of grants, debt and equity; or non-financial support through incubation, training, etc.
The support provided has been assessed for their applicability throughout the lifecycle of the enterprises:
 - R&D, including Proof of Concept;
 - Early stage enterprises with less than five years of experience; and
 - Growth stage enterprises with more than five years of experience.

3. Engaging key stakeholders to understand their overall experience of supporting SMEs in clean energy, and outlook on the clean energy innovation ecosystem for SMEs

To validate the assessment of how clean energy policies are impacting the segment as a whole and SMEs in particular, and to ensure our comprehensive understanding of the clean energy ecosystem for SMEs; interactions were undertaken with around 30 stakeholders across the clean energy industry continuum. The list of the stakeholders engaged is included as Annexure 2. Based on policy and institutional landscape as well as primary discussions, a segment-level analysis has been presented. This forms the basis of the interventions that have been proposed to overcome those hurdles that have been identified. These shall aid the growth of the segment as a whole and particularly the role of SMEs in each of these segments.

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AIM	Atal Innovation Mission
A-TUFS	Amended Technology Upgradation Fund Scheme
BEE	Bureau of Energy Efficiency
C&I	Commercial and Industrial
CBG	Compressed Bio Gas
CFA	Central Financial Assistance
CGTMSE	Credit Guarantee Fund Trust for Micro and Small Enterprises
CIIE	Centre for Innovation Incubation and Entrepreneurship
CoE	Centre of Excellence
CSR	Corporate Social Responsibility
DISCOM	Distribution Companies
DFI	Development Finance Institution
DST	Department of Science and Technology
ECBC	Energy Conservation Building Code
EE	Energy Efficiency
EESL	Energy Efficiency Services Ltd.
ESCO	Energy Service Company
EV	Electric Vehicle
FAME	Faster Adoption and Manufacturing of Electric Vehicles
GEF	Global Environment Facility
GITA	Global Innovation and Technology Alliance
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GOBAR	Galvanizing Organic Bio-Agro Resources Scheme
GST	Goods and Services Tax
IFC	International Finance Corporation
IIT	Indian Institute of Technology
IoT	Internet of Things
IPR	Intellectual Property Right
IREDA	India Renewable Energy Development Agency
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
KUSUM	Kisan Urja Suraksha evam Utthaan Mahaabhiyan

LEED	Leadership in Energy and Environmental Design
LPG	Liquified Petroleum Gas
MNRE	Ministry of New and Renewable Energy
MoEFCC	Ministry of Environment, Forests and Climate Change
MoF	Ministry of Finance
MoHI&PE	Ministry of Heavy Industries and Public Enterprises
MoHUA	Ministry of Housing and Urban Affairs
MoJS	Ministry of Jal Shakti
MoMSME	Ministry of Micro, Small and Medium Enterprises
MoP	Ministry of Power
MoPNG	Ministry of Petroleum and Natural Gas
MSME	Micro, Small and Medium Enterprises
NABARD	National Bank for Agriculture and Rural Development
NBFC	Non-banking Finance Company
NEMMP	National Electric Mobility Mission Plan
NIT	National Institute of Technology
NISE	National Institute of Solar Energy
NMEEE	National Mission for Enhanced Energy Efficiency
NNBOMP	New National Biogas and Organic Manure Programme
O&M	Operations and Maintenance
P2P	Peer-to-Peer
PAT	Perform-Achieve-Trade scheme
PEACE	Promotion of Energy Audit and Conservation of Energy
PNB	Punjab National Bank
PoC	Proof of Concept
PV	Photovoltaic
R&D	Research and Development
RESCO	Renewable Energy Service Company
SATAT	Sustainable Alternative Towards Affordable Transportation
SBI	State Bank of India
SHS	Solar Home System
SIDBI	Small Industries Development Bank of India
SME	Small and Medium Enterprises
SNA	State Nodal Agency
TIDE	Technology Incubation and Development of Entrepreneurs
UDAY	Ujwal DISCOM Assurance Yojana Scheme
UJALA	Unnat Jyoti by Affordable LEDs for All Scheme
ULB	Urban Local Bodies
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development



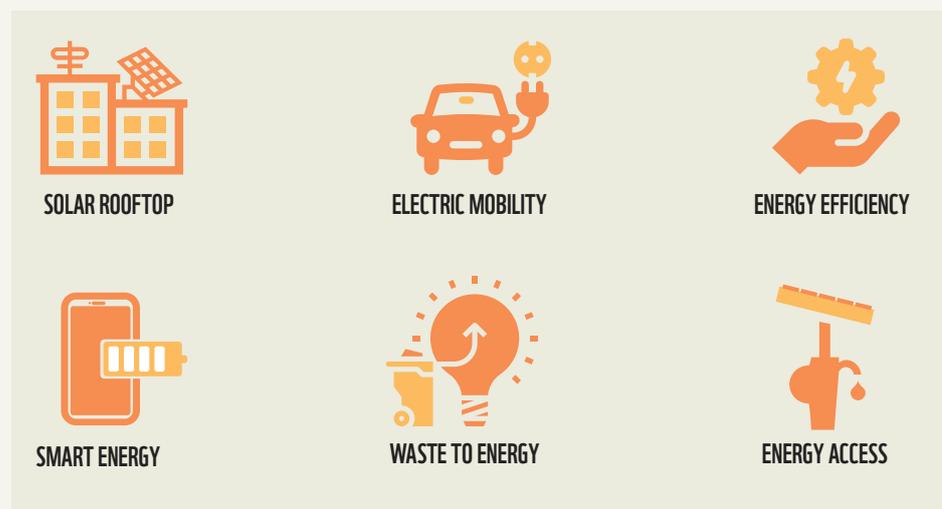
INTRODUCTION

India's energy demand is expected to increase to nearly 14,000TWh by 2050³. With this in mind, the government of India has set various targets at the national and state level to accelerate renewable energy capacity, promote electrification of the transportation sector and solarize the agricultural pumps, among other endeavors.

Innovative clean technology solutions in segments like renewable energy, industrial efficiency, green buildings (including sustainable cooling and sustainable transportation) have emerged as a focus area for the corporates, emerging enterprises, as well as investors. This has resulted in the rapid rise in the number of start-ups and SMEs in the cleantech sector, in both product and service sectors.

This study focuses on the six segments indicated below from within the larger clean energy landscape in India. These are expected to have a considerable impact across key sectors such as industries, buildings, transportation, etc. Even as energy use across these is expected to increase manifold in the coming decades, scaling up the interventions in these six segments could potentially reduce nearly 600 million tonnes of CO₂ annually⁴ by 2032. This figure illustrates how critical these segments are in India's clean energy revolution.

Figure 1: Clean energy segments



³ ckinetics. 2020. Envisioning India's transition towards decentralized energy systems

⁴ ckinetics analysis. IESS Model version 2

IMPORTANCE OF SMEs AND START-UPS IN THE CLEAN ENERGY ECOSYSTEM

Technology and business innovation have played a key role in the adoption of renewable energy solutions. Given that India is on the cusp of an energy transition, new-age clean technology start-ups and existing SMEs are expected to play an important role in helping the country achieve its targets. Not only from the perspective of adoption of clean energy solutions as end-users, but also as providers of the products and services across the identified segments.

As a first step towards understanding the clean energy SME landscape in India, the segments/areas where these enterprises play a role in the value chain were mapped. Even though opportunities exist for SMEs as manufacturers and as service providers, these opportunities are skewed towards the latter. SMEs or start-ups are more inclined to operate or may naturally operate in certain sub-segments, due to factors such as the quantum of investment required, nature of product and the target consumers. For instance, very few SMEs are developers of wind power plants due to the large amount of capital investment required. On the other hand, biomass-based cooking solutions for peri-urban and rural areas are natural opportunities for SMEs due to the nature of product. The graphic overleaf provides a view of the areas where SMEs are naturally active.

Table 1: Natural opportunities for SMEs in the clean energy value chain

	Manufacturing	Service models
 <p>SOLAR ROOFTOP</p>	<ol style="list-style-type: none"> 1. Balance of System (BOS) 2. Manufacturers of inverters, micro controllers and chargers 	<ol style="list-style-type: none"> 1. Last mile installation and commissioning 2. Small RESCOs 3. Operation and maintenance
 <p>ELECTRIC MOBILITY</p>	<ol style="list-style-type: none"> 1. EV /component manufacturers (E-rickshaw, 2-wheelers, etc.) 2. Retrofits for hybrid vehicles 3. Battery manufacturers 	<ol style="list-style-type: none"> 1. Charging stations 2. Fleet operators/aggregators
 <p>ENERGY EFFICIENCY</p>	<ol style="list-style-type: none"> 1. Manufacturers of energy-efficient appliances and components 	<ol style="list-style-type: none"> 1. Systems installers 2. ESCOs with Performance Contracts
 <p>SMART ENERGY</p>	<ol style="list-style-type: none"> 1. Smart meter manufacturers 2. Inverter-less AC/DC systems 	<ol style="list-style-type: none"> 1. System Installers 2. IoT (energy analytics and management) solution providers
 <p>WASTE TO ENERGY</p>	<ol style="list-style-type: none"> 1. Biogas plant developers 2. Manufacturers of digesters 	<ol style="list-style-type: none"> 1. Collection, segregation and recycling services 2. Small-scale biogas plant operators
 <p>ENERGY ACCESS</p>	<ol style="list-style-type: none"> 1. Assemblers of SHSs, Solar Pumps, Milk Chillers, Micro-cold storages 2. Biomass cookstove manufacturers 3. Charkha manufacturers 4. Pump /controller manufacturers 	<ol style="list-style-type: none"> 1. Pay-as-you-go model for SHSs 2. Mini-grids (ESCOs) 3. Irrigation-as-a-service model (for solar pumps) or asset on lease (micro cold storage)

The enterprises and start-ups in these segments are expected to have significant influence on key sectors such as power, industries, buildings, agriculture, transportation and communication. Thus, it is important to analyze the policy, investment and market landscape across these segments. This will help assess the current uptake, barriers and interventions needed for SMEs to fully utilize available opportunities.

A photograph of a welder in a blue uniform, kneeling on a wooden bench in a workshop. He is wearing white protective gloves and is focused on his work, with bright sparks flying from the point where he is welding a metal piece. The background shows a cluttered workshop floor with various tools and materials. A semi-transparent orange box is overlaid on the top left of the image, containing the title text.

CLEAN ENERGY ECOSYSTEM FOR SMES AT A GLANCE



ECOSYSTEM AT A GLANCE

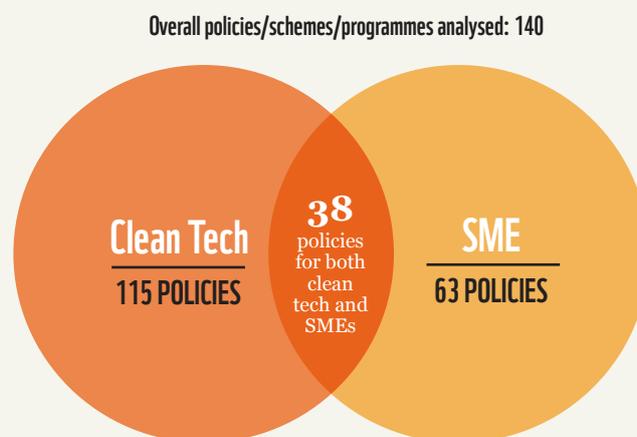
The clean energy ecosystem involves multiple stakeholders, such as government bodies, financial institutions, investors, catalysts and incubators, international foundations and donors. This section explains:

1. The key policies targeted at the segments in the clean energy sector, particularly the ones influencing the opportunities for SMEs
2. The institutional landscape and specific priorities of the key institutions operating in the different segments
3. The viewpoints of key stakeholders on barriers to growth, and interventions that would address them

OVERVIEW OF POLICY LANDSCAPE

The government has formulated nearly 140 interventions: covering missions, policies, schemes, etc. to catalyze the clean energy segment and to support SMEs. However, only a fraction of these interventions focuses specifically on the SMEs and start-ups that operate in the clean energy segments. A deep-dive analysis of the policies and evident gaps are discussed below.

THERE ARE ALMOST 140 GOVERNMENT INTERVENTIONS FOCUSED DIRECTLY OR/ AND INDIRECTLY ON CLEAN ENERGY AND SMES/START-UPS, HOWEVER, ONLY 38 POLICIES EXPLICITLY TARGET SMES IN THE CLEAN ENERGY ECOSYSTEM



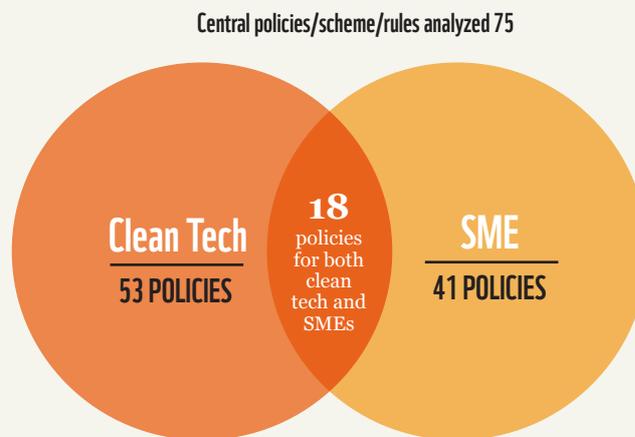
Other policies either only target SMEs, such as the Special Credit Linked Capital Subsidy Scheme, Amended Technology Upgradation Fund Scheme (A-TUFS) or are

focused on the clean energy segment such as the Programme on Energy from Urban, Industrial and Agricultural Wastes/ Residues.

In addition to these, there are several sector-focused interventions such as Mission for Integrated Development of Horticulture (which covers solar-powered cold storages).

Interestingly, despite several of these segments being ones where state agencies need to lead the way, the bulk of the policy targeting the clean energy interventions are predominantly established by the central government or are under programmes catalyzed by the Centre.

**OF THE 140
GOVERNMENT
INTERVENTIONS, 75
WERE ISSUED BY THE
CENTRE. HOWEVER,
ONLY 18 CENTRAL
INTERVENTIONS ARE
FOCUSED ON BOTH
CLEAN ENERGY AND
START-UPS**



In addition to 18 policies mentioned above, 20 additional central policies are focused on cleantech and indirectly create opportunities for SMEs. An overview of this is presented overleaf. An analysis of these policies indicates:

- The targeted focus on solar rooftop has given rise to several new enterprises in the segment. There are gaps in policy clarity and consistency.
- Though policies and market development programmes (by Bureau of Energy Efficiency) exist for energy efficiency, all of these are focused on upgrading SMEs to energy-efficient plant and machinery, and not essentially targeted towards SMEs as energy-efficient goods or service providers.
- Various policies and rules for Waste-to-Energy, such as Extended Producer Responsibility for e-waste and plastic waste, have created several opportunities for SMEs (for segregation, processing, etc.). However, the policy needs to specifically frame incentives for SMEs/start-ups, particularly those focused on collection and recycling efforts.
- There are no direct, targeted policies or interventions for SMEs operating in the smart-energy segment. The overall momentum in the smart-energy segment is driven by the larger focus of looking at IoT (Internet of things) as a key enabler for digital transformation.
- Many policies/schemes (both direct and indirect policies) are focused on incubation support of early-stage and growth organizations; however, very limited funding and focus exists for R&D and innovation. Additionally, the policy interventions and/or schemes for fostering R&D are cross-cutting in nature with no specific priorities or defined targets.

