

论文

甘肃黄土丘陵地区农户取暖用能需求的评价

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摘要:

甘肃黄土丘陵地区冬季温度多处于0℃以下,农户取暖水平低。论文通过实地观测记录获取数据,建立趋势面模型,核算采暖期累计温差和实际用能消耗,提出以16℃的室内温度为小康取暖标准。参考国家相关标准,比较实际用能和应用节能技术下用能的热效率。结果表明,陇东长官村和陇中河畔村农户采暖期累计温差分别为23 002 h·℃和36 390 h·℃,实际取暖能耗分别为926 kgce/a和1 199 kgce/a。农户取暖用能数量虽不少,但目前只解决了小康水平下39.6%和46.6%的取暖需求。取暖用能的综合热效率只有17%左右。如果应用节能技术,能耗会大幅降低,提高综合热效率的潜力巨大。因此,通过住房的节能改造和用能设施的改善来提高房屋的保暖性、降低单位面积的热损耗是今后解决取暖用能问题的主要方向。

关键词: 取暖用能 热舒适性 趋势面模型 小康标准 热效率 黄土丘陵地区

Assessment on Energy Demand for Rural Household Heating in Loess Hilly Region, Gansu Province

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Abstract:

The winter temperatures are almost below zero degree Celsius in loess hilly area of Gansu Province, where rural households could not obtain enough heat to comfort farmers through heating. In this research, we obtained the data of temperature change and energy consumption through observation and record in two villages of the region, set up trend surface models and calculated accumulated temperature differences in the heating period. We proposed indoor temperature of 16℃ as a well-off living standard of rural household heating. According to relevant national standards, we compared the thermal efficiencies between actual energy consumption and theoretic consumption under energy-saving technology used. The results are as follows: accumulated temperature differences of Zhangguan Village and Hepan Village in heating period are 23002 h·℃ and 36390 h·℃, and actual energy consumption are 926 kgce/a and 1199 kgce/a respectively, which only meet 39.6% and 46.6% demands of household heating under the well-off standard. Integrated thermal efficiency of energy consumption for household heating is only about 17%. If energy-saving technology was applied, both actual energy consumption and that under 16℃ would be substantially reduced. Therefore, the potential for improving integrated thermal efficiency is enormous. We consider that raising heat retention of houses and reducing heat loss per unit area through houses' energy saving reconstruction and improving heating appliance are the main direction to solve household heating issues.

Keywords: energy for household heating thermal comfort trend surface model well-off living standard thermal efficiency loess hilly area

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