

A Proposal for Structuring a Legal Framework of Smart Water Grid in an Era of Climate Change

Moon-Hyun, Koh

Department of Law, Soongsil University, Seoul, Korea
kohmh@ssu.ac.kr

Abstract. It is high time that state, local government, public institution, company and people should establish a new paradigm in order to overcome water shortage due to global population growth, urbanization and climate change etc. This means that we should establish strategies for water management in a dimension of securing state competitiveness of a dynamic force for new growth as well as prevention of disaster through integrated smart water management, turning away from passive defense strategy to water crisis. Smart Water Management that refers to implement intelligent water information systems by IT convergence is considered a new paradigm. Smart Water Grid (hereinafter “SWG”) is the core of this water management policy. In this paper, we try to study the Smart Water policy, especially SWG, and technology development trends in major advanced countries such as U.S.A., EU, Singapore, Australia and Japan etc. In the conclusion, we suggest a proposal for structuring a legal framework of SWG in an era of climate change.

Keywords: Climate Change, Water Management, Water Shortage, Smart Water Grid, Smart Grid, Smart Water Management, Integrated Water Management, Sewage Treatment, Water Industry, Multiplex Source of Water, Human Right to Water, Water Management Governance, a legal framework of Smart Water Grid.

1 Introduction

The crisis due to water shortage etc. is, nowadays, the world-wide permanent crisis which all the states in the world. Therefore, one of the most important responsibilities of states and local government is to protect people's lives, health and properties safe from the hazards derived from water or water disaster. Furthermore, the government must establish a strategy to prevent and protect the water crisis and water problems, which makes the perfect water management.

On the basis of results from the comparative analysis with Smart Grid in power sector, we evaluate legal, economic and technological feasibility related with the Smart Water Grid(hereafter ‘SWG’). Into the bargain, we try to suggest a proposal for structuring a legal framework of SWG in this paper.

It is necessary that related ministries such as Ministry of Environment and Ministry of Land and Transportation etc., local government, public institution, civic organization, company and people should establish a new water management system

in which governance system works well based on a bond of sympathy to smart water management.

Concerning other countries abroad, there are various systems for water management. There are countries such as U.S.A. and Japan which maintain several systems for the water management and there are countries such as Great Britain, Germany, France and Singapore which pursue only one system for the water management. We need to make a framework which fits to our circumstance well, with bearing in mind of other countries, among them the current legislation, “Basic Law on Water Circulation” of Japan.

Why is legislation important in water management? It is because of several reasons as follows: the paradigm of water management has been changed, therefore (i) it is necessary for us to provide water management stably and to secure human rights to water, (ii) it is necessary for us to help global water industry grow well, (iii) it is necessary for us to take a legal measure to prepare for threat against security because of the character of the Smart Grid, (iv) it is necessary for us to prepare for the necessity of the mediation surrounding interest-conflicts of water management, (v) it is not enough to cover these issues, with only the development of the technology or the adjustment of administration or budget, (vi) it is high time for us to prepare for a mechanism of mediation and integration focusing on law.

Concretely, it is necessary for us to revise existing provisions of Acts on Water Management or to make new provisions of Acts on Water Management. These kinds of effort could not be perfect measures for preparing for water shortage due to climate change. Therefore, it is necessary for us to make new and integrated “Smart Water Grid Act”, likewise the “Smart Electricity Web Act”.

The main problem is that tasks of water management are divided into various departments of government such as Ministry of Land, Infrastructure and Transport and Ministry of Environment. Accordingly, there could be contradictions and conflicts between management of water quantity and management of water quality. Also, in the overall view, it is so difficult to coordinate between governmental departments. It is not efficient in that where investment is really required, sufficient investment is not made. For this reason, in the dimension of national government, an establishment of the new SWG system and legislative efforts to support the SWG system are desperately required.

In this paper, we will cover, at first, the concept, background and expectation of the SWG. And then, we will look into water management policies of major countries and current trends of legislation on water management of them. We will cover the establishment of governance collaboration and integration oriented SWG, the framework of Smart Water management, and current situations and problems of existing provisions on Water Management Acts. In the end, we will draw necessity to legislate an integrated Act on SWG to cope with climate crisis.

2 The concept, background and expectation of the Smart Water Grid

2.1. The concept of the Smart Water Grid

“Smart Water Grid (SWG)” means the next generation total water management system which combines the state-of-the-art science technology engaged in the water production, distribution, care and consume processes with the information and communications technology, to make the real-time Smart integrated water management and share relative information possible, so that it makes the water supply chain stable and efficient.

In a nutshell, SWG is the water management system which combines the existing water management system with the information and communication technology, to make it overcome the existing limits. Therefore, it can distribute, manage and transport the variable sources of water, so that it solves the imbalance situations of water resources.

3 Conclusion

There are many water-related problems which relate to water shortage etc. because of climate change. Therefore, “water” has become indispensable to a human being in the international society, in view of the resolution on human right to water of UN.

There is emerging a smart water management system which increases efficiency of water resources utilization as a result of development of Information and Communication Technology. That is SWG, which is the Smart Grid strategy on water management field. SWG can solve the problems derived from water scarcity, water crisis and climate change and, also, develop industry on water which can pioneer a new water market.

One of the major features of SWG is an integrated Smart water management, by which integrate dispersed functions of water management. In addition, SWG is based on the water management governance which integrates all the subjects in the water management. Especially, with appearance of “water loop system based on multi water resources,” which is the most important feature of SWG, not only one department of a local government or a government but also many other major agents can utilize multiple water resources to constitute a circulative water loop system.

Though, considering Korea’s present conditions, there are many water management agents, – such as Ministry of Environment, Ministry of Land, Infrastructure and Transport, lots of local governments, the Water Resources Corporation, the stake- holders, many private companies and people – a lot of related tasks are dispersed. Accordingly, efficiency of water management and its connectivity seem to be quite poor.

For the one more thing, when it comes to entering full-scale integrated water management, it seems that value of water will increase, therefore, problems between

inter-local, inter-personal and state-company-private person on water rights will occur even more frequently.

Therefore, the government should develop the SWG system to efficient water utilization and solve conflicts around water. It is high time to revise existing individual Acts or to make a new Act for better water management. Furthermore, the legislature should take it into account to enact a new integrated act on SWG as a center. Especially, in the overview, it should be legislated that the framework which enhances efficiency of water management and adjusts some rights around the water resources in an anticipated way.

One of the most important thing is to establish a new law and to supplement to existing laws on SWG for solving foreseeing or existing problems which have occurring around new technologies on SWG in the administrative and financial view. Also, there are many main agents which are involved in developing of SWG technology, Accordingly, it is necessary to prepare for long-term road map so as to coordinate entangled interests with one another. Considering these things, it is necessary to make an integrated legislation on SWG.

“Act on Rivers,” “Act on Underground Water,” “Act on the Water Supplement” and “the Act for the limitation on the Taxation Privilege” stipulate the water management clauses relating SWG. Nonetheless, the legislation should make those acts more effective and related one other, with bearing in mind of essence of SWG and direction of development of SWG.

When it comes to making new integrated law for Smart Water Grid, we should include following considerations, that is, excavation of multiple water resources and its systematic cooperation and management, solution of conflicts on water management including water rights, basic principles and major legal means and solutions for establishing a new governance, promotion of water industry through new fusion technology on water management. That is to say, with enacting an effective and basic law for an integrated Smart Water Grid, it is necessary to revise exiting laws on water management in accord with an integrated Smart Water Grid.

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