

APPROCHE GLOBALE POUR L'ENVELOPPE DU BÂTIMENT  
**RÉNOVATION ÉNERGÉTIQUE**



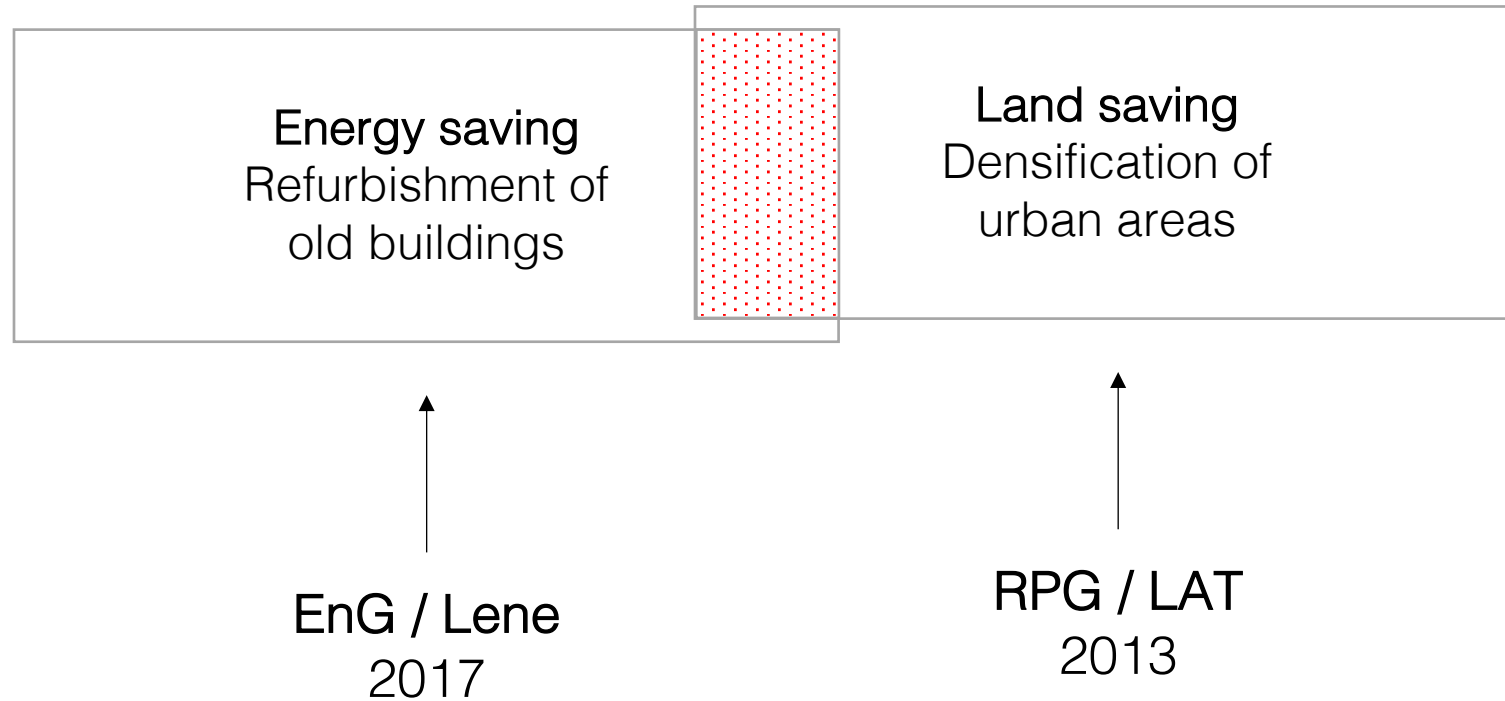
SWISS REAL ESTATE  
RESEARCH CONGRESS

Economic optimisation of  
densification – retrofit  
operations in Switzerland

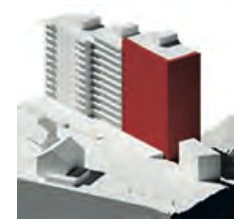
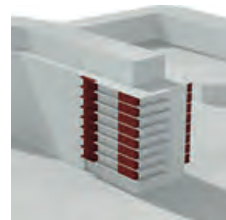
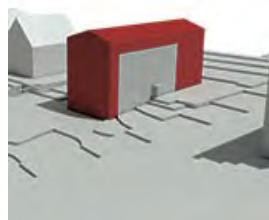
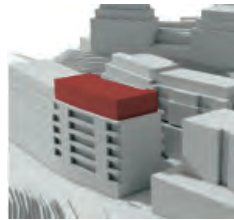
15.04.2021

Prof. L. Riquet

# Context



# Study cases and selected strategies



## Study question marks

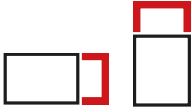





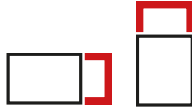

