中国城市科学研究会2016年度智慧城市课题

备选项目征集指南

为贯彻《中共中央国务院关于深入推进城市执法体制改革改进城市管理工作的指导意见》（2015年12月24日），落实《国家新型城镇化规划(2014-2020年)》，以《意见》内容为总体指导思想，中国城市科学研究会紧紧围绕城市科学技术前沿领域寻求基础性突破、掌握智慧城市产业发展的核心技术、加强集成创新和应用模式创新、延拓信息技术应用尝试与广度、支撑新一代智慧城市产业发展等重点任务，在前期工作的基础上，在战略方向与前沿技术方向围绕大数据国际标准、城市仿真、网格化管理、国际合作模式等主题方向征集备选项目。为做好2016年度城市科学领域备选项目库的建设工作，更好地开展智慧城市联合实验室的工作，特制定本指南。

## 一、课题方向与内容

### （一）战略方向

#### 1.1 新型城镇化背景下智慧城市建设发展方向与策略研究

党的十八大指出推进新型城镇化，须围绕全面建成小康社会的目标，转变经济增长方式，走集约、智能、绿色、低碳的四化同步发展道路。面对目前我国城镇化所面临的困境和瓶颈问题，国家从全局出发指出了未来要坚持走以人为本、四化同步、优化布局、生态文明、传承文化的新型城镇化道路。智慧地推动新型城镇化，是顺应现代城市发展新理念新趋势，统筹城市发展的物资、信息和治理资源，推动新一代信息技术创新应用，实现城市经济社会科学发展的重要途径。2016年3月，李克强总理政府工作报告中提出，打造智慧城市，改善人居环境，使人民群众生活得更安心、更省心、更舒心。研究新型城镇化背景下智慧城市发展，按照建设新型城镇化的方针，智慧地推进城市科学健康的可持续发展。在全球新一轮科技革命和我国城镇化高速发展的时代背景下，智慧城市将会成为政府加速科技创新驱动、促进发展方式转变、推动经济结构优化升级的有力支撑。本课题主要研究新型城镇化与新型智慧城市建设的关系与模式，探讨未来五年在新型城镇化过程中智慧城市建设思路与模式。

#### 1.2 “一带一路”战略下的智慧城市全球参与建设模式研究

建设“一带一路”，是以习近平同志为总书记的党中央主动应对全球形势深刻变化、统筹国内国际两个大局做出的重大战略决策。它对推进我国新一轮对外开放和沿线国家共同发展意义重大。当前，经济全球化深入发展，区域经济一体化加快推进，全球增长和贸易、投资格局正在酝酿深刻调整，亚欧国家都处于经济转型升级的关键阶段，需要进一步激发域内发展活力与合作潜力。“一带一路”战略构想的提出，契合沿线国家的共同需求，为沿线国家优势互补、开放发展开启了新的机遇之窗。随着国家“一带一路”战略的推出，我国研制的自主知识产权的新型技术、在中国的实践等具有国际视野的公司已经开始布局国际化智慧城市布局，把我们在中国的实践经验带向国际。参与研究单位共同国际标准编制，参与智慧城市相关国际合作研究等项目。

### （二）前沿技术研究

#### 2.1 智慧城市基础设施数据交换与共享建设指南（国际标准）

城市基础设施分布在不同的领域，涉及许多城市内部或外部的系统。而它们可能由不同的部门管辖，但之间却存在相连性，隶属不同部门却相互关联。

在城市化过程中，特别是当今世界正在经历这快速的城市化过程，这些城市基础设施的全面而准确的信息对城市规划，建设和运营至关重要。然而，相关的数据存在着存储的分散的问题，难以实现不同领域和不同部门的共享和同步更新。为保证服务的连续性和正确性，城市规划的科学性，让城市更安全、友好与宜居，研究如何共享相关数据十分必要，这要求城市建立一个数据共享机制。旨在通过对数据与系统的信息安全领域我国自主知识产权的CCKS（Combined Credit Key System）等核心技术的标准化研究，形成智慧城市建设包括基础信息安全标准在内的信息资源共享开放国际标准。本项目已在国际标准化组织智慧城市基础设施计量分技术委员会（ISO TC268 SC1）立项。

