

Peering Into the Future: IoT and Smart Devices driving
Big Data Analytics in Sustainability
Market Brief
[OCTOBER 2015]

**Sustainability
Outlook**

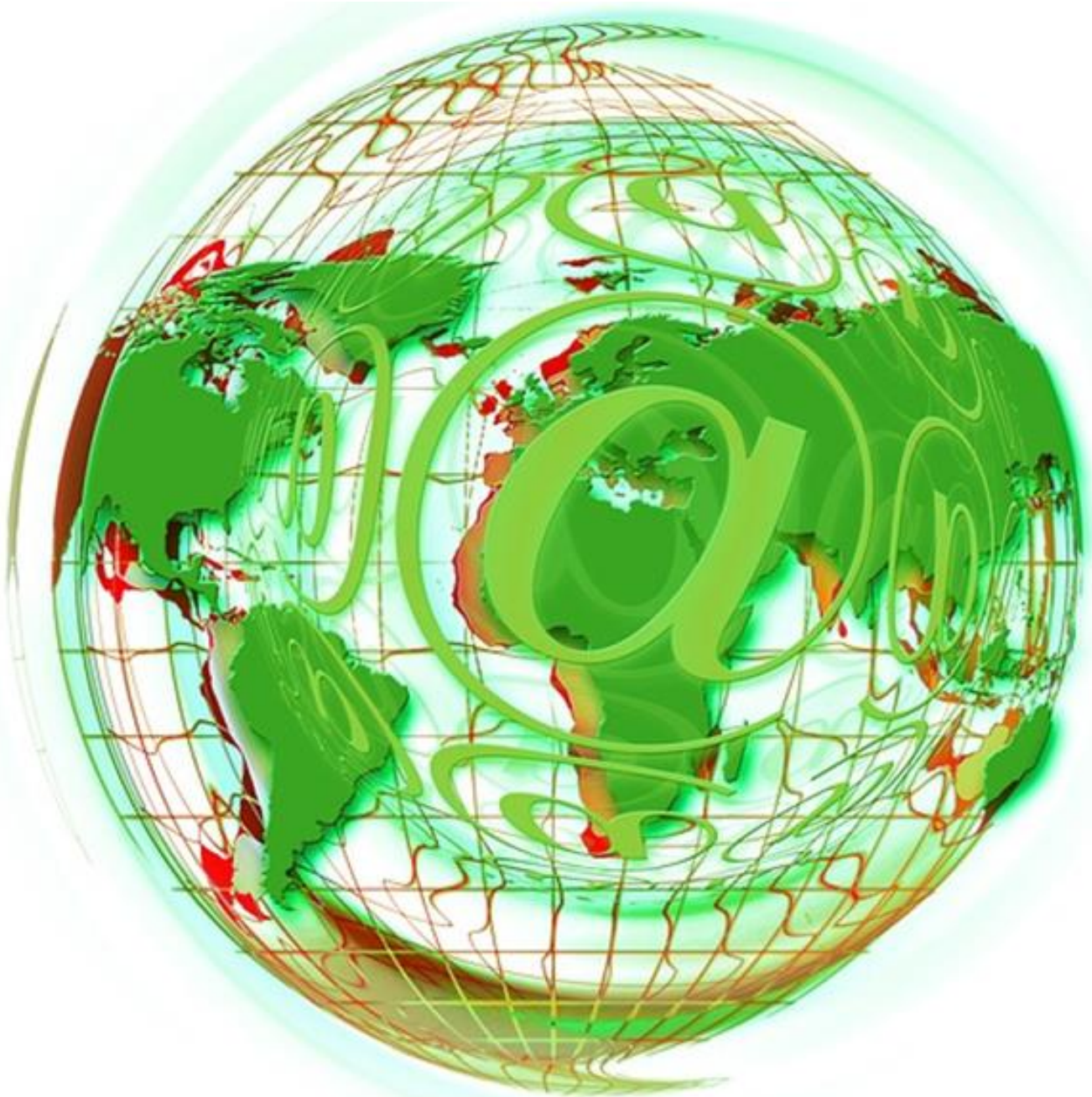


Image courtesy: pixabay.com

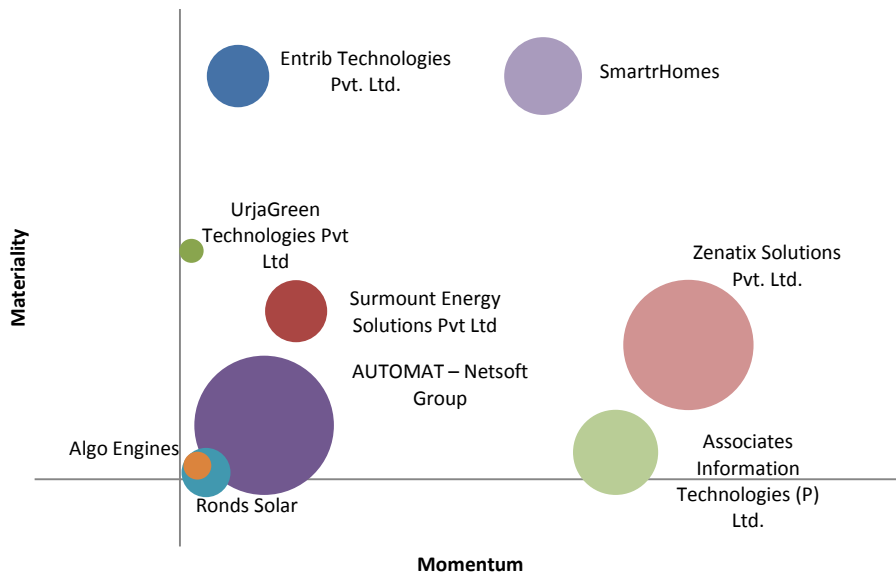
Market Access and Insights Team
Sustainability Outlook
mait@sustainabilityoutlook.in

Evolving potential for driving sustainability using IoT

Several new businesses are emerging in India recognizing the potential of the internet of Things (IoT) in the sustainability space. Most of them either work in the domain of Smart Buildings or Machine to Machine Communication.

This note from Sustainability Outlook profiles the use cases and outlines the market opportunity.

Figure: Sustainability Impact Map for emerging Indian players



Source: Sustainability Outlook Analysis

Further details refer section on Sustainability Impact Map

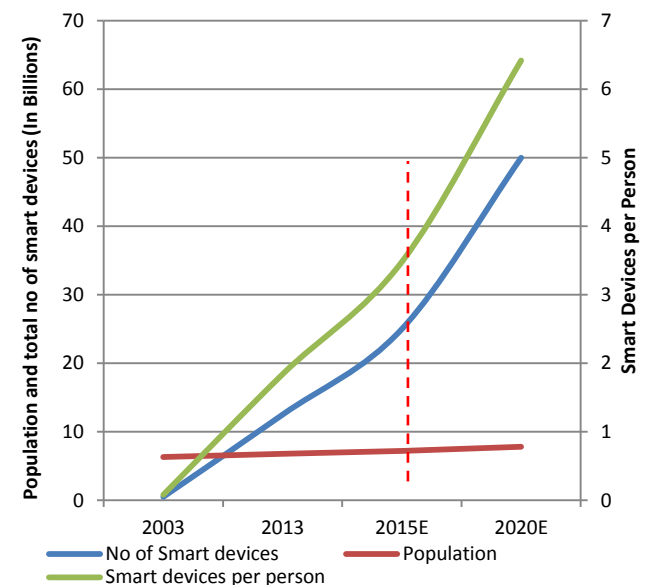
Disruptive innovations fueling rapid growth in the digital market

The digital space has undergone major transformations in the recent past, and has witnessed the surge of disruptive technologies. The latest entrant in this space is Internet of Things, which broadly can be defined as a network that is connecting devices together for communicating amongst themselves and taking decisions

Just as the first decade of the 21st century witnessed an unprecedented increase in adoption of mobile phones, the coming decade is going to witness the proliferation of Internet of Things (IoT) and Smart devices- which will increase resource efficiency in all facets of our lives and the products we use. This trend will start with smarter utilities, smarter manufacturing and smarter logistics; and then into the smart consumer world.

According to a report by Cisco, as of 2015, there are approximately 3 smart devices per person in the world. This number is expected to rise as the number of connected devices will reach 50 billion by 2020.

