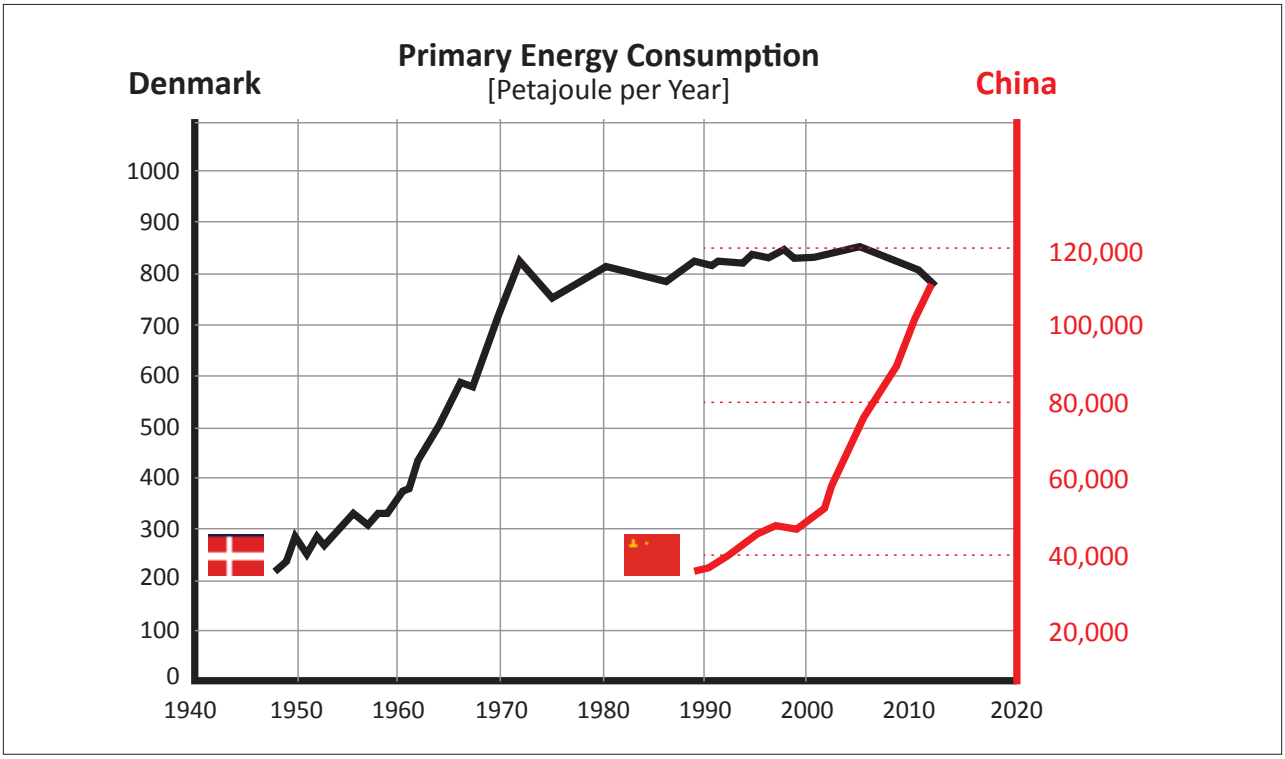
The Case Of Denmark:
50% ENERGY SAVINGS IN BUILDINGS

For a good example of green achievements in the building sector, look no further than to Denmark and its successful 40-year quest of continuously improving the energy efficiency standard in the building sector.

Like China, Denmark underwent a rapid exponential growth in energy consumption. In the case of Denmark, however, this came to an abrupt end in the 1970s when the oil crisis struck and oil prices tripled. This was a turning point for the nation, and Denmark embarked on a path of energy efficiency. The result is impressive, as Denmark's energy consumption has not increased for the past 40 years – even though both the population and the economy continued to increase during this period.

In Denmark about to 40% of the total energy consumption is consumed in by the building sector, which played an important role in achieving this remarkable feat of energy efficiency. In fact, the entire building stock (new and existing buildings) of Denmark has seen a reduced of its energy consumption by 50%. In other words, the energy consumption for heating per square meter of building space has dropped to half. This was achieved by an effective 'carrot and stick' approach by the Danish government. The carrot was financially attractive subsidy schemes for energy efficient retrofitting of existing buildings. The stick was introducing a mandatory energy efficiency building codes that were made stricter approximately every five years and announced ten years ahead. The stakeholders in the Danish building industry appreciate the early announcement of these mandatory requirements, as it allows them to plan ahead. To future-proof their buildings, some developers and homeowners even choose to build in compliance with the future building code instead of the current one.

Perhaps China, which as seen a 3-fold increase of it its energy demand over the last 20 years, can seek some inspiration from Denmark's example of pursuing energy efficiency? In fact, Denmark has just been awarded the prestigious Energy Efficiency Visionary Award. Moreover, Denmark is accelerating its efforts to become even more energy efficient as well as 100% fossil fuel free by 2050.



Denmark and China's actual consumption of primary energy is here shown with solid lines.
Source: "Energy Statistics 2012", Danish Energy Agency.