目标：实现各部门、各系统之间数据的互操作性。

目的：

1）建立一个普遍使用的数据共享机制，为城市规划者、管理者、维护者和服务提供者提供服务；

2）为更好统筹城市，共享可用于城市仿真的实体模型和城市数据；

3）为更好推动城市创新发展，不同单位（规划部门、通讯部门、水利部门、食品监督部门等）之间共享循证知识。

#### 2.2 构建城市虚拟仿真系统支撑城市科学决策体系

现代城市发展迅速，科学（互联网、大数据，云计算，IT信息化等等）技术日新月异，随之城市管理方法不断创新。2015年底，中共中央、国务院第37号文件提出了“构建城市虚拟仿真系统”。仿真技术的应用将推动数据整合，探索城市在经济、政治、文化、环境等方面的发展规律，达到预测意外突发事件的目标。通过可视化技术（动画、大屏幕、圆顶投影、全息三维投影等）将融合后预期成果直观展现，科学地进行城市建设、管理和运行。智慧城市联合实验室与国内外相关科研机构合作，以期建立仿真、体验和应急指挥一体化中心，实现“多规融合”全方位推动城市的智慧发展。结合前期基础和成果，决定开展仿真领域重点课题研究工作，包括但不限于：

1）城市环境仿真分析（包括热岛、风环境、水环境、水资源、污染物扩散等大规模城市计算仿真）

2）城市交通仿真

3）城市安全供水及能源供应弹性仿真

4）城市照明系统仿真

#### 2.3 基于网格化管理的智慧城市（社区）公共信息服务效果评估

城市网格化管理，是运用数字化、信息化手段，通过有效整合城市公共服务资源，以网格管理人员的多元化来服务群众需求的个性化，以强化条块协同、上下联动来消除条块分割、各自为政的管理积弊，以市、区、街、社区、网格五级联动来解决一个部门、一个层面无法解决的问题。

对智慧城市（社区）公共服务效果的评估，是提升城市管理服务效率的有效手段。结合前期研究成果和今后工作重点，联合实验室决定开展相关课题研究合作，包括但不限于：

1）智慧城市（社区）网格化管理运行机制研究；

2）[基于城市网格化信息共享的协同管理机制研究](http://app.nj95.net/cdown?filename=jl3N2c0MudTMuBXcEJzRnx0dZRlcodncwkUN4VmRhJjaY9USzUDMRtUNal2d2Q0cpZjSEd1dVJWQtFHU5FkbI9Sa1NEUL1Gdp1ENGp1diVGZLJ2bWJUUaRDdBN1avETc4smdTh3YYxGVKV3TF1UZoRkS2QGU2NET&tablename=CJFD2007&dmark=pdfdown&ddata=QBZZ200712004|CJFD2007|%E5%9F%BA%E4%BA%8E%E5%9F%8E%E5%B8%82%E7%BD%91%E6%A0%BC%E5%8C%96%E4%BF%A1%E6%81%AF%E5%85%B1%E4%BA%AB%E7%9A%84%E5%8D%8F%E5%90%8C%E7%AE%A1%E7%90%86%E6%9C%BA%E5%88%B6%E7%A0%94%E7%A9%B6|%E6%A8%8A%E5%8D%9A;%20%E9%83%AD%E7%90%BC|%E6%83%85%E6%8A%A5%E6%9D%82%E5%BF%97|%0A2007-12-18%0A|%E6%9C%9F%E5%88%8A)

3）[基于网格化的城市管理系统的研究与设计](http://app.nj95.net/cdown?filename=idwRHNmFEdrhHciFTWldVchV3ZqFXMv5GWWl2VT50NwQGOSx2YpZkZhl1bqZWd1hGdElHRYVXSSN2T=0TUXZkUMRTVG9EenxkNYVGe3pWSvAzKBJmQxIXaZdlWZF1LEBnQLJlUrl2dqxEZMFkNVlER4d0Va9&tablename=CMFD2009&dmark=pdfdown&ddata=2009074378.nh|CMFD2009|%E5%9F%BA%E4%BA%8E%E7%BD%91%E6%A0%BC%E5%8C%96%E7%9A%84%E5%9F%8E%E5%B8%82%E7%AE%A1%E7%90%86%E7%B3%BB%E7%BB%9F%E7%9A%84%E7%A0%94%E7%A9%B6%E4%B8%8E%E8%AE%BE%E8%AE%A1|%E8%83%A1%E8%8F%82|%E5%A4%A9%E6%B4%A5%E5%A4%A7%E5%AD%A6|%0A2008-05-01%0A|%E7%A1%95%E5%A3%AB)；（基于网格化管理的城市（社区）公共信息平台建设方案研究）