Figure: Population and total number of smart devices in the world



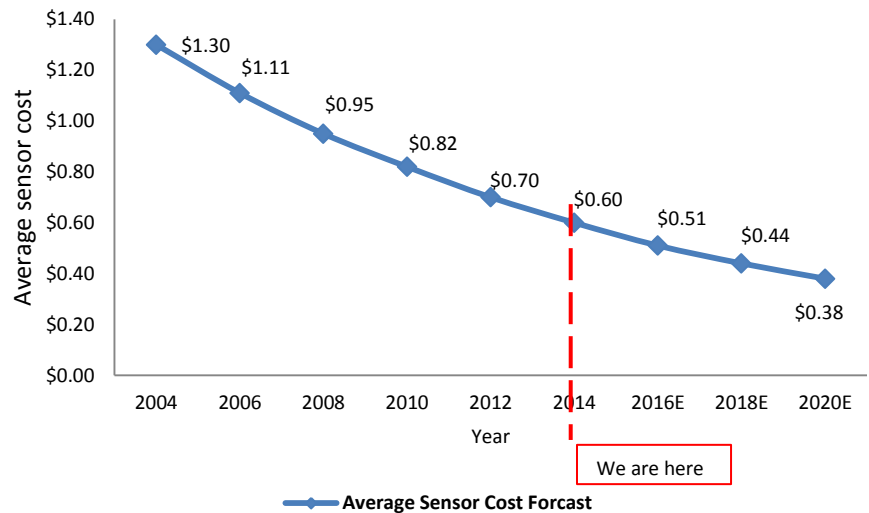
Source: Cisco IBSG, 2013

Drivers for IoT proliferation- both demand side and supply side to play a key role

Decreasing cost of sensors and bandwidth (supply side drivers)

Average cost of sensors has declined in last few years. From \$1.30 in 2004 it has reduced to 55 cents in 2015. This trend is expected to continue and it will reduce the cost further below 40 cents by the year 2020. At the same time there is a decrease in sizes of chips due to advancements in electronics. This combination is enabling companies to produce cheaper but more advance devices compared to yesteryears. Apart from this, the bandwidth cost is showing a downward trend and it is expected to drop even more, reducing the cost of connectivity.

Figure: Average sensor cost

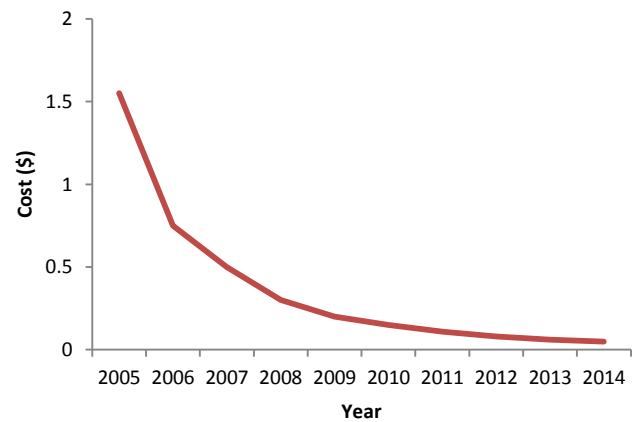


Source: Goldman Sachs, BI Intelligence Estimates

Change in outlook of businesses and policy regulations (demand side drivers)

Automation in industries in decision making is reducing the need for manual monitoring, thus enabling greater optimization on the shop floor and in other operations. New test facilities are enabling manufacturers to test new technologies like M2M communication. Experts claim that conventional stage based production will be replaced by smart and intelligent self-organized factory in the near future. A mix of policy regulations and the need for industries to become resource and energy-efficient will be a key demand driver for sustainability- a key opportunity that IoT based companies can capitalize on.

Figure: Bandwidth Cost



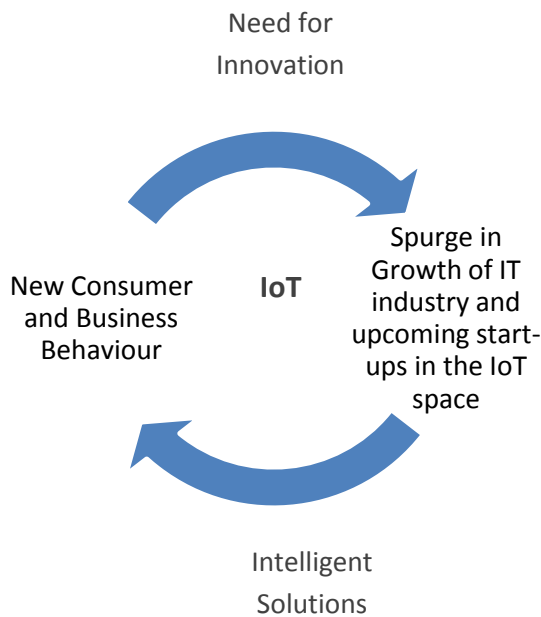
Source: The Evolving Internet of things market¹

IoT and Smart devices- potential for driving sustainability

While IoT is set to become the next big backbone of local and global communication with its reach in different verticals- healthcare, agriculture, energy, manufacturing, security, disaster management etc., it also carries with it a massive potential become a key driver for sustainability- cutting across all verticals. With big volumes of data and information being collected and transmitted from these devices, analytics as a tool can help optimize operations in these sectors, thus increasing efficiency and driving sustainability.

