

Patent Tracker

Smart Meters

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Research related to Smart Meters has been in progress since 1931. However, significant patenting activity in this area has been observed since 1991 and as of today, a large number of patent and non-patent publications are available. Applications include industrial, commercial, domestic and residential billing or tarrifing, energy management, remote monitoring and can also control amount of energy consumed. In this Patent tracker, SciTech brings out the overview of patents published in the area of Smart Meters. Our patent search based on key words and class codes relating to smart meters has identified the top patent filers, research/ academic institutes, independent inventors as well as possible research collaborations in this area. The period of study is from 1931 to till date.

A smart meter, usually an electrical meter that identifies consumption with more specific details than a conventional meter and communicates that information through a network to the local utility for monitoring and billing purposes.

These meters are fully electronic and smart, with integrated bi-directional communications, advanced power measurement and management capabilities, an integrated, software-controllable disconnect switch, and an all solid-state design.

Smart Meters provides a wide range of advanced features, includes ability to remotely turn power on or off to a customer, read usage information from a meter, detect a service outage, detect the unauthorized use of electricity, change the maximum amount of electricity that a customer can demand at any time; and remotely change the meter's billing plan from credit to prepay as well as from flat-rate to multi-tariff.

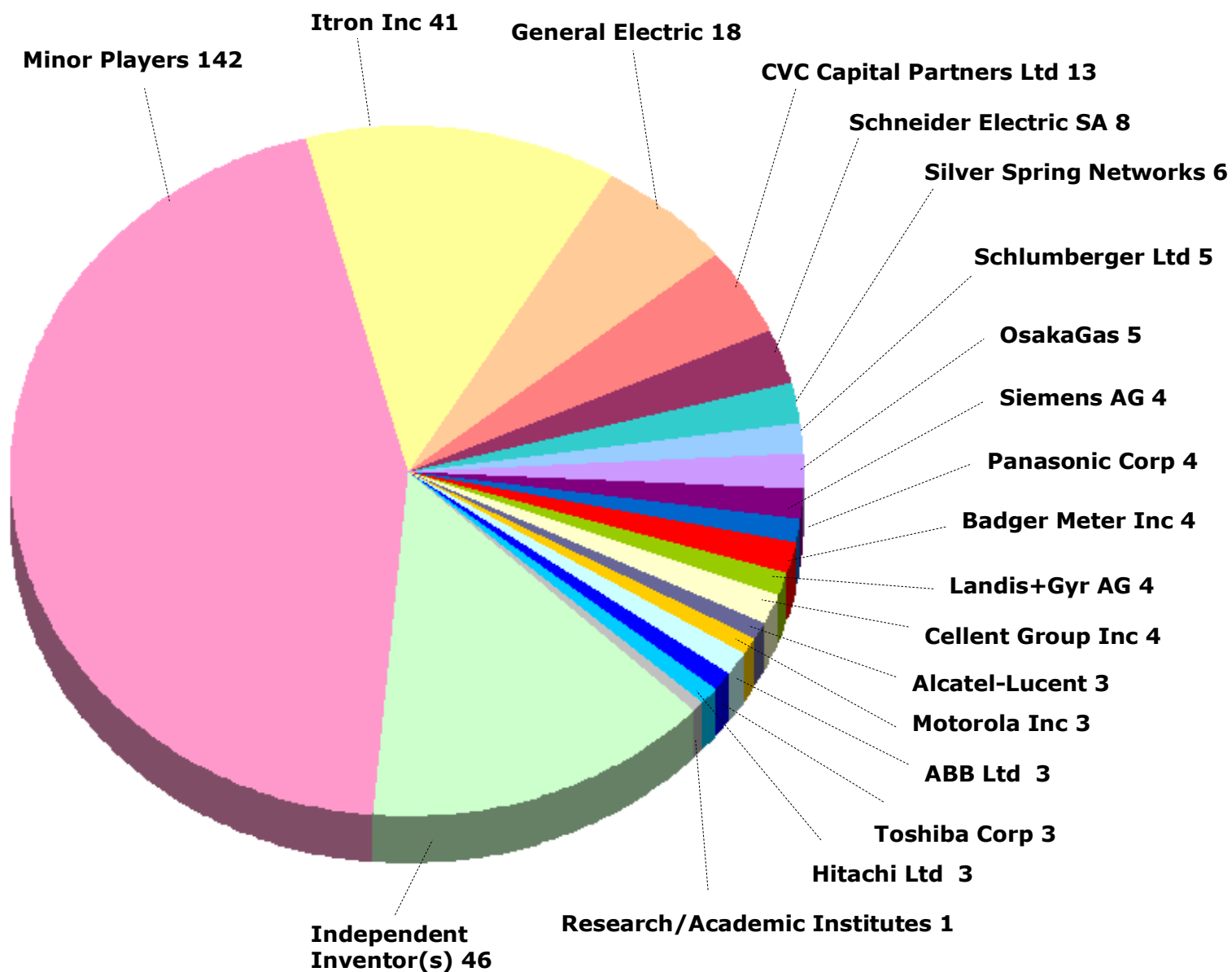
Each Meter should reliably and securely communicate the collected information. Some of the potential network configurations include use of Wi-Fi and other internet related networks.

