建筑节能标准展望

Energy Efficiency Design Standards for Buildings

--- 可持续城市能源发展国际市长论坛

中国建筑业协会建筑节能专业委员会

China Building Energy Efficiency Association

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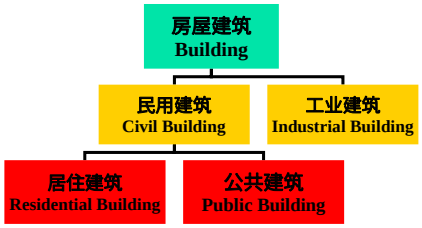
介绍要点 Outline

- 背景 Background
- 建筑节能设计标准
  Energy Efficiency Design Standards for Buildings
- 实施节能标准是实现可持续发展的重要环节
  Implementation is a Critical Link to Achieving Sustainable Development
- 小结 Conclusion

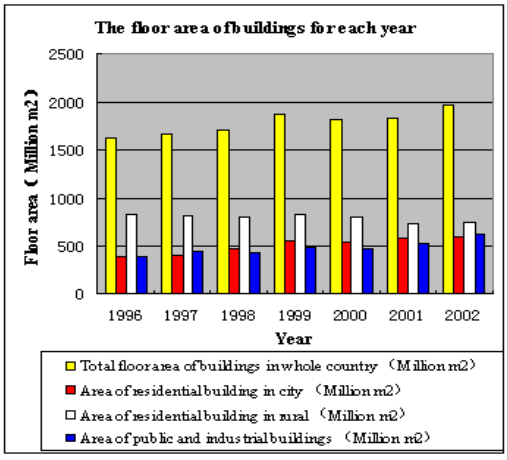
背 景
Background

每年建成大量建筑
Significant Annual Construction

房屋建筑分类 Building Sectors

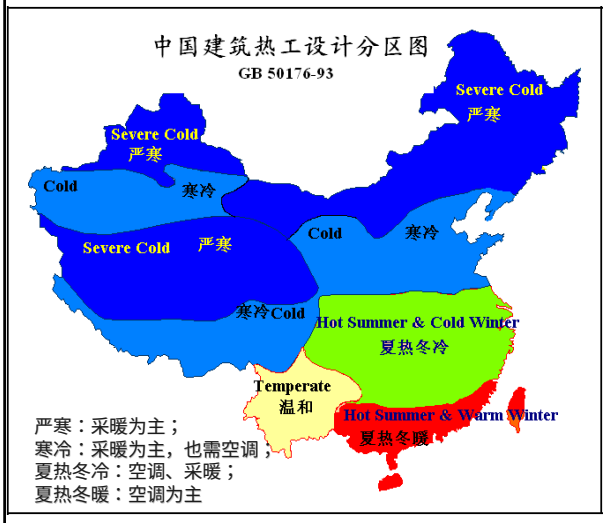


- 每年全国新建房屋建筑16-19亿m^2
  其中：
  - 城市住宅 5-6 亿m^2
  - 公共建筑和工业建筑 4-5 亿m^2
  - 农村住宅 7-8 亿m^2



- 1.6 - 1.9 billion m^2 of new buildings in China annually
- Of which:
  - 500-600 million m^2 residential buildings (urban)
  - 400-500 million m^2 public and industrial
  - 700-800 million m^2 residential buildings (rural)

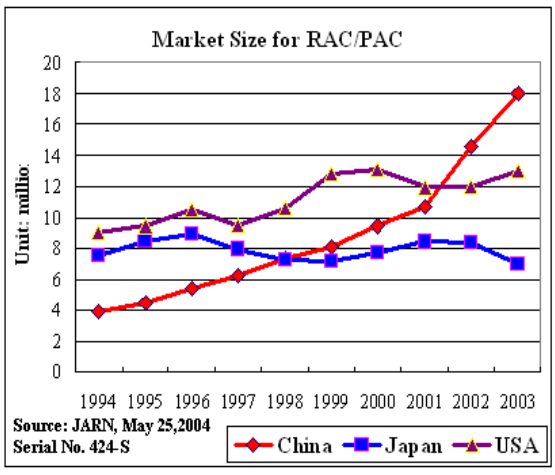
气候和对采暖空调的需求
Climate Zones & Their Heating, A/C Demands



- **严寒地区：采暖为主**
- **寒冷地区：采暖与空调**
- **夏热冬冷地区：空调与采暖**
- **夏热冬暖地区：空调为主**
- **温和地区：部分采暖或采暖空调**

- **Severe Cold: Heating**
- **Cold: Heating & A/C**
- **HSCW : A/C & Heating**
- **HSWW zone: A/C**
- **Temperate: Some heating or both**

空调、采暖设备需求量激增
Rapid Demand for A/C & Heating



中国已成为世界空调第一生产大国

China is the No. 1 air conditioner manufacturer in the world

根据日本空调、采暖和制冷新闻(JARN)预测，全世界2004年“房间空调器(RAC)”/“单元式空调机(PAC)”需求量为5600万台，中国(2200万台)占36%

According to JARN, room AC (RAC)/ “packaged” AC (PAC) will total 56 million sets in 2004, 20 million from China (36%)

建筑能耗
Energy Use in Buildings

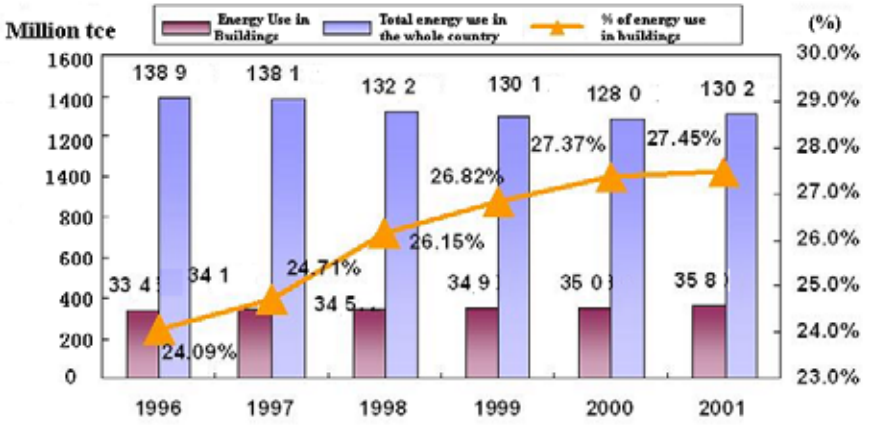
- 建筑能耗包括消耗在建筑中的采暖、空调、降温、电气、照明、炊事、热水供应等所消耗的能源
- 2001年城乡采暖、空调能耗占全国总能耗的55%
- 建筑节能对象：采暖与空调的节能

说明：关于照明节能。我国已颁布了“建筑照明设计标准” GB 50034-2004

- Energy consumption includes: A/C , heating, lighting, appliance, cooking and domestic hot water.
- In 2001, heating and A/C comprised 55% of China’s energy use.
- Goal of energy efficiency design standards: A/C and Heating energy efficiency.