¹http://www.cartesian.com/wp-content/uploads/2015/07/The-Evolving-IoT-Market_Cartesian_Mar2015.pdf

Figure: Cyclical growth potential for IoT

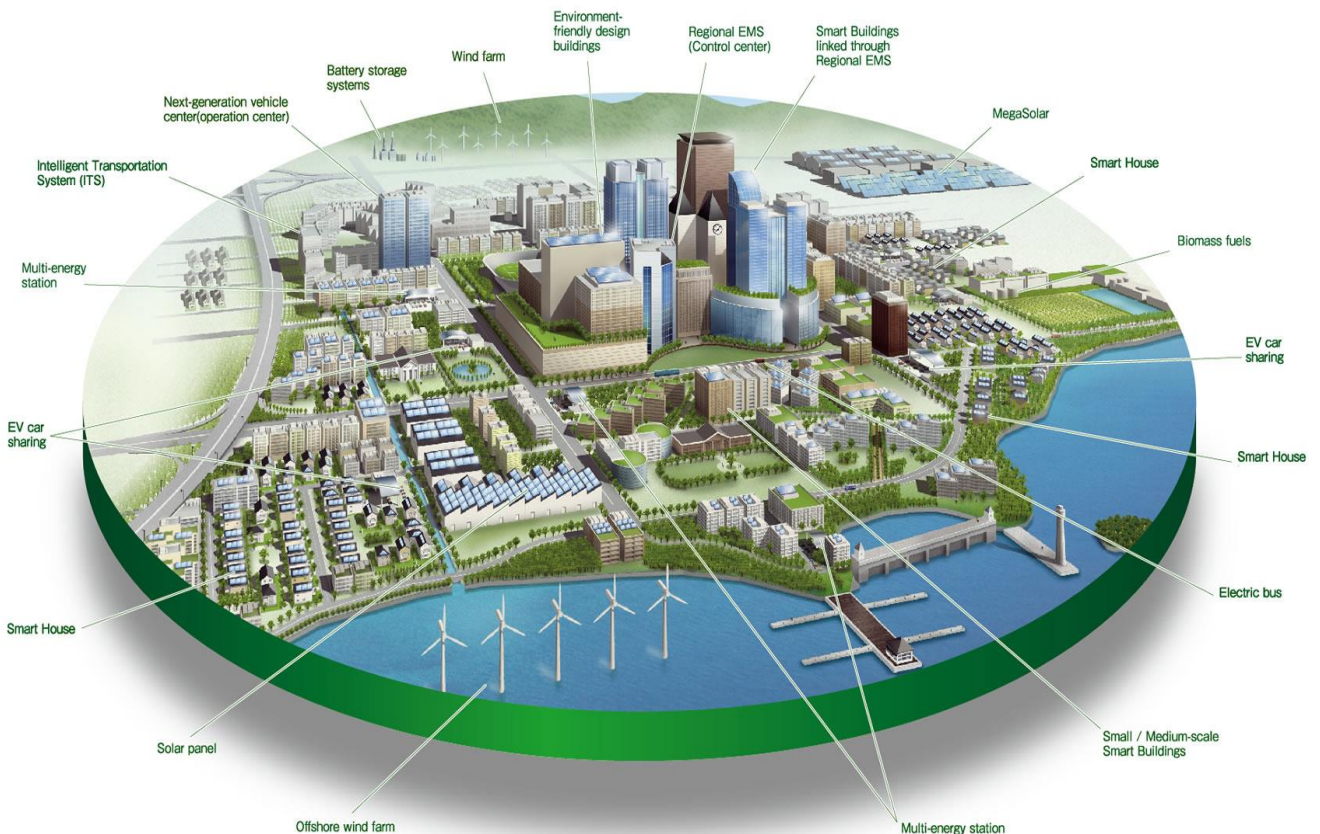


Draft Policy on Internet of Things, Dept. of Electronics and IT, Govt. of India

The Indian government's revised draft policy for IoT, 2015 recognizes the spurge that is going to take place in internet connected devices and therefore pushes for leveraging India's strength as a leader in the global service industry by creating an IoT ecosystem in the country. It has set a target of creating an IoT industry of USD 15 billion by 2020 and estimates 2.7 billion connected devices by then.

