Journal of
Environmental Risk Assessment and Remediation

Abstract

Smart Electric Meters Technology Development Analysis Based on Patent Survey

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Introduction: Smart electric meters are used for near real-time monitoring of electricity consumption at a location with a capability of two way communication with central system. This ability has opened up a several applications that include a broad range of uses such as metering of electricity and fault detection, among others.
What is the Aim: This study is aimed at analysing the development of technology with respect to smart meters. At a broad level, chronological trends, geographical trends, technical trends and applicant filing trends were studied. A deeper analysis revealed the top organization's focus on specific technology area within smart meters, and timelines associated with it.
Explain your Methods: A broad search was conducted on patent search database Orbit using specific keywords for 'Smart Meters' and combining it with respective synonyms and allied subject keywords using appropriate operators. The results were then exported to a spreadsheet, which was then manually studied to be suitably classified and categorized.
Materials used: Orbit database, Microsoft® Excel spreadsheet
Describe your Results: The technology of smart meters has been known since the early 1980s. There was a sharp increase in R&D in this field since 2010. The biggest patent filers were State Grid Corporation of China and its subsidiaries and affiliates, who account for more than 70% of the total patents filed. Itron and Toshiba have the maximum patents filed among non-Chinese players. It is interesting to note that the IPC Class G06Q, which is associated with software developments, is among the top 5 technology classes related to patent filings. For purposes of this study, all the patents related to smart meters were classified under one of the following headers: Power Supply, Storage Memory, Communication Channel, Applications (Theft Detection, Power Management, Fault and Leakage Detection, Load Identification, Data Encryption, Demand Response), Centralized Management and Control System, and Advanced Tariff Systems. The patenting trends for each of these technological developments over the years by different companies were studied and have been charted to understand the progression of the technology. Based on the current trends of patent filings, it can be concluded that this technology is still in its growing stage of the technology lifecycle.
Discussion points: A careful study of the patent filing trends coupled with an analysis of products available in the market indicates that the technology of smart meters is still in the growth stage of the technology lifecycle. Several areas of technology development are still open and yet to be explored thoroughly. Due to the simplicity of development, softwares, and relatively inexpensive hardware have been developed by a number of players recently. Give your conclusion Chinese players have dominated over the past decade, accounting for over 70% of patents filed. Communication protocols between meters and centralized servers are a major topic of R&D. Power and load management have generally been major focus of attention, with tariff systems getting more attention in the recent past. Smart meters are seen as an enabler for the smart electricity grid systems.

Biography:

Arvind Viswanathan is the CEO at Pitch Scientific, a patent search and analytics service provider. He has over 15 years experience in the IP field. His initial foray into patent service industry was at GE John F. Welch Technology Centre, Bangalore, India. Subsequently, he served as a consultant providing solutions for all stakeholders involved in the form of patent search service work products as well as IP strategizing, and commercialization. He was also a faculty for the CLE Webinar on the "Best Practices Prior Art Searches" Series. He has a Ph.D. in Polymer Science from UMass Lowell. Prior to his entry into the patent field, he was a product development specialist at Tyrx Inc (now part of Medtronic). He is also a certified Green Belt practitioner, and instils this philosophy in all the processes to maximize quality of output while minimizing errors in the process.

Earth and Environmental Sciences 2020; June 05-06, 2020; Zurich, Switzerland

Citation: Arvind Viswanathan; Smart Electric Meters Technology Development Analysis Based on Patent Survey, Earth and Environmental Sciences 2020; June 05-06, 2020; Zurich, Switzerland