National Lighting Design Standard for Buildings has been issued.

建筑能耗呈上升趋势
Rapid Increase in Buildings Energy Use



建筑能耗的总量逐年上升，在我国能源总消费量中所占的比例已从1978 年的10%，上升到2001年的27.45%。

Buildings energy use made up 27.45% of China’s total commercial use in 2001

建筑节能设计标准

Energy Efficiency Design Standards for Buildings

建筑节能设计标准

Energy Efficiency Design Standards for Buildings

- 居住建筑节能设计标准
  - 严寒、寒冷地区：JGJ 26-95，96年7月1日施行
  - 夏热冬冷地区：JGJ 134-2001，2001年10月1日施行
  - 夏热冬暖地区：JGJ 75-2003，2003年10月1日施行
- 公共建筑节能设计标准
  - 计划2004年年底完成
- 从两方面控制能耗
  - 围护结构：保温、隔热、气密
  - 暖通空调、照明：从设备、系统节能

- Residential Building Standards
  - Severe cold & cold zones: JGJ 26-95, implemented July 1, 1996
  - Hot summer & cold winter zone: JGJ 134-2001, implemented Oct. 1, 2001
  - Hot summer & warm winter: JGJ 75-2003, implemented Oct. 1, 2003
- Public Building Standard
  - To be completed by the end of 2004
- Two ways to control energy consumption
  - Envelope: insulation, isolation, airtightness performance
  - HVAC and Lighting: Energy efficiency ratio of equipment and system

建筑节能设计标准
Energy Efficiency Design Standards for Buildings

JGJ 26-95: Implemented July 1, 1996.

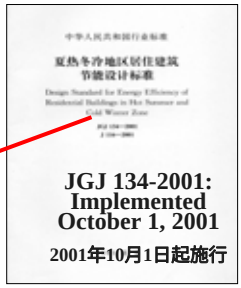
1996年7月1日起施行

公共建筑节能设计标准 – 2004年完成

Energy efficiency design standard for public buildings – end of 2004

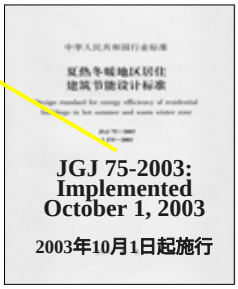
JGJ 134，JGJ 75和公共建筑节能设计标准的编制还得到美国LBNL技术帮助，EF的资助

Technical support provided by LBNL and NRDC



JGJ 134-2001: Implemented October 1, 2001

2001年10月1日起施行

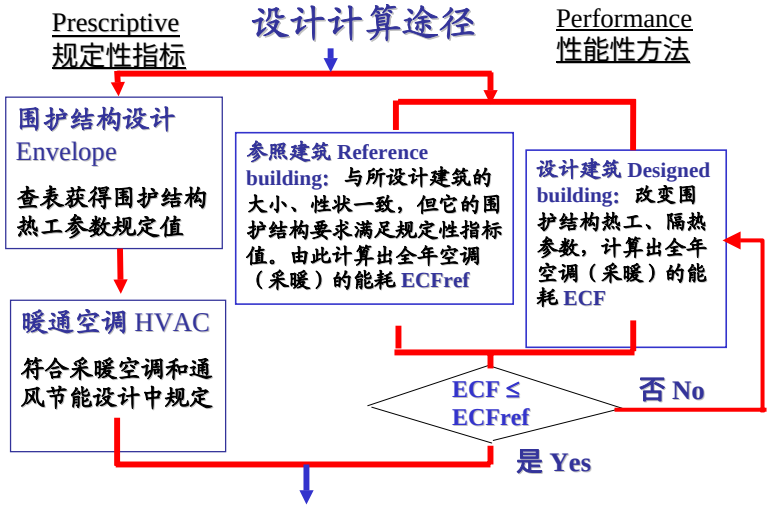


JGJ 75-2003: Implemented October 1, 2003

2003年10月1日起施行

两种设计途径，方便应用
Compliance Paths

规定性指标操作容易、简便；性能性方法则给设计者更多、更灵活的余地



实施标准是实现可持续发展的重要环节

Implementation is a Critical Link to Achieving Sustainable Development

能源增长只能翻一番

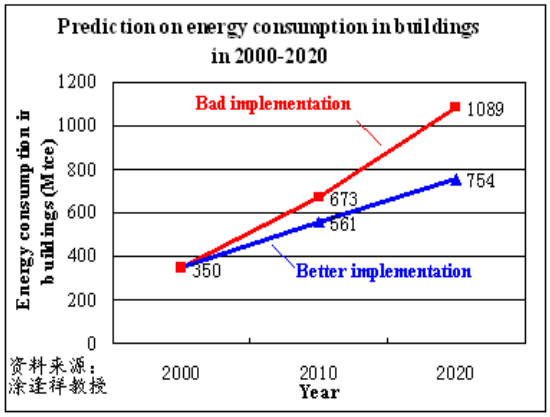
Double Energy Use in 2020

- 我国2020年的宏伟目标是全面建设小康社会。可持续发展是应对各种面临挑战的长远战略，能源是中国经济和社会发展的动力，是中国社会经济发展目标能否实现的具体保证
- 政府制提出到2020年GDP要在2000年的基础上再翻两番，并制定了“能源开发与节约并重，近期将节能放在优先”的战略，使能源消费增长翻一番，保证了国民经济翻两番目标的实现
- 要实现我国2020年的宏伟目标，要确保GDP在2000年的基础上再翻两番，建筑能耗增长必须要控制在翻一番的水平上