It identifies avenues for creating an IoT ecosystem, including Smart Cities, Smart water, Smart Health, Smart Agriculture among others. The policy pushes for in house incubation and capacity building, international engagement in standardisation around IoT devices and in innovation, research and development related to IoT. It also lays a pathway for shaping governance structures around IoT, like setting up a Legal framework for addressing issues that might arise due to IoT related products and a High Level Advisory Committee for providing guidance in the emerging area of IoT.

Link:http://deity.gov.in/sites/upload_files/dit/files/Revised-Draft-IoT-Policy.pdf



Illustrative cases of IOT in Sustainability showcasing market potential

Although IoT and Smart devices driving analytics for sustainability is a fairly new space, there are several examples in India that showcase the potential of this domain.

Illustrative use cases	Description	Value at Stake ² (2025)	Illustrative cases
Optimizing utilities performance	Utilities can improve their performance by using sensors to	\$ 26.4 Billion	<p>SPML Infra. Pvt. Ltd., infrastructure development company that has managed and implemented over 600 projects across India on an EPC, PPP and BOOT (Build-Own-Operate-Transfer), installed a smart metering system for Karnataka Urban Water Supply & Sewage Board maintains water supply distribution to Dharwad City, that can carry out water loss analysis, pressure management, network management with ability to do simulation and Digital Terrain Modelling, Graphical Interface with Zoning/creation of DMA facilities for 45,000 Water connections, Data capturing and GIS mapping.</p> <p>Outcome Better consumer service leading to better consumer satisfaction; Identification of illegal connections and hence reduction in NRW from 43% to 33%; Quick & real time decisions by the department; Preventive & Proactive approach on pipe network distribution; Increase in revenue for the Department from USD 58300 to USD 107400 per month.</p>
Facilities Optimization	Using IoT and smart devices with building infrastructure as well as IT infrastructure at various facilities (corporate houses, educational institutes etc.), for facilitating optimum usage of resources like water and energy. This also helps in reducing costs, and at the same time it allows for integration between IT infrastructure and building systems, both of which otherwise run in a largely isolated manner.	\$11.2 Billion	<p>Cisco's Smart + Connected Communities (S+CC) solutions combine networking technologies with building systems and infrastructure to increase productivity, improve energy and building process efficiencies, and lower operations cost. This was installed in Cisco's campus in Bangalore. It has 2 components:</p> <ul style="list-style-type: none"> • <u>Community + Connect</u>: Helps employees leverage the S+CC solution for a safer, healthier, more sustainable work environment. For example, a user request for a conference room can automatically trigger the HVAC in that room to switch on 15 minutes before the meeting is scheduled to begin. • <u>Community + Exchange</u> - It enables the network to be a highly secure, resilient service delivery platform, and helps facilities managers operate the campus in a more cost-, energy-, and time-efficient manner. For example, it can measure ambient lighting and temperature in different parts of the building to moderate the cooling and brightness in a designated conference room. <p>Outcome Time savings- More than 700 hours saved annually in</p>

² Value at Stake is defined as the combination of net new revenues, cost savings, and the value that flows to organizations and industries that take advantage of new IoT connection-based capabilities

Peering Into the Future: IoT and Smart Devices driving Big Data Analytics in Sustainability

Market Brief

[OCTOBER 2015]









