

# Application scenario analysis of Power Grid Marketing Large Data

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**Abstract.** In recent years, large data has become an important strategic asset in the commercial economy, and its efficient management and application has become the focus of government, enterprise and academia. Power grid marketing data covers real data of electricity and other energy consumption and consumption costs and so on, which is closely related to each customer and the overall economic operation. Fully tap the inherent value of marketing data is of great significance for power grid company to make rapid and efficient response to the market demand and improve service level. The development of large data technology provides a new technical scheme for the development of marketing business under the new situation. Based on the study on current situation of marketing business, marketing information system and marketing data, this paper puts forward the application direction of marketing data and designed typical scenes for internal and external applications.

**Keywords.** Power grid; large data; application.

## 1. Introduction

Marketing as one of the main business of the power grid company, has the responsibility of transfer the need of market and customer, and ensure timely recycling the accompli of power grid operation and other important duties. Power grid marketing large data volume is huge, according to the different data sources, marketing large data can be divided into internal data and external data [1]. Internal data sources include grid marketing organization data, electricity customer file data, power grid equipment (lines, transformers, stations, etc.) data, customer service process accounting data, electricity and electricity data. External data sources of grid companies include meteorological information systems, geographic information systems, internet data, public service sector data, and socioeconomic data [2]. Almost every time customers need to deal with the grid-related business and each customer's energy information collection frequency is 15 minutes [3]. The amount of data collected will be even bigger with higher collection frequency in the future.

## 2. Features of power grid marketing big data

In addition to the large data common 3V (Volume, Variety, Velocity) features [4], the grid marketing large data also has features of multi-channel channels, high timeliness and implication of high value.

(1) Multi-source Channel



Power grid companies have access to channel data including power users, power producers, suppliers, partners, etc., and have large data port layouts in multiple areas and large scale potential of user, such as smart grid, car networking, and so on.

(2) Strong timeliness

Data of production, operation, equipment status, and behavior and business transactions of power Grid Company are mainly collected through the following online information collection system.

**Table1.** Examples of data sources with strong timeliness

Type of Data	For the Company's Internal Data Resources	For the Company's External Data Resources
Status Data	Energy Management System(EMS);	Electric Vehicle Replacement Network Management System; Weather Forecasting System (WFS); Geographic Information System (GIS)
	Wide Area Measurement System (WAMS);	
	Distribution Management System (DMS);	
Behavior Data	Production Management System (PMS);	95598 Customer Service Data; Financial Sector 400 Telephone Data; E-commerce Management System
	Operation Management System (OMS);	
	Real-time Measurement of Grid Data	
Operating Transaction Data	Electricity Acquisition System; Marketing System;	E-commerce Management System; Electric Vehicle Replacement Network Management System; Financial, Industrial Trading system
	Electric Vehicle Replacement Network Management System; Professional Control System	
Other Data	Marketing System; Financial Control System; OA System	
	other data through data transactions, cooperation and other means to obtain	

(3) Contains high value

Power grid marketing data can not only reflect the power industry production and operation conditions, but also has a strong reference value for the analysis of socio-economic situation, production, personal consumption [5].

### 3. Application Design of Large Data Application in Power Grid Marketing

#### 3.1. Factors to be considered for power grid marketing big data application scenario construction

Based on data fusion sharing. That is, the application of data assets need to highly integrate different types of data from different channels, and share among various departments and units, in order to give full play to the value of data asset[6].

Taking large data analysis as a means. That is, the application of data assets need to make full use of large data thinking and technical means, including data collection, processing, analysis, visualization and other aspects of the realization[7].

