

# Local alternative for energy supply: performance assessment of integrated community energy systems

B.P. Koirala; J.P. Chaves Ávila; T. Gómez San Román; R.A. Hakvoort; P. M. Herder

## Abstract-

Integrated community energy systems (ICESs) are emerging as a modern development to re-organize local energy systems allowing simultaneous integration of distributed energy resources (DERs) and engagement of local communities. Although local energy initiatives, such as ICESs are rapidly emerging due to community objectives, such as cost and emission reductions as well as resiliency, assessment and evaluation are still lacking on the value that these systems can provide both to the local communities as well as to the whole energy system. In this paper, we present a model-based framework to assess the value of ICESs for the local communities. The distributed energy resources-consumer adoption model (DER-CAM) based ICES model is used to assess the value of an ICES in the Netherlands. For the considered community size and local conditions, grid-connected ICESs are already beneficial to the alternative of solely being supplied from the grid both in terms of total energy costs and CO<sub>2</sub> emissions, whereas grid-defected systems, although performing very well in terms of CO<sub>2</sub> emission reduction, are still rather expensive.

**Index Terms-** distributed energy resources (DERs); energy communities; smart grids; multi-carrier energy systems; optimization

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to Energies, you can download the paper from the journal website:

[Access to the Journal website](#)

## Citation:

Koirala, B.P.; Chaves, J.P.; Gómez, T.; Hakvoort, R.A. ; Herder, P. M. "Local alternative for energy supply: performance assessment of integrated community energy systems", Energies, vol.9, no.12, pp.981-1-981-24, December, 2016.