Smart Meters- Introduction



**Patenting trends in
Smart Meters**

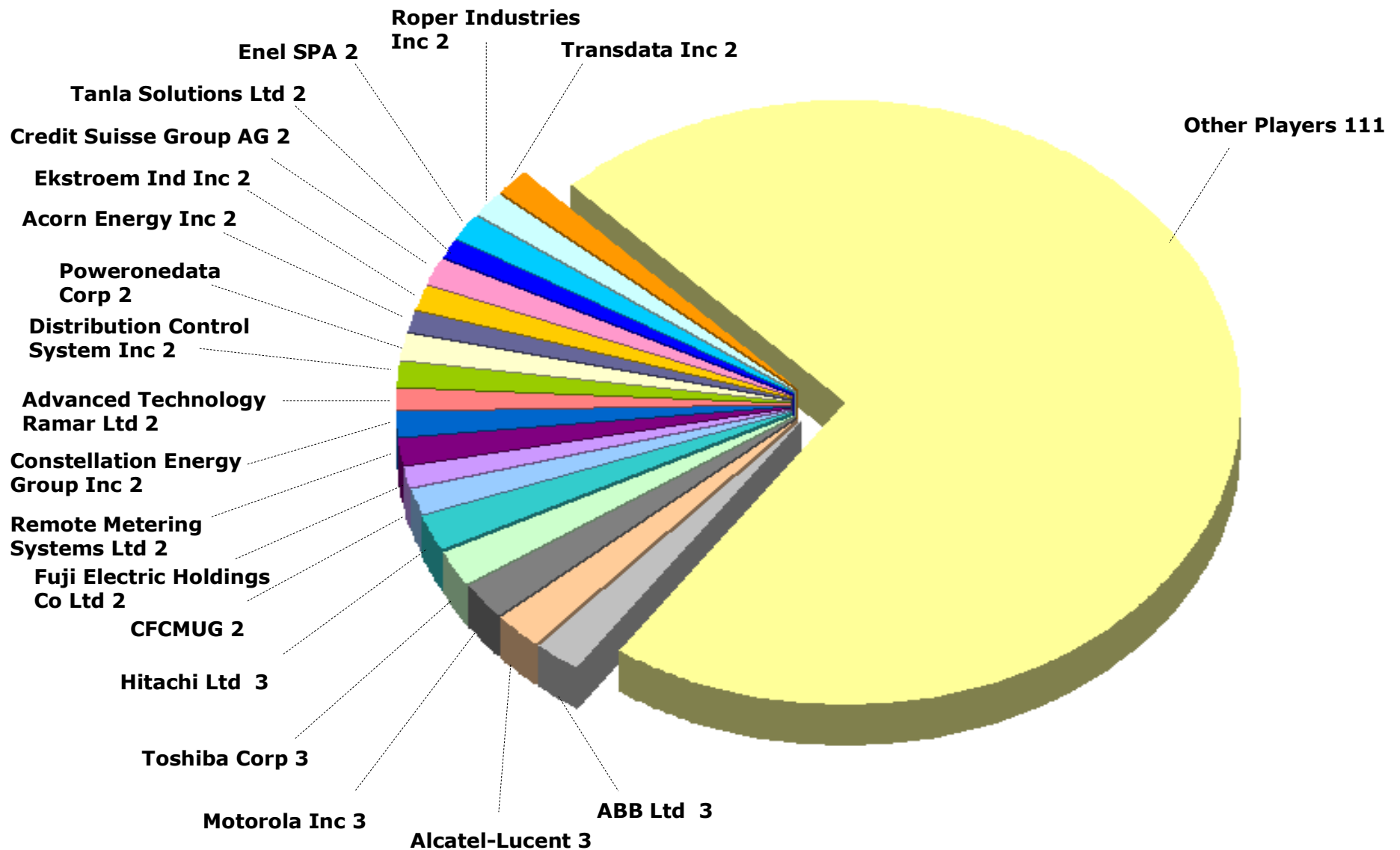
Assignee wise distribution of IP in Smart Meters