- **To achieve the 2020 development goals and ensure GDP is quadrupled from 2000, energy consumption in the buildings sector must only double.**

2000至2020年建筑能耗预测

Energy Use Forecast, 2000-2020



国家领导多次对建筑节能工作批示

- 由于建筑节能法规、管理体制不够完善，经济激励政策力度不够，目前执行节能标准比例不高
- 如果严格执行标准，2020年建筑能耗增加一倍，不然将增加二倍，制约经济发展

- Few new residential buildings comply because the laws, codes, and administrative system are insufficient. Economic incentives are lacking.
- With strong implementation energy consumption will only double in 2020. Weak implementation will lead to a quadrupling and impede economic development.

小 结 Conclusion

- 我国每年在城镇新建8-9亿m^2住宅建筑和公共建筑
- 随着经济发展、人民生活水平提高，空调、采暖需求增长快，建筑能耗将持续上升
- 我国已经颁布、实施北方、中部、南方地区居住建筑节能设计标准，并即将颁布公共建筑节能设计标准
- 是否执行好节能设计标准是实现我国可持续发展的重要环节

- The buildings industry has undergone rapid development, with 800 ~ 900 million m^2 floor area for residential and public buildings being built annually.
- With economic development and improvements in living standards, energy use in buildings has dramatically increased.
- Energy efficiency design standards for residential buildings have been implemented. The energy efficiency design standard for public buildings should be issued and put into effect in 2005 .
- Implementation is a critical link to achieving sustainable development.

上海市建筑节能情况介绍

Overview of Building Energy Efficiency in Shanghai

上海市建筑节能办公室 王宝海

二〇〇四年八月

Wang Baohai, Shanghai Building Energy Efficiency Office

August 2004

- 随着城市现代化的发展和人民生活水平的日益提高，降低建筑物使用能耗，提高能源利用效率，提高居住舒适性，推进建筑节能工作越来越被政府和社会各界所重视。
- 2001年10月，国家建设部颁发了我国《夏热冬冷地区居住建筑节能设计标准》，上海属于这一地区范围。在市政府、市建委的领导下，在市住宅管理部门的支持下，在各有关部门的配合支持下，上海的建筑节能工作经过两年多的努力，正在稳步推进，有序发展，并取得了一定的成效。

- As China has undergone rapid development, the government has turned its attention to reducing building energy consumption, increasing energy efficiency, improving comfort level in the home, and promoting building energy efficiency.
- In October 2001, the Ministry of Construction issued the “Residential Building Energy Code for Hot-Summer, Cold-Winter Zone,” which includes Shanghai.
- Under the leadership of the Shanghai Municipal Government and Construction Commission and several related administrative departments, building energy efficiency work in Shanghai has made steady progress over the past two years.

下面从三个方面介绍有关情况：

一、上海近年来贯彻国家节能标准，推进建筑节能的工作情况；

二、适合上海特点的住宅建筑围护结构技术体系和相关工程介绍；

三、下一步加快推进建筑节能工作的主要目标和措施。

Main Points:

I. Recent Efforts in Implementing National Building Energy Codes and Promoting Building Energy Efficiency in Shanghai

II. Residential Building Envelope Technology Systems and Demonstration Projects

III. Main Targets and Measures for Accelerating Future Building Energy Efficiency Work

一、上海近年来贯彻国家节能标准，推进建筑节能的工作情况

I. Recent Efforts in Implementing National Energy Efficiency Standards and Promoting Building Energy Efficiency in Shanghai

1、不断完善建筑节能相关的标准规范

为使建筑节能工作稳步推进，本市依据国家标准、结合上海特点建立和制定了相关的地方标准和规范。

- 《上海市住宅建筑围护结构节能应用技术规程》；

该规程执行《夏热冬冷地区居住建筑节能设计标准》。对建筑围护结构节能技术进行细化，以指导上海市新建、扩建和改建的住宅建筑围护结构节能设计、施工和验收。

1. Improved Codes for Building Energy Efficiency

To improve building energy efficiency, Shanghai has formulated local codes in line with national codes.

- ***Shanghai Municipal Energy Efficiency Application Technology Provisions for Residential Building Envelopes***

These provisions, in line with the "Hot-Summer Cold-Winter Zone Residential Building Energy Code," identify energy efficiency technologies for building envelopes and guide energy efficiency design, construction and approval of newly built, expanded, and renovated residential building envelopes in Shanghai.

- 《上海市住宅建筑节能检测评估标准》。

该评估标准对节能住宅单体、节能住宅小区和节能超过50%的住宅建筑的认定明确了评估标准、条件和方法。现已经市建委批准实施。

- 《上海市公共建筑节能设计标准》；

该标准于2004年1月正式施行，适用于上海市范围内的新建商场、旅馆、办公楼和由它们组成的综合楼项目。

- ***Shanghai Energy Efficiency Inspection and Evaluation Standard for Residential Buildings***

This standard specifies the evaluation standard and method for energy efficiency in individual residential buildings, building complexes, and residential buildings with a 50% and above energy efficiency.

It has been approved by the Shanghai Construction Commission and is under implementation.

- ***Shanghai Municipal Energy Code for Public Buildings***

This code went into effect January 2004 and is applicable to newly built shopping malls, hotels, office buildings and their corresponding building complexes.

