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IS ALL-ELECTRIC AN OPTION? ABOUT RETROFITTING AND GENTRIFICATION OF PRE-WAR TENEMENT APARTMENT BLOCKS IN AMSTERDAM

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This article by the TU Delft Research Group **Beyond the Current** (Vincent Gruis, Thijs Asselbergs, Wessel de Jonge) was written after consultations with housing associations: Eigen Haard and Haag Wonen and architects Van Schagen Architecten, INBO architecten, and Hooyschuur architecten.

INTRODUCTION

Is all-electric or zero-carbon an option in the sustainable exploitation and replacement of inexpensive natural gas use in Dutch pre-war tenement apartment blocks of housing associations? Reducing CO₂ emission and the reliance on fossil-fuel-dictatorships for the housing stock is a good ambition. The recently published *Woonagenda 2017-2021* speaks about CO₂-neutral housing stock for all housing associations in 2050.¹ However, in a country with cheap natural gas the transition towards all-electric exploitation of this housing stock is difficult. This article describes the renovation of eye-catching projects in Amsterdam from the archives of the NRP Gulden Feniks Award.² All those projects with an integral approach of characteristic architectonic brickwork, tenants' preferences, and sustainability led to particular results in the period 1995-2015 in Amsterdam. Finally, we describe recent developments and give an outline of a workable intervention framework to renovate this housing stock to all-electric and then we will come back to the main question.

SUSTAINABILITY AFTER THE RENEWED HOUSING ACT OF 2015

For a number of reasons, transforming to all-electric at this housing stock is not an easy task. The impact of the worldwide financial and real estate crisis from 2008 onwards were enormous and the sale of houses stagnated. This was not a good starting point for the funding of projects by Dutch housing associations. Between 1995 and 2015 they financed the building of social houses (30%) by selling off a part of newly built houses (70%). The already developed plans were executed but new plans were not developed in the years after the crisis.

Nevertheless, housing associations agreed in the *SER-energieakkoord* of 2013 to renovate their existing housing stock to an average Energy Performance Certificate B, then to Certificate A by 2030 and to climate-neutral by 2050. On March 1, 2013 the VAT rate on labour costs for the reparation and renovation of houses was reduced from 21% to 6% but on July 1, 2015 that rate was withdrawn. At the same time however, the requirements for sustainability have been further tightened.³ For new buildings BENG (Almost-Energy-Neutral) is required by January 1, 2021 and new requirements for existing buildings are still being considered.

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The change of the Housing Act of July 1, 2015 had a profound influence on the renovation of the housing stock. The reason for the change was that the government wanted to subsidise people in need instead of buildings. Since that change housing associations have only been allowed to develop, build, and rent houses to the target group. Project developers plan, build, and rent or sell other housing categories. Furthermore, housing associations and landlords with more than 10 houses are since charged a fee by the government and tenants who live in social houses with too high an income face considerable rent increases.

Not every housing association directly has the investing capability to renovate their housing stock to EPC B. Deep renovation of pre-war tenement apartment blocks is costly because of the repair of bearing walls and foundations of the blocks in inhabited state. If households have to be moved, each receives a legally established moving fee of €5,910. Furthermore, by Dutch legislation 70% of the tenants in an apartment complex must agree with the proposed renovation plans and the change in rent.

In Amsterdam, with a relatively large social housing stock (ca. 45%) and great shortage on the housing market plus a policy of mixing housing categories, associations have sold their apartments or rented them out expensively. Comparably, in The Hague with much less social housing (ca. 30%) the sale of social housing has been undesirable. For that reason, the tenement apartment blocks have been renovated at a much slower rate.

Another consequence of the renewed Housing Act is that the flow of tenants stagnated. The mutation rate was already very low in attractive residential areas near historic centres. No one wants to leave their home for another with a higher rent to pay based on a newly introduced point system determining the rent level. In this point system the location in the city and the value of the real estate are parameters. But that's not the biggest problem, which is that there are hardly any housing replacements for these people and few affordable dwellings have been added to the housing stock. Because of all this uncertainty, the mutation rate remains low. In panic municipalities, government and housing associations are trying to stimulate people to move with flow plans like 'Van Groot naar Beter' in Amsterdam. With a 'Samenwerkingsstafel' in 2017, the government is collaborating on an agreement with stakeholders about the flow of tenants.⁴

Since the renewed Housing Act took effect, new houses are only being assigned to tenants with appropriate low incomes. Consequently, tenants with low incomes are gradually being concentrated in neighbourhoods with tenement apartment buildings. Yet segregation is not a good prospect for cities.

From the tipping point 2015, there have hardly been any major deep renovations of pre-war tenement apartment blocks by housing associations mentioned in the archives of the NRP. But then what were the successes of renovation in the Golden Period from 1995 to 2015?