RTS	Rooftop
EE	Energy Efficiency
WtE	Waste to Energy
EA	Energy Access
SE	Smart Energy
EM	Electric Mobility

Text color	Denotes
Blue	Mission
Green	Policy
Maroon	Programme/ Scheme
Grey	Market Development Programme
Yellow	Rule/ Guideline/ Code

Table 2: Policy assessment based on growth stage of an organization

Policies	Policy Type (Direct/Indirect)	Ministry	Segments					
			RTS	EE	WtE	EA	SE	EM
Solar Charkha Mission	Direct	MoMSME				E, G		
Biomass Gasifier-based Distributed/Off-grid Power Programme for Rural Areas	Direct	MNRE				R, E, G		
Financial support to MSMEs in ZED certification (ZED)	Direct	MoMSME		E, G				
GOBAR DHAN Scheme	Direct	MoJS				E, G		
Off-Grid and Decentralized Solar PV Installations	Direct	MNRE				E, G		
Solar Energy Scheme for Power looms	Direct	MoT	E, G					
Unnat Chulha Abhiyan	Direct	MNRE				E, G		
4E (End to End Energy Efficiency)	Direct	NA		G				
Partial Risk Sharing Facility for Energy Efficiency	Direct	NA		G				
“Promoting EE & RE in MSME in India”, GEF-UNIDO-BEE project	Direct	NA		G				
SATAT Programme	Direct	MoPNG				E, G		
National Mission for Enhanced Energy Efficiency	Indirect	MoP		E, G				
National Electric Mobility Mission Plan 2020	Indirect	MHI & PE					R, E, G	
National Mission on Transformative Mobility and Battery Storage	Indirect	MHI & PE					R, E, G	
National Tariff Policy, 2016	Indirect	MoP				E, G		
Biogas-based Power Generation & Thermal Application Programme	Indirect	MNRE			E, G			
Faster Adoption and Manufacturing of Electric Vehicles (FAME-II)	Indirect	MHI & PE					E, G	
Integrated Power Development Scheme	Indirect	MoP				E, G		

Note:

- R - Research & Development (R&D) and Proof of Concept (PoC);*
- E - Early stage companies which have been in operation for five or less years;*
- G - Growth stage companies which have been in operation for more than five year.*

Policies	Policy Type (Direct/Indirect)	Ministry	Segments					
			RTS 	EE 	WtE 	EA 	SE 	EM 
New National Biogas and Organic Manure Programme	Indirect	MNRE			E, G			
Perform Achieve and Trade	Indirect	MoP		E, G				
UJALA Scheme	Indirect	MoP		E, G				
E-waste Management Rules, 2016	Indirect	MoEFCC			E, G			
Guidelines for Development of Decentralized Solar Power Plants	Indirect	MNRE	E, G					
Solid Waste Management Rules, 2016	Indirect	MoEFCC			E, G			
AIM	Direct	Niti Aayog	R, E					
Priority Sector Lending	Direct	RBI	G					
GITA	Direct	DST	R					
Growth Capital and Equity Assistance Scheme	Direct	MoMSME	R, E					
Research, Design, Development, Demonstration (RDD&D) and Manufacture of New and Renewable Energy	Direct	MNRE	R					
Suryamitra Skill Development Programme	Direct	MNRE	E			E		
Sustainable Finance Scheme	Direct	SIDBI	E, G			E, G		
Jawaharlal Nehru National Solar Mission	Indirect	MNRE	E, G			E, G		
Smart Cities Mission	Indirect	MoHUA	E, G					
Goods and Services Tax	Indirect	MoF						
Safeguard Duties	Indirect	MoF	E, G			E, G		
KUSUM Scheme	Indirect	MNRE	E, G			E, G		
India Innovation Growth Programme	Indirect	NA	R, E					
Energy Conservation Building Code, 2017	Indirect	MoP	E, G	E, G		E, G		

OVERVIEW OF INSTITUTIONAL LANDSCAPE

Over 80 institutions including incubators/catalysts, banks, NBFCs, private equity firms, international donors and foundations are active in the clean energy landscape. The infographic overleaf presents a pictorial view of this. An analysis of the targeted efforts by these institutions reveals the following:

- There is limited dedicated/focused incubation and start-up accelerator support for the clean energy segment as a whole. Also, support for R&D from institutions is scarce or limited, with most institutions extending support only after the technology has fairly evolved (i.e. when Proof of Concept/product prototype is ready).
- The Electric Mobility segment is witnessing a growing interest from investors (though the bulk of the investment is being attracted by a handful of early-bird start-ups). As a result, several new start-ups have emerged in this segment.
- Despite smart energy being a natural area for many start-ups to operate in, very few debt institutions are focused on this segment, as the latter is currently at a nascent stage.
- There is limited participation of commercial banks in the clean energy sector, despite qualifying as a priority sector for banks. Even as credit lines for segments such as solar rooftops have been set up, the conventional balance sheet and collateral-driven mindset of mainstream banks has restricted this sector's access to capital.
- The support from international donors is primarily focused on energy access, given the connection of this segment with socio-economic development of communities.
- Waste to Energy, a major thrust area for start-ups, has limited support from institutions including catalysts and investors.
- Support for training and development primarily relies on the limited number of government initiatives and institutions, particularly for energy efficiency.

DEEP DIVING INTO INNOVATION AND R&D SUPPORT FOR SMEs/START-UPS

As highlighted above, R&D support for SMEs/start-ups is primarily provided through cross-cutting policies (policies that have implications across segments). The key takeaways, with respect to R&D and support for innovation in the clean energy segment, are as follows:

- R&D support is primarily provided under five programmes/government departments - GITA, AIM, Department of Science and Technology (DST), Centre of Excellence (CoE) for IoT, and India Innovation Growth Programme.
- Most of the catalysts and incubators provide support to start-ups, but not necessarily for R&D or developing Proof of Concepts, outside of support provided by a few organisations, such as DST (for research on solar cells) and NCL Venture Centre, Pune.
- For energy access and electric mobility, provisions under AIM provide some level of innovation support. Additionally, several state EV policies plan to set up testing centers for research and development in this segment.
- Overall, smart energy and energy efficiency start-ups have received minimal support under these programmes.

Figure-2: List of institutions providing support to start-ups/SMEs in clean energy

	Rooftop Solar	Energy Efficiency	Waste to Energy	Energy Access	Smart Energy	Electric Mobility
Capital support	Debt	1 3 5 7 10 57	1 9 44	1 3 6 8 11 57 64	1 46	2 4 46
		2 4 6 9 11 59	2 41 55	2 4 9 10 41 59	2 54	7 43
		14 37 38 43 44 63	14 43	14 37 38 43 46 60	14 43	14 54
Equity	46 47 48 54 56 64	46 54	47 48 54 55 56 63	11		
	12 14 39 42 45 67 71 79	14 22 41 45 80	12 14 25 39 41 60 67 71	12 14 22 39 71	14 16 39 67	
	16 22 40 50 52 68 78 82	16 39 42 67 82	16 22 30 40 42 74 68 72	15 16 42 67 76	15 22 42 69	
Grant	54 56 63 64 58 70 77	16 50 54 68 75	45 50 51 54 56 64 70	50 53 54 75	50 52 54	
	14 22 34 37 62	14 22	14 22 26 28 30 36	14 20 26	14 20 28	
	20 28 36 38	20 28	20 24 27 29 31 38	15 22 28	15 22	
R&D and innovation support	61 29 66 65	61	32 33 34 34 37 45	37	29	
	12 20 23 36	15 20 28	12 20 23 27 34 31	12 15 28	15 20 22	
	18 22 28 67	18 21 67	18 22 23 28	20 22 67	18 21 28	
Incubation and acceleration support	12 13 14 21	13 14 18 20	12 13 14 24	12 13 14 20	13 14 17 19 21	
	16 18 20 23	15 16 19 24	16 18 20 70	15 16 19	15 16 18 20	
	83 84 33 29	84	83 33		67	
Support for clean energy training						

- | | | | | | | | | | |
|--|---|--|---|--|---|--|---|---|---|
| <ul style="list-style-type: none"> 1 IREDA 2 Tata Cleantech 3 Electronica Finance 4 cKers Finance 5 Sunvest Capital 6 responsAbility Investments 7 Innoven Capital 8 Northern Arc 9 Intellegrow 10 Maanaveeya D&F 11 PTC Financial Services | <ul style="list-style-type: none"> 12 CII 13 Social Alpha 14 Villgro 15 IIT Bombay 16 D-Labs 17 T-Hub 18 Autodesk Entrepreneur Impact 19 DNA Bosch 20 Atal Incubation Centre 21 Jito Angel Network 22 Venture Center 23 UnLtd India 24 Echoing Green 25 Village Capital | <ul style="list-style-type: none"> 26 Good Energies Foundation 27 Lemelson Foundation 28 Shell Foundation 29 MacArthur Foundation 30 Doen Foundation 31 IKEA Foundation 32 Aga Khan Foundation 33 Schneider Foundation 34 HILTI Foundation 35 Good Energies 36 Packard Foundation 37 The Rockefeller Foundation 38 Tata Trust | <ul style="list-style-type: none"> 39 Aavishkar 40 Bamboo Finance 41 Acumen 42 Sangam Ventures 43 Caspian Advisors 44 C4D Partners 45 Rianta Capital 46 Yes Bank 47 RBL Bank 48 Indusind Bank | <ul style="list-style-type: none"> 49 A91 Partners 50 Engle 51 Enel Green Power 52 Mitsui Global Investments 53 Hero Electronix | <ul style="list-style-type: none"> 54 SIDBI 55 NABARD 56 ADB 57 IFC 58 SDC | <ul style="list-style-type: none"> 59 OPIC 60 Global Innovation Fund 61 UNIDO 62 USICEF 63 KfW 64 Proparco 65 GIZ 66 USAID | <ul style="list-style-type: none"> 67 Venture Capital/PE 68 Infuse Ventures 69 Gray Ghost Ventures 70 Tiger Global 71 IFCI Venture capital funds 72 Omnivore Partners | <ul style="list-style-type: none"> 72 Ankur Capital 73 Blume Ventures 74 Invested development 75 Parampara Capital 76 Pi Ventures 77 Texas TPG 78 Warburg Pincus 79 I Squared Capital 80 Endiya Partners 81 Indian Angel Network 82 SBICAP Ventures Ltd. | <ul style="list-style-type: none"> 83 NISE 84 Green Skill India under GoI |
|--|---|--|---|--|---|--|---|---|---|

OVERVIEW OF STAKEHOLDER SENTIMENTS

In order to get a comprehensive view of the sentiment in the sector, interactions were undertaken with around 30 stakeholders to gauge their perception of the policy enablers, challenges and market momentum in the various clean energy segments. The respondents also mentioned key interventions that would help exploit the potential across all segments.

Figure 3: Overview of stakeholders interviewed

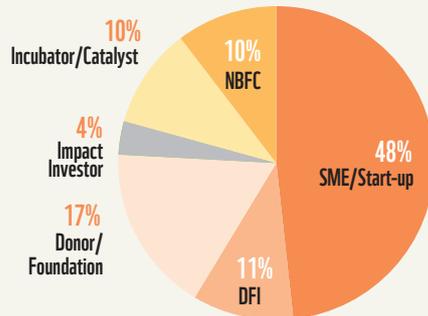


Figure 4: Growth stage of SMEs

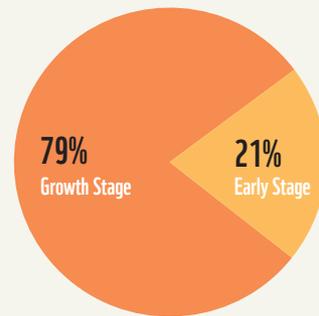
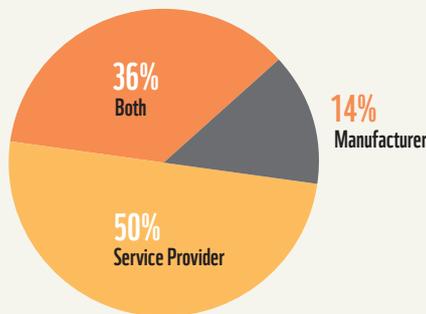


Figure 5: Role of SMEs interviewed in the value chain



The graphs below present an overview of challenges in the clean energy segments, as highlighted by the respondents. Among these, contradictory signals/policy uncertainty and lack of project financing have been identified as two of the most critical challenges. Other challenges include low awareness and high dependence on grants, which limits maturing of the enterprises, etc.

Figure 6: Overview of challenges in clean energy segments

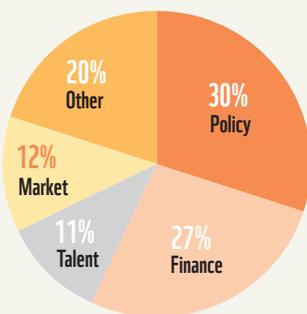


Figure 7: Overview of policy challenges

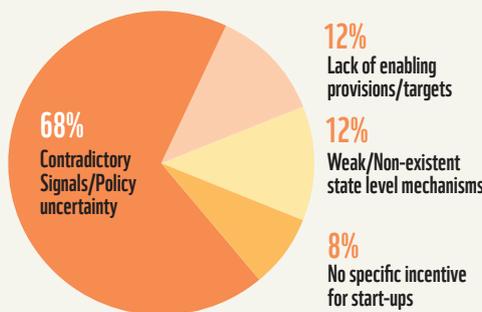
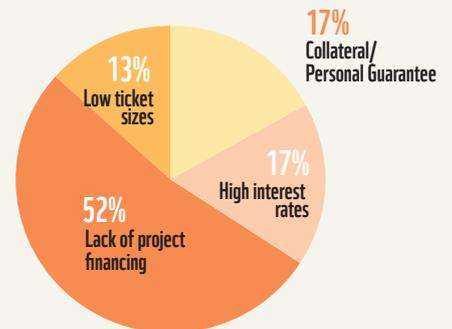


Figure 8: Overview of finance challenges



TALENT: A KEY CHALLENGE FOR CLEANTECH SMEs

Several enterprises, particularly the ones in the ‘Waste to Energy’ and ‘energy efficiency’ segment, cited unavailability of trained personnel as a key challenge. An overview of the areas where talent availability is deemed a challenge and the underlying causes across each of the segments is presented in Figure 9. For instance, for the energy access segment, the challenge lies in hiring technicians in rural areas; while for energy efficiency, the training provided under Skill India is not in sync with the needs on-ground. To overcome this challenge, start-ups in the energy efficiency segment have partnered with technical institutions, such as state engineering colleges, to provide trainings relevant to the energy efficiency domain.

Figure 9: Talent-related challenges faced by SMEs across segments

Symbol	Roles	Reasons	1. Lack of qualified workforce due to outdated training	2. Lack of requisite talent due to inadequate growth capital	3. Lack of skilled technicians in rural areas
	Product Development	Segments			
	Business Development and Sales				
	Legal, Compliance and Finance				
	Installation and Commissioning				
		Waste to Energy	   		
		Energy Efficiency	  		
		Rooftop Solar		  	
		Energy Access			
		Smart Energy			
		Electric Mobility	General talent challenge		

In order to address the challenges, a list of key interventions suggested have been provided below. The next section is a deep dive into the segment-level analysis covering the policy enablers, key institutions and barriers in detail. Further, it provides key recommendations for the overall growth of the segment and role of SMEs in the segments, based on pre-requisites highlighted by the stakeholders.

INTERVENTIONS PROPOSED FOR THE CLEAN ENERGY SEGMENTS

The table below outlines the interventions suggested across the six segments.