2、逐步将建筑节能推进工作纳入依法管理的轨道

◆制定了上海市建筑节能工作推进“十五”目标；

由于历史的原因，上海的建筑节能工作较我国北方地区相对滞后（原来国家对长江以南地区居住建筑没有具体的节能要求）。另外近年来上海的建设量大面广，住宅建筑每年竣工近2000万m^2，其它建筑1000万m^2左右。因此上海的建筑节能推进思路是：既要达到节约能源，保护环境，改善居住建筑功能，提高居住建筑整体质量的目标，又要坚持因地制宜、分步实施、稳步推进原则，同时借鉴国内外先进技术和经验，不断提升上海市建筑节能的发展水平。

2. Promoting Building Energy Efficiency through Legal Channels

◆Formulated the 10th Five-Year Plan Goals to Promote Building Energy Efficiency in Shanghai

Reasons:

- Shanghai has lagged behind northern China in building energy efficiency.
- Construction boom in Shanghai:
  - 20 mil m^2 of residential buildings annually
  - 10 mil m^2 of non-residential annually
- Promoting building energy efficiency in Shanghai can:
  1. achieve energy efficiency and environmental protection goals,
  2. provide better residential building functionality and quality,
  3. encourage measures suitable to local conditions and consistent implementation.
- This will reference advanced international technologies and experiences, and boost the development of building energy efficiency in Shanghai.

推进目标是：

2002年落实100万m^2的新建住宅按国家节能标准进行工程试点。2003年，在原来试点工程的基础上，扩大试点范围，实现300万m^2新建住宅按节能标准设计和建设。同时，完成上海市的公共建筑节能设计标准的制定和试点工作。2004年，加大推进力度，对相关区域的住宅和建筑通过强化管理措施，执行国家和上海市建筑节能标准。到2005年底，争取新建住宅和公共建筑都要按节能标准设计和建设。

Objectives:

- Launched pilot in 2002 with the goal of building one million m^2 of new residential buildings
- Expanded in 2003 to 3 million m^2
- Municipal energy efficiency standards for public buildings were formulated and put into trial implementation.
- Greater efforts were made in 2004 to apply the national and Shanghai municipal building energy codes to residential complexes and buildings by strengthening regulatory measures.
- By the end of 2005, all new residential and public buildings designed and built to comply with the energy codes.

- 颁布了四个委局文件《关于进一步加快推进上海市建筑节能工作的若干意见》（市建委、经委、发改委和规划局联合颁发了2003年658号文）。
  - 明确了近期本市建筑节能的推进目标和范围；
  - 实施三个同步：工程项目扩初设计、施工图审查和工程验收备案阶段要严格把关，要求必须按节能标准设计建造。
- 正在会同有关部门进行《上海市建筑节能管理规定》立法工作。目前已进入立法程序。

- Issued document No.658, "Opinions on Accelerating Shanghai Municipal Building Energy Efficiency Promotion"
  - Defined near term targets and scope for building energy efficiency in Shanghai.
  - Three step synchronized implementation:
    1. new/expansion project design,
    2. design review, and
    3. project inspection.

    All three must comply with the code.
- Ongoing legislation for *Shanghai Municipal Building Energy Efficiency Administrative Regulations*.

3、做好宣传和培训工作，不断提高相关人员和市民的认识及参与的积极性

- 多次开展系列建筑节能宣传与培训；
- 编印《上海住宅建筑节能知识读本》，
  上海市建筑节能普及知识50问 ；
- 编印《上海住宅建筑节能技术与管理》；
- 全市范围开展征集"上海市节能建筑"标志活动。

3. Improved training for stakeholders, and increased public awareness

- Conducted several publicity and training activities on building energy efficiency
- Compiled and printed *Shanghai Residential Building Energy Efficiency Booklet* and *Fifty Questions on Shanghai Building Energy Efficiency*
- Compiled and printed *Shanghai Residential Building Energy Efficiency Technology and Regulations*
- Conducted a citywide campaign for the "Shanghai Municipal Energy Efficiency Building" logo

4、加大科研投入、落实试点工程

科研方面：

- 政府有关部门每年安排一定的科研资金给予支持，开展新型墙体材料多排孔砼砌块、加气砌块为基础墙的复合墙体应用技术；
- 其它各类住宅围护结构节能技术研究；
- 开发住宅建筑节能设计与评估分析软件。

4. Increased Funding for Scientific Research, Conducted Pilot Projects

Scientific research:

Responsible government departments set aside funds to support scientific research projects such as

- **Developing new wall material**
- **Energy efficient technology research on other types of residential building envelopes**
- **Developing the design and evaluation software for residential building energy efficiency**

试点工程方面：

- 先后在上海市“四高、四新”住宅小区、国家康居示范工程、以及新型墙材与建筑节能试点工程中进行了住宅建筑节能的工程试点。2002年107万m^2、2003年319万m^2、今年将超过600万m^2的新建住宅按节能标准设计和建造。起到了一定的示范效应。在实施上述试点工程中，政府有关部门给予必要的政策支持，包括技术攻关检测费的资助。

Pilot projects:

- **In the “four high, four new ” residential building complex, national eco-building demonstration projects, and new wall materials and building demonstration projects in Shanghai.**
- **Total residential area designed and built in compliance**
  - **1.07 million square meters in 2002**
  - **3.19 million square meters in 2003**
  - **over 6 million square meters this year**
- **Responsible government departments are funding technology research and testing.**

5、培育中介服务机构，探索市场化运作方式

- 筹建了上海市节能住宅建筑认定和检测评估事务所。
- 建立了建筑节能技术检测中心。
- 努力探索合同能管理模式，按照市场化运作方式推进建筑节能工作。

5. Fostering Intermediary Service Organizations and Exploring Market-Oriented Modes of Operation

- Established the Shanghai Residential Building Energy Efficiency Certification and Testing Evaluation Office.
- Established the Building Energy Efficiency Technology Testing Center.
- Exploring contractual management modes and using market-driven measures to promote building energy efficiency.

6、加强国际合作，加快建筑节能推进步伐

- 与法国、德国等有关部门和机构建立合作关系，中法合作项目、碧林湾苑节能65%，示范小区已正式启动 。目前正在落实中德合作项目；
- 得到美国能源基金会的支持，编制公共建筑设计标准，开发公共建筑节能分析评估软件等；
- 在建设部的支持下上海作为建筑节能试点城市将进一步开展国际合作。

6. Strengthening International Cooperation, and Accelerating Building Energy Efficiency Promotion

- Cooperated with international organizations.
- The Sino-French cooperative (Bi Li Wan Yuan) project: 65% energy savings.
- The Sino-German cooperative project: under implementation.
- With Energy Foundation support, compiled public building design standards and developed the analysis and evaluation software on public building energy efficiency.
- As a building energy efficiency pilot city, Shanghai will further expand international cooperation with the support of the Ministry of Construction.