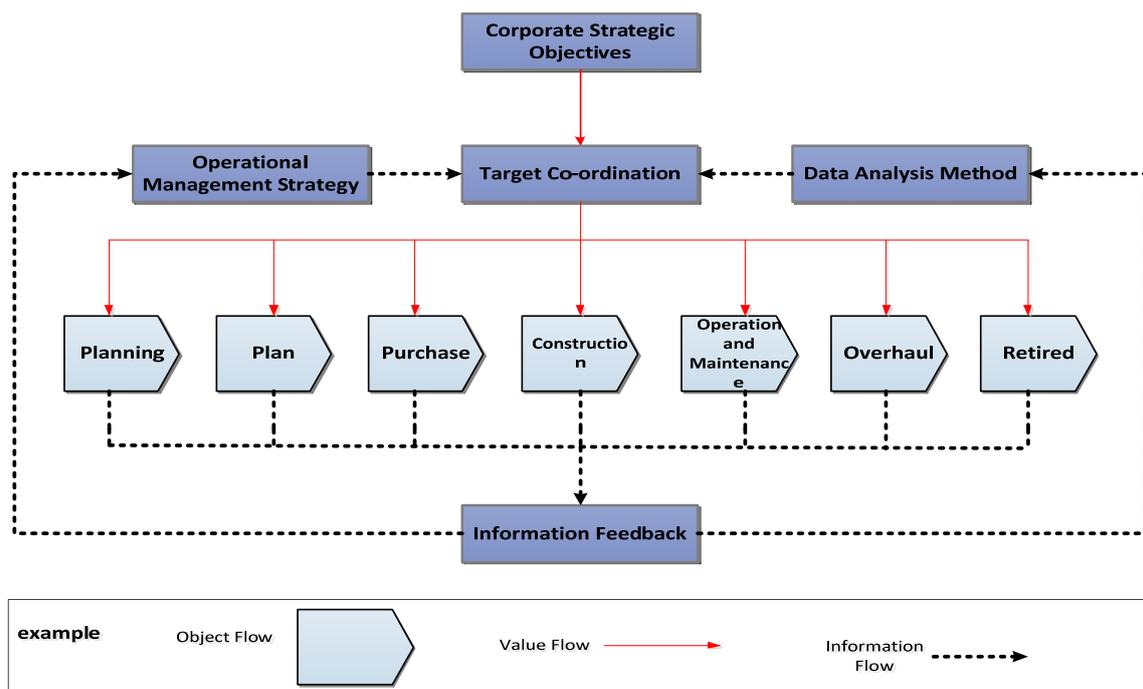
For the purpose of value discovery. The application of data assets is essentially to discover the law of value from the information level. These values are reflected in the law of the operation of the grid, the understanding of customer behavior, the grasp of business development problems and the understanding of emerging business development.

The application scenarios of grid marketing data can be divided into internal and external application scenarios.

**3.2. Typical Internal Scenes - Decision Making Optimization of Asset Management Life Cycle (LCC)**

Traditional asset management is mainly based on statistical analysis, and is good at analyzing and calculating the cost cycle, lacking the forecast and impact analysis of the future. This scene mainly combines the large data analysis method, the probability of equipment failure to predict the impact of mutual influence on the assets can be controlled in a wider range of costs and improve the level of lean management.

Based on the evaluation of the health status of different types of equipment, the introduction of weather, geography, population and other external data to improve the accuracy of equipment downtime analysis and timely planning, procurement, construction, operation and maintenance and other aspects of transmission and feedback, to enhance the level of management of all aspects of lean.



**Figure 1.** Optimization of Asset Management Decision Making with Large Data Analysis

Conducting a comprehensive evaluation of the data such as the model of the equipment assets, the maintenance situation, the family defects and other physical data as well as the information of purchase price, the cycle cost, the cost of the fault and the value of the data and so on. To establish equipment failure probability analysis and evaluation model which can provide a basis for equipment procurement, operation and maintenance, power grid planning and other aspects of management.

Implementation of countermeasures: to strengthen the base data management and cross-business integration, and establish asset life cycle assessment model based on equipment status data, in order to provide support for decision making in all aspects.

First, deepen the integration of data across business segments, improve the consistency of the accounts of the asset. At present, the data quality of all aspects of asset management has been improved

obviously [8]. The next step will focus on the data coding and the interface from different business systems, to improve the consistency of physical assets in the system and provide the foundation for enterprise applications.

The second is to establish technical and economic evaluation model of asset life cycle (LCC) concept based on the equipment status data. Accumulating real estate, value flow and information flow data in the LCC process (Planning, procurement, construction, operation and maintenance, maintenance, retirement) to improve the accuracy and coverage of the LCC evaluation model.