BEAUTY IS SUSTAINABLE: GENTRIFICATION OF NEIGHBOURHOODS 1995-2015

As part of a wider gentrification policy, pre-war period residential building renovations in diverse neighbourhoods of large Dutch cities began in the last decade of the twentieth century.⁵ For the housing stock inside the ring road of Amsterdam there was a policy in place to improve and retrofit old one-sided workers' neighbourhoods for more socio-economic differentiation with residents of various lifestyles living side by side to strengthen the local economy. The city wanted the neighbourhood to maintain its amenities, thus improving the future value of the residential district and buildings,⁶ despite doubt about this approach.⁷ After the renovation of the social houses a part was sold and another part was rented outside the social sector. Note that attractive architectural icons were

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refurbished. The municipality, the Amsterdam Federation of Housing Associations AFWC, the Renter's Association of Amsterdam HA and other organisations⁸ made an agreement and framework between them about this approach. The historic façades on the street-side would be restored but the garden-side, floor plans and in some cases also the private gardens inside the blocks would be completely changed by housing associations and tenant organisations. Gentrification was the result. Between 1995 and 2016 the change of the average selling price of existing houses, the ownership of these houses, and the number of houses that were sold was enormous, especially inside the ring road, the belt of the city with interwar houses.⁹

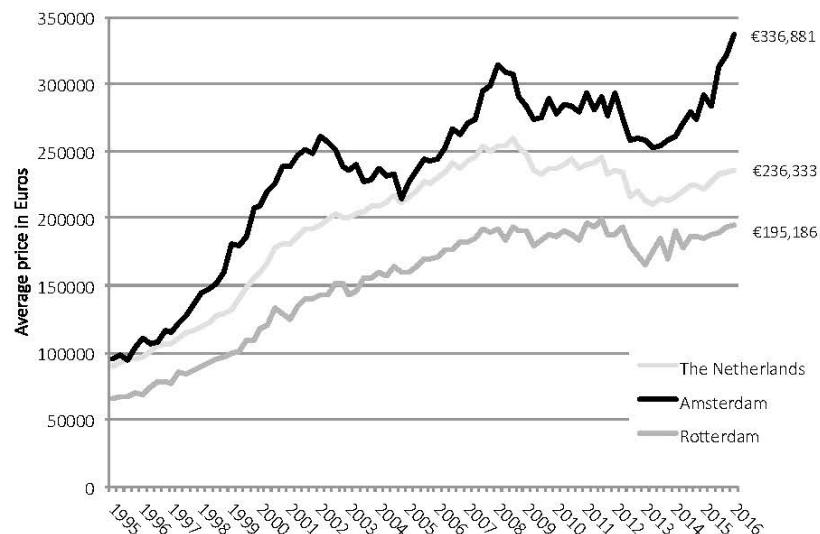


Figure 1 Hochstenbach 2017: 28
Average sale price houses in Amsterdam and Rotterdam