通过上述工作，在上海市政府、市建委的领导下，在上海市住宅管理部门支持下，在社会各界配合下，近2年多来，上海已有800多万平方米住宅按照《夏热冬冷地区居住建筑设计标准》设计和建造，并取得了较好的成效。经检测平均节能效率达到50%左右，住宅的质量得到提高，居住的舒适性明显改善，用户反映满意。

但与建设国际大都市的地位要求相比，与加快建设小康社会的要求相比，上海市的建筑节能工作仍然任重道远。

Through abovementioned activities, over 8 million square meters of residential buildings have been designed and built in the last two years in compliance with the *HSCW Residential Building Energy Code* with notable results.

- **Energy use cut by 50%**
- **Improved quality of residences**
- **Higher comfort level, residents happier**

Yet, compared with major international cities and the demands of a well-off society, Shanghai still has a long way to go in its building energy efficiency work.

存在的差距：

- 推进的进度不快，占全市建筑总量比例不高；
- 住宅围护结构节能研究较多，用能设备系统研究较少；
- 设计和开发商及有关方面的积极性还有待于不断提高；
- 管理和推进的力度还需不断加强。

Existing gaps:

- **Slow rate of expansion and low compliance;**
- **Insufficient research on energy consumption equipment systems;**
- **Stakeholders, such as designers and developers, are not very receptive;**
- **Regulations need stronger implementation.**

二、适合上海特点的住宅建筑围护结构技术体系和相关工程介绍

II. Residential Building Envelope Technology Systems and Demonstration Projects

经过上海市科研、设计、施工、房产开发以及管理部门等共同努力，在实践的基础上，不断探索了住宅建筑围护结构节能技术体系。目前，主要有以下体系：

1、外墙外保温体系
2、外墙内保温体系
3、外墙自保温体系
4、一次浇捣外保温体系。
5、围护结构其它部位的保温隔热措施
6、相关工程介绍

We have been exploring energy efficiency technology systems for residential building envelopes . At present, these are the main systems available:

1. Exterior Wall Outer Insulation System
2. Exterior Wall Inner Insulation System
3. Exterior Wall Self-Insulation System
4. One Time Casting and Pounding External Heat Insulation System
5. Heat Insulation and Preservation Measures for Other Parts of the Envelopes
6. Demonstration Projects

上海春城

Shanghai Chuncheng

膨胀聚苯板薄抹灰外保温系统

Expanded Polyphenylene Plaster Board Outer Heat Insulation System

“曲阳豪庭”砂加气外墙自保温系统

“Qu Yang Hao Ting” Sand Aerated External Wall Self-Insulation System

中新公寓

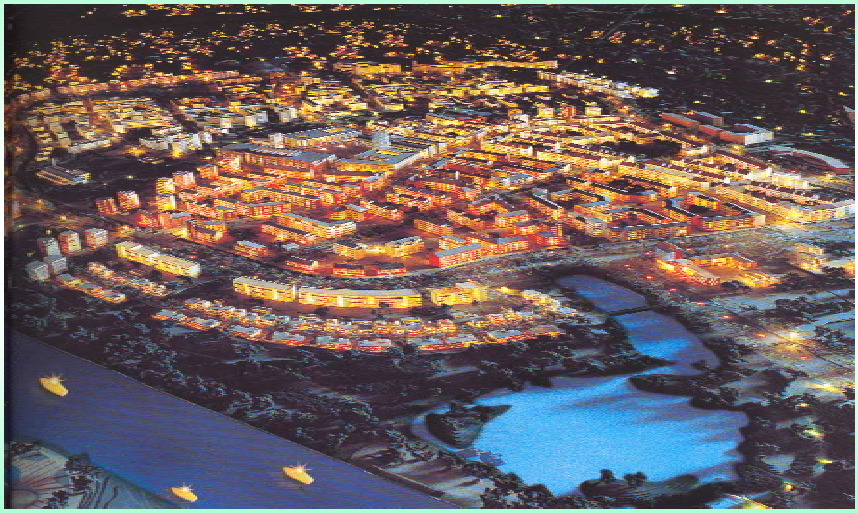
Zhongxin Apartment Building

一次浇捣外保温系统

One Time Casting and Pounding External Heat Insulation System

◆安亭新镇

An Ting New Town



“碧林湾苑”建筑节能实践

“Bi Lin Wan Yuan” Building Energy Efficiency Demonstration

碧林湾苑位于闵行区，占地14.5万平方米，规划住宅面积22万平方米，是中法合作项目。

Covering 145,000 square meters of land with planned residential building space totaling 220,000 square meters, Bi Lin Wan Yuan, the Sino-French Cooperative Project, is located in Minhang District, Shanghai.

三、下一步加快推进建筑节能工作的主要目标和措施

III. Main Objectives and Measures for Accelerating Future Building Energy Efficiency

2004~2005年本市建筑节能推进目标：

◆今年的目标：
▪内环线以内的住宅建设项目；
▪申报“国家康居示范工程”和“市新型墙体材料与节能住宅示范工程”的住宅建设项目；
▪低层住宅小区和一城九镇特色风貌住宅小区的建设项目;
▪上海市范围内的政府投资的办公用房、商场、旅馆和由它们组成的综合楼建设项目。

均按照（居住或公共建筑）节能设计标准设计和建造。

•2005年的目标：
明年起初步确定所有新建的住宅和政府投资的公共建筑将全部按节能标准设计建造，探索既有建筑的改造。

Shanghai Municipal Building Energy Efficiency Promotion Targets 2004~2005:

- This year's targets:
  - Residential building projects within the inner ring;
  - Residential building projects that applied for "National Eco-Building Demonstration Project" and "Shanghai Municipal New Wall Material and Energy Efficiency Demonstration Project";
  - Low-rise residential complexes and one-city nine-town residential building complexes with unique architectural styles;
  - Shanghai government-funded office building, shopping mall, and hotel projects.

  All the projects should comply with the energy efficiency codes for (residential and public buildings).