丹麦的实例:
实测建筑整体能耗降低50%

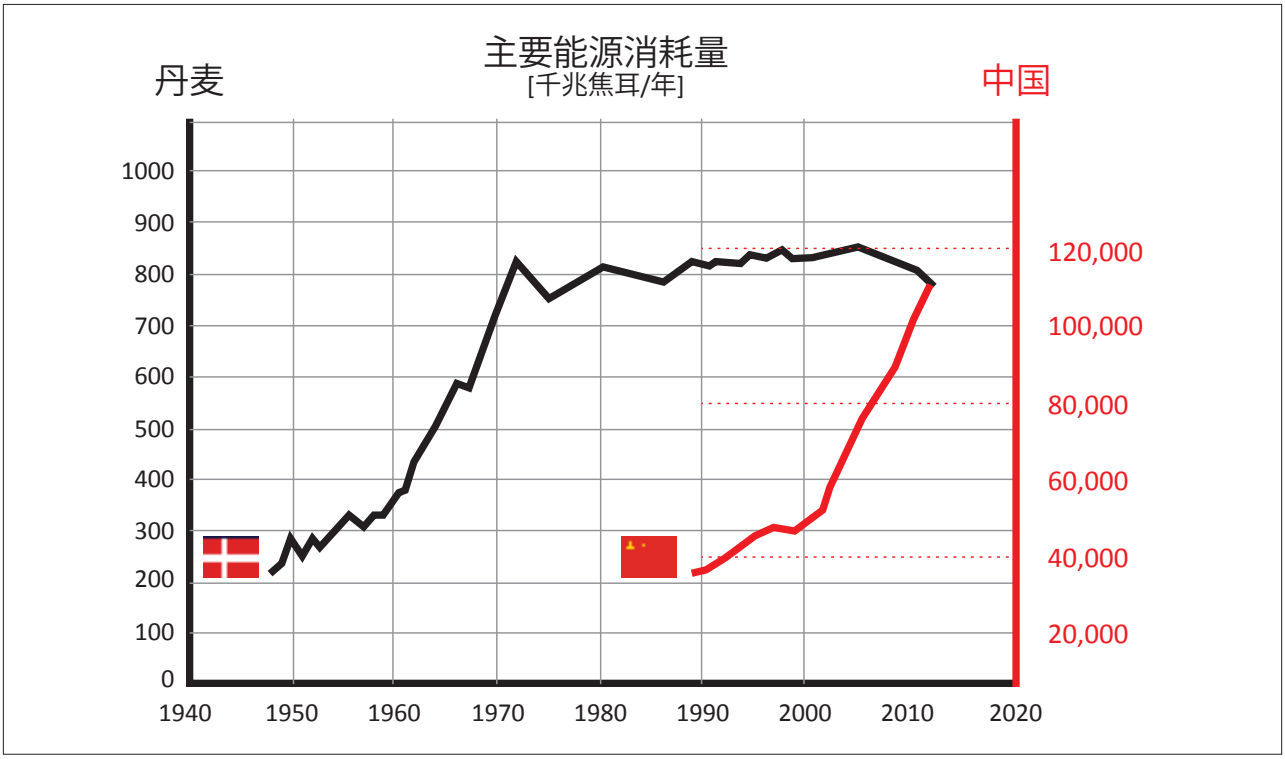
如果要寻找一个建筑行业取得绿色成就的好例子，看看丹麦如何40年不断追求提高建筑能效标准的事实就知道了。

像中国一样，丹麦经历过快速指数级增长的能源消耗阶段，然而这一切在70年代石油危机爆发与石油价格增至三倍时突然结束。对于整个国家而言这是一个转折点，丹麦决定走上一条提高能源效率的发展道路。结果是令人印象深刻的，尽管人口和经济水平在此期间持续地增长，丹麦的总体能源消耗在过去的40年里并没有增加。

在丹麦，建筑行业约占整个国家总体能耗的40%，因此在实现丹麦提高能源效率的行动中发挥了重要作用。事实上，丹麦所有的建筑（包含新建与既有建筑）的实测能耗整体降低了50%，这主要来自每平方米建筑空间的供热能耗下降了一半。这些成就是通过丹麦政府有效的“胡萝卜加大棒”的方法取得的。“胡萝卜”是给予现有建筑节能改造的经济上有吸引力的补贴。“大棒”是在建筑规范中坚持引进强制性的能效要求，这些要求每隔五年就会更加严格，并且会被提前十年颁布。这样的做法得到了丹麦建筑行业主要利益相关者的感激，因为这允许他们提前做出应对的计划。为了使他们的建筑不会过时，一些开发商和建筑业主甚至主动选择构建符合未来建筑规范的建筑，而不仅仅是符合当前的标准要求。

建筑物的强制性能源标签是另一个有助于促进丹麦建筑能源效率的重要措施。商业和公共建筑以及达到一定规模的私有建筑必须每隔7~10年进行一个独立的能源审计，并给定一个能源效率标签。这种强制性能效标识使买方知道这个建筑是节能还是不节能，并作为最终价格谈判的参考因素。从卖方的角度来看，强制能源标签确保在能源改造上花的钱，会在建筑销售时增加价值，促使其更容易从经济性上选择进行节能改造。

中国在过去20年里能源需求增加了3倍，也许中国可以在丹麦追求能源效率的例子中得到启发？事实上，丹麦刚刚被授予著名的能源效率有远见奖（Energy Efficiency Visionary Award）。此外丹麦正在加速努力变得更加节能，并且在2050年实现100%不使用化石燃料。



丹麦和中国的主要能源消耗量如上图所示.
资料来源: *“Energy Statistics 2012”, Danish Energy Agency.*