Table 3: Overview of intervention

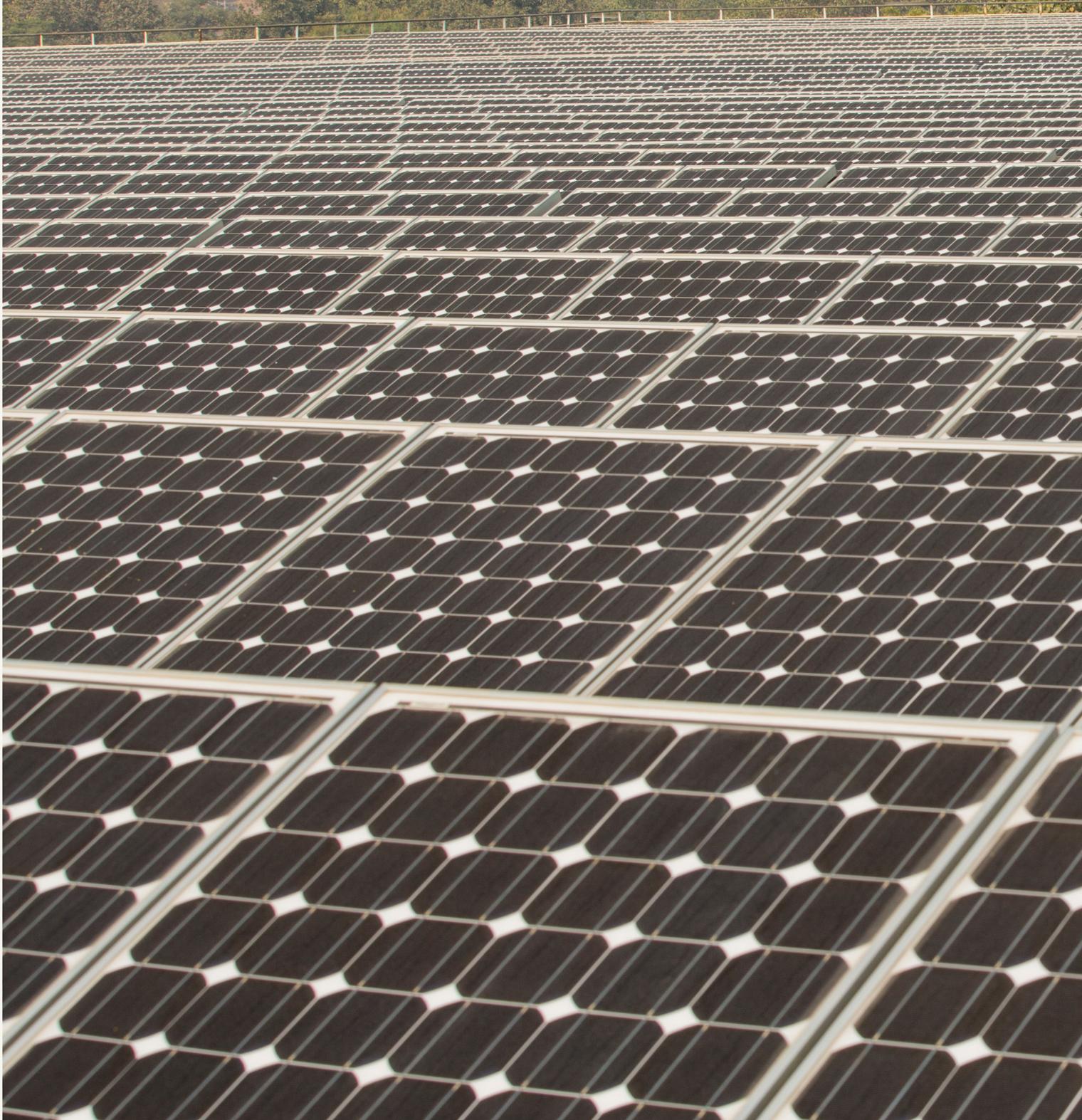
Interventions	RTS	EE	WTE	EA	SE	EM
Awareness programme needed to structure demand uptake	✓	✓	✓	✓		✓
Policy Enhancements						
• DISCOM-led implementation	✓					
• ECBC to be made mandatory		✓				
• Relaxation in tenders to procure from SMEs			✓		✓	
• Subsidy equivalent to LPG to be extended to other fuels			✓	✓		
• Enhancements in FAME to support retrofits and energy efficient batteries						✓
• Lower GST slab		✓				
Segment-specific credit enhancement efforts to be formulated to ensure enhanced lending from financiers	✓	✓	✓	✓		
Incubation of ESCOs		✓		✓		
Intensification of training programmes	✓	✓		✓		

The key takeaways are summarized below.

- The growth of SMEs/start-ups in this segment is hampered by the slow growth of the clean energy segment, compared to other start-up-focused sectors such as fintech or e-commerce.
- Karnataka and Maharashtra are preferred states for SMEs/start-ups to set up manufacturing hubs because of an enabling ecosystem, supportive policies (for EVs) and proximity to market (in case of micro-cold storage for farmers).
- Even though many of the start-ups continue to focus and operate in their primary segments (rooftops, energy access), they are exploring other segments, such as electric mobility and smart energy (particularly IoT).
- Few SMEs/start-ups in the clean energy segment are able to tap into benefits under the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) since the clean energy segments do not necessarily form a key focus area for the banks.
- Even though 'Rooftop Solar' falls under Priority Sector Lending for banks, it has not led to better access to capital for the early and upcoming players.
- Public sector banks are focused on SMEs' balance sheet strength; therefore, service models struggle to raise capital.
- SMEs/start-ups in the 'Waste to Energy' segment are uncertain about the opportunities that may emerge from initiatives such as SATAT given the indications on size and investment needed.
- In addition to government policies, voluntary building certifications are considered a driver for demand within the smart energy segment.
- For energy efficiency, there are not enough government mandates or they are not stringent enough to support the intent of the policies. This is coupled with a lack of project financing for the segment.

**SEGMENT-
WISE CLEAN
ENERGY
LANDSCAPE
ASSESSMENT**

SOLAR ROOFTOP

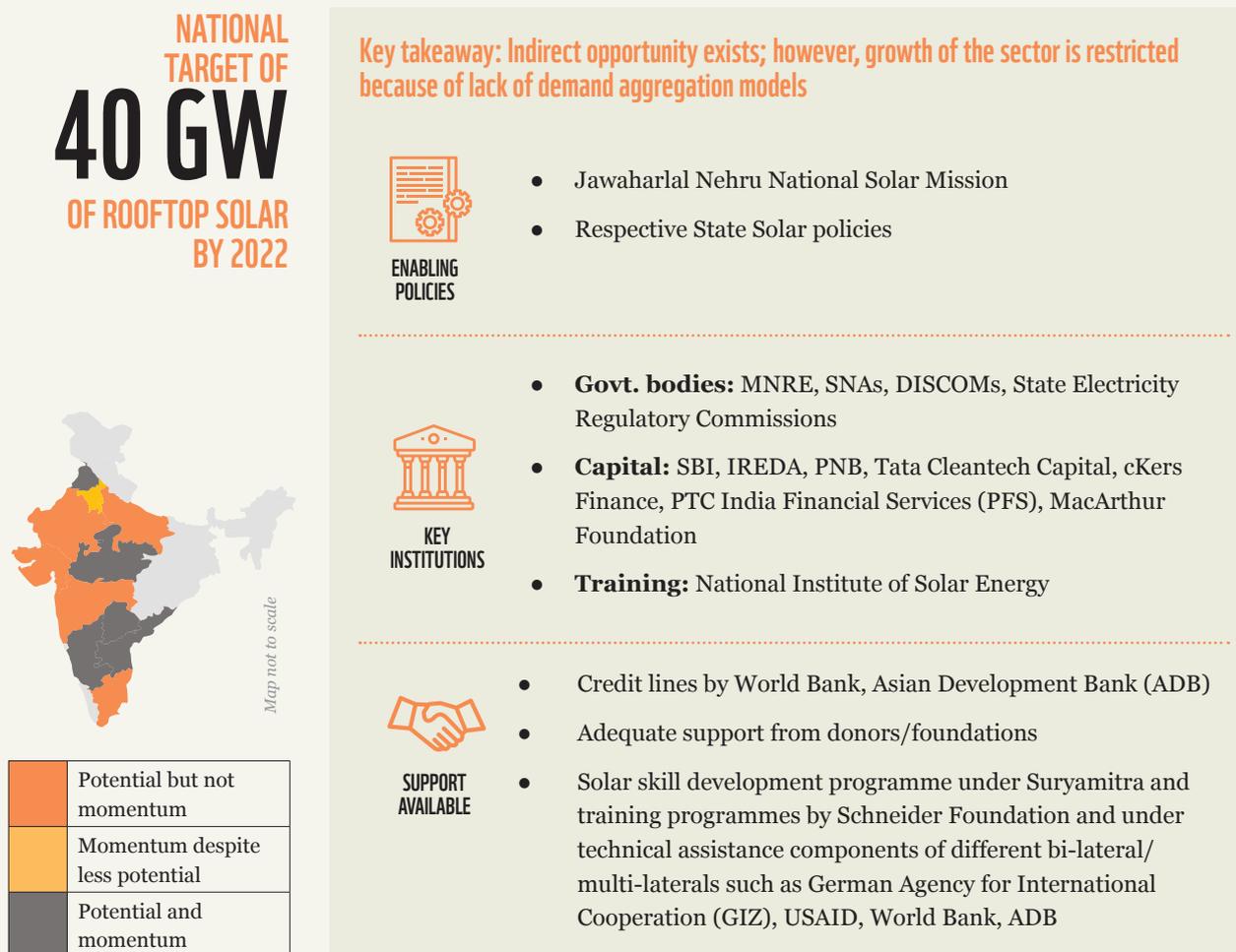




SOLAR ROOFTOP

Rooftop systems have gained prominence, on account of declining PV prices over the last decade, combined with the overall thrust on solar energy by the government, under the National Solar Mission. Of the 100GW solar rooftop target, the government aims to install an aggregate rooftop capacity of 40GW by 2022. The targets reflect in state-level allocations for solar rooftop, however, only about 5GW have been installed till date. The potential for the solar rooftop segment is especially high in 10 states as shown below (with Maharashtra, Uttar Pradesh and Tamil Nadu having the highest potential), which together constitute more than 70% of the total potential based on irradiation and availability of the area.

Figure 10: Overview of solar rooftop segment



In the solar rooftop segment, SMEs are active as manufacturers of inverters, micro controllers and balance-of-system providers. Besides, a large number of SMEs are pursuing RESCO and O&M models.

At a broad level, the progress in the solar rooftop segment has been patchy. A key reason being an inconsistent net-metering policy across all states. This is further accentuated by lack of project financing available for upcoming ESCOs. Besides, there is limited awareness about this segment and a low prioritization for the implementation of these projects within the consumer segments.

An analysis of the sector dynamics vis-a-vis the opportunity areas for SMEs is represented below.

Opportunity area	Enabling policy environment	Availability of capital	Institutional capacity	Supporting ecosystem
SMEs as manufacturers				
SMEs as service providers				

Source: cKinetics analysis



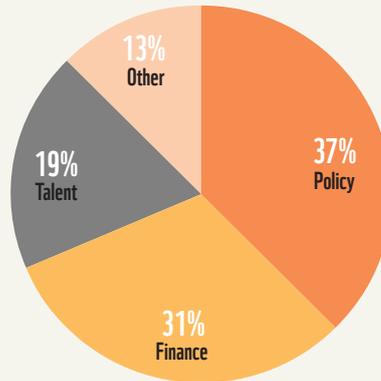
Since electricity is a concurrent subject, planning occurs both at central and state level. There is a national target for rooftop, but the goal is not actively supported by the state governments. The rooftop policy differs from state to state.”

- Aman Mathur, Addwatt



KEY CHALLENGES AND BARRIERS TO THE OPPORTUNITY FOR SMEs

Figure 11: Overview of challenges in solar rooftop



Based on primary and secondary research, key barriers identified have been highlighted below:

- Challenges restricting growth of the solar rooftop segment
- Challenges restricting growth of SMEs in the solar rooftop segment.

Challenges	
Market-related	<ul style="list-style-type: none"> ● Lack of viable/feasible business cases for domestic consumers, given the low residential tariffs and high upfront cost of rooftop system
Policy and implementation-related challenges	<ul style="list-style-type: none"> ● There is a lack of progress in implementation of net-metering policy across different states in India, primarily due to push-back from DISCOMS. ● In states such as Tamil Nadu and Gujarat, it is difficult to get the 'No Objection Certificate' for net metering for Commercial & Industrial (C&I) consumers. ● There is lack of a policy focus on specific procurement or projects purely earmarked for SMEs from amongst the enterprises building solar rooftop businesses. ● Several state policies prevent or discourage RESCO/third-party-owned models
Finance-related challenges	<ul style="list-style-type: none"> ● Banks are inherently built to provide retail credit and small business loans, not project finance. Therefore, there is limited sub-scale project financing available impacting the pace of roll-outs. ● As end-users, SMEs lack requisite rating and balance sheet financing and therefore are viewed as risky propositions by commercial banks. ● High interest rate charged
Supporting ecosystem	<ul style="list-style-type: none"> ● Even though EESL has a market linkage programme (for Maharashtra and Andhra Pradesh), there is a high turnover requirement for the bidders.
Institutional-related challenges	<ul style="list-style-type: none"> ● Retaining personnel is a challenge, primarily on account of limited cash-flows and thin margins. ● Availability of technicians is only a challenge for SMEs operating in non-metropolitan areas.

SUGGESTED INTERVENTIONS

In order to provide an impetus to the sector and consequently to SMEs, there are a number of interventions required. These include:

**CREDIT GUARANTEE
AND RISK MITIGATION
MECHANISM
SEEN AS THE KEY
FOR UNLOCKING
OPPORTUNITIES
FOR SMES IN THIS
SEGMENT**

INTERVENTIONS THAT ALLOW GROWTH OF THE SEGMENT

1. At a broad level, the governments' vision needs to be clearer and has to be reflected in consistency, and continuity of policies.
2. DISCOM-led aggregation models (targeted at residential segment) can help provide a win-win model for developers, consumers and DISCOM itself. For example, models formulated by Kerala and Andhra Pradesh can be adopted by other states.
3. From an end-user perspective, the demand aggregation mechanism of solar rooftop installation in MSME clusters is another way to increase volume. The implementation of such a model would be driven by international trends and would be dependent on the identification of an anchor partner (industrial associations) and technical partners (to undertake assessment of energy consumption in the clusters).
4. The Building Bye-laws should stipulate a minimum 5% of connected load of group housing buildings to be met by onsite generation.
5. Financial incentives such as 80C benefits for residential consumers who are installing solar rooftop projects.
6. Business models predicated on P2P trading, enabled by blockchain, can further increase the adoption of solar rooftops.
7. Project finance capacity among bankers need to be developed through training/workshops.

INTERVENTIONS THAT ENABLE THE GROWTH OF SMES IN THE SEGMENT

1. Under the DISCOM-led aggregation model, there should be a provision to procure at least 20 per cent of capacity (MW procurement target) from SMEs.
2. Credit guarantee and risk mitigation mechanisms - Risk mitigation instruments can be funded under public financing to create a catalytic effect for private sector investments.
3. Lower interest rates and easier access to working capital for installers and service providers.

ELECTRIC MOBILITY



ELECTRIC MOBILITY

Electric mobility covers electric and hybrid vehicles, battery storage and the charging infrastructure for these vehicles. The current government has an ambitious target of converting 15% of the total vehicles to electric by 2024, however, only 400,000 registered electric vehicles have been sold in the country till February 2020.

Geographically the potential for electric mobility lies in states such as Delhi, Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu and Uttar Pradesh, which together account for more than 70% of the vehicles in the country (on the basis of aggregate registered vehicles as of March 2019). All of these states have introduced EV policies in the last two years with the exception of states where draft EV state policies are yet to be finalised, like Madhya Pradesh and Rajasthan.