- Goals for 2005:
  All new residential buildings and government-funded public buildings will be designed and built in compliance with energy efficiency standards and efforts will be made to renovate existing buildings starting next year.

推进的措施

1、进一步加大宣传和培训力度，不断提高相关人员和市民认识和参与积极性。

- 开展系列宣传活动；
- 组织示范工程观摩交流会；
- 适时召开全市性的全面推进建筑节能工作的动员大会；

Promotion Measures

1. Bolster training efforts, and strengthen public awareness;
   - Conduct workshops and publicity events;
   - Organize site visits to the demonstration projects;
   - Convene city-wide meetings to promote building energy efficiency.

2、在加快行政立法的同时，认真贯彻好建设部2004年87号文件和市三委一局2003年658号文件，努力按时间节点、区域范围、节能指标落实建筑节能推进目标。

将目标分解到区(县)落实责任制：

- 加大监管力度，推进三个同步（扩初设计、施工图审查和工程验收备案)；
- 探索将建筑节能项目纳入建设程序，形成长效管理机制。

2. Carry out the mandates in the Document No.658 and No.87 and strive to meet building energy efficiency targets within the time period and area limit.

The targets will be assigned to districts (counties):

- Strengthen regulation and supervision, and promote three step synchronized implementation (project design, design review, and project evaluation);
- Explore ways to incorporate code compliance into construction approval procedures and form an effective management mechanism.

3、加快技术进步，开展国际合作，不断提高上海市建筑节能应用技术水平

- 科技创新，完成上海市住宅建筑节能技术集成，逐步解决和克服应用中的技术难点，包括燃气空调和太阳能在住宅建筑中的应用等；
- 年内完成上海市住宅建筑节能技术施工规程、验收标准的制定和颁布工作；
- 开展国际合作与交流、加强与美国、法国和德国合作项目，以示范工程引路，不断提高上海市建筑节能的利用水平；
- 开展公共建筑节能试点示范项目建设，完成公共建筑节能设计分析软件。

3. Accelerate technological progress, expand international cooperation, and continually raise the applied technological level of building energy efficiency

- Promote energy-efficient technologies such as gas air-conditioning and solar energy in residential buildings;
- Formulate and issue the *Shanghai Municipal Residential Building Energy Efficiency Technical Construction Procedures and Approval Standards* within the year;
- Strengthen cooperation with the US, France and Germany to showcase and guide project development, and raise building energy efficiency in Shanghai;
- Construct public building energy efficiency demonstration projects, and complete the analysis and evaluation software for public building energy efficiency.

4、开展调查研究，探索市场化推进机制

- 节能产品和技术在认定和推荐过程中实施社会保险机制；
- 推行社会化认定、评估管理和建筑节能技术服务；
- 开展节能住宅能效标识工作，提高节能住宅市场竞争能力。

4. Conduct research and investigations, and explore the market mechanisms

- Institute an insurance system for certified and recommended energy-efficient products and technologies;
- Promote market driven certification/evaluation management and technical services for building energy efficiency;
- Certify energy efficient residential buildings, raise the competitiveness of the energy-efficient residential building market.

5、加强多方面合作，形成管理合力，共同推进建筑节能工作。

- 管理合力，健全管理网络；
- 加强监督和检查，努力形成制度化；
- 制定激励措施，调动各方积极性，共同参与推进全市建筑节能工作。

5. Promote cooperation among different sectors

- Pool management efforts and perfect the management network;
- Strengthen supervision and inspection, and strive to achieve institutionalization;
- Formulate incentive measures or policies.

总之，通过上述措施，进一步加快推进上海市的建筑节能工作，逐步实现全面推进的目标，为上海城市现代化建设和可持续发展作出贡献。

In conclusion, through the abovementioned measures, efforts will be made to further accelerate building energy efficiency work in Shanghai, gradually reaching promotion targets, and contributing to the sustainable development of Shanghai.

谢谢！

Thanks!

SUSTAINABLE CITIES

- *SUSTAINABLE CONSTRUCTION*

可持续发展的城市 - 可持续发展的建筑

Kaarin Taipale, Architect ETH-Z, CU
高级顾问, ICLEI – 地方政府的可持续发展
城市能源可持续发展, 2004 年 11 月 11-12 日
国际城市市长论坛, 云南昆明

International Mayors' Forum – Kunming, Yunnan
Sustainable Urban Energy Development, 11-12 Nov, 2004
Kaarin Taipale, Architect ETH-Z, CU
Senior Adviser, ICLEI – Local Governments for Sustainability

- *Building cities is a long-term process.*
- *In the process, building control will always be the last step.*
- *If you want to make a change, political intervention early in the process has the greatest impact!*

- *城市建设是一个长期过程。*
- *在此过程中，建设的控制总是最后一步。*
- *要达到理想的结果，早期的政治干预最为有效！*

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- *Long-term regional and urban planning is the key. Individual buildings don't solve anything.*
- *No single trick or material is going to make a building sustainable!*

- *区域与城市的长期规划是关键。个别建筑不会解决任何问题。*
- *单纯某种技巧或材料不会产生可持续发展的建筑！*

- *The whole life-cycle of a building is what matters.*
- *In Finland, about 30% of all energy consumption is used in buildings for heating, cooling, light and electric appliances.*

- *建筑的整个寿命期是关键。*
- *在芬兰，大约全部能源消耗的 30% 用于建筑中的供热、制冷、照明和电器。*

CONTENTS
目录

- LOCAL AND GLOBAL
- APARTMENTS, OR URBAN HOMES?
- POLICY TO INITIATE A CHANGE
- PROCESS TO IMPLEMENT THE POLICY
- TOOLS FOR IMPLEMENTATION
- 地方与全球
- 公寓，或所有城市住宅？
- 引起变革的政策
- 执行政策的过程
- 执行手段

LOCAL AND GLOBAL
地方与全球

global... worldwide... international... transnational ...multi-lateral...The United Nations...HP...the World Bank... ICLEI...Kyoto/CDM...UNEP Governing Council...

.....regional organisations of states... ...defence alliances... unions of independent nations...The European Union...The African Union... G77 and China

.....federal... national... state-level... nation-state...the United States... Australia...Switzerland...senate... house of representatives...