			<p>routine daily maintenance tour; Reduced energy consumption; Building process efficiencies; Resource optimization</p>
<p>Driving consumer response to reduce resources</p>	<p>This segment aims targets the saying “You can’t control which you can’t measure.” Big data analytics and IoT technologies can enable consumers to develop insight on their consumption of resources like water and electricity, therefore making them enablers of sustainability. Further, these devices also improve the quality of life (ease) of consumers, thereby also facilitating scale up of adoption.</p>	-	<p>SmartrHomes Technologies Pvt. Ltd., a start-up based out of Bangalore, uses IoT for building smart infrastructure systems for households. Their device called, WaterOn measures the water consumption at various sites for a house. This helps in developing a clearer picture about the water consumption pattern and the areas where most of the water is consumed.</p> <p>It performs three functions- measuring, monitoring and controlling. This device has a control valve which controls the flow of water. Users can allocate distribution quota to each area hence limiting the amount of water consumed at each section of the house.</p> <p>Outcome It provides a custom report which gives users a more insights on their water consumption and judge where they can improve on their water footprint. As users know where they can intervene to improve their water efficiency and the impact of that intervention on their water bill it drives them to go for such interventions and reduce their water consumption step by step.</p>
<p>Optimizing equipment maintenance and up-time</p>	<p>Real time data collection on various parameters like machine performance, temperature, usage time, fuel utilization etc., transferring and analysing the collected data to take automated decisions for efficient performance, reducing ideal time and saving fuel consumption.</p>	\$ 75 Billion	<p>In 2012, JCB Limited, world’s third largest construction equipment manufacturer, launched the "LiveLink" IoT program for its customers in India. This helped them to be in constant touch with their machine by sending out real-time data and keeping them informed all the time. The telematics-based technology helps the users to collect the vital parameters of machine performance and its location using sensors on three fronts: service, operations and security</p> <p>Outcome Ensure machines are maintained at the most convenient time and are used throughout the working day; Identifying actual fuel consumption, improving fuel security and planning; Identifying and removing ideal time, improving utilization and cutting fuel costs; bundled as a value-added service along with the machine.</p>


Peering Into the Future: IoT and Smart Devices driving Big Data Analytics in Sustainability

Market Brief

[OCTOBER 2015]

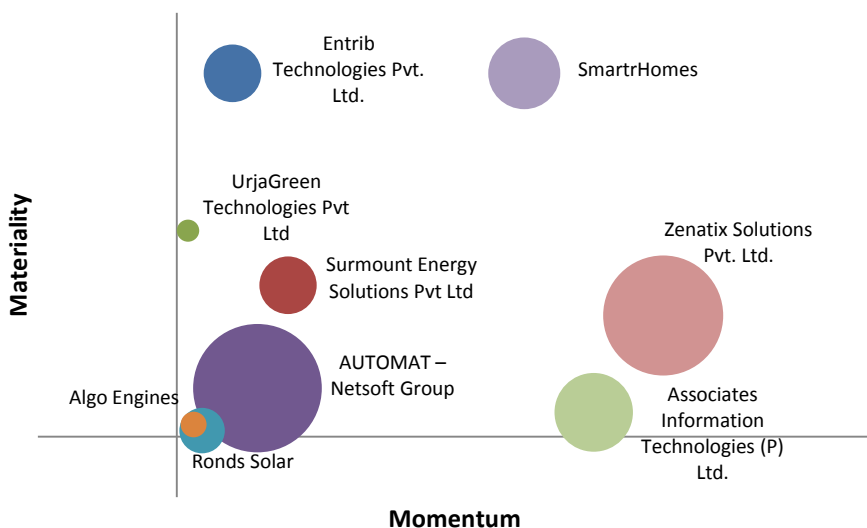
Emerging providers that are shaping the space