Figure 12: Overview of electric mobility segment



	Potential but not momentum
	Momentum despite less potential
	Potential and momentum

In the electric mobility segment, SMEs are active as manufacturers of auto components, system installers for EVs/hybrids, providers of retrofit kits of hybrid vehicles, charging infrastructure companies and fleet aggregators/operators.

The electric mobility segment has massive potential for SMEs and start-ups (primarily for service-led models) and is slowly becoming the focus area for many investors and NBFCs. In fact, conversations with a few investors revealed that the unused funds from the rooftop sector are slowly being redirected to the electric mobility segment. However, currently the business case for this segment primarily exists for fleet-focused, service-led models which have enough utilization to realize the investments into the EVs.

An analysis of the sector dynamics vis-a-vis the opportunity areas for SMEs is represented below.

Focus sub-segments	Enabling Policy Environment	Availability of Capital	Institutional Capacity	Supporting Ecosystem
SMEs as auto part manufacturers, system installers for EVs/hybrids				
SMEs providing energy-as-service, asset financing, running service-led models for charging infrastructure, battery swapping				

Source: cKinetics analysis



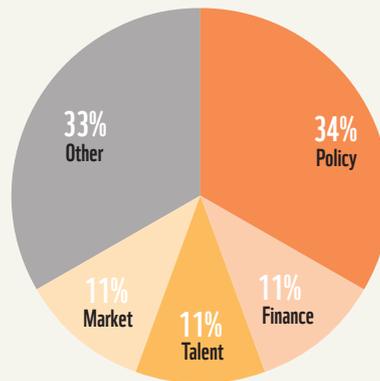
The flaw in the policy is that incentives are provided on the battery weight and not on how energy efficient these batteries are. The vehicles should have light-weight batteries with lower carbon footprint. The starting point needs to be energy efficiency.”

- Anil Arora, Clean Motion



KEY CHALLENGES AND BARRIERS TO THE OPPORTUNITY FOR SMEs

Figure 13: Overview of challenges in electric mobility



Based on the secondary analysis and primary discussion, key barriers as reported by the segment players are summarized below.

Challenges	
Market-related	<ul style="list-style-type: none"> Weak market demand for EVs Low return on investment for EVs compared to internal combustion engine vehicles for buyers (high upfront purchase price)
Policy and implementation-related challenges	<ul style="list-style-type: none"> Lack of intermediate targets in state and national policies/mission (for vehicles as well as charging infrastructure) Limited policy-level focus on hybrids and retrofitting kits Significant investment by large auto manufacturers into Bharat Stage-VI (BS-VI) engines (due to government's push) indirectly delaying the scale-up and direction of investments available for EVs.
Finance-related challenges	<ul style="list-style-type: none"> No financial line/grants focused on this segment Lack of equity support for small-scale auto component manufactures of EVs and batteries
Institutional challenges	<ul style="list-style-type: none"> Limited training support for retrofitting

■ Challenges restricting growth of the electric mobility segment

■ Challenges restricting growth of SMEs in the electric mobility segment.

SUGGESTED INTERVENTIONS

In order to provide a thrust to the sector and consequently to SMEs, there are a number of interventions required. These include:

**FINANCIAL
SUPPORT SUCH AS
INTEREST SUBSIDY
FOR SMES SHOULD
BE ADOPTED
ACROSS INDIA**

INTERVENTIONS THAT ENABLE THE GROWTH OF THE SEGMENT

1. EVs and hybrids should be included as a priority area in the Industrial Investment Promotion policy of all the states, particularly where policies exist for EVs, like in Karnataka and UP. Bihar, for instance, has proposed the adding of 'EVs' as a high-priority area through an amendment in the Bihar Industrial Investment Promotion Policy 2016. This step will provide a clear impetus to local vehicle manufacturers and service providers.
2. There is a need for phased targets for EVs, rather than an overarching long-term target (for instance of 100% EVs by 2030 under NEMMP). Intermediate targets, such as '30% of government buses to be electrified by 2020', '50% government buses to be electrified by 2022' and so on, should be set. This will provide a clear vision to SMEs/start-ups, enabling them to prioritize EV-related manufacturing and services opportunities.

INTERVENTIONS THAT ENABLE THE GROWTH OF SMES IN THE SEGMENT

1. Financial support to SMEs, in the form of interest subsidy for the procurement of the plant and its machinery, which are being offered in UP, Telangana, Tamil Nadu; should be adopted by all states. This will help lower the cost of debt for this segment.
2. Rather than focusing just on EVs, the government should also focus on relatively low hanging fruits such as retrofit kits and the hybrid interventions. To support this transition, state-level EV incentives should be extended to hybrids as well.

ENERGY EFFICIENCY

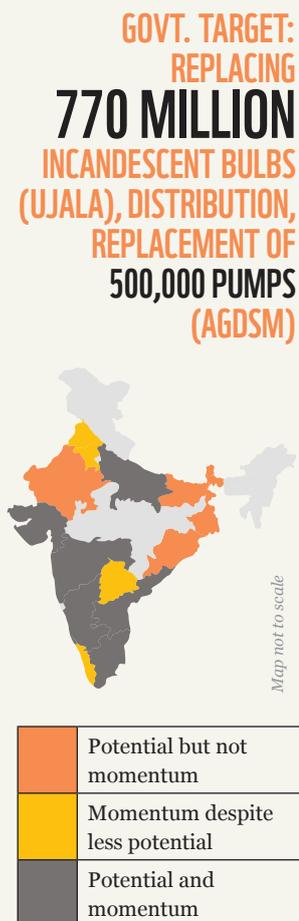




ENERGY EFFICIENCY

Energy efficiency is a national priority for the government. Despite some flagship efforts such as PAT (Perform-Achieve-Trade) scheme and technology transfer initiatives by Bureau of Energy Efficiency (BEE), the potential remains broadly untapped across residential, commercial and industrial consumers. The segment has also seen initiatives supported by international organizations such as UNIDO, KfW and GEF. The key geographies where substantial scope and market opportunity exist are represented in the map. Together, these constitute more than 70% of the number of commercial establishments and cover a majority of industrial corridors. Currently the momentum is seen in states such as Kerala, Karnataka, Tamil Nadu, etc.⁵

Figure 14: Overview of the energy efficiency segment



Key Takeaway: Significant potential for SMEs; new thrust area for investors and NBFCs

ENABLING POLICIES

- National Mission for Enhanced Energy Efficiency (NMEEE)
- 4E (End to End Energy Efficiency)
- “Promoting EE & RE in MSME in India”, GEF-UNIDO-BEE project
- Financial support to MSMEs in ZED certification (ZED) (under CLCS)
- A-TUFS Scheme for the Textiles Industry
- UJALA Scheme
- Perform Achieve and Trade (PAT)
- ECBC, 2017 (Commercial & Residential) and GRIHA
- State specific ECBC Commercial (20 states) and Residential (8 states)

KEY INSTITUTIONS

- **Govt. bodies:** MoP, MoMSME, BEE, EESL
- **Capital:** SIDBI, UNIDO, KfW, YES Bank, Tata Cleantech Capital, cKers Finance, Sangam Ventures
- **Training:** Energy optimization and efficiency training under Skill India

SUPPORT AVAILABLE

- Market aggregation by EESL
- Star ratings and labelling programmes by BEE for appliances such as ACs, and refrigerators

5 AEEE. 2019. State Energy Efficiency Index 2019

SMEs play a dual role in the energy efficiency segment – they are a vital part of the manufacturing as well as the service-delivery value chain. SMEs play an active role as manufacturers of energy-efficient appliances/components. Apart from this, they are also engaged as systems installers, providers for cooling or heating as a service, providers of technology platform, ESCOs, and as end-users of energy efficient appliances/machineries.

At a broad level, the energy efficiency policy framework is focused on promoting the use of energy efficient technologies in industries where SMEs are end-users. In addition to programmes focused on MSME clusters, there are sectoral schemes such as A-TUFS (for technology upgradation in the textiles industry) and energy audit schemes by states such as the PEACE scheme of Tamil Nadu, Haryana’s energy audit scheme that provides subsidy support to SMEs for commissioning energy audits at their facilities. The focus on the role of SMEs as manufacturers or service providers of energy efficient technologies in policies is weaker than required.

An analysis of the sector dynamics vis-a-vis the opportunity areas for SMEs is represented below:

Opportunity area	Enabling policy environment	Availability of capital	Institutional capacity	Supporting ecosystem
SMEs as end-users				
SMEs as manufacturers, and service providers of energy efficient appliances, system installers, ESCOs, tech platform providers				

Source: cKinetics analysis



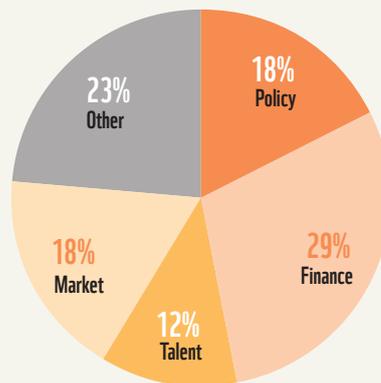
The policy environment is not helpful for people like us who manufacture ultra-efficient appliances.”

- R. Ramarathnam, Basil Energetics



KEY CHALLENGES AND BARRIERS TO OPPORTUNITIES FOR SMEs

Figure 15: Overview of challenges in energy efficiency



Based on the secondary analysis and primary discussion, key barriers as reported by the segment players are summarized below.

Challenges	
Market-related	<ul style="list-style-type: none"> Customers prefer prioritizing investments in revenue enhancing measures; energy efficiency is a bottom-line improvement Difficulty of demonstrating impact of energy savings Limited customer awareness of energy efficient technologies (except for LEDs)
Policy and implementation related challenges	<ul style="list-style-type: none"> No tangible state-level targets for energy efficiency Limited enforcement of ECBC code (Commercial) limits the uptake of the segment No minimum energy efficiency standards for common industrial equipment such as motors, compressors, boilers, etc. Energy audit schemes are voluntary in most states No procurement targets for SMEs under UJALA scheme
Finance-related challenges	<ul style="list-style-type: none"> Difficult to tap into debt from commercial banks for energy efficient technology upgradation due to risk perception. Equity available only for early, service-focused start-ups but project-based equity is non-existent. Inadequate financing support to SMEs for upgrading technology based on energy audit recommendations
Institutional challenges	<ul style="list-style-type: none"> Outdated trainings under Skill India Limited skilled workforce availability for steam optimization, machine configuration
Ecosystem-related challenges	<ul style="list-style-type: none"> Limited R&D support for SME service providers

- Challenges restricting growth of the energy efficiency segment
- Challenges restricting growth of SMEs in the energy efficiency segment

**MARKET
AGGREGATION
PROGRAMMES
WOULD BE KEY
TO ENABLE TIE-UP
BETWEEN SMES
AND START-UPS
FOR UPSCALING
OF ENERGY
EFFICIENCY.**

SUGGESTED INTERVENTIONS

In order to provide an impetus to the sector and consequently to SMEs, there are a number of interventions required. These include:

INTERVENTIONS THAT CAN FUEL THE GROWTH OF THE SEGMENT

1. Awareness programmes should be extended beyond LEDs for other appliances such as fans and refrigerators.
2. Standardized contracts and templates need to be developed to ensure financiers and customers can easily understand all aspects of energy efficiency projects.
3. ECBC code for commercial buildings should be made mandatory across states. Though all states have adopted it in theory, mandating and enforcing the code in commercial buildings is limited to Andhra Pradesh, Himachal Pradesh, Karnataka, Punjab and Telangana.
4. State-specific targets for energy savings should be set (similar to efforts by Karnataka and Tamil Nadu which had targets, particularly for municipalities, independent from those under PAT).
5. State governments should mandate minimum efficiency standards for common industrial equipment such as motors, boilers, etc. This will help SMEs manufacture and adopt energy efficient technologies.
6. Energy audit schemes should be intensified across states, providing subsidy support to SMEs for the same. This will help measure and frame implementation models and priorities for the identified energy saving opportunities.

INTERVENTIONS THAT ENABLE THE GROWTH OF SMES IN THE SEGMENT

1. BEE needs to intensify its market aggregation programmes. For instance, for the ceramic cluster, BEE and UNIDO aggregated demand across the cluster SMEs and facilitated tie-ups with start-ups for supply and installation of energy efficient motors. Similar programmes should be launched for other industrial clusters that cover a larger number of appliances and technologies.
2. Targets must be set to procure a certain percentage of energy efficient goods from SMEs for entities such as EESL. Government tenders should state that 10% of goods need to be procured from SMEs (coupled with a price equalization clause).
3. Support is inadequate, though available, for the upgradation to energy efficient machinery and plants, to SMEs as end-users. For e.g., under the ATUFS scheme, only 10% of the investment required for new machinery is provided as capital subsidy.
4. The existing partial risk sharing facilities need to be stepped up to ensure first loss comfort to banks and NBFCs. This will strengthen the role of bank financing in this space.
5. Specific incubation and R&D centers should be set up for this segment to further enhance innovation.

SMART ENERGY





SMART ENERGY

The smart energy segment encompasses smart grids, smart meters, smart sensors and related IT tools. The government's push for smart cities, the smart grids mission, digital India, etc. has been fueling the growth of automation technologies in India across all sectors – industrial, agricultural, transportation, etc. In the past, DISCOMs have undertaken only small-scale smart metering projects. However, this sub-segment has received attention because of initiatives such as the Ujwal DISCOM Assurance Yojana (UDAY). Market aggregation programmes have also been undertaken by Energy Efficiency Services Limited (EESL), to replace conventional meters with smart meters. Programmes such as UDAY mandates that all users with a consumption of more than 200 units per month⁶ should use smart meters. However, there is only an approximately 5% increase. Now there are 300,000 smart meters deployed for consumers with more than 500kWh consumption and 11 lakh⁷ smart meters deployed for consumers with consumption between 200 and 500kWh as of Jan 2020⁸. The maximum geographical potential for smart energy (based on population) lies in states such as Uttar Pradesh, Maharashtra, Bihar, West Bengal and Madhya Pradesh, which together constitute close to 70% of the urban households of the country. However, the procurement has so far been led by Uttar Pradesh.

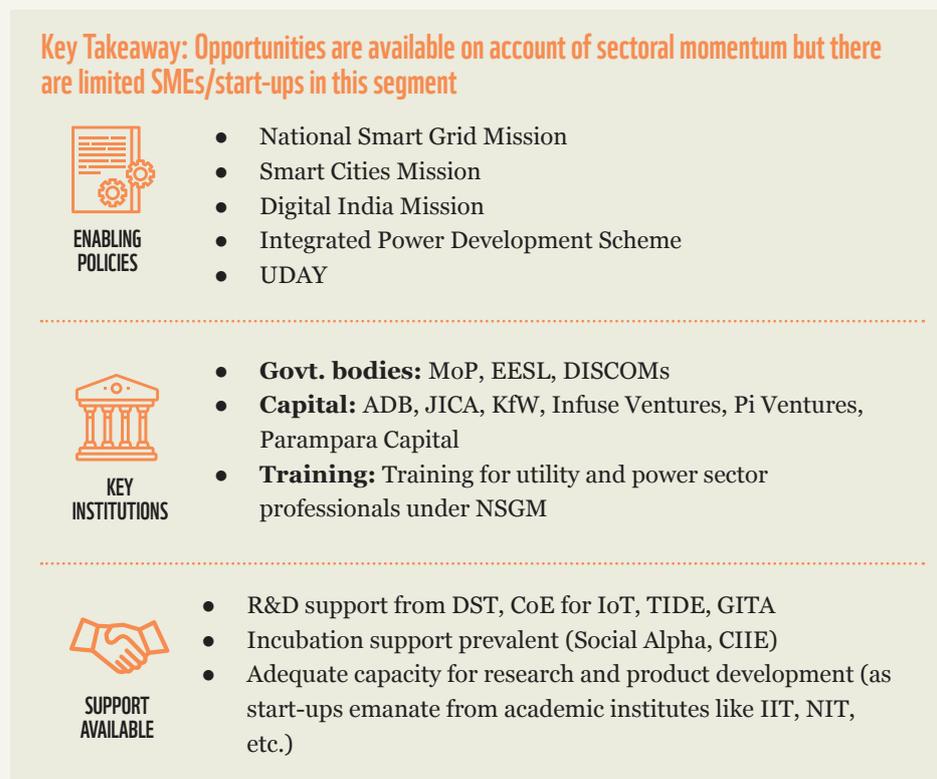
**GOVT. TARGET:
SMART METERS WILL
BE MADE AVAILABLE
FOR ALL CONSUMERS
WITH CONSUMPTION OF
MORE THAN
200 KWH
PER MONTH**



Map not to scale

	Potential but not momentum
	Momentum despite less potential
	Potential and momentum

Figure 16: Overview of the smart energy segment



6 https://powermin.nic.in/pdf/Uday_Ujjawal_Scheme_for_Operational_and_financial_Turnaround_of_power_distribution_companies.pdf

7 1 lakh= 100,000

8 <https://www.uday.gov.in/home.php>

Given the innovative nature of this segment, SMEs are exploring offerings such as energy management platforms, energy analytic services and remote sensing technology for energy optimization and as manufacturers/installers of smart meters.