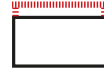
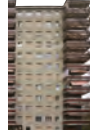


What's the real potential for densification of the study cases  
(legal framework : planning rules, structure, fire protection...)

Does densification make it possible to improve energy  
consumption per m<sup>2</sup> compared to a simple renovation ?

In case of densification do the additional rents pay for the  
energetic refurbishment works of the existing building ?

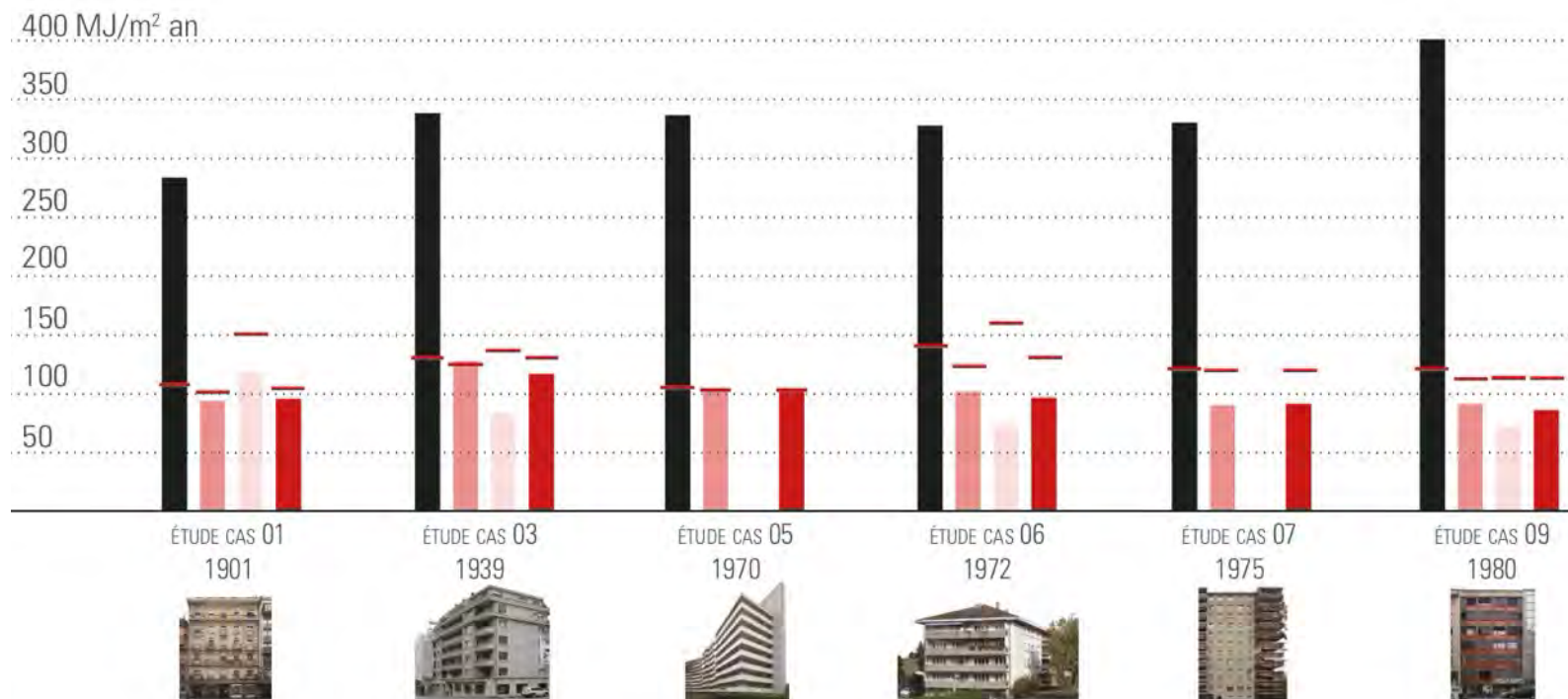
Are there any other synergies between energetic refurbishment  
and densification ?