- Top players in the field of Smart meters are Itron Inc, General Electric & CVC Capital Partners Ltd.
- Assignees having less than 3 patents are grouped under Minor Players.



**Distribution of
Minor Players**



- **Toshiba has independent filings as well as with other companies as Tokyo Gas Co. Ltd. and Chubu Electric Power Co. Inc.**
- **Also Fuji Electric Holdings Co. Ltd. has independent filings in this area and as well as with Tokyo Gas Co. Ltd. and Takenaka Seisakusho Co. Ltd.**

Distribution of patents- Minor Players



Citation Velocity

Citation Velocity

➤ Overall CVC Capital Partners Ltd has more number of self citations and cited other patents.

Patent/ Publication No.	Assignee	Title	Year Issued	Cited by	Self Citations	Other Assignees	Citation Velocity
US5892758A	Qualcomm Inc	Concentrated subscriber wireless remote telemetry system	1996	156	1	CVC Capital Partners Ltd (16) Current Technologies LLC (9)	11.22
US4803632A	Utility Systems Corp	Intelligent utility meter system	1986	154	Nil	General Electric (3) CVC Capital Partners Ltd (3)	6.39
US20040113810 A1	CVC Capital Partners Ltd	Data collector for an automated meter reading system	2002	46	15	Schweitzer Engineering Laboratories Inc (2)	5.79
US6100817A	ABB Ltd	Fixed network RF communications complaint with CEBus protocol	1998	64	1	CVC Capital Partners Ltd (21) Itron Inc (3)	5.24
US20030036822 A1	Statsignal Systems Inc	System and method for controlling power demand over an integrated wireless network	2001	45	1	CVC Capital Partners Ltd (14) Nivis LLC (5)	5.11

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Citation Velocity

Patent/ Publication No.	Assignee	Title	Year Issued	Cited by	Self Citations	Other Assignees	Citation Velocity
US5473322A	Itron Inc	Apparatus and method for sensing tampering with a utility meter	1992	85	6	Cvc Capital Partners Ltd (20) ABB Ltd (3)	4.76
US5994892A	Turino, Thomas R	Integrated circuit design automatic utility meter: apparatus & method	1996	64	Nil	Itron Inc (3) Sipco LLC (2)	4.62
US5923269A	Cvc Capital Partners Ltd	Energy meter with multiple protocols for communication with local and wide area networks	1997	59	14	SmartSynch Inc (2) Sipco LLC (2)	4.54
US5541589A	Delaney, Patrick J	Power meter data acquisition and control system	1994	69	Nil	Cvc Capital Partners Ltd (20) Power Measurement Ltd (2) American Meter Co (2)	4.46
US6078785A	Bush E, William	Demand reporting of electricity consumption by radio in relays to a base station, and demand relays wattmeters so reporting over a wide area	1996	51	Nil	Cvc Capital Partners Ltd (10) Royal Thoughts LLC (3) Itron Inc (3)	3.74