The smart meter segment is currently at a nascent stage in India. It is only slowly growing, primarily due to lack of manufacturing capacity; within the segment in general and SMEs in particular. Even though R&D support is limited from industry accelerators, support is available through government programmes such as GITA, India Innovation Growth Programme and Centre for Excellence for IoT (under Digital India).

An analysis of the sector dynamics vis-a-vis the opportunity areas for SMEs is represented below:

Focus sub-segments	Enabling Policy Environment	Availability of Capital	Institutional Capacity	Supporting Ecosystem
SMEs as smart meter manufacturers/ installers				
SMEs as IoT solution/ services providers				

Source: eKinetics analysis



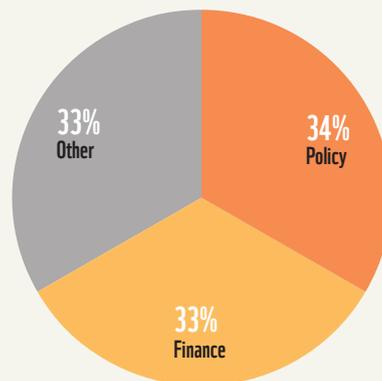
When we entered the space, there were no policy levers to monitor the energy consumption. However, in any industrial or commercial sector, as much as 25% of the total cost goes towards energy consumption and managing this can increase their profit line. However, for this, we need facilities to accept the technology.”

- Akshdeep Singh, Ecolibrium Energy



KEY CHALLENGES AND BARRIERS TO THE OPPORTUNITY FOR SMEs

Figure 17: Overview of challenges in smart energy



Based on the secondary analysis and primary discussion, key barriers as reported by the segment players are summarized below.

Challenges	
Market-related challenges	<ul style="list-style-type: none"> • Slow uptake/adoption (particularly by DISCOMS) coupled with challenges of data integration and limited readiness at utility level. • Limited manufacturing capacity of existing SMEs/start-ups.
Policy and implementation-related challenges	<ul style="list-style-type: none"> • The draft IoT policy released in 2016 is yet to be finalised. • Historic and current budgetary expenditure for 2020-21 does not reflect the target.⁹ • Stringent criteria in tenders, such as high turnover requirements and operating experience of at least 3 years, in manufacturing and supply of meters are restricting participation by SMEs.¹⁰
Finance-related challenges	<ul style="list-style-type: none"> • No dedicated fund or investor focused on smart energy • No specific incentives/provisions to encourage manufacturing of devices in this segment by SMEs
Ecosystem-related challenges	<ul style="list-style-type: none"> • Limited testing facilities for smart meters

- Challenges restricting growth of the smart energy segment
- Challenges restricting growth of SMEs in the smart energy segment

9 <https://www.indiabudget.gov.in/doc/eb/sbe77.pdf>

10 <https://www.cgijoburg.gov.in/pdf/Uploaded-Tender-Document-28-01-19.pdf>

SUGGESTED INTERVENTIONS

In order to provide a thrust to the sector and consequently to SMEs, there are a number of interventions required. This includes:

**EXPLICIT
PROVISION FOR
PROCUREMENT
OF SMART
DEVICES FROM
SMEs WOULD
ENCOURAGE ROLE
OF SMEs IN THIS
SEGMENT.**

INTERVENTIONS THAT ENABLE THE GROWTH OF THE SEGMENT

1. Mandatory demand-response scheme, a measure to manage the demand for power during peak hours, for all DISCOMs to target up to 10% or similar amount of their peak power demand.
2. To ensure that targets are met within the intended timelines, adequate budget is required for smart meters.

INTERVENTIONS THAT ENABLE THE GROWTH OF SMEs IN THE SEGMENT

1. Explicit procurement provision of certain 'smart devices' such as smart meters, sensors, etc. from SMEs for the national programmes. This would follow the example of the tender floated by Power Finance Corporation for Himachal Pradesh State Electricity Board (HPSEB), which mandates 20% minimum procurement from SMEs in line with GoI's public procurement policy 2012¹¹. This measure would also indirectly encourage manufacturing of Smart Energy Devices by SMEs.

11 <http://www.pfcclindia.com/download/rfP-volume-I.pdf>

WASTE TO ENERGY





WASTE TO ENERGY

The Waste to Energy segment covers a broad variety of technologies such as incineration, gasification and bio-methanation. These processes are used to convert agricultural and other feedstock and municipal waste into energy (including biofuels, power, biogas). The geographical areas of focus for the segment includes states such as Maharashtra, Gujarat, Uttar Pradesh, and seven other states which together generate more than 70% of the municipal waste of the country (as indicated in the map). Only certain cities such as Indore (Madhya Pradesh) and Pune (Maharashtra) have taken significant measures for waste management, whereas states such as West Bengal process less than 5% of the waste generated.

Figure 18: Overview of Waste to Energy segment

Key Takeaway: This is a muted segment with diffused government focus and lack of implementation of rules by Urban Local Bodies (ULBs)



ENABLING
POLICIES

- Swachh Bharat Mission
- Smart Cities Mission
- GOBAR (Galvanizing Organic Bio-Agro Resources) DHAN scheme, 2018
- New National Biogas and Organic Manure Programme (NNBOMP)
- National Policy on Biofuels, 2018
- Waste Management Rules, 2016 (including solid, e-waste)



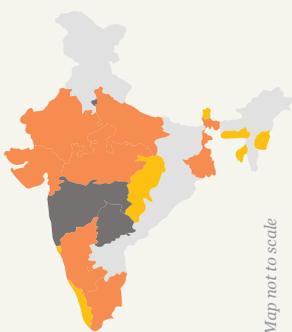
KEY
INSTITUTIONS

- **Govt. bodies:** MNRE, MoJS, MoPNG, MoEFCC
- **Capital:** SBICAP Neev fund, Shell, Sangam Ventures
- **Training:** Green Skill India for biogas



SUPPORT
AVAILABLE

- Grant and acceleration support from DST
- Market development through the SATAT Initiative for Compressed bio gas (CBG)



Map not to scale

	Potential but not momentum
	Momentum despite less potential
	Potential and momentum

Most SMEs in this segment play a small role in the larger Waste-to-Energy value chain. The role of SMEs is limited to being manufacturers of digesters and biogas plants and being service providers for collection, segregation and recycling, as well as for operation and maintenance of the Waste-to-Energy plants.

At a broad level, Waste-to-Energy remains a low-profile segment due to diffused government focus and the lack of implementation of waste management rules by urban local bodies. Currently the opportunity for start-ups in this segment is limited to commercial establishments or bulk waste generators such as hotels, hospitals, and sports complexes, which segregate waste at source.

An analysis of the sector dynamics, vis-a-vis the opportunity areas for SMEs is presented below:

Focus sub-segments	Enabling Policy Environment	Availability of Capital	Institutional Capacity	Supporting Ecosystem
SMEs as plant O&M and manufacturers				
SMEs as service providers (for segregation, collection and processing services)				

Source: cKinetics analysis



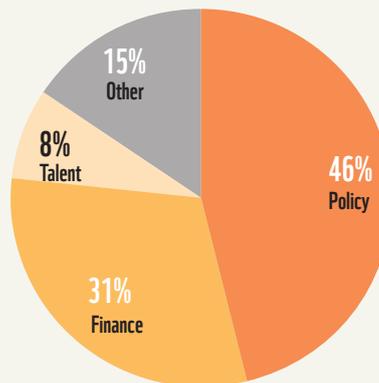
“The Waste to Energy segment is still at a nascent stage and therefore, debt & working capital funding is still limited. The government also needs to provide an enabling policy ecosystem and bring multiple stakeholders including financial institutions into the space as well as have state level programmes in place.”

- Lt. Col Monish Ahuja (Retd), PRESPL



KEY CHALLENGES AND BARRIERS TO THE OPPORTUNITY FOR SMEs

Figure 19: Overview of challenges in Waste to Energy



Based on the secondary analysis and primary discussion, key barriers as reported by the segment players are summarized below.

Challenges	
Market-related challenges	<ul style="list-style-type: none"> Limited awareness of dry and wet waste segregation at household level Lack of successful business models for Waste to Energy has led to scepticism among financiers Challenge in implementing business models which incorporate informal labour force into a formal collective
Policy and implementation related challenges	<ul style="list-style-type: none"> Lack of implementation of waste management rules, segregation at source reduces the calorific value of waste Government's focus and massive subsidy for LPG restricts the uptake of biogas as a sector In context of biofuels, there could be a role for SMEs, albeit limited, for second generation refining, bio CNG, etc. However, no role has been defined for Ministry of MSME in the National Policy on Biofuels, 2018.
Finance-related challenges	<ul style="list-style-type: none"> Waste to Energy is not a key focus area for clean energy funds and other impact funds Lack of financial support with absence of any major impact investors or dedicated funding line focused at SMEs

- Challenges restricting growth of the Waste to Energy segment
- Challenges restricting growth of SMEs in the waste to energy segment.

Challenges	
Supporting ecosystem	<ul style="list-style-type: none"> No back-end market development programme for procurement of feedstock (at an aggregate level) – relevant for bio-energy opportunities being targeted under SATAT Government tenders for installation of biogas plants are non-supportive for start-ups (requirements in tender include 10-year profitability, cash deposit of INR 25 lakhs) Limited R&D and incubation support Stringent qualification criteria for CBG provider (such as under expression of interest (EOI) issued by GAIL for SATAT4) including high turnover and past experience requirements limiting evolution of SMEs in the space
Institutional-related challenges	<ul style="list-style-type: none"> Limited funding support, with absence of any major impact investors or a dedicated funding line for SMEs

SUGGESTED INTERVENTIONS

In order to provide a thrust to the sector and consequently to SMEs, there are a number of interventions required. These include:

PARTNERSHIP BETWEEN SMES AND MUNICIPALITIES FOR DECENTRALISED WASTE MANAGEMENT SOLUTIONS IS SEEN AS A POTENTIAL INTERVENTION FOR GROWTH OF SMES IN THIS SPACE

INTERVENTIONS THAT ENABLE THE GROWTH OF THE SEGMENT

- Subsidy for LPG should be extended/renamed as subsidy for adoption of clean energy-based fuels (including biogas). This will create a fair market for all clean energy fuels, enabling the adoption of biogas as a segment. It will provide an option for consumers to choose from different alternatives.
- Waste management rules need to be enforced. Models from Pune, Indore and other cities can be implemented across ULBs.
- The scope of market development programmes by the government should be extended beyond procurement of CBG, to feedstock aggregation as well.
- There is need for awareness building around the ways to segregate dry and wet waste. Many municipalities have launched awareness programmes, but implementation needs to be stricter.
- There is need for patient investors for the Waste-to-Energy segment specifically and clean energy segment generally.

INTERVENTIONS THAT ENABLE THE GROWTH OF SMES IN THE SEGMENT

- Specific financing support such as interest subvention or capital subsidy for biogas plants will help SMEs/start-ups.
- Government tenders and norms for biogas installation as well as CBG procurement should be relaxed for start-ups/SMEs. In addition, provisions to procure 10% of CBG from start-ups (under SATAT) should be included.
- R&D support from the government should be enhanced for this segment. This will enable start-ups to create innovative ways to process waste and improve/set-up supply chains.

ENERGY ACCESS





ENERGY ACCESS

Energy access encompasses multiple sub-segments including distributed standalone solar lighting solutions (such as SHS, mini-grids), improved biomass cookstoves and ‘productive use’ appliances such as solar pumps, solar charkhas and micro cold storages, etc. The thrust by the government is primarily towards the solar pump sub-segment. Under one of the components of the flagship KUSUM scheme, the government aims to install 17.5 lakhs standalone solar pumps (extended to 20 lakhs under the union budget 2021) by 2022. Currently, over 250,000 solar pumps have been installed in India. The maximum potential for energy access lies in states such as Uttar Pradesh, Jharkhand, Bihar, Odisha, Chhattisgarh, etc. (as highlighted in the map) where despite electrification, power supply is unreliable. Most SMEs/start-ups are focused on these states and are offering a variety of solutions to the consumers in these areas.

Figure 20: Overview of the energy access segment

Key takeaway: There is opportunity for SMEs, given the nature of sector; but lack of scalable business models and subsequently, access to capital is an issue



ENABLING POLICIES

- Jawaharlal Nehru National Solar Mission
- Solar Charkha Mission
- KUSUM Scheme
- Off-grid and Decentralized Solar PV Applications Programme –Phase III
- Biomass Gasifier based Distributed / Off-grid power programme for Rural areas
- Unnat Chulha Abhiyan (National Biomass Cookstove Programme)



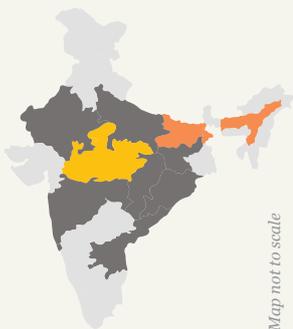
KEY INSTITUTIONS

- **Govt. bodies:** MNRE, MoMSME
- **Capital:** IREDA, RBL Bank, Maanaveeya, Caspian, cKers Finance, Rockefeller Foundation
- **Training:** Training available under Suryamitra Skill Development Programme and Skill India



SUPPORT AVAILABLE

- Grant from international foundations/donors available
- Market linkages available for Khadi village industries clusters (solar charkha clusters)



Map not to scale

	Potential but not momentum
	Momentum despite less potential
	Potential and momentum

Within the energy access segment, SMEs operate as assemblers of SHS; manufacturers of charkhas, pumps, pump controllers; as well as service providers for lighting solutions and productive uses (such as water for irrigation and/or asset on lease models).

The energy access segment has primarily been led by government procurement. Also, there is an on-going transition from lighting to livelihood/productive-use appliances. This segment has natural opportunities for SMEs; however, there are no explicit procurement provisions in the government schemes on this front. The main challenge plaguing this segment (excluding pumps) is the lack of scalability of business models, due to scattered market demand/aggregation. Meanwhile, on the issue of financing, SMEs report working capital challenges as well as high collateral requirements for tapping into bank financing.

An analysis of the sector dynamics vis-a-vis the opportunity areas for SMEs is given below.

