

4 Building Sector Energy Efficiency

WHAT ARE THE MAIN ISSUES

Worldwide the energy consumption in the commercial and residential buildings amounts to close to 40 % and residential sector accounts for just over ¾ of this. Although parts of the energy consumption go towards use of appliances, cooking lighting and water heating more than 50 % goes towards space heating (and cooling). The high energy consumption in buildings is both an individual issue and a social issue in form of CO2 emissions which for the individual dwelling might not seem large, but within a city, a country or a province the aggregate will be substantial and becomes an important factor when local governments are to try to balance their CO2.



POSSIBLE SOLUTIONS

Building related energy consumption broadly speaking depends on two things, the building envelope and the buildings facilities/appliances. Curbing the overall energy usage of the building stock thus will depend on how well one can increase the energy efficient of these two factors. Increased/better insulation, energy efficient glazing, and the inclusion of natural light in the design all reduces the building envelope's energy consumption. Energy management system that enables scheduled control of lighting and dimming, reduction or termination of air-conditioning in unoccupied rooms are features which can reduce appliances energy use. Centralized heating and cooling systems and installation of renewable energy options such as photovoltaic (PV) panels and small scale wind turbine etc. can provide for both economy of scale and reduces the carbon footprint. The below outline three broad areas of solutions which has been shown to be beneficial:

- Certification of buildings that goes above and beyond national minimum standards and is aimed at obtaining a building stock consisting of passive or zero energy buildings.
- Retrofitting the older building stock to optimize its energy efficiency based on building energy audits. Programme like these will not only provide for reduced emissions but will also provide for an increase in employment opportunities for semi-skilled labors
- Capacity building and expansion of audits and enforcement of mandatory building energy codes, standards and rating system

UNDP PAST EXPERIENCE AND SUCCESSFUL CASES

UNDP has been involved in energy efficient buildings projects both in China such as Beijing as well as internationally in countries such as Armenia, Belarus, Kazakhstan and the Republic of Macedonia to name a few.

- **Armenia: Improving Energy Efficiency in Buildings**
The project aims to reduce consumption of electrical and thermal energy and associated greenhouse gas emissions in new, restored and primarily residential buildings in Armenia.
- **Belarus: Improving Energy Efficiency in Residential Buildings in the Republic of Belarus**

A roadmap that includes a list of technical regulatory acts subject to further development and adoption has been developed.



4 建筑行业能源高效利用

主要问题

世界范围内，商业和居住用途的建筑占据了能源消耗的40%。其中，居住建筑这一类别则占据了超过四分之三的消费量。尽管一些能耗是用来支持电器、厨房灯光和热水，超过50%的能耗却被用于空间的加热（和冷却）。由于二氧化碳的排放，建筑内的能源消耗不仅是个体面临的问题，也是一个社会性的问题——也许这对于个体的居住并不严重，但对于一个城市，乡镇或者省来说则是非常显著的。当政府试图平衡二氧化碳的排放时，这一点成为了一个重要的考虑方面。



可行措施

广义上讲，建筑的能源消耗主要依赖两个方面，围护结构和建筑的设施与电器用品。因此，对于整个建筑能源消耗的控制将依赖于这两方面效率的提升。更好的隔热材料，高效利用能源的玻璃窗以及设计中对自然光的考虑都会减少建筑的围护结构对能源的消耗。如果一个能源管理系统能够计划调控建筑内明暗、适时减少或停止未经使用房间的气温调节功能，它将会大幅减少能源的使用。中央控制的加热和冷却系统和可再生能源的安装，如光伏面板和小型风力发电机，不但可以提供规模经济，还可以为碳足迹的减少做出贡献。以下列举了三个主要领域的应用，它们已被证明是行之有效的：

- 对于那些超过国家最低标准的建筑、致力于实现少量甚至是零排放的建筑，提供相应的认证
- 在建筑能源使用审查的基础之上，为陈旧的建筑加装能够最大化能源使用效率的设施。此类项目将不仅为节能减排做出贡献，还会为半技术工人提供更多的就业机会
- 建设容纳能力，广泛推广强制实施的建筑能源使用规范、标准和评级系统

UNDP的过往经验和成功案例

在提高建筑能源使用效率方面，联合国开发计划署不仅在中国国内的城市，如北京，还在国际上的其他国家，如亚美尼亚，白俄罗斯，哈萨克斯坦和马其顿共和国等进行过类似的项目。举例如下：

• 亚美尼亚：提高建筑内的能源使用效率

项目致力于在新型的居住建筑内减少电能、热能的消耗以及相关的温室气体的排放。

• 白俄罗斯：提高白俄罗斯国内的建筑内能源使用效率

运用了一种特殊的路线图，包含着与进一步发展和推广相关的技术监管行为。

