Theory and practice of the EIA consultation information platform

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This paper analyzes the concept and development background of the EIA consultation information platform, through the studies of the environmental impact assessment technical guidelines and the business process of technical evaluation, EIA consultation information platform has designed five main functions of the EIA platform, namely engineering information, the regional environment, environmental impact prediction, index analysis and public participation. EIA consultation information platform has also studied the key technologies to achieve these functions, and established the air forecasting model Aermod based on SOA architecture. Using spatial analysis capabilities of GIS, EIA consultation information platform show the visual overview of the project engineering, relationship with the surrounding environment of the project, the environmental impact prediction and public participation in the form of "EIA one map" to determine the feasibility of the project for the user.

Keywords: environmental impact assessment; consultation platform; SOA framework; GIS; environmental quality forecast model

1. Background

Throughout the domestic and foreign references, consultation platform information system is applied to huge disaster events, such as flood, earthquake, meteorology, which is determined by the complexity and the importance of decision consequences of these events in the decision making process. With the development of science and technology, decision support system experienced a process of consultation platform information system by simple decision support system. In recent years, a decision support system developed quickly, it has been successfully used in water resources system planning, design and management. Environmental information is the premise and foundation of scientific environmental management, directly affecting the environment management efficiency and decision-making ability.

According to the environmental impact assessment technical guidelines and actual work demand, EIA consultation platform has realized the management, query, statistics, analysis, processing and output of business data and supporting data, combined with a variety of built-in model and the model prediction, providing technical support for the whole life cycle management for the evaluation of environmental impact.

2. Analysis of the EIA business demands

Traditionally, technology assessment business process is comprised of the following processes: the construction unit submits the technical documents of environmental impact assessment through the disk /U disk / email. After the acceptance of the technical documents, the

person responsible for the project are chosen to determine the assessment experts and conduct the on-site step exploration, technical review, expert evaluation, assessment report. Most important of the technology assessment business process is "the expert review meeting" mode, through the convening of meetings, relevant suggestions given by experts, and finally the technical evaluation report is produced. The experts mainly have to rely on the expertise and experience to make judgments, but both the key model parameter selection and whether the model is really calculated are difficult to judge without calculating, therefore, at present, only by the meeting of experts can not solve deep-seated problems.

3. The key technologies and the overall architecture

3.1 Using SOA architecture

Because the EIA consultation platform needs to integrate a large number of sources of pollution, weather, terrain, environmentally sensitive areas, such as environmental data, which may be deployed in other units of the Ministry of Environmental Protection, or in the province environmental information center, and even some services such as world map, Google maps are deployed on the Internet, and at the same time seamlessly integrate Regulatory models such as AERMOD and model results, service-oriented architecture SOA becomes a inevitable choice.

3.2 To build a prediction model system based on SOA architecture

Currently, most of forecasting models used are based on C / S structure, and can not be effectively integrated with the existing information systems, especially in consultation information platform. In order to predict the environmental impact of the construction in consultation platform, "Technical Guidelines for Environmental Impact Assessment - the atmosphere" of recommended ambient air quality prediction model AERMOD is transformed into WebGIS based, multi-user, B / S structure, and can be seamlessly integrated with the EIA consultation information platform，thus successfully resolved the technical difficulties model in the browser remote call，

AERMOD successfully integrated with consultation platform provides a solid technical foundation for EFDC, CALPUFF and LIMMA model.

3.3 The overall technical architecture

The EIA consultation platform uses four layers, including the interface (business application) layer, business logic, data layer and external data services.

(1) The application layer

Application layer is comprised of project overview, regional environment, environmental impact, index analysis and public participation.

(2) Business logic layer

Business logic layer built on top of the data layer, based on Environmental Impact Assessment Technical Guidelines, the business logic and the EIA forecast model, the EIA business data, supporting data, manage spatial and non-spatial data, are packaged into services according to the SOA architecture, that enables each application to build their own function easily in the form of service interface. Services include basic map service, the EIA business data services, spatial analysis service, forecasting model services, these services resources provide a unified interface to facilitate online calling service resources based on common IT standards.

(3) Data layer

Data layer is comprised of supporting data, business data generated by the EIA process and management data.

Support data group is the data resources supporting the EIA data lifecycle management, including laws and regulations, technical guidelines, the social environment data, environmentally sensitive areas, environmental quality monitoring data.