Focus sub-segments	Enabling Policy Environment	Availability of Capital	Institutional Capacity	Supporting Ecosystem
Lighting (assemblers and service-led models for SHSs, mini-grids)				
Pump manufacturers, service-led models such as irrigation-as-a-service or asset on lease				
Biomass cookstoves suppliers				
Productive use (charkha manufacturers, service- models for cold rooms)				

Source: cKinetics analysis



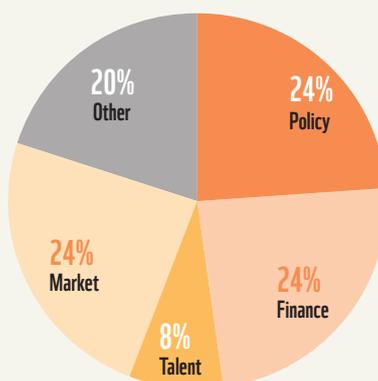
“Our debt exposure is primarily from NBFCs, they have been very quick to understand business requirements and structure solutions to help our business growth. Our growth in the past few years is attributable to their timely support.”

- Prateek Singhal, Ecozen Solutions



KEY CHALLENGES AND BARRIERS TO THE OPPORTUNITY FOR SMEs

Figure 21: Overview of challenges in energy access



Based on the secondary analysis and primary discussion, key barriers as reported by the segment players are summarized below.

Challenges	
Market-related challenges	<ul style="list-style-type: none"> Market demand uncertain and driven by government support
Policy and implementation related challenges	<ul style="list-style-type: none"> The government's promotion of LPG is restricting the uptake of improved cookstoves For micro-cold storages, there are no specifications at a central level for small cold rooms Delay in subsidy disbursement (across different sub-segments) impacting the cash flows of SMEs in the space. KUSUM only allows manufacturers of pumps, controllers and solar modules to participate in the tender. This restricts role of assemblers in the value chain
Finance-related challenges	<ul style="list-style-type: none"> Lack of credit guarantee and risk mitigation mechanisms restricting the provision for debt by commercial banks High interest rate charged by NBFCs Availability of provision for debt from commercial and public banks is an issue due to collateral requirements
Supporting ecosystem	<ul style="list-style-type: none"> Market linkage programmes seen as a core need to scale up cookstoves segment
Institutional-related challenges	<ul style="list-style-type: none"> Lack of availability of entry-level technicians in rural areas Inadequate capacity and lack of training focused at enhancing capacity for mid-level management.

- Challenges restricting growth of the energy access segment
- Challenges restricting growth of SMEs in the energy access segment.

SUGGESTED INTERVENTIONS

In order to provide an impetus to the sector and consequently to SMEs, there are a number of interventions required. These include:

SUPPORT FOR NEW AND EMERGING BUSINESS MODELS WITHIN THE EXISTING POLICIES; SUCH AS IRRIGATION-AS-A-SERVICE FOR SOLAR PUMPS, SEEN AS A KEY ENABLER FOR SMES IN THIS SPACE

INTERVENTIONS THAT ENABLE THE GROWTH OF THE SEGMENT

1. Working capital and Order financing products suited to the needs of solar pumps and micro cold storage segment to be created. This will be supported by risk mitigation mechanisms to motivate lenders to engage in the space.
2. Despite willingness of certain private banks to invest, there is a need for institutions to provide guarantees to banks to reduce their risk perception and increase willingness to invest.

INTERVENTIONS THAT ENABLE THE GROWTH OF SMES IN THE SEGMENT

1. Existing policy support for new and emerging business models, such as irrigation as a service, needs to be sharpened to encourage village level entrepreneurship.
2. Guidelines for < 3 HP pumps should be incorporated in the KUSUM scheme. This will encourage SMEs to promote micro pumps in line with the landholdings of the farmers.
3. Intensification of training programmes in states such as Jharkhand and Odisha will help increase the number of solar technicians who can support enterprises operations in rural areas.

WAY FORWARD

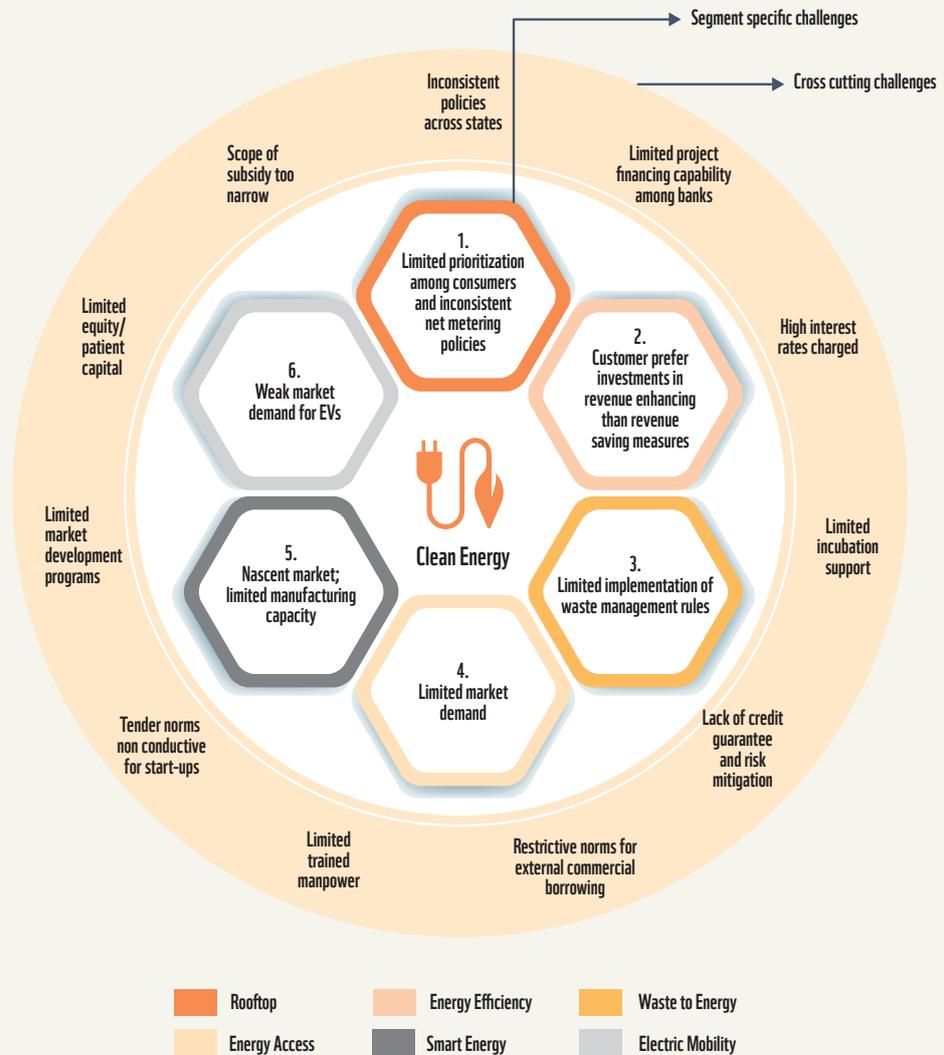




WAY FORWARD

A consolidated view of the clean energy ecosystem is a picture in contrasts. The policy and institutional ecosystem is designed for the development of various sectors within the clean energy space. However, the vision of a vibrant ecosystem where SMEs play a significant role in at least a few sub-segments has had mixed success. The graph below highlights the key challenges, which are restricting the growth of the specific segments.

Figure 22: Summary of challenges



Given below are the key recommendations that can be implemented in the short, medium and long term to galvanize the progress of the six segments.

Specific policy provisions for SMEs and understanding their individual constraints could promote the role of SMEs across the clean energy space. From a policy perspective, the key focus areas should entail support to new/emerging business models, make provisions of patient capital and provide clarity on continuity and consistency in policies.

Meanwhile, the catalysts can play a key role in providing dedicated incubation and acceleration support to encourage new ventures in this segment. This could be especially useful in segments that appear to have strong future growth potential such as Electric Mobility, where start-ups are of great importance. Also, they can help frame risk mitigation instruments to unlock capital for the segment as a whole. Lastly, catalysts could support the government (for programmes such as Skill India), in updating the training programmes in alignment with market requirements and in providing training/workshops to develop project finance capability among bankers.

Table 4: Recommendations for growth of clean energy segments

Segment	Recommendation blueprint			Cross-cutting interventions
	Short term	Medium term	Long term	
Solar Rooftop	<ul style="list-style-type: none"> Formulation of parameters for minimum on-site generation for group housing buildings DISCOM-led aggregation models (in residential complexes) 80C benefits for residential consumers 	<ul style="list-style-type: none"> Innovative tariff structures to support a balanced net billing approach 	<ul style="list-style-type: none"> P2P-based, block-chain enabled intra DISCOM energy trading frameworks 	<ul style="list-style-type: none"> Government needs to augment far more risk capital for incubators to provide support to start-ups. Incubation of ESCOs (particularly in energy efficiency) is a high priority need. Credit guarantee and risk mitigation mechanisms - Risk mitigation instruments can be funded under public financing to create a catalytic effect for private sector investments in upcoming sectors Building project finance capacity among bankers is a core need
Energy Efficiency	<ul style="list-style-type: none"> Awareness building for EE products Lower GST slab of energy-efficient appliances 	<ul style="list-style-type: none"> Updating training programmes for energy efficiency (to include new technologies) ECBC code for commercial buildings should be made mandatory across states. Expansion of market aggregation programmes by BEE to other clusters and industries. 	<ul style="list-style-type: none"> Frameworks for net zero and industrial productivity targets to be established to prioritize efficiency among consumers 	

Segment	Recommendation blueprint			Cross-cutting interventions
	Short term	Medium term	Long term	
Energy Access	<ul style="list-style-type: none"> Intensification of training in states such as Jharkhand, Odisha, etc. for skilled technicians. Sharper policy support around new/ emerging business models such as irrigation as a service, etc. Support for RE for productive uses so as to enhance clean energy-based livelihood opportunities. 	<ul style="list-style-type: none"> Allow CSR funds from corporates to aid village-level entrepreneurs, ESCOs who may not have 80G certification, etc 	<ul style="list-style-type: none"> Integrate distributed renewable energy systems in centralised generation 	<ul style="list-style-type: none"> Enhanced support for innovation and R&D capabilities amongst SMEs and start-ups in clean energy segment. Incubation support for SME innovators to be further accelerated
Waste to Energy	<ul style="list-style-type: none"> Tender norms to be relaxed for start-ups and SMEs Enforcement of segregation rules LPG subsidy, fertilizer subsidy to be extended to all clean fuels such as Biogas and bio-compost. Encourage partnerships between municipalities and SMEs for decentralized waste management solutions 	<ul style="list-style-type: none"> R&D support from government to create innovative ways to process waste 	<ul style="list-style-type: none"> Policies and mandates to ensure zero waste community and industrial settings, as an opportunity for policy that helps create market 	
Electric Mobility	<ul style="list-style-type: none"> EVs and hybrids should be included as a priority area in the concerned state's industrial investment promotion policy Enhancements under FAME should ensure that incentives are indexed to the demonstrated efficiency of the battery pack and not only the battery size 	<ul style="list-style-type: none"> State-level EV incentives to be extended to the Hybrid Vehicles component manufacturers Financial support such as interest subsidy for SMEs should be adopted pan-India. 	<ul style="list-style-type: none"> P2P guidelines to support exchange and trading of energy with grid; enabled by block-chain based micro-energy trading models 	
Smart Energy	<ul style="list-style-type: none"> Tender norms w.r.t operational track record and turnover to be relaxed for SMEs/Start-ups. 	<ul style="list-style-type: none"> Mandatory demand response scheme for all DISCOMS with defined targets 	<ul style="list-style-type: none"> Bi-directional (such as Vehicle-to-grid) charging standards 	

ANNEXURES

ANNEXURE 1: POLICY SNAPSHOT

SEGMENT 1: SOLAR ROOFTOP

Central Policies

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Solar Energy Scheme for Power looms (Under PowerTex India comprehensive scheme)	-	Po, In	End-user	<ul style="list-style-type: none"> - Capital subsidy (Subsidy depends on number of looms (minimum 4), Gen/ SC/ST categorization and type of plant (on grid or off grid); Gen (50%) for 4 power looms up to INR 2.25 Lakh) - Tax concessions/ Duty support 	E, G

Note: Po= Power, In= Industrial, Ag= Agriculture, Tr= Transport, Bu= Buildings; R: R&D and PoC, E: Early stage and G: Growth Stage

State Policies

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Rajasthan Solar Energy Policy 2019	30GW of solar capacity by 2024	Po, Tr, Bu	Manufacturer, Service provider, End-user	<ul style="list-style-type: none"> - Financial benefits to manufacturing MSMEs including interest subvention, stamp duty waiver, etc. - Grants for research (State facilitates Research and Development (R&D) of storage technologies including generation of hydrogen for use in hydrogen fuel cell, for renewable energy 	R, E

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Gujarat Solar Power Policy 2015	-	Po, Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - Capital subsidy to MSMEs - Exemption of 50% on wheeling charges/transmission charges on Intrastate Sale of Power to third party or in case of Captive use) - MSMEs allowed to install solar projects that are more than 100% of their sanctioned load or contract demand, instead of 50% 	E, G
Madhya Pradesh Grid Connected Net Metering Renewable Energy Systems Policy	Solar RPO of 5636MW by 2022	Po	Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G
Uttar Pradesh Solar Energy Policy 2017	10700MW (inclusive of target of 4300MW fixed for Solar Rooftop projects)	Po	Manufacturer, Service provider	<ul style="list-style-type: none"> - Non-financial support (solar R&D, testing and standardization in two institutes/universities in UP) 	R, E
Delhi Solar Energy Policy 2016	Solar installations to be completed within 5 years on all government-owned rooftop	Po	Manufacturer, Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G
Andhra Pradesh Solar Policy	5000MW Solar power capacity, 50000 pumps	Po, Ag, Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - Exemption of wheeling charges 	E, G
Jharkhand State Solar Power Policy, 2015	2650MW by 2020	Po, Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - Capital subsidy (deemed Priority Industry status, thus, incentives/ subsidies earmarked for industries will be available); 4% grant in wheeling charges in terms of energy injected 	E, G
Tamil Nadu Solar Energy Policy, 2019	9000MW by 2023 out of which 40% is from consumer installations	Po, Ag, Tr	Manufacturer, Service provider	<ul style="list-style-type: none"> - Non-financial support (TEDA will coordinate with national/ international inst. for R&D) 	R, E

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Telangana Solar Power Policy 2015	-	Po, Bu	Manufacturer, Service provider, End-user	- Tax concessions/ Duty support (Refund of VAT/GST)	E, G
Karnataka Solar Policy, 2014-2021	Additional 6000MW by 2021	Po, Bu	Manufacturer, Service provider	- Non-financial support (Solar energy centre of excellence and incubation centre for promoting innovation in technology, skill development, and R&D)	R, E, G
Haryana Solar Power Policy, 2016. Amendment March 2019	3200MW solar power by the year 2021-22	Po, Bu	Manufacturer, Service provider	- No financial support for SMEs - Non financial; co-creation of Solar Centres of Excellence and pools of technical professionals which would work towards applied research and commercialization of indigenous and cutting-edge technologies involving applications of solar energy generation and appliances.	R, E, G

Note: Po= Power, In= Industrial, Ag= Agriculture, Tr= Transport, Bu= Buildings; R: R&D and PoC, E: Early stage and G: Growth Stage