4）智慧城市（社区）网格化管理评估指标体系研究；

5）网格化管理与城市创新治理案例研究；

6）网格化管理粗细度评价体系研究

#### 2.4 智慧、生态、海绵城市规划设计建设与投资国际合作模式

主要关注国际组织、金融机构、国家、企业智慧、生态、海绵城市等方面中国战略和走出去国际化战略。

重点梳理和研究中欧智慧城市合作、世界银行中国智慧城市项目、中德生态城项目、中芬生态城项目，三井、松下等海外企业的中国落地智慧城市项目，中兴通讯、中国航天等中国企业智慧城市海外落地项目的规划设计与建设合作模式。

帮助地方政府学习了解海外智慧、生态、海绵城市规划设计国际合作新趋势、新理念和新模式，也为中国企业智慧城市走出战略的国际布局提供参考。

#### 2.5 ICT等新兴现代科技对城市发展的影响与发展预测研究

当前，物联网、云计算、大数据等新一代的科技信息技术，对城市的建设发展起着越来越重要的作用。例如大数据，在政府转型中起到重要的角色，政府部门能够集中人力物力进行本部门业务的运转，从而减轻政府行为负担，能有更多的经历专注于面向公众的公共服务，提高政府效率。

新兴科技技术融入到城市的建设当中，将为城市带来一种新的变革，城市管理高效、民众生活便捷、产业转型优化。但是也会对城市产生一些负面的影响，例如生态环境的恶化、就业结构失衡、信息安全无保障等一系列的问题。

新兴科技技术的日异月新，加快了城市的发展的步伐，有些负面影响还没有消除有可能被下一个影响叠加。为了使得这些技术能够更高效的为城市服务，建立新兴科技技术对城市发展的预测模型。

#### 2.6 城市可持续发展和节能技术研究与案例分析

节能减排是人类应对全球气候变暖的重要战略选择。2010年7月，国际能源署发表报告称，中国成为世界上能源消耗最多的国家，也是碳排放量最多的国家，于此同时我国正处在全面建成小康社会的关键时期与城镇化快速发展的重要阶段，能源需求还将继续增长。积极应对气候变化，是我国经济社会发展的一项重大战略，也是加快经济发展方式转变和经济结构调整的重大机遇。

在我国，交通、建筑及工业制造是能源消耗的三大主体。新能源汽车、既有建筑改造、工业4.0等的发展应用不仅顺应了国家节能减排战略，同时也保障了城市化的可持续发展和环境改善。

智慧城市联合实验室致力于环境治理与节能技术研究，与国内外高等院校、科研机构以及企业合作，探索城市及区域低碳经济及可持续发展。结合前期研究成果和今后工作重点，决定开展相关课题合作，包括但不限于：

1）区域及城市低碳经济发展模式研究；

2）城市能量规划研究；

3）节能计量技术研究；

4）新能源技术研究；

5）欧洲节能减排技术研究及案例分析；

6）城市级可再生能源智能电网关键技术及评价体系研究

## 二、申报要求

### （一）实施年限

战略方向类两年一个周期，前沿技术研究类实施年限原则上为三年。

### （二）经费来源

申请国家课题经费、实验室自筹经费与企业赞助。

### （三）咨询

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Guidebook for Soliciting 2016 Smart City Research Topics

by

Chinese Society for Urban Studies

For implementing the ‘guiding opinions of the CPC Central Committee and the State Council on deepening the reform of urban law enforcement system and improving urban management work’ (December 24th, 2015), and carrying out the ‘national new urbanization plan’ (2014-2020), Chinese Society for Urban Studies (CSUS) engages in researching city science and technology frontier for fundamental breakthrough, mastering the core technology of the smart city industrial development, strengthening the application model of innovation and integration innovation, expanding the application of information technology, supporting a new generation of smart urban industrial development, and etc. . On the basis of previous work, and focus on the theme of big data international standards, urban simulation, grid management, international cooperation, and etc., NSCJL plan to collect alternative projects in the direction of the strategic direction and cutting-edge technology. In order to do a good job in the construction of the 2016 annual urban science and alternative project, and to carry out the work of CSUS better, this guidebook has been made.