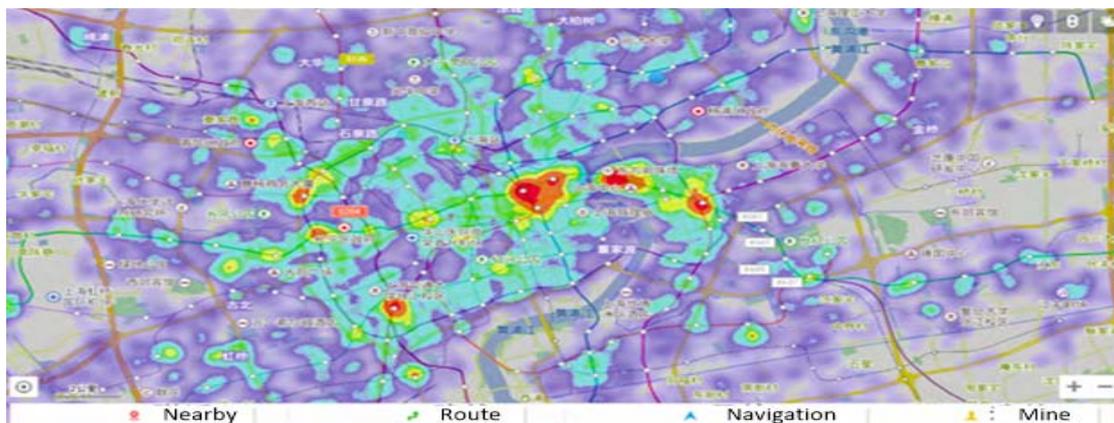
Third, based on the information feedback, big data plays a role of the auxiliary decision-making for cross-disciplinary, cross-sectoral management. For example, from 95598 customer complaint information as the source, to further accumulate the equipment state data and cost, supplier information, fault information and other data, to establish asset and equipment health evaluation model which can provide decision Support for equipment status maintenance, supplier evaluation, material procurement and other work; and at the same time can be retrospected equipment manufacturers information, factory date, batch, etc., add to blacklist for the frequently faulted manufacturers.

### 3.3. Typical External application scenarios- Power Thermal Map

For the external scene design, the application strategy focuses on the integration of internal and external strong cohesive application scenarios, and continuously improve cross-business data acquisition and analysis capabilities. The design idea of the external application scenario is to clarify the core demands by identifying the important external stakeholders. Take power services as the core, to integrate social resources, and improve the control and driving force in the ecosystem. Establish service platform and building an integrated energy service enterprises to provide energy, information, products and other diversified services for relevant agencies and enterprises.

The thermal chart is using the acquired mobile phone base station information to locate the number of users in the area, render the map color by the number of users, and display the visitor's keen page area and the geographical area where the visitor is located in a special highlight.

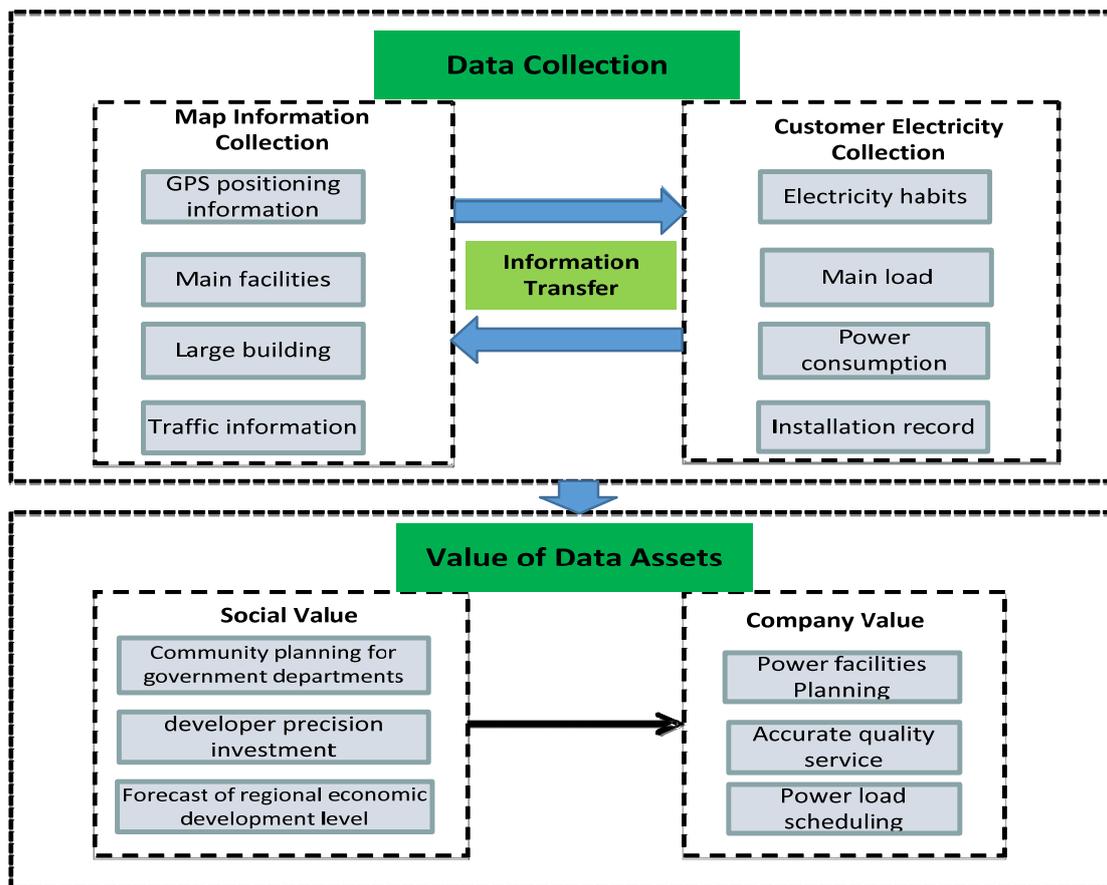
Baidu map thermal chart is a new large data visualization products [9]. The product is based on the geographic location data of mobile phone users, through a certain spatial expression processing, and ultimately presented to the user varying degrees of crowd aggregation, That is, by superimposing the different patches on the network map to describe the distribution of the population in the city in real time, as shown in the following figure.