Player/ website	Description	Age of firm	Relevant Market Segments
Entrib Technologies Pvt. Ltd.  www.entrrib.com	<p>Entrib is working to equip Manufacturing Companies with greater control using their “Industrial” Internet of Things innovation - ShopWorx.</p> <p>ShopWorx is Real Time Monitoring, Communication Improvement, Process Optimization and Trend Analytics Solution for operation of a Manufacturing Shop Floor to achieve efficiency improvement and cost reduction.</p>	4	Plastic Manufacturing, Effluent Treatment in Auto industries (Water, Smart Buildings)
Surmount Energy Solutions Pvt Ltd  www.surmountenergy.com	<p>Surmount Energy offers Green Buildings Design, Automation and CCTV Surveillance. Through these solutions and services, Surmount Energy provides builders, architects, owners, tenants, facility managers and property managers the ability to create and operate green, safe, secure, comfortable, efficient and economical living and work spaces. Their goal is to not only create green homes, green buildings and green township but ensure that they operate that way throughout their lifetime.</p>	5	Residential buildings and Commercial buildings like retail stores (Smart Buildings)
UrjaGreen Technologies Pvt Ltd  www.smartbuildings.in	<p>Their tool SmartBuildings™ is a technology for energy conservation, management and monitoring in buildings. It complements today's hi-tech buildings by enhancing energy efficiency, data center reliability, comfort and analytics.</p>	3	Office and retail buildings (Smart Buildings)
AUTOMAT – Netsoft Group  www.automat.co.in	<p>AUTOMAT primarily focused on providing sustainability solutions towards Smart Home & Smart Building Solutions in the field of Automation and Security. Specialized in providing sensor based solution. The company has done more than 100 Home Automation and implemented more than 500 sensors in corporate spaces and continue to educate client for the usage of sustainability solution which is the passion for AUTOMAT. AUTOMAT Smart Home is implementing more than 300+ home automation this year and already has 500+more in the pipeline. AUTOMAT Smart Building is working with hospitality segments as well as corporate business houses with the technology solution that makes sustainability and green initiatives.</p>	14	Home Automation (Smart buildings)
Ronds Solar  www.rondssolar.com	<p>Ronds solar provides smart connected devices for effective monitoring and control of domestic solar PV systems. This enables the user to improve the Plant Load Factor (PLF) of the system.</p>	6	Solar inverter value chain (M2M Comm.)
Algo Engines  www.algoengines.com	<p>Algo Engines provides operational intelligence for wind turbines, met masts and solar plants. SCADA systems, sensors, and smart meters generate massive volumes of machine data. Algo Engines helps transform this mountain of data into actionable insights.</p>	3	Wind and solar power producers and OEM across 3 countries (M2M Comm.)
MachinePulse  www.machinepulse.com	<p>MachinePulse product offerings as an M2M provider and its Data Analytics solutions have been recognized by several industrial stalwarts and organizations like CIO Review and Gartner. MachinePulse is focused on developing technology products that can provide meaningful insights for improving plant performance, reducing downtimes and costs of O&M activities.</p>	5	EPC Service providers Independent Power Producers (IPPs) (M2M Comm.)
Zenatix Solutions Pvt. Ltd.  www.zenatix.com	<p>Zenatix, co-founded by alumni from IIT-Delhi, IIM-Ahmedabad and UCLA, provides an IoT based energy management product helping building managers save more than 10% on their energy consumption using intelligence from the energy data. Their product is a combination of hardware and software. The hardware includes standard off-the-shelf sensors including smart energy meters, temperature, humidity and level sensors together with proprietary controller. Zenatix controller collects high resolution (every 1-30 seconds) from these</p>	2	Office Spaces, Retail Outlets, Educational institutes. (Smart Buildings)

	sensors, and pushes it to their cloud server. Collected energy data is then analysed to derive actionable insights leading to energy conservation. These insights are delivered as SMS/email alerts for manual control or automated control, wherever desired. They have a SaaS based engagement model - the customer doesn't pay upfront for the hardware or software, instead the customer pays a fixed monthly fee.		
Associates Information Technologies (P) Ltd.  www.softwareassociates.co.in	<p>Their technology called Ripples is an Industrial IoT solution which combines the power of multi-sided platform, smart sensors and data analytics. Ripples can facilitate data capture, data analysis and data sharing that can add new dimensions in the way you are working, making it smart.</p> <p>Ripples acts as an Industrial IoT platform, multi-location business intranet, collaborating work force and, capturing information on your valuable assets and decoding them to actionable insights</p>	1	Healthcare, Logistics, High tech manufacturing, Food processing
Basil Systems www.basilsystems.com 	<p>CloverBoard is a Wi-Fi enabled switch that provides convenience, energy saving, and security. It senses motion & light, follows a user's routine and communicate together to give occupancy and time of the day based intelligence. It gives the user automatic control of appliances, notifications for energy wastage and access to control appliances from anywhere in the world. It also contributes to save 10-15% on heating & cooling cost and upto 50% on lighting cost.</p>	NA	Resident and commercial buildings (Smart Buildings)
SmartrHomes  www.smartrhomes.com	<p>WaterOn - smart water metering solution from SmartrHomes offers three distinctive features:</p> <ul style="list-style-type: none"> • Measure - the meter is able to accurately measure even small quantities and offer a very long life even in not so good water conditions. • Monitor - being connected in real time to the monitoring network, the consumption point is monitored in real time and is able to raise alerts if it detects any abnormal consumption, a leak or any other potentially damaging event in the water infrastructure of a building • Control - Once an abnormal consumption or a leak is reported, the user has the choice to control water supply to stop any water losses and save money 	1	Resident Welfare Associations, Building developers, Government utilities (Utilities, Smart Buildings)
Switch  www.switchkit.in	<p>Switch is a startup working in the IoT space. Switch has built an end-to-end (hardware + cloud + Mobile) connectivity solution for appliance makers (switchboards, lights, fans, AC etc) and developers to make their appliances 'Smart' and integrate onto 'Switch' mobile app. Switch is also working with home appliance manufacturers to integrate Switch's technology into their appliances.</p>	0	Home appliance manufacturers (Home Automation)