SEGMENT 2: ENERGY EFFICIENCY

Central Policies

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Standards and Labelling Programme (BEE)	-	In, Bu	Manufacturer, End-user	- No support for SMEs	NA
GRIHA	-	Bu	-	- No support for SMEs	NA
National Mission for Enhanced Energy Efficiency	-	Po, Ag, Tr, Bu, In	Manufacturer	- No support for SMEs	E, G
UJALA Scheme	770 million incandescent bulbs to be replaced by LEDs in 3 years	Po, Ag, Tr, Bu	Manufacturer	- No support for SMEs	E, G
PAT under National Mission for Enhanced Energy Efficiency (NMEEE)	Energy consumption reduction of 8.869 MTOE (PAT cycle- II)	In	Manufacturer	- No support for SMEs	E, G
EcoNiwas Samhita (Residential Buildings)	-	Bu	Manufacturer	- No support for SMEs	E, G
SAATHI for power loom (Sustainable and Accelerated Adoption of efficient Textile technologies to Help small Industries)	-	Po, In	End-user	- Energy efficient power looms, motors and rapier kits at no additional cost for small industries	G
Financial support to MSMEs in ZED certification (ZED) (under CLCS)	28,570 MSMEs	In	End-user	- Financial assistance for conducting gap analysis and pilot implementation of better technology; MSMEs opting for desktop analysis have to pay only their contribution ranging from INR 2000 to INR 5000 (depending on size of enterprise)	E, G
Integrated Development of Leather Sector Scheme (ELSS)	-	In	End-user	- Capital subsidy (up to 30% for updating plant and machinery) - Assistance provided for training and placement of skilled development training	G

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
4E (End to End Energy Efficiency)	-	In	End-user	<ul style="list-style-type: none"> - Interest reduction/ Subvention (concessional rate) - Energy audit at concessional price) 	G
Partial Risk Sharing Facility for Energy Efficiency (PRSF)	-	In	End-user	<ul style="list-style-type: none"> - No direct financial support for SMEs - Guarantees to participating financial institutions (i.e. banks/ financial institutions/ non-banking financial company) for energy efficiency loans extended by financial institutions to energy service companies (ESCOs). 	G
Financing Energy Efficiency Projects in the MSME Sector (SIDBI)	-	In	End-user	<ul style="list-style-type: none"> - Financial assistance for investments in energy efficiency projects to existing MSMEs under a line of credit from KfW Development Bank, under the Indo-German Development Cooperation 	G
Amended Technology Upgradation Fund Scheme (A-TUFS)	-	In	End-user	<ul style="list-style-type: none"> - Capital subsidy (of the range 10 to 15% on eligible machines) 	G
Credit Guarantee Trust Fund for Micro & Small Enterprises (CGT SME)	-	In	End-user	<ul style="list-style-type: none"> - Collateral-free loan 	E, G
GEF-UNIDO-BEE project	-	In	End-user	<ul style="list-style-type: none"> - Ecosystem support 	E, G

Note: Po= Power, In= Industrial, Ag= Agriculture, Tr= Transport, Bu= Buildings; R: R&D and PoC, E: Early stage and G: Growth Stage

State Policies

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Integrated Textile Policy 2019 (Tamil Nadu)	-	In	Service provider, End-user	<ul style="list-style-type: none"> - Capital subsidy (of 20% up to INR 10 lakh for equipment required for energy and water conservation, and of 25% up to INR 25 lakh for investment in technology acquisition/collaboration) - 50% assistance (up to INR 50,000 for energy/ water audit and environmental compliance for textile units operating for more than three years) 	G
Andhra Pradesh State Energy Conservation Mission	-	Ag, In, Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - Non-financial support (Trainings and workshops for implementation of ECBC Code and development of energy-efficient boilers, furnace, etc.) 	E, G
Amendment in ECBC for the state of Himachal Pradesh	-	Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G
Karnataka Energy Conservation Building Code (ECBC) 2014	-	Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G
Telangana Energy Conservation Building Code 2017	-	Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - Non-financial support (training for ULB staff and inspectors, education and outreach programmes for design professionals and programmes for licensing professionals and inspectors on TSECBC compliance) 	E, G
Kerala State Energy Conservation Building Code 2017	-	Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - Non-financial support (trainings and workshops) 	E, G
Energy Audit Scheme	-	In	Manufacturer, Service provider	<ul style="list-style-type: none"> - Others (reimbursement of 75% of the cost of conducting an energy audit, 50% subsidy up to INR 2 lakh provided on the cost of capital equipment required to conserve energy) 	G

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Energy Audit Subsidy Scheme by Gujarat Energy Development Agency (GEDA)	-	In, Bu	Manufacturer	- Others (subsidy for energy audit)	G
Scheme for Promotion of Energy Audit & Conservation of Energy (PEACE)	-	In	End-user	- Grant (25% up to INR 2 lakhs for cost of upgrading machinery/ equipment to improve energy efficiency after audit) - Incentive/subsidy of 50% (up to INR 75,000 for the energy audit cost)	E, G
Energy Audit Scheme, Haryana	-	In	End-user	- 75% reimbursement of cost of energy audit, (subject to a maximum of INR 2 lakhs) and 50% subsidy on cost of capital equipment that help conserve energy (subject to maximum of INR 20 lakhs for Micro, Small & Medium Enterprise)	E, G

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SEGMENT 3: ENERGY ACCESS

Central Policies

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Solar Charkha Mission	2000 solar charkhas	Ag, In	Manufacturer, End-user	<ul style="list-style-type: none"> - Interest reduction/ subvention (interest subvention of 8% on working capital for a period of 6 months) - Capital subsidy (of 35% for 2000 solar charkhas for individuals and SPVs, 100% capital subsidy up to INR 120 lakhs for construction of work shed per cluster) 	E, G
Unnat Chulha Abhiyan (National Biomass Cookstove Programme)	-	Ag, Bu	Manufacturer	<ul style="list-style-type: none"> - R&D to researchers and academicians, no support for SMEs 	R
Capital Investment Subsidy for Construction/ Expansion/ Modernisation of Cold Storage and Storages for Horticulture Products	-	Ag	Manufacturer, Service provider	<ul style="list-style-type: none"> - Capital subsidy (credit linked back-ended subsidy @ 35% of project cost for cold storage unit-mezzanine structure and PEB structure)) 	E, G
Mission for Integrated Development of Horticulture	-	Ag	Manufacturer, Service provider	<ul style="list-style-type: none"> - Capital subsidy (100% up to INR 35 lakh per project) 	E, G
Dairy Entrepreneurship Development Programme	-	Ag, Bu	Manufacturer	<ul style="list-style-type: none"> - Capital subsidy (back-ended capital subsidy of 25% up to INR 7.5 lakh (INR 10 lakh for SC/ST) on cold storage facilities for milk and milk products) 	E
Off-grid and Decentralized Solar PV Applications Programme –Phase III	118MWp equivalent solar power capacity	Ag, Bu	Manufacturer, Service provider, End-user	<ul style="list-style-type: none"> - Soft loans for projects, including working capital loans, for SME manufacturers of solar thermal systems, in order to promote technology up-gradation, improvement in technology, expansion in production facilities, etc. 	E, G
Biomass Gasifier based Distributed / Off-grid power programme for Rural Areas	-	Ag, Bu	Manufacturer, Service provider, End-user	<ul style="list-style-type: none"> - Capital subsidy (CFA provided Rs. 15000 per kW, financial support limited to a maximum of 3 kW, that is, Rs 3 lakh per project) - Non-financial support (HRD training, Gasifier Entrepreneur Development Course, Awareness promotions, O&M (operation and management), Technician's Course (subsidy INR 2 lakh to INR 3 lakh per course) 	E, G
National Tariff Policy (NTP), 2016	-	Po, Ag	Manufacturer, Service Provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G

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State Policies

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non- financial)	Stage for which support is relevant/ provided
Solar Inverter Charger Programme, Haryana	Deploy 250 solar inverters of 300 watt capacity and 150 solar inverters of 500 watt capacity	Po, Bu	Manufacturer, Service provider	- NA	E, G
Uttar Pradesh Mini Grid Policy 2016	-	Po, Ag	Manufacturer, Service provider	- Capital subsidy (of 30%) - Others (tariff has been set up)	E
Madhya Pradesh Policy for Decentralized Renewable Energy Systems 2016	-	Po, Bu	Manufacturer, Service provider	- No support for SMEs	E, G
Mukhyamantri Solar Pump Yojana Maharashtra	100,000 off-grid solar pumps	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Scale up of Access to Clean Energy Scheme	30,000 beneficiaries across three states	Ag	Manufacturer, Service provider, End-user	- Central financial assistance to (up to 30%) suppliers, entrepreneurs, contractors and service companies to develop renewable energy technology packages	E, G
Policy for promotion of New and Renewable energy sources, Bihar	Installed capacity of 2,969 MW solar, 244 MW biomass and bagasse cogeneration by 2022	Po	Manufacturer, Service provider	- Interest reduction/ Subvention (improved financial viability of solar pumps via subsidy) - Exit option when grid enters - Non-financial support for R&D	R, E, G
Odisha Electricity Regulatory Commission (Mini- grid Renewable Energy Generation and Supply) Regulations	-	Po, Ag, Bu	Manufacturer, Service provider	- Exit option when grid enters	E, G

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non- financial)	Stage for which support is relevant/ provided
Madhya Pradesh MPERC Micro-grid Regulations	-	Po, Ag, Bu	Manufacturer, Service provider	- Exit option when grid enters	E, G
Andhra Pradesh Solar PV Water Pumping Scheme	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Bihar Saur pump Yojana	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Punjab Solar pump subsidy scheme	2,700 solar pumps	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Saur Sujala Yojana Scheme, Chattisgarh	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Suryashakti Kisan Yojana, Gujarat	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Saur Sichayi Yojana, Himachal Pradesh	5,580 solar pumps	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Saur Sichayi Yojana, Chhattisgarh	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Surya Raitha Scheme, Karnataka	Pumps to supply 1/3rd of total energy generated to the nearby grid	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Mukhyamantri Solar Pump Yojana, Madhya Pradesh	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Solar Pump Scheme, Tamil Nadu	1,000 solar pumps	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
UP Solar Pump Scheme, Uttar Pradesh	10,000 solar pumps	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Solar Pump Scheme, Jharkhand	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Solar Pump Scheme, Rajasthan	-	Ag	Manufacturer, Service provider	- No support for SMEs	E, G
Soura Jananidhi Scheme, Odisha	5,000 solar pumps	Ag	Manufacturer, Service provider	- No support for SMEs	E, G

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SEGMENT 4: WASTE TO ENERGY

Central Policies

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non- financial)	Stage for which support is relevant/provided
National Policy on Biofuels	-	Ag, Tr, Bu	Service provider	<ul style="list-style-type: none"> - Grant (for R&D) - Capital subsidy for plant - Tax concessions/ Duty support (Concessional excise duty of 16% for bio ethanol and exemption from excise duty for bio diesel, concessions on plant and machinery) 	R, E, G
GOBAR (Galvanizing Organic Bio-Agro Resources) DHAN scheme 2018 (Under Swachh Bharat Mission)	700 biogas plants	Ag	Manufacturer, Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G
Biogas-based Power Generation & Thermal Application Programme (BPGTP)	-	Po, Ag, Tr, Bu	Service provider	<ul style="list-style-type: none"> - No support for small plants - Interest reduction/ subvention (mostly for medium-sized plants) - CFA for training and skill development for the sector 	E, G
New National Biogas and Organic Manure Programme (NNBOMP)	76000 small biogas plants	Ag	Manufacturer, Service provider	<ul style="list-style-type: none"> - Back-end capital subsidy provided for setting up of village-level biogas plants 	E, G

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non- financial)	Stage for which support is relevant/provided
Programme on Energy from Urban, Industrial and Agricultural Wastes/ Residues	57MWeq from Waste to Energy	Po, Ag, Bu	Service provider, End- user	<ul style="list-style-type: none"> - Tax concessions/ Duty support (Concessional Customs Duty and GST at 5% for initial setting up of grid connected projects for power generation) - Non-financial support (R&D support, setting of test centres and technology upgradation) 	R, E
SATAT Initiative (Sustainable Alternative Towards Affordable Transportation)	15 MMT compressed bio-gas, 5000 CBG plants	Ag, Tr	Manufacturer, Service provider	<ul style="list-style-type: none"> - INR 48.3/kg fixed procurement price 	E, G
Pradhan Mantri J-VAN Yojana	-	Ag, Tr	Service provider	<ul style="list-style-type: none"> - Grants (for R&D in the area) 	R, E
Solid Waste Management Rules 2016	-	In, Bu	Service provider, End- user	<ul style="list-style-type: none"> - No support for SMEs 	E, G
Plastic Waste Management Rules 2016	-	In	Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G
E-waste Management Rules 2016	Phase-wise collection targets for e-waste	In	Manufacturer, Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G
Swachh Bharat Mission	To make India public- defecation free by 2019	Ag, Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G

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State Policies

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Haryana Bio-Energy Policy 2018	150 MW biomass- based power generation	Po, Bu	Manufacturer, Service provider	<ul style="list-style-type: none"> - Capital Subsidy (Exemption of Transmission & distribution, cross subsidy charges, surcharges and Reactive Power Charges) - Tax concessions/ Duty support (100% exemption from entry tax on supplies) - Non-financial support for research 	R, E
Gujrat Waste to Energy Policy 2016	-	Po	Manufacturer, Service provider	<ul style="list-style-type: none"> - No support for SMEs 	E, G

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SEGMENT 5: SMART ENERGY

Central Policies

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
National Smart Grid Mission	-	In, Bu	Manufacturers	- No direct support to SMEs	E, G
Digital India Mission	-	Bu	Manufacturer, Service provider	- Risk capital to companies developing new technologies in the area of electronics, nano-electronics and Information Technology (IT)	R, E
UDAY Scheme	Smart meters for households with consumption more than 200kwh per month	Bu, In	Manufacturer	- No support for SMEs	E, G
R&D Funding Scheme	-	In, Bu	Service provider	- Grant (grants-in-aid)	R
Integrated Power Development Scheme	50 lakh smart meters	Po	Manufacturer	- No support for SMEs	E, G
Smart Meter National Programme	Replace 25 crore conventional meters with smart meters	Po	Manufacturer	- No support for SMEs	G

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SEGMENT 6: ELECTRIC MOBILITY

Central Policies

Name of policy/scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Faster Adoption and Manufacturing of Electric Vehicles (FAME II) (under National Mission on Electric Mobility)	-	Tr	Manufacturer, Service provider	- No support for SMEs	E, G
National Mission on Transformative Mobility and Battery Storage	-	Tr, In	Manufacturer, Service provider	- No support for SMEs	R, E, G
National Electric Mobility Mission Plan 2020	- 60 to 70 lakh EVs by 2020 - 100% sale of EVs by 2030	Tr	Manufacturer, Service provider	- No support for SMEs	R, E, G

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State Policies

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Electric Mobility Policy 2018-23, Andhra Pradesh	<p>Convert 100% of APSRTC bus fleet into electric buses by 2029.</p> <p>Phase out all fossil fuel based commercial fleets and logistics vehicles in top 4 cities by 2024 and all cities by 2030.</p> <p>All government vehicles to be converted to electric vehicles by 2024.</p>	Tr	Manufacturer	<ul style="list-style-type: none"> - Capital subsidy (of the range 10% to 25% depending on size of industry (micro, small, medium and large)) - Tax concessions/ Duty support (reimbursement of tax) - 100% stamp duty reversed - Skill development fees reimbursed - Non-financial support (R&D support, infrastructure support, support for IPR filing, marketing incentives in the range of 50% for 10 MSMEs per year) 	R, E, G
Maharashtra's Electric Vehicle Policy 2018	Increase number of EV registered in Maharashtra to 5 lakhs.		Manufacturer, Service provider	<ul style="list-style-type: none"> - Interest reduction/subvention (for loans taken for acquisition of new fixed assets) - Capital subsidy (of the range 20% to 80% for MSMEs depending on the group (SC/ STs)) - Non-financial support (skill development workshops, establishment of CoE and R&D centres for EVs, power tariff subsidy, 75% subsidy on the expenses incurred on patent registration) 	R, E, G
Electric Vehicle Policy 2019, Tamil Nadu	-	Tr, In	Manufacturer, Service provider	<ul style="list-style-type: none"> - Interest reduction/ subvention (of 6%) - Capital subsidy (of 20% for MSMEs along with 15% for intermediate products used in EV manufacturing) - Tax concessions/ Duty support (electricity tax exemption and stamp duty exemption) - Non-financial support (incubation support, R&D support) 	R, E, G