**Figure 2.** Baidu map thermal chart screenshot

Using the idea and mature technology of thermal map, we can consider adding residential electricity information, power supply configuration information and other massive data on the basic functions of thermal map GPS positioning, to carry out comprehensive analysis for the grid operation status, social

electricity situation, electric vehicle charging Service, distributed energy construction and so on. Combined with the regional population distribution, living and income, socio-economic development, the formation of multi-source data to establish a panoramic power map, which can provide intuitive data support for identifying the weak links in urban power grid, mastering the law of social electricity. This is of use for the company's power infrastructure construction, customer service, power distribution scheduling and other types of business.



**Figure 3.** Power Thermal Map Scenario Design

The following work need to do:

(A) Establish comprehensive data collection channel. In order to draw the power heat map, intuitive display various periods of the community's electricity behavior, we need to collect a full range of information, including geographical location, electricity, and electric vehicle charging location and charging capacity. The data collected by each channel need to ensure the timeliness, accuracy and comprehensiveness of the data.

(B) Establish large data analysis and computing platform. To pseudo-true, looking for the correlation and common between various types of data, which can lay the foundation for the next step use of data. In this process, relevant standards need to be developed to meet the requirements of format uniform specification and general interface between various types of data.

(C) Data visualization technology development. According to the different use objectives of data, data visualization and application need to be developed to achieve a more intuitive display of the relationship and find the law between various types of data.

(D) External publicity and promotion. For the objective of providing users with power supply, basic electricity information and corporate image of the external publicity, intuitive, easy to be understand

and more attention to the content need to be shown. It is recommended to learn from the form of mobile APP.

(E) Guarantee the security of information. Data security is the basis of business. For the wide range and many types of direct social impact, a sound information security mechanism and safety monitoring system need to be established to clear the requirements and responsibility of various aspects. In particular, the external display of data, confidential and privacy is strictly prohibited unauthorized release, and prohibit the external release which has not be passed by the national authority and the company's information security laboratory professional safety testing.

#### 4. Conclusion

The application potential of power grid marketing large data is huge, and the application space is broad. This article scientifically designed the internal and external typical business application scene. For internal scene design, taking data fusion and sharing as a base, large data analysis as a means and value mining as a goal. For the external scene design, the purpose is to integrate social resources, improve the enterprise control ability in the overall ecosystem.

For the next step, three aspects of the work need to be strengthen:

First, improve the development incentive and sharing mechanism of data application. Through the construction of data standards, to strengthen the development and application of data assets assessment and incentives which can promote cross-professional data sharing. Second, actively build data ecological chain. Uphold the concept of win-win cooperation, fully integrated the grid business with financial, electricity, electric vehicles and other related business. Breaking through the traditional business model of electric purchase and sale and building the data industry ecosystem to realize the goal of energy information integration services and diversification extension in other areas. Third, actively carry out external joint development and platform cooperation. Further cooperate with the advanced data management companies with technology, resources, market advantages, and learn from advanced concepts and experience to achieve strong combination, and common mining the value of power grid marketing large data.

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