Sustainability Impact Map for emerging Indian players

This is a schematic that represents the impact of enterprises in India working in this space. Materiality (Vertical axis) depicts the potential sustainability market for these companies, that is, their resource saving potential. Momentum (Horizontal axis) represents the number of years that have passed since the inception of the enterprise. The size of the bubble represents the revenue of these companies.



Outlook for IoT driving Sustainability 2016

For driving sustainability using IoT tool and Big Data Analytics, India has its own unique advantages. It is a powerhouse in the digital sector due to its robust IT infrastructure and it has an increasing number of start-ups emerging in this space. Taking conservative estimates, India will account for 5-6% of the global IoT market or a total of USD 15 billion by 2020; and the government is looking to engage all stakeholders and build an IoT ecosystem.

Amongst the key drivers for IoT and smart devices in Sustainability are:

- Increasing resource costs, be it energy, water, or chemicals
- Increasing product variety in a number of industries which is putting pressure on optimizing processes
- Emerging legislation and policy mandates in several industrial sectors that are requiring tracking and reporting
- Emerging new infrastructure in a variety of sectors (ranging from buildings to power) that would leverage low cost sensors and IoT for more effective monitoring

The reducing price of sensors will continue to add new uses cases and make existing ones more attractive.

Top 5 predictions for 2016

1. **Shop floor analytics** tools will emerge that will help optimize processes. This will leverage 3 key trends (a) increasing number of smart equipment being used in the production environment, (b) lowering cost of data concentrators and (c) inexpensive communication.
2. New start-ups working on **track and trace systems** will emerge. Supply chain Sustainability efforts are picking up momentum in several larger corporates. Combined with the policy efforts on Make in India and Zero-Effect and Zero-Defect; will create a market segment for new ventures.
3. The number of start-ups in **consumer driven smart applications** (remote appliance control, smart home systems) **will continue to mushroom**. Some of these ventures are likely to tie-up with e-commerce companies to create a channel. There is also a likelihood that cash-flush e-commerce companies set up their own smart devices.
4. **Use cases in cities will see several pilots**. The Indian Government driven **smart cities mandate** will play a significant role in shaping the thinking of the IT majors where **Cities and Urban Local Bodies will emerge as customers**. Cities will start developing plans in 2016 and leaders amongst them will commence pilots.

Additionally, consumer facing Smart Utility applications will see pilots in the larger cities. Behavioral response tools are being tested in a few energy and water municipalities; in an effort to curb move demand or reduce demand.

5. **Utility related IoT and Analytics applications will be in demand in the renewable energy sector** (wind and solar) in particular. The thrust on increasing renewables to 175 MW by 2022 along with the need to lower tariff in increasingly putting pressure on operations. Tracking unit-level performance, real-time control of the panels (in case of solar), are already becoming common. Firms working in this space will have to increase capacity.

About Sustainability Outlook

Sustainability Outlook, a division of cKinetics is a market access, insight and collaboration platform tracking actions related towards enhanced resource management in the Indian economy. Sustainability Outlook provides market analysis and data tracking services, news and intelligence updates, and creates momentum towards specialised sustainability interventions by facilitating a structured process for multi-party collaboration.

Contact

Market Access & Insights Team

mait@sustainabilityoutlook.in

Sustainability Outlook™ and cKinetics™ are trademarks of cKinetics Consulting Service Private Limited, its parent, or subsidiaries thereof. Other product and company names mentioned herein may be trademarks and/or registered trademarks of their respective owners. Sustainability Outlook™ assumes no liability or responsibility for any errors or omissions in the content of this report and further disclaims any liability of any nature for any loss whatsoever caused in connection with using the information on this report. By accessing Sustainability Outlook™ reports and services, you agree to the following terms, and your viewing of and any use of the information is subject thereto: <http://sustainabilityoutlook.in/content/page/terms>

Licensed by cKinetics Consulting Services Private Limited under Creative Commons Attribution-NonCommercial 4.0 International
<http://creativecommons.org/licenses/by-nc/4.0/>