



# LCA study of an office building renovated according to Kegel Klimasystem vs. Standard retrofit

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## Introduction

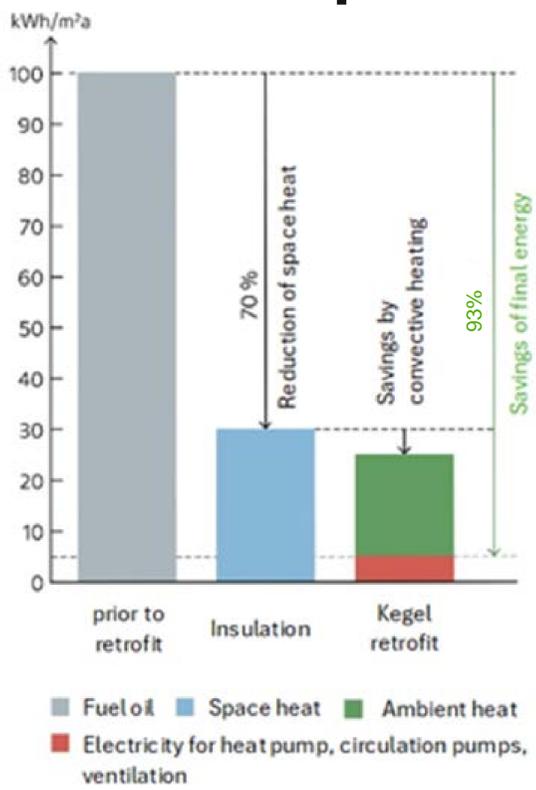
- Assessment of **award-winning Kegel method** for retrofitting buildings
- **Reduces operational energy** consumption while requiring **less extensive modifications of building** compared to standard retrofit.
- Objective: Understand **environmental performance** of the Kegel method.

## Method

- Object studied: **Office building** Rosenbergstrasse 30 in St. Gallen, CH
- Next to Kegel retrofit: also standard retrofit
- Cut-off approach, cradle-to-grave.
- Analysis of cumulative energy demand (**primary energy, PE**) and 13 midpoint indicators acc. to **EF 3.1** impact assessment method.

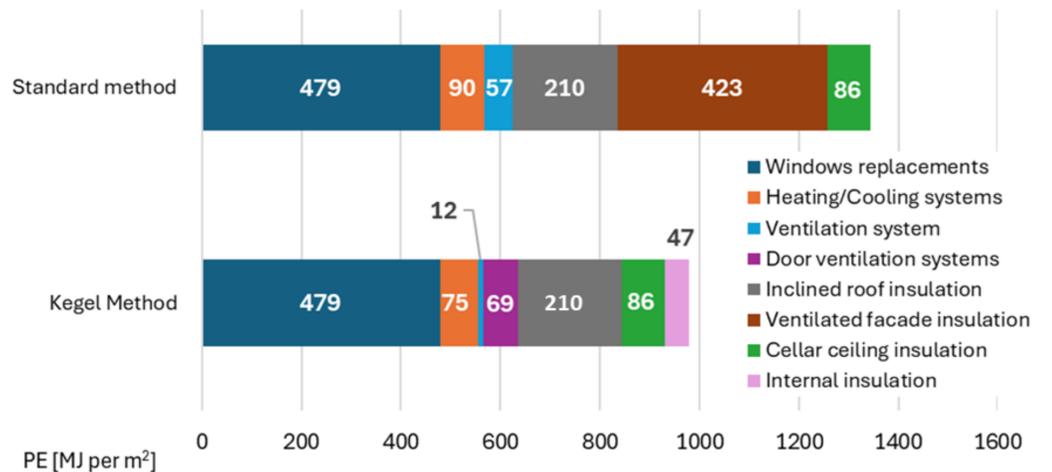


## Results – Operation

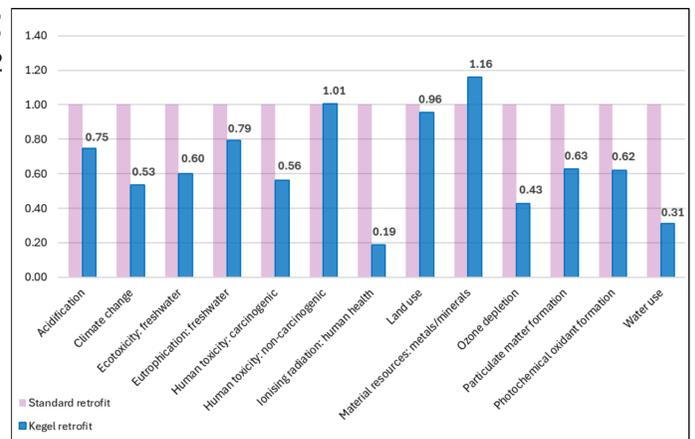


- **PE:** 93% reduction in annual PE use by Kegel method, reaching 46 MJ/m<sup>2</sup>/a
- **EF 3.1:** on average 79% reduction

## Results – Retrofit phase



- **PE** (see figure above): Less than 1000 MJ/m<sup>2</sup> for Kegel retrofit compared to 1350 MJ/m<sup>2</sup>, i.e., **27% less**
- **EF 3.1** (see right): All lower for Kegel, on average **by 34%**



## Results – Overall

	<b>Kegel retrofit</b>	<b>Standard retrofit</b>	<b>Unretrofitted</b>
	[MJ/m <sup>2</sup> /a]	[MJ/m <sup>2</sup> /a]	[MJ/m <sup>2</sup> /a]
Primary energy retrofit phase	33	45	0
Primary energy operational phase	46	218	636
<b>Total</b>	<b>79</b>	<b>263</b>	<b>636</b>

12%      41%      100%  
30%      100%      -

- Total PE demand of Kegel retrofit is only 30% of PE demand of standard retrofit, i.e. a **70% reduction**.
- Most of the Kegel method's advantage is enabled by the operational phase, while **also being lower in retrofit phase**.
- **Factor 8** improvement by Kegel compared to unretrofitted.

## Conclusions

- Primary energy (PE) demand for Kegel retrofit is **offset within 1.7 years**
- Total PE savings are **18 times greater** than PE invested in Kegel retrofit.
- The findings highlight **outstanding environmental performance** of the Kegel retrofit.

Core partners



Cooperation partner