Business data group is that all data resources EIA lifecycle generated on strategic environmental assessment, planning, environmental impact assessment and construction project EIA, etc., including the EIA report and based on all kinds of indicators EIA report standardized extract, technical assessments, approval documents completion and acceptance of environmental protection-related data, operational monitoring and post-evaluation project data.

Management database group is generated for the EIA management service, such as EIA practitioners qualification management data, technology assessment expert database etc..

(4)Hardware support layer

Relying on Chinese government extranet private network, it can connect the national, provincial, city, county, in conjunction with database systems, middleware, security systems and video conferencing systems, providing infrastructure protection for the operation of the entire platform.

4. Main functions

By combing EIA business processes and the Environmental Impact Assessment Technical Guidelines, five core functions such as the project overview, regional environment, environmental impact, index analysis and consultation platform for public participation are determined.

4.1 Project overview

Environmental engineering analysis mainly provides basic information, project layout, production technology, engineering review and other functions. Basic information mainly show s the project name, construction site, construction investment, environmental investment, project reports, industry indicators. The project layout shows the project location, address range, spatial distribution of major works on a map, surface current situation of the project site, allowing users to have an intuitive understanding to the project overview of the construction projects.

4.2 Regional environment

This module analyzes the relationship between the location of the construction project and environmentally sensitive area, identifies sensitive conservation goals, listed the name of the relative distance sensitive conservation goals, and project orientation and standards in the figure. Using the overlay method, the construction project layout is lying on urban planning, land use planning and other plans to analyze the relationship with the relevant planning and other construction projects, and also to analyze the construction project location selection, design parameters and environmental impact compliance with environmental requirements related to planning.

4.3 Environmental Impact Assessment

According to the air, water, noise and other technical guidance requirements, the impact of construction projects on the surrounding environment is need to be analyzed. After the

Environmental quality prediction models are seamlessly integrated with consultation platform, user can input the evaluation scope, time, evaluation factors, meteorological parameters, surface parameters, terrain parameters, pollution parameters and the background concentration on the electronic map or model of remote sensing, then build a simulation program, run the model to calculate the concentration of a variety of environmental conditions. Platform supports model results displayed in a temporal and spatial evolution mode to analyze the pollutants diffusion process, the scope affected by the construction project, sensitive point area compliance with or exceed the standard.

4.4 Analysis of the EIA key indicators

Using GIS spatial analysis function, statistics results of the EIA key index are produced to generate spatial maps and charts by administrative area and basin based on historical construction projects stored in consultation platform, to facilitate the user to analyze the reasonableness of the spatial distribution of the project. In order to provide the necessary data support to grasp the consistent and fair scale of the evaluation of similar projects, a contrastive analysis of key indicators of the similar project is conducted to analyze the status of key indicators such as clean production levels, emissions performance in the industry. Source quota of total control is analyzed and database is established to avoid repeated use of the quota of total control

4.5 Public participation

Accordance with the "Environmental Impact Assessment Technical Guidelines Master" requirements, investigation information, related videos and pictures of the public participation from sub groups and individuals are displayed for user track and manage advice for each category. the number of participants in favor of and against the project is counted and displayed on the basemap, allowing users to intuitively understand the spatial distribution of the pros and cons.

五. Promotion and application

EIA consultation platform has provided MEP data query, statistical analysis and EIA consultation services, and provided shared access to the Yunnan, Guangxi, Shenzhen, and other province and city EIA agencies.

Consultation platform is used at the technical evaluation process of Qinzhou Power Plant Phase II expansion project, the new airport project Beijing, China Petrochemical Caofeidian refinery project and other projects, through the review of existing engineering background, part of the layout and major facilities around the environmentally sensitive area analysis, project location analysis, simulation and prediction of environmental impact, total control index analysis, public participation, and other functional modules, consultation platform provides a strong technical support for the environmental impact assessment of the site exploration, technical pre-assessment and expert consultation, as well as director of the topics.

六. Conclusion and Outlook

Through the integration of pollution source, weather, topography, geography, and other data, seamless integration of regulatory model, the use of GIS spatial analysis capabilities, The EIA consultation platform generates "EIA a map" to show the project

overview, regional environment, environmental impact, index contrast and public participation etc., providing a new method to predict and analyze the environmental impact assessment of the project.

In summary, The EIA consultation platform are of great significance in the demonstration of China's EIA information system construction, integration and sharing of massive data, promoting EIA business process reengineering, breaking through the traditional "expert review" mode..

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