## 1. Research Topics

### a. Strategic Orientation

#### 1.1 Overall Research Directions on Smart City Construction & Development of New-type Urbanization

The 18th National Congress of CPC indicates that new-type urbanization should be impelled by the aim of building the moderately prosperous society, and transforming economic growth pattern, also, constructing with intensive, smart, green, and low-carbon way. Currently, China has been encountered some bottlenecks in urbanization construction, therefore, the Chinese governments have made the policies that new-type urbanization construction should insist on these principles: people oriented, four modernizations synchronization, layout optimized, ecological civilization, and culture inheritance. Promoting new-type urbanization in a smart way is a significant method to arrange goods and materials, information and resources which used for constructing cities, and motivate new IT innovations. Also, it can realize sound development for economy, society and science in city, due to the reason that it complies with new concept and new trends of modern city development. In Mar. 2016, Chinese premier Li Keqiang put forward an instruction in the State of Nation Report that building smart city to improve residential environment, which means make them live more eased, convenient, and comfortable. Moreover, promoting city sound and sustainable development in a smart way requires the governments comply by the new-type urbanization policies to carry on research. Nowadays, a new round revolution --- scientific and technical revolution has been taken place in the world and new-type urbanization has been carried out in China, so smart city will be an efficient support for boosting technology innovation and economic structure optimizing. In conclusion, this research topics focus on the discussion of the relationship between new-type urbanization and smart city construction, and innovative ideas and corporative patterns could be adopted in the next 5 years.

#### 1.2 ‘One Belt One Road ’Strategic (B&R Strategic) Guiding the Research on Smart City Global Participation Construction Pattern

Coping with the immense global transformation and planning international and domestic situations as a whole, China’s Secretary-general Xi Jinping puts forward the significant policy B&R, and it is considerable for implementing the Chinese new round Opening-up policy and cooperating with the Silk Road Economic Belt countries. Currently, in-depth development of economic globalization, regional economic integration and trade & investment pattern transformation has put Asia and Europe in a critical moment for exploring their potential intra-area and arouse the vigor to cooperate with other countries. Therefore, B&R Strategy could be able to meet the needs for the countries which along the Silk Road to the large extent, and it could create an opportunity for these countries opening up to the world and obtain win-win relationship. Some Chinese companies that contributing their efforts in domestic smart city constructions own their practical experience and proprietary intellectual property rights, and they have been looking forward to participate in international scope, in terms of international standards, cooperation and research.

## 2 Research on advanced technology

#### 2.1 Studies on Smart community infrastructure data exchange and Sharing Construction Research (International Standard)

During the urbanization, especially currently the world is experiencing the rapid urbanization, full and accurate information about these community infrastructures is basic and important for processes of the city planning, construction and operation. However, related data is stored decentralized, and it is difficult for different domains and divisions to share and update data synchronously. To guarantee continuous services, scientific city planning should make a city more security, friendly and livable, it is necessary to study how to share related data. And this requires to developing a data sharing structure to achieve interoperability of the data in the systems of different departments, bureaus.

The standardization research on the technology like the CCKS (Combined Credit Key System) is our country’s independent intellectual property right in the field of information security and data system, and it focuses on the international standard including basic information security standards on smart city information resource sharing and opening. This project is an established project in ISO TC268 SC1.

Goal: Achieving data interoperability in the systems of different departments and bureaus.This Technical Report aims to facilitate:

- Building a common tangible mechanism to share data between related cities or community planners, managers, maintainers and service providers;

- Sharing real-world models and city data for simulation tools between interacting communities and cities;

- Sharing evidence-based knowledge between organizations (in charge of e.g. planning, energy, mobility, water, food) to scale up community innovation.

#### 2.2 Study on the establishment of the city simulation system to support the scientific system of the city policy decision

The modern cities are developing rapidly and the city management innovates which constantly along with the science (internet, big data, cloud computing, IT information and so on) changing from day to day. By the end of 2015, the CPC Central Committee and the State Council issued the document No. 37, proposed to ‘build the city simulation system’. The application of the city simulation will not only promote the integration of the big data of the city, but also explore the city development law in economics, politics, culture, and environment etc., and will be able to achieve the aim to predict the city accidents at last. With the visualization (animation, large screen projection, dome projection, and 3D holographic projection etc.), all the simulated results will be showed to anyone who can easily and directly perceived through their senses, and will help the city to carry out scientific construction, management and operation. Smart City Joint Laboratory will cooperate with the relevant research institutes at home and abroad, for establishing an integrated all-in-one command center, which will include the simulation, experience and emergency response, to achieve **“the integration of multi standards"** and promote all-round smart development of the city. Based on the previous basic work, we will decide to start the simulation research on focusing the following contents, including but not limited to:

1) Simulation of the city environment (including heat island, wind environment, water environment, water resources, large-scale city simulation of pollutant diffusion etc.)