.....provinces... cantons...Länder...California... New South Wales... Gauteng... Zürich...Berlin

.....metropolitan areas... cities... towns... municipalities... villages...São Paulo... New York... Jabalpur... Zürich Village...city councils...

..... urban and rural areas, city districts, communities, ... grassroots...Quartier Latin... SoWeTo...ward councils


NOT ONLY APARTMENTS...
不仅仅是公寓


... BUT HOMES IN A CITY WITH A FUTURE!
... 也包括未来城市中的住宅！

SUSTAINABLE URBAN ENERGY?

可持续的城市能源供应？

SUPPLY SIDE:

HOW IS ENERGY PRODUCED?

"ENERGY MIX?"

供应方：能源如何产生？

"各种能源组合？"

DEMAND SIDE:

HOW MUCH ENERGY IS NEEDED?

"ENERGY SAVING"

需求方：需要多少能源？

"节能"

POLICIES TO INITIATE A CHANGE

引起变革的政策

- GLOBAL AGREEMENTS, CDM
- INVESTMENT INTO R&D
- NATIONAL LEGISLATION
- LOCAL GUIDELINES
- REAL ESTATE ／LAND POLICIES
- HOUSING POLICIES
- POLICIES FOR PLANNING OF LAND USE, MOBILITY, SERVICES
- URBAN INFRASTRUCTURE INVESTMENT POLICIES
- BUILDING CONTROL POLICIES
- 全球协议，清洁发展机制
- 向研发投资
- 国家立法
- 地方指导方针
- 房地产业／土地使用政策
- 住房政策
- 土地使用、交通出行、服务设施规划的政策
- 城市基础设施投资政策
- 建设控制政策

HOW DO POLICIES GET IMPLEMENTED?

如何使政策得以执行？

- NATIONAL LEGISLATION: enforcement and sanctions
- LOCAL GUIDELINES: local conditions, information
- REAL ESTATE POLICIES: strategic application
- LAND USE PLANNING: key to energy strategies
- URBAN INFRASTRUCTURE: energy, transport
- BUILDING PERMITS AND SUPERVISION: capacity

- 国家立法：执行与制裁
- 地方指导方针：当地条件与信息
- 房地产政策：战略应用
- 土地使用规划：能源战略的关键
- 城市基础设施：能源，交通
- 建设的许可和监督机制：容量

SUPPLY SIDE
INFRASTUCTURE FOR
+ MOBILITY
+ LIGHTING
+ HEATING
+ COOLING

供应方
以下基础设施
+ 交通出行
+ 照明
+ 供热
+ 制冷


SUPPLY SIDE
INFRASTRUCTURE FOR AN ENERGY MIX WITH RENEWABLES
+ SOLAR
+ WIND
+ GEOTHERMAL
+ HYDRO
+ BIOMASS
供应方
可再生能源组合基础设施
+ 太阳能
+ 风能
+ 地热
+ 水能
+ 生物质能
RENEWABLES
- local, domestic
- no dependency on imports and foreign currency
- security
- employment creation
可再生能源
-地方的
-不依赖于进口和外汇
-安全
-创造就业
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SUPPLY SIDE
URBAN INFRASTRUCTURE FOR CENTRAL CO-GENERATION OF ELECTRICITY AND HEAT/COOL
供应方
集中发电、供热/制冷城市基础设施

DEMAND SIDE

ENERGY SAVING

+ THERMAL INSULATION OF THE BUILDING ENVELOPE

+ HEAT RECOVERY FROM EXHAUST AIR

需求方

节能

+ 建筑外层隔热

+ 从排出的空气中回收热量

FINNISH NATIONAL BUILDING CODE, EXAMPLE

芬兰国家建筑规范，示例

C Insulation

C1 Sound insulation and noise abatement in building
Regulations and guidelines

C2 Moisture
Regulations and guidelines

C3Thermal insulation in a building Regulations

C4 Thermal insulation Guidelines 2003

D Hepac and energy management

D1 Water supply and drainage installations for buildings
Regulations and guidelines

D2 Indoor climate and ventilation in buildings
Regulations and guidelines

D3 Energy management in buildings
Regulations and guidelines

D4 HEPAC drawings, Regulations

D5 Calculation of power and energy needs for heating of buildings, Guidelines

D7 Efficiency requirements for boilers, Regulations… …

C 隔绝

C1 建筑隔音与降噪
规章与指导方针

C2 湿度
规章与指导方针

C3 建筑隔热 规章

C4 隔热 2003 年指导方针

D 供热通风与空调和能源管理

D1 建筑给排水安装
规章与指导方针

D2 建筑室内气候与通风
规章与指导方针

D3 建筑内部能源管理
规章与指导方针

D4 HEPAC 制图 规章

D5 建筑供热所需电能与能源计算 规章

D7 锅炉能效要求 规章

PROCESS IN THE CITY OF HELSINKI

赫尔辛基市的程序

- LAND LEASE (CAN BE CONDITIONAL)
- ZONING PLAN (HAS REGULATIONS)
- APPLICATION FOR BUILDING PERMIT
  - ✓ BUILDING DESIGN ACCORDING TO ZONING
  - ✓ STRUCTURAL AND HEPAC DRAWINGS ACCORDING TO NATIONAL BUILDING CODE
  - ✓ PROOF OF THERMAL INSULATION SOLUTIONS INCLUDED
- 土地租用 (可以附加条件)
- 分区规划 (有相关法规)
- 申请建设许可证
  - ✓ 根据分区规划设计建筑
  - ✓ 根据国家建筑法规绘制结构图和 HEPAC 图
  - ✓ 包括隔热方案的审批

PROCESS IN THE CITY OF HELSINKI

赫尔辛基市的程序

- REVIEW PROCESS
- BUILDING PERMIT BY BUILDING BOARD
- INSPECTIONS ON CONSTRUCTION SITE
- 2-YR WARRANTY BOND PAID BY THE CONSTRUCTION COMPANY (2% of cost)
- 审核程序
- 建设委员会颁发建设许可证
- 建设现场检查
- 建筑公司交付 2 年保证金 (成本的 2%)

WHY DOES IT WORK IN HELSINKI?