Smart Meters- Research/Academic Institutes

Patent/ Publication No.	Research/ Academic Institute	Title	Focus area
GB2461915A	University of Oxford	Utility meter	Method of metering the use of utility of an utility meter with a processor that analyzes received values representing use of one utility, to determine information on use of other utility

Research Collaborations

Patent/ Publication No.	Collaborators	Title	Focus area
JP2001128256A	Toyo Keiki Co. Ltd.; Nagano Japan Radio Co.	Automatic Metering System	Automatic meter reading system having base station which embeds synchronous code into demand data
JP2006345662A	Panasonic Corporation; The Tokyo Electric Power Co. Inc.	Remote Monitoring/Controlling System for Apartment House	Remote monitoring/controlling of apartment house
JP03818912B2	Tokyo Gas Co. Ltd.; Takenaka Seisakusho Co. Ltd.; Fuji Electric Holdings Co. Ltd.	A gas meter and the setter for production	Gas meter with success or failure indication of communication with respect to setter based on data output from read switch
JP2005174107A	Chugoku Keiki Kogyo Kk; Saiko Engineering kk	Automatic meter reading system	Automatic meter reading system to receive/transmit electricity meter reading data superimposed on packet signal between pair of media converters
JP2006064430A	Yazaki Corporation; Panasonic Corporation	Automatic-meter-reading unit	Automatic-meter-reading unit for switching and displaying meter- reading information, residual amount of prepaid money and usable gas

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Research Collaborations

Patent/ Publication No.	Collaborators	Title	Focus area
JP2005018720A	KMC kk; Ishizaka Denki Kengyo kk	Information Network System Automatically Reading Analogy Display Device Meter Installed on Building, Facility or the Like with Camera to Conduct Conversion to Digital Data, Transfer Data to ASP, Data Totalization, use Charge Calculation, Bill Issue or the	Automatic meter reading of electricity meter for transmitting stored digital reading data to target application through internet
JP7184275A	Tokyo Gas Co. Ltd.; Toshiba Corporation	Radio Equipment for Automatic Metering	Radio apparatus for automatic inspection of utility meter has CRC decoding circuit
JP04405415B2	Chubu Electric Power Co. Inc.; Toshiba Corporation	Power Transaction Evaluation Support System and Method, Program, Server and Terminal	Power transaction simulation considering demand and supply balance of power, and restriction of power line capacity by distribution processing via a communication network
JP2006185081A	Yazaki Corporation; Panasonic Corporation	Setting Method and Automatic Meter Reading System	Automatic meter reading system with automatically setting values that do not require change

Focus of Technology- Major Assignees

Assignee/ Applicant	Focus of Technology
Itron Inc	Type of communication, displaying, sensing, controlling and monitoring of data
General Electric	Type of communication, detecting and controlling of meter reading
Cvc Capital Partners Ltd	Type of network and communication, configuration of meters, data collection and energy measurement
Schneider Electric SA	Manufacturing of meters, data storage, monitoring and controlling of data
Silver Spring Networks	Type of network and its management

Commercial Products

Smart Meter Products by Itron Inc.

- CENTRON GPRS SmartMeter
- CENTRON® C1SC Meter
- CENTRON Polyphase meter

Products of Cvc Capital Partners Ltd.

- Tariff application using the SmartMeter C100R
- SM150VR+ Visual Read (N1.5m³/h)

Products by Silver Spring Networks

- GE kV2c™ polyphase commercial and industrial meter
- GE I-210+™ Meters
- PRI Meters

Products by General Electric

- WiMax Smart Meter Solution (WiMax-based MDS Mercury 3650 radio)
- I-210+c® SmartMeter

Smart Meter Products by Siemens

- Smart Metering solution
- Automated Metering and Information System (AMIS)

Recent Non-IP Literature

- **Linking Smart Meters and Social Networks**
- **Smart Multiagent Architecture for Congestion Control to Access Remote Energy Meters**
- **Building Web-based Infrastructures for Smart Meters**
- **Prepaid energy metering system using SMS**
- **Smart Metering—a means to promote sustainable energy consumption? Socio-technical research and development on feedback systems**
- **Encouraging public support for smart metering via appealing and enabling in-home energy feedback devices**