# Potential (legal framework)

	 agrandir des pièces surélever l'immeuble Etude de cas 01 		 surélever l'immeuble Etude de cas 03 		 agrandir des pièces Etude de cas 05 		 ajouter des pièces surélever d'un étage Etude de cas 06 		 ajouter une «couche» non-chauffée Etude de cas 07 		 surélever l'immeuble Etude de cas 09 	
	état existant	état après intervention	état existant	état après intervention	état existant	état après intervention	état existant	état après intervention	état existant	état après intervention	état existant	état après intervention
Respecter la réglementation urbanistique	X	X	✓	X	✓	✓	X	X	X	X	X	X
Respecter les distances de de sécurité (incendie)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Maintenir la catégorie du bâtiment (incendie)		✓		✓		✓		✓		✓		✓



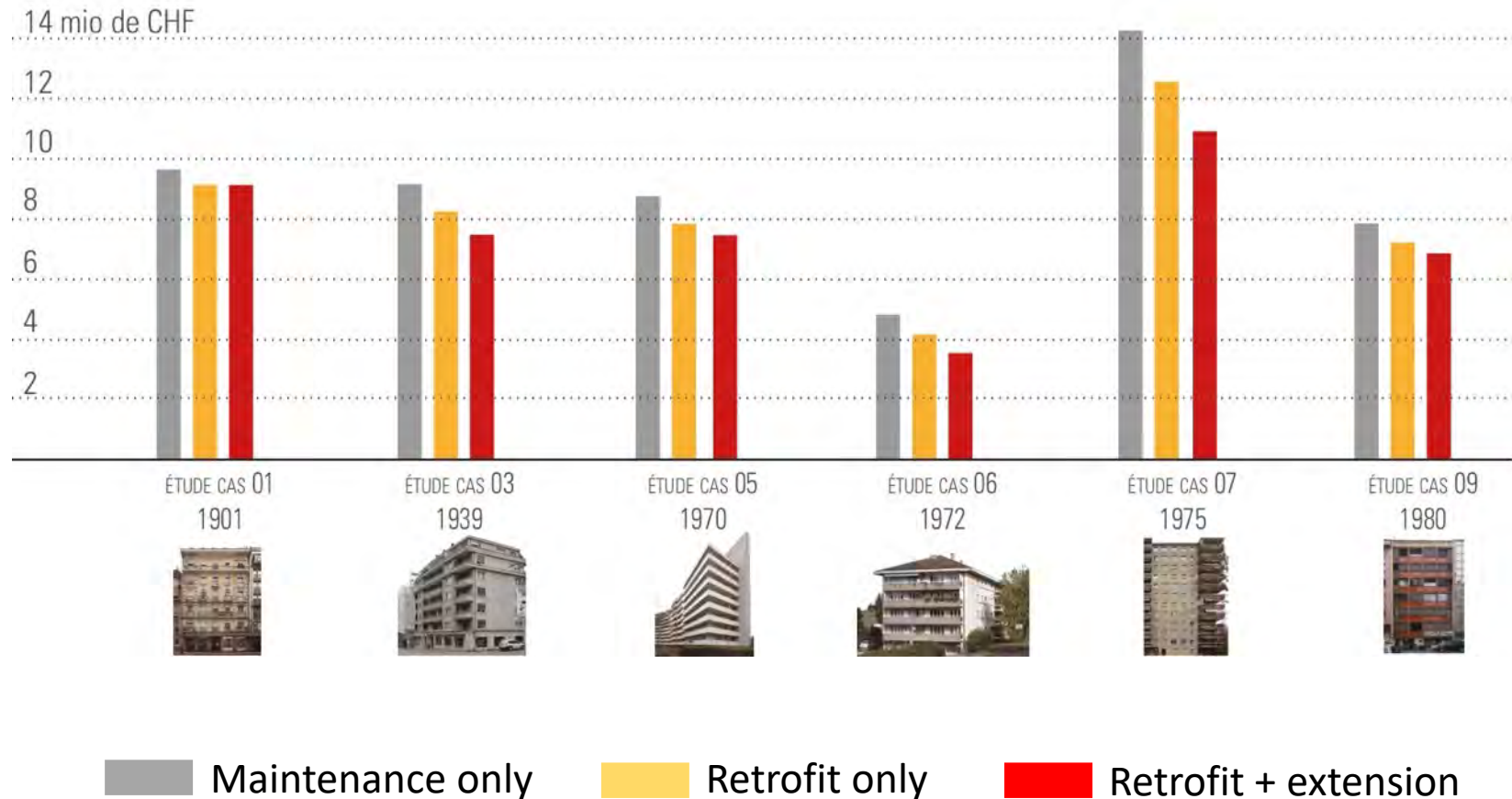
# Energy savings



- besoin de chaleur pour le chauffage  $Q_h$  (état existant)
- besoin de chaleur pour le chauffage  $Q_h$  (scénario eREN2 - partie transformée)
- besoin de chaleur pour le chauffage  $Q_h$  (scénario eREN2 - partie neuve)
- besoin de chaleur pour le chauffage  $Q_h$  (scénario eREN2 - pondéré)

# Actual value of building (DCF method)

Keeping the flats on rent & based on historical return rate (4.87%)



## Findings

- Economic performance of refurbishment-densification projects is disappointing
- Local building regulations are a clear barrier to densification
- Refurbishment – densification does improve energetic balance sheets, but only marginally
- Sensitivity to discount rate is huge



