

# ***Energy Efficiency Pays: The Impact of Building's Energy Performance on Housing Values in Korea***

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## **Overview**

Formal implementation of a label and certificate system is regarded as one of the most conducive policy solutions to overcoming the residential energy efficiency gap and inducing market signals. This study aims to show otherwise: a policy-induced premium based on energy certificate dissipates while market-induced premium prevails. In essence, we show that the private market can in fact sell green purchasing behavior. Furthermore, this study examines variations in market premium, corroborating the heterogeneity of market premium from energy performance. In looking at these critical questions, we analyze the existence and magnitude of the market premium from energy performance of 65,678 multi-family residential buildings in Seoul, Republic of Korea with gas use intensity and assessed property values from 2015 as our key indicators

## **Methods**

To examine whether energy efficiency itself generates a price premium, we use a hedonic model in this study, the most common method applied in studies of price premium and housing prices. Rosen (1974) demonstrated empirically that prices of unobservable attributes could be estimated by regressing them on the price of housing. However, depending on the data available, the hedonic model is ridden with potential endogeneity issues that need to be dealt with. To obviate a potential reverse causality problem which may arise from increasing housing values from additional cost of constructing energy efficient buildings, two stage least square methodology has been applied.

## **Results**

To briefly highlight our main findings, first, a premium is attached to energy performance and this premium holds regardless of the presence of policy. Second, in relation to exogenous and endogenous variables, the premium derived from energy performance varies significantly.

## **Conclusions**

Assessed values of multi-family residential buildings increase by 0.84% as energy performance increases by 1% regardless of government intervention (table 4). Thus, energy performance does affect housing values and its magnitude of premium is nearly identical regardless of acquisition of a certificate. As explained in the discussion section, this phenomenon may arise due to the ability of the private market to provide the information more efficiently. In addition, the premium ranges widely depending on the exogenous and endogenous variables concerning the building. As for future research, it would be useful to conduct further study on whether a premium is attached to energy efficiency certificates from housing values with data from 2017. There is a limitation in this study in discerning whether the only attribute in which residents find a premium in a certificate is the building's energy performance or if residents simply did not find the certification program to be reliable in 2015. The adoption rate of the certificate has significantly increased since 2017 and it would be worthy to conduct this study with newly updated data. If there is still no premium attached to a certificate with the new data, evidence for the former supposition can be further corroborated. Finally, this research provides evidence for the possibility of market capitalizing green behavior on its own