为什么在赫尔辛基能够奏效？

- PROFESSIONAL QUALIFICATIONS REQUIRED FOR THE DESIGN TEAM
- PROFESSIONALLY QUALIFIED BUILDING INSPECTORS
- INSPECTION FEES COVER ALL COSTS OF THE PROCESS
- A TRANSPARENT PROCESS
- ROLE OF THE POLITICAL BUILDING BOARD IS STRICTLY LIMITED TO OVERSEEING THE LEGALITY OF THE PROCESS
- 设计队伍具有职业资格
- 具有职业资格的建筑检查员
- 检查费包括过程中的所有成本
- 过程透明
- 建设行政管理严格限制在过程合法性的监督上

TOOLS AT THE CITY LEVEL

城市一级可采取的方法

- DESIGN COMPETITIONS AND PILOT PROJECTS FOR THE CITY
- CITY BUILDING ORDINANCE (required by law)
- "EVALUATE THE SUSTAINABILITY OF YOUR PROJECT" CHECKLIST
- INFORMATION EVENTS FOR BUILDERS
- "PROJECT TEAM" APPROACH
- IF NOTHING ELSE WORKS:
  NO BUILDING PERMIT! COURT DECISION! FINE!
- 设计竞赛与示范项目
- 城市建筑条例 (法律强制措施)
- "评估项目可持续性"审核单
- 针对承建商的信息活动
- "项目队伍"方法
- 如果其他方法都无效：不颁发建设许可证！法院判决！　罚款！

NATIONAL LEVEL SUPPORT TOOLS

国家层次的支持方法

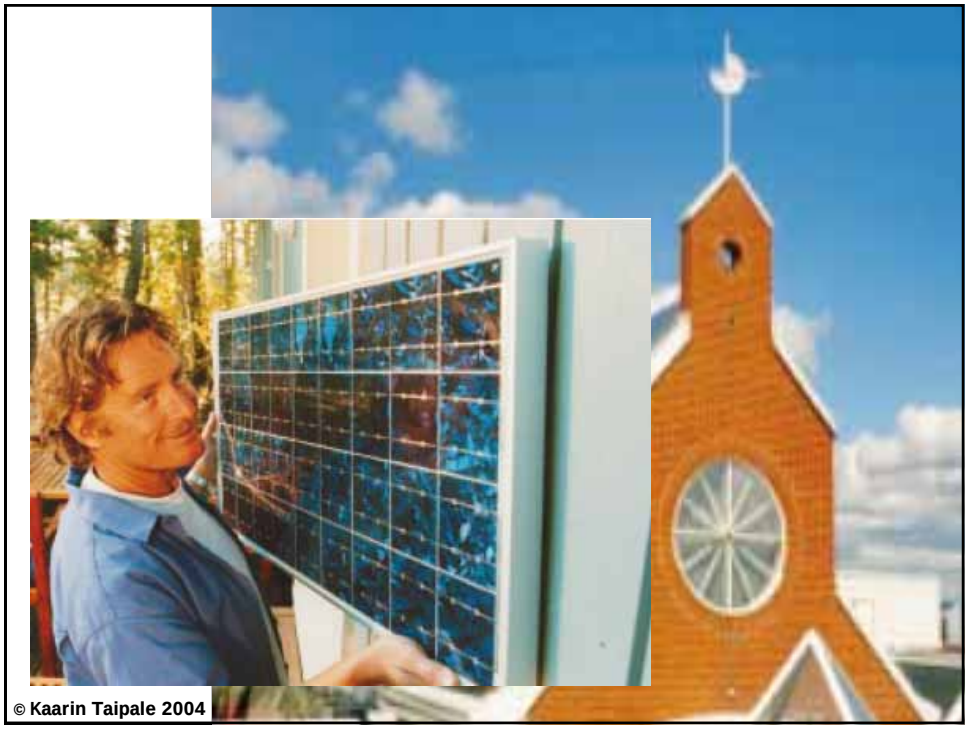
- DESIGN COMPETITIONS FOR NATIONAL BENCHMARK BUILDINGS
- BUILDING RESEARCH INSTITUTES (TEKES, VTT)
- INTERNATIONAL RESEARCH PROJECTS (EU)
- INFORMATION FOR BUILDERS (Foundation for Building Information)
- MOTIVA AGENCY www.motiva.fi

- 全国示范建筑设计大赛
- 建筑研究协会 (芬兰科学院 TEKES，芬兰技术研究中心 VTT)
- 国际研究项目 (欧盟)
- 提供给承建商的信息 (建设信息基金会)
- MOTIVA 机构 www.motiva.fi

TOOLS PROVIDED BY THE PRIVATE SECTOR

- A NEW MARKET FOR RENEWABLES! PRODUCT RESEARCH AND DESIGN, PILOT PROJECTS
- SOLAR ELECTRICITY WWW.NAPSSYSTEMS.FI
- BIOMASS FROM FORESTS

- 一个新的可再生能源市场；产品研发、设计、试点项目
- 太阳能发电: WWW.NAPSSYSTEMS.FI
- 生物质能：森林资源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BIOMASS OUT OF WOOD:
20% OF PRIMARY ENERGY CONSUMPTION IN FINLAND IN 2002
源于木材的生物质能利用占到芬兰2002年一次能源消费的20%。

GLOBAL LEVEL SUPPORT TOOLS

全球范围内的支持方法

- INTERNATIONAL RESEARCH INSTITUTES
- INTERGOVERNMENTAL CONFERENCES (Renewables2004 in Bonn)
- GLOBAL POLICY NETWORK
- UN PROCESSES (CSD-14,15)
- UN AGENCIES (UNEP a.o.)
- NETWORKS OF CITIES: ICLEI-Local Governments for Sustainability - www.iclei.org
- 国际研究机构
- 政府间会议 (波恩 2004 年可再生能源会议)
- 全球政策网络
- 联合国的推动 (联合国可持续发展委员会—14,15)
- 联合国机构 (联合国环境规划署)
- 城市网络：地方环境行动国际委员会 — 地方政府的可持续发展 www.iclei.org

Local Action Moves the World

地方行动将改变世界

www.iclei.org