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Policy on Electric Mobility, Kerala	<ul style="list-style-type: none"> - Pilot fleet of 2 lakh two wheelers, 50,000 3-wheelers, 1000 good carriers, 3000 buses and 100 ferry boats by 2020 - 10 lakh EVs on the road by 2022 	Po, Tr, In	Manufacturer, service provider	<ul style="list-style-type: none"> - Capital subsidy - Tax concessions/ Duty support (EVs exempt from road tax) - Non-financial support (set up CoE for electric and autonomous vehicles) 	R, E, G
Uttar Pradesh Electric Vehicles Manufacturing Policy 2018	<ul style="list-style-type: none"> - Launch 1,000 electric buses and achieve 70% EV public transportation - Achieve 50% EV mobility in goods transportation - Roll out 10 lakh EVs across all segments - Set up nearly 2 lakh charging stations - Bring in manufacturing units of power storage of at least 5GWh 	Po, Tr, In	Manufacturer, Service Provider	<ul style="list-style-type: none"> - Interest reduction/ subvention (of 5% per annum depending on type of loan taken and ceiling cap) - Capital subsidy - Tax concessions / duty support (electricity duty and stamp duty exemption) - Non-financial support (5% R&D support, skill development training for EV battery repair with 20% expenditure imparted) 	R, E, G
Uttarakhand EV Policy 2018	500 electric buses	Po, Tr, In	Manufacturer, Service provider	<ul style="list-style-type: none"> - Govt. to provide term load of INR 10 to 15 crores to MSMEs to manufacture EVs, GST from 30 to 50% to be provided by state, electricity duty exempted 	E, G

Name of policy/ scheme	Targets	Sectors impacted	Potential for SMEs (as a manufacturer/ service provider/ end-user)	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Telangana Electric Vehicle Policy	<ul style="list-style-type: none"> - 100% electric buses by 2030 - Corporate offices with annual turnover of INR 100+ crore to compulsorily migrate 25% of their employee commuting fleet to EVs 100% by 2030. 	Po, Tr, In	Manufacturer, Service provider	<ul style="list-style-type: none"> - Interest Reduction/ subvention (of 3%) - Capital subsidy (of 15% on investment subject to max of INR 20 lakhs) - Non-financial support (Development of EV clusters, CoE, research hubs and prototyping centres, testing facilities for compliance, preferential allotment for government vehicles) 	R, E, G
Amendment to Bihar Industrial Investment Promotion Policy 2016 (for inclusion of EV sector under high priority)	-	Po, Tr, In	Manufacturer, Service provider	<ul style="list-style-type: none"> - Capital subsidy (of 25% on equipment for first 500 public EV-charging stations) - Non-financial support (infrastructure development, seed funding of INR 10 lakh to first 50 start ups in EV domain) 	R, E, G
Karnataka Electric Vehicle and Energy Storage Policy 2017	-	Po, Tr, In, Bo	Manufacturer, Service provider	<ul style="list-style-type: none"> - Capital subsidy (of 20% for MSMEs in EV domain) - Tax concessions/ Duty support (stamp duty exemption on EV-cell manufacturing and EV module manufacturing and assembly, exemption from tax on electricity tariff) - Grant provision for training on EV manufacturing of INR 1 lakh (per month per trainee) - Non-financial support (incubation centres, research programmes in collaboration with EV industry, venture capital fund for research in e-mobility, skill development) 	R, E, G
Electric Vehicle Policy 2019, Delhi	25% new car registration by 2025 in the capital to be EVs	Tr	Manufacturer, Service provider	- Interest reduction/ subvention	E, G

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CROSS-SECTORAL POLICIES

Central Policies

Name of policy/scheme	Targets	Sectors impacted	Segments impacted	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Startup India	-	All	All segments	- Funding support and incentives, industry-academia partnerships and incubation support to empower the start-ups	R, E, G
Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM)	-		All segments	- Financial grant to individual innovators (ranging from INR 2 lakhs to INR 50 lakhs) for green technology, waste to wealth, clean energy etc.	R, E
The Credit Linked Capital Subsidy and Technology Upgradation Scheme (CLCS-TUS)	-	In	EE	- Capital subsidy (of 15% against institutional finance taken from the financier)	E, G
Building Awareness on Intellectual Property Rights (IPR) For Micro, Small and Medium Enterprises (under CLCS)	-	All sectors	All segments	- Grant (FA for patent/ registration depending on nature of patent) - Non-financial support (Awareness campaigns for IPR, training and workshops for IPR filing)	R, E, G
Sustainable Finance Scheme (SIDBI)	-	Po, Ag, Tr, In, Bu	RT, EE, EA	- Others (term loan or working capital loan is granted) - Non-financial support	E, G
Safeguard duties	-	Po	RT, EA	- No support for SMEs	E, G
AIM (including Atal New India Challenge)	-	Po, Ag, Tr, In, Bu	All segments	- Funding provided to incubators (grants up to Rs. 10 crore) - Non-financial support (Provides access to resources for piloting, testing, and market creation)	R, E
Self-Employment and Talent Utilization (SETU)			All segments	- Grants (to start-ups and incubation centres) - Non-financial support (incubation support)	R, E
International Cooperation	-		All segments	- Financial assistance of up to 95% on airfare and space rent for entrepreneurs; assistance for common expenses of delegations	

Name of policy/scheme	Targets	Sectors impacted	Segments impacted	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Support for International Patent Protection in Electronics and Information Technology (SIP-EIT)	-	In, Bu	SE, EM, RT	- Grant (financial assistance up to INR 15 lakh per invention or 50% of the costs required in filing patent applications)	E, G
Credit Guarantee Fund Scheme for Micro and Small Enterprises	-	Po, Tr, In, Bu	All segments	- Collateral Free Loan (up to a limit of INR 200 lakh - for individual MSEs)	E, G
Micro & Small Enterprises Cluster Development Programme (MSE-CDP)	-			- Non-financial support (Infrastructure support, East access to banking facilities)	E, G
Research, Design, Development, Demonstration (RDD&D) and Manufacture of New and Renewable Energy	-		RT, EE, WtE, EA, SE	- Grants (of 50% or 100% depending on the institute/ organization implementing the project)	R
Smart Cities Mission	-		RT, EE, WtE, EA, SE, EM	- No support to SMEs	E, G
Global Innovation and Technology Alliance (GITA)	-		RT, EE, WtE, EA, SE	- Grants and collateral free loans (grants and soft loans for R&D efforts)	R
Growth Capital and Equity Assistance Scheme	-		All segments	- Collateral free loans - Convertible instruments, equity	R, E, G
Goods and Services Tax	-	All sectors	All segments		
Interest Subvention Scheme for Incremental credit to MSMEs 2018	-	Bu	All segments	- Interest reduction/ subvention (of 2% for incremental term loan or fresh term loan or working capital loans)	E, G
National Innovation Foundation	-		All segments	- Grant - Non-financial support (mentoring support, IPR filing help)	E, G
India Innovation Growth Programme	-		RT, EE, WtE, EA, SE	- Grant (INR 25 lakh or 10 lakh) - Non-financial support (incubation support, infrastructure, testing support)	R, E
KUSUM (Kisan Urja Suraksha evam Utthaan Mahaabhiyan) Scheme	25,750MW solar capacity over 10 years	Po, Ag, Bu	RT, EA	- No support for SMEs	
Pradhan Mantri Mudra Yojana	-	Po, Tr, In, Bu	All segments	- Collateral Free Loan	G

Name of policy/scheme	Targets	Sectors impacted	Segments impacted	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
Suryamitra Skill Development Programme	Training to 50,000 in 5 years (2015-20)	Po, In	RT, EA	- Non-financial support (Free training to people)	E, G
Multiplier Grants Scheme	-	Po, Ag, Tr, In, Bu	All segments	- Grant (If industry supports R&D for development of products that can be commercialized at institution level, then government will also provide financial support that is up to twice the amount provided by industry)	R, E
Jawaharlal Nehru National Solar Mission	- 40 GW by 2022 - Achieve 15 million sq. meters solar thermal collector area	Po, Ag	RT, EA	- Provision of 40% accelerated depreciation to commercial users, a 10-year tax holiday and availability of loans under priority sector lending up to INR 15 crores as an end-user. However, no subsidy is provided for C&I establishments	E, G
Special Credit Linked Capital Subsidy Scheme	-	Po, Ag, Tr, In, Bu	All segments	- Capital subsidy (of 25 % upfront capital subsidy to SC/ST-owned MSEs on institutional finance used by them)	E, G
Priority Sector Lending	-	Po, Ag, In	RT, EA	- No support for SMEs	E, G
Entrepreneurial and Managerial Development of SMEs through Incubators	-		All segments	- CFA of 75% to 85% of the project cost up to a maximum average of INR 6.25 lakh per innovative idea) - Non-financial support (Business incubation support, training)	R, E
ECBC 2017	-	Po, Bu	RT, EE, SE	- No support for SMEs	E, G
CSR Bill, 2019	-	NA	All segments	- Allows corporates to spend 2% of their CSR spend on government initiatives such as govt. incubators, public education entities like IITs.	NA
Renewable Energy Research and Technology Development Programme for the period from 2017-18 to 2019-20	-	All sectors	All segments	- Grant (CFA provided with 50% released initially and rest released upon project completion) - Non-financial support (Incubation support, Technology labs for development)	R

Name of policy/scheme	Targets	Sectors impacted	Segments impacted	Support for SMEs (financial and non-financial)	Stage for which support is relevant/ provided
SIDBI Make in India Soft Loan Fund for MSMEs (SMILE)	-	All sectors	All segments	- Soft loans to MSMEs (10-15% of the project cost, subject to a maximum of INR 20 or 30 lakhs are provided as the loan amount (depending on category)	E, G
Standup India		All sectors	All segments	- Bank loans between INR 10 lakhs and INR 1 crore to at least one SC or ST borrower and at least one woman borrower per bank branch, for setting up of a greenfield enterprise	E, G
MSME Business Loans for Startups in 59 Minutes		All sectors		- Business loans for start-ups for value INR 1 lakh to INR 1 crore. The rate of interest starts from 8% onwards.	E, G

State Policies

Name of policy/scheme	Targets	Sectors impacted	Segments impacted	Support for SMEs (financial and non-financial)	Stage for which support is relevant / provided
TN Startup Innovation Policy 2018-2023 (under Startup India)	5000 technology start-ups	Po, Ag, Tr, In, Bu	RT, WtE, EA	- Grant - Non-financial support (R&D Support, funding for incubation)	R, E
Punjab New and Renewable Sources of Energy (NRSE) Policy, 2019	- Accomplish 21% power generation through RE by 2030 - Achieve 3000 MW of solar power generation capacity - Develop 500MW equivalent of bio fuels	Ag, Tr, In	RT, EE, WtE	- Tax Concessions/ Duty support (Exemption of taxes, electric duty, subsidy by way of reimbursement of State GST, property tax)	E, G
Bihar Policy for Promotion of Bihar New and Renewable Energy Sources 2017	2,969MW solar power, 244MW bio-fuel energy	Po, Ag	RT, EA, WtE	- Tax concessions (All new micro and small units will be given tax benefits by an additional 30% of the approved project cost)	R, E, G
Odisha Renewable Energy Policy	2016-2022, 2200 MW from solar, 20 MW from WtE, 180 MW from biomass	Po, Ag, Bu	RT, EA, WtE	- Incentives to MSMEs as per IPR guidelines	E, G

Note: Po= Power, In= Industrial, Ag= Agriculture, Tr= Transport, Bu= Buildings; R: R&D and PoC, E: Early stage and G: Growth Stage

ANNEXURE 2: LIST OF STAKEHOLDERS ENGAGED FOR THE STUDY

S.No.	Name of enterprise	Name of interviewee	Designation of interviewee
SME			
1	Simpa Networks	Piyush Mathur	Chief Executive Officer
2	Ecozen Solutions	Prateek Singhal	Co-Founder and Director
3	Carbon Masters	Kevin Houston	Co-Founder
4	GPS Renewables	Jidesh Haridas	Chief Marketing Officer
5	Smart Joules	Ujjal Majumdar	Director of Operations
6	Punjab Renewable Energy Systems Pvt. Ltd. (PRESPL)	Lt. Monish Ahuja	Managing Director
7	Clean Motion	Anil Arora	Country Head
8	Altigreen Propulsion Labs	Shalendra Gupta	Co-Founder and Chief Financial Officer
9	Waste Ventures	Roshan Miranda	Co-Founder
10	Addwatt Power Solutions	Aman Mathur	Managing Director
11	Ecolibrium Energy (P) Ltd.	Akshdeep Singh	Senior Manager
12	SunSource Energy	Adarsh Das	Co-founder, CEO
13	Atomberg Technologies	Arindam Paul	Founding Member and Head, Marketing & Strategy
14	Basil Energetics	R Ramarathnam	Chairman
Incubators/catalysts			
1	Social Alpha	Manoj Kumar	CEO
2	D-Labs	Anusha Reddy	Programme Manager
3	Villgro Innovations Foundation	Ananth Aravamudan	Senior Advisor and Practice Lead - Energy
Donors/Foundations			
1	MacArthur Foundation	John Balbach	Director, Impact Investments
2	IKEA Foundation	Biswarup Banerjee	Programme Manager, RE
3	Good Energies Foundation	Stephanie Jones	Programme Manager
4	Rockefeller Foundation	Pari Phan Uawithya	Director, Power Initiative
5	Doen Foundation	Michelle De Rijk	Investment Manager
NBFCs/Debt Funds			
1	IREDA	K. P. Philip	Senior Manager
2	cKers Finance	Jayant Prasad	Executive Director
3	Caspian Advisors	Ravinder Voomidi Singh	Senior Investment Manager
4	ResponsAbility Investments AG	Sameer Tirkar	Principal

S.No.	Name of enterprise	Name of interviewee	Designation of interviewee
SME			
International and regional DFIs			
1	KfW	Ekta Mehra	Senior Sector Specialist
2	NABARD	V. S. Balasubramanian	Deputy General Manager
Impact Investor			
1	Sangam Ventures	Kartik Chandrashekhar	Co-Founder and Partner

ABOUT WWF-INDIA

WWF-India is one of the leading conservation organizations in the country. It is a science-based organization which addresses issues such as the conservation of species and its habitats, climate change, water and environmental education, among many others. Over the years, its perspective has broadened to reflect a more holistic understanding of the various conservation issues facing the country and seeks to proactively encourage environmental conservation by working with different stakeholders.

The Climate Change and Energy Programme of WWF-India is working towards climate resilient future for people, places and species that support pathways for sustainable and equitable economic growth. WWF-India is engaged in promoting renewable energy uptake, enabling clean energy access, demonstrating renewable energy projects in critical landscapes, and overall promoting sustainable clean energy solutions. Climate innovations, low carbon development and renewable energy at scale are the thrust areas of the programme.

To know more, log on to: www.wwfindia.org

ABOUT CKINETICS

cKinetics is a mission driven sustainability insight, innovation & capital advisory firm, working with businesses, investors, industry groups as well as thought leaders to continually generate market insight and catalyse change.

To know more, log on to: www.ckinetics.com



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