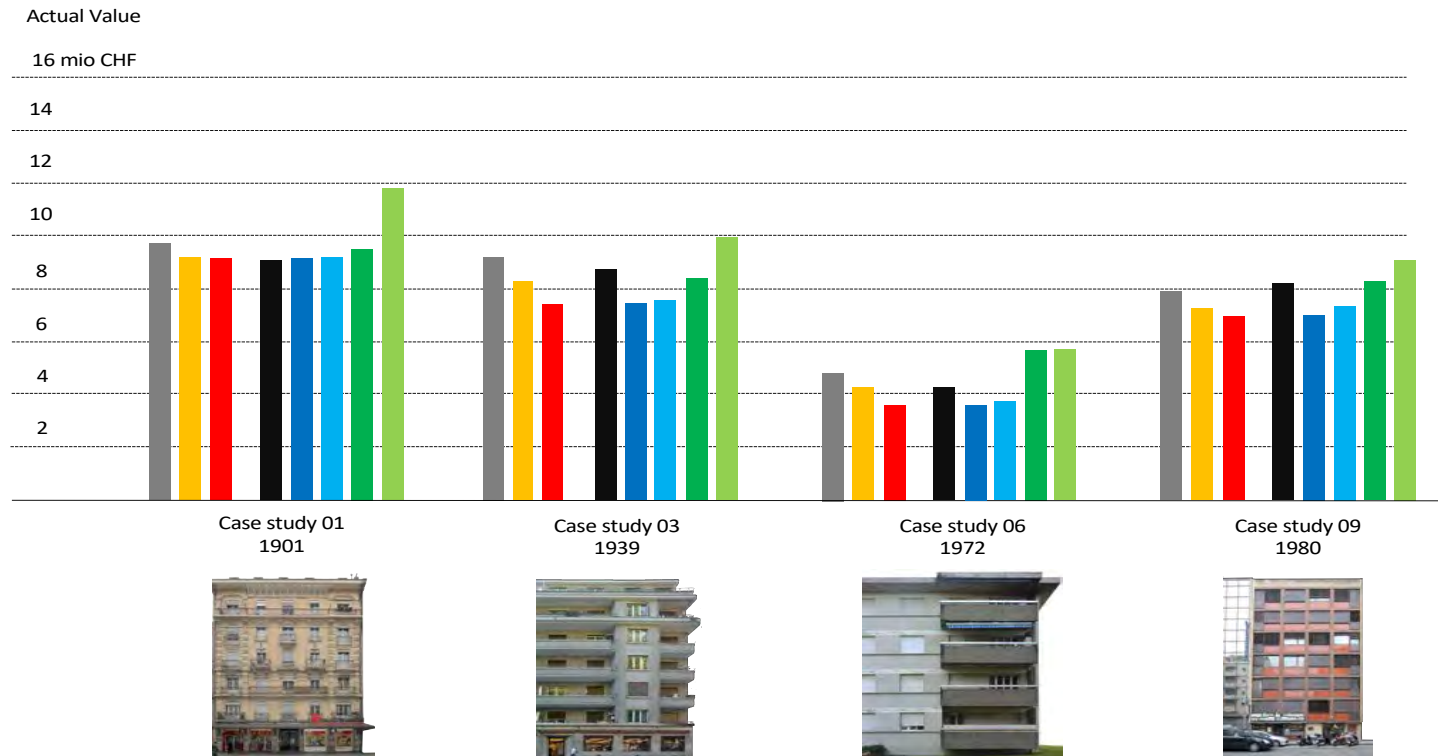
Are there alternatives options to improve the performance of retrofit-densification projects ?

## Alternative solutions – step 1

- **Single extension** - Densification with new apartments, but no refurbishment of the old part.
- **Subsidies** - Grant state subsidies to those owners who densify together with refurbishment
- **Compensation** - Allow thermal balance sheet compensation between the existing and new parts of the building
- **Partial real estate development** - Sell the newly built apartments (divided ownership) after densification-refurbishment
- **Global real estate development** - Sell the whole building (divided ownership) after densification-refurbishment

# Alternative solutions to improve ROI - Step 1

Discount rate : 4.87%



- 1 Simple maintenance, no refurbishment
- 2 eREN1, refurbishment
- 3 eREN2, densification-refurbishment

- 4 Single extension
- 5 Compensation
- 6 Subsidies
- 7 Partial real estate development
- 8 Global real estate development