2) Traffic simulation of the city

3) Simulation of city safety water supply and energy supply flexibility

4) Simulation of the city street lighting system

#### 2.3 Effect evaluation of public information service based on Grid Management in smart city (community)

Urban grid management using digital technology, information methods, and effectively integrate urban public service resources，then the grid management are able to serve the needs of the masses personally and diversely. Strengthening synergy and linkage within different management levels, such as cities, districts, streets, and communities, is a method to solve the problems that each single department cannot solve.

Evaluation of the effect of public service on smart city (community)，is an effective way to enhance the efficiency of urban management services. On the basis of previous research results and future priorities, the joint lab decided to carry out relevant research cooperation, including but not limited to:

1) Research on smart city (community) grid management mechanism;

2) Research on collaborative management mechanism of information sharing urban grid research;

3) Research and Design on urban grid management system; (Based on grid management of the city / community Public Information Platform);

4) Smart City (community) Grid Management Evaluation Index System;

5) Grid Management and Urban Governance Innovation Case Study;

6) Research on Evaluation System of grid management.

#### 2.4 Smart, Ecology and Sponge city design & engineering with international cooperation investment pattern

Mainly, we focus on the strategy of China and opening up to global strategy in terms of international organizations, financial institutions, national strategy, enterprises' wisdom, ecological development and sponge city etc.

The key point is research on the design, engineering and construction pattern of corporations in Smarter City project which built overseas, such as China-EU Smart City cooperation, World Bank invested Chinese Smart City projects, China-German Ecological City project, China-Finland Ecological City project, etc. As well as the projects located in China which invested by overseas, like Mitsui and Panasonic invested Smarter City projects in China.

This Guidebook is used for helping local governments understand new tendency, new concept and new pattern of design and engineering of overseas smart, ecology and sponge city, and also provide the strategy and international layout references for Chinese enterprises.

#### 2.5 Studies on the Influence and Growth Prediction of ICT and Other Emerging Modern Technologies Applied for Urbanization

Currently, new technologies such as IoT, cloud computing, big data, etc., have been playing an increasingly significant role in urbanization. For instance, big data is crucial in government function transformation for saving manpower and time, then these civil servants are able to focus on serving the public, therefore it is efficient.

Such new technologies applying in smart city construction will give rise to a new city transformation, specifically, efficient urban management, convenient living condition, and optimized industry transformation. However, some negative impacts will also emerging, such as ecological environment deterioration, employment structure disequilibrium, no-guarantee information assurance, etc.

Fast updated technologies is a double-edged sword in urbanization construction, so, making prediction models is necessary for avoiding adverse impacts they could emerge in smart city construction.

#### 2.6 Urban Sustainable, Energy-saving Technologies and Case Study

Energy-saving and emission-reduction is important strategic choices of the human response to global warming. In July 2010, the International Energy Agency released a report that China has become the world's largest carbon footprint and energy consuming country. At the same time, China is in a critical period of building a moderately prosperous society and an important stage of rapid development of urbanization, so the energy demand will continue to grow. Respond to climate change actively is a major strategy for economic and social development, but also a major opportunity to accelerate the economic development pattern and economic restructuring.

In China, the transportation, construction and industrial manufacturing are the three main energy consumptions. New energy vehicles, retrofitting of existing buildings, Industrial 4.0 and other development application only conforms to the national energy conservation strategy, but also to protect the environment and improve the development of sustainable urbanization.

CSUS Smart City Joint Lab is committed to environmental management and energy-saving technology research, and domestic and foreign universities, research institutions and enterprises to explore the city and regional low-carbon economy and sustainable development. Combined with previous research results and future priorities, we decided to carry out cooperation in related subjects. Including but not limited to:

1) The research of regional and urban low-carbon economy development mode;

2) The research of urban energy planning studies;

3) The research of energy conservation measurement technology;

4) The research new energy technology;

5) The analysis of European energy saving technology and case studies;

6) Study on key technology and evaluation system of urban renewable energy smart grid

## 2. Application Requirements

### a. Research Periods

2 years for strategic field research;

3 years for cutting-edge technology research (in principle)

### b. Founding Source

Chinese national projects funds, joint lab self-financing, and enterprise sponsoring.

### 3. Consulting

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