## Alternative solutions – step 2

The discount rate (4.87%) is based on historical records\*

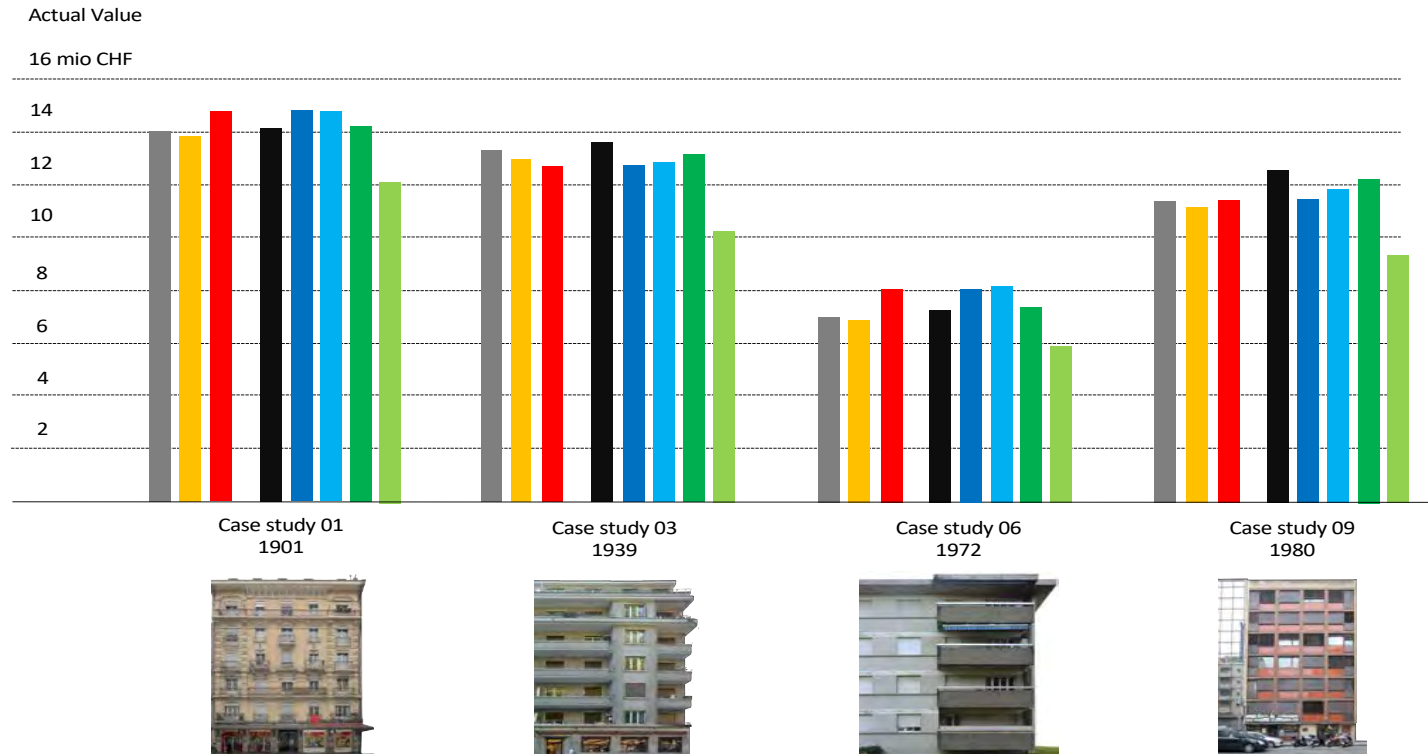
Is looking at the past the best way to predict the future ?

Since 2008 interest rates have dropped to historical lows, and expected return in real estate in the long run look more like 3.5% than 5%

\* Return rate of swiss real estate fundations between 1995 and 2016 – source BCV – SIX

# Alternative solutions to improve ROI - Step 2

Discount rate : 3.5%



- 1 Simple maintenance, no refurbishment
- 2 eREN1, refurbishment
- 3 eREN2, densification-refurbishment

- 4 Single extension
- 5 Compensation
- 6 Subsidies
- 7 Partial real estate development
- 8 Global real estate development

## Conclusions

- New options and revised discount rate show a much more contrasted picture, simple maintenance is not the n°1 option anymore
- Refurbishment – densification look economically more attractive now and in the near future than they were in the past
- To combine refurbishment – densification with a real partial estate development is a good compromise in some cases
- Subsidies and compensation are economically quite comparable
- Global real estate development is very sensitive to discount rate and not an option anymore at 3,5%



# Report and scenario sheets : [lionel.rinquet@hesge.ch](mailto:lionel.rinquet@hesge.ch)



ÉTUDE DE DENSIFICATION

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