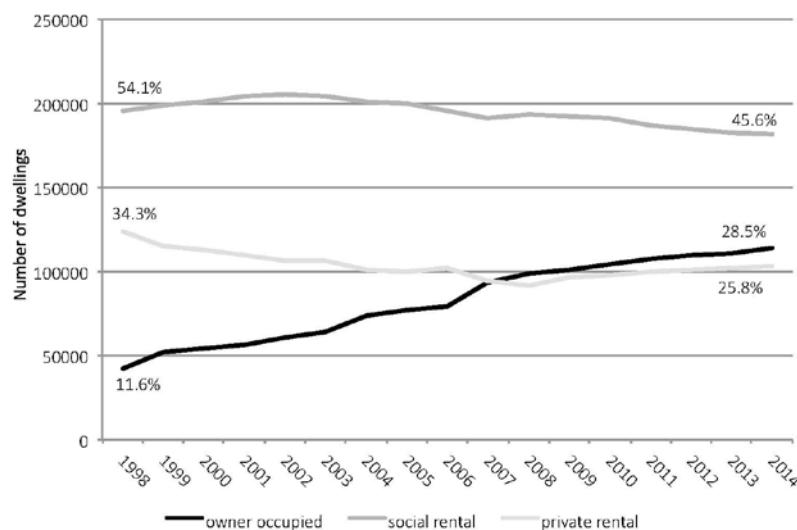


Figure 2 Hochstenbach 2017: 40
Ownership Amsterdam housing stock

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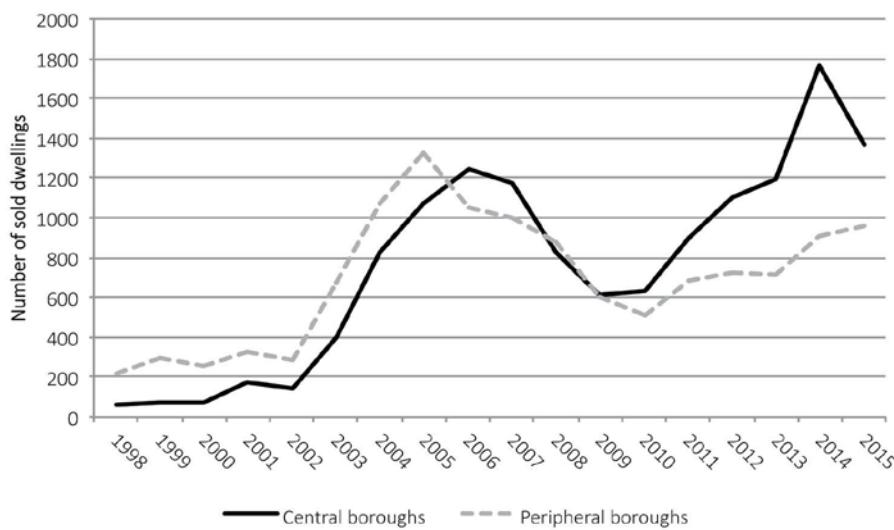


Figure 3 Hochstenbach 2017: 40
Number of existing sold by housing association

Another cooperative agreement was made (Samenwerkingsafspraken) for the period 2015-2019 between the municipality, AFWC and HA to allow housing associations to sell a maximum of 2,000 dwellings per year and free another 1,000 for higher sector rentals. Ultimately in 2016, 1,325 were sold to individuals, 112 to investors and 520 rented on the free rental market. In the year 2015 housing associations sold 2,042 homes and 869 went to the free market.¹⁰ Since then the property sale inside the ring road has been sharply tempered. The year 2015 was a turning point.¹¹

TABEL 16
Verkoop corporatiewoningen aan particulieren per stadsdeel¹²*

	Centrum	West	Nieuw-West	Zuid	Oost	Noord	Zuidoost	totaal
1998	32	29	8	0	0	4	206	279
1999	51	4	96	0	22	15	188	376
2000	14	9	67	8	38	102	85	323
2001	2	66	78	52	52	164	88	502
2002	6	35	44	55	52	105	137	434
2003	47	140	65	70	141	322	283	1.068
2004	114	320	231	180	211	448	398	1.902
2005	119	405	417	171	375	558	357	2.402
2006	68	596	257	146	437	490	302	2.296
2007	94	531	205	203	342	470	326	2.171
2008	55	362	141	148	264	428	306	1.704
2009	53	232	145	116	208	277	183	1.214
2010	84	256	142	99	199	189	175	1.144
2011	77	382	132	229	214	364	186	1.584
2012	156	431	202	254	266	324	195	1.828
2013	124	394	215	330	349	342	161	1.915
2014	192	594	258	570	412	436	220	2.682
2015	176	473	272	369	355	453	239	2.337
totaal	1.464	5.259	2.975	3.000	3.937	5.491	4.035	26.161

Figure 4: AFWC 2016

In the attractive neighbourhoods of Amsterdam charming pre-war tenement apartment blocks were refurbished to EPC B or even A by housing associations. Eye catching and sometimes listed monuments mentioned by the NPR Gulden Feniks were partially rented outside the social category

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and a number were sold. The plan for renewal of the working-class neighbourhood Spaarndammerbuurt (1914-1920) from 2001 onwards had two objectives: profiling of tourism and the promotion of a mix of lifestyles and income groups.¹² In this neighbourhood in 2014, 71% of the homes were still held in the social rent category. The double block around the Zaandammerplein was one of the first major projects. The ensemble was divided into several residential buildings in sturdy brick rationalism. It was renovated between 2005 and 2010 and included the merging of 100 apartments for social rent. Spaardammercarré are four blocks on an intersection. The houses all got EPC A. In this case, the courtyards inside the blocks were changed to create storage rooms and a common roof garden was realised. Stairwells were removed and galleries and lifts were added. The double block Zaanhof, also in sturdy brick rationalism with about 256 apartments, was an ensemble of five residential buildings designed by different architects and housing associations. Here only some galleries and lifts were added. In Spaardammercarré and Zaanhof some apartments were sold, some rented outside the social category and another part remained for social rentals. The most iconic project was Het Schip, a tenement apartment block from 1919 in Amsterdam School Expressionism. An old school in the block was refurbished into a museum about how the working class was living in the interwar period. After the renovations a part of the apartments were rented outside the social housing category.



Figure 5: Zaandammerplein (picture Archivolt architecten)

In the *Bos en Lommer* neighbourhood the renovation of the Koningsvrouwen van Landlust took place between 2007 and 2012. About 134 small apartments were merged into 102 large ones. In the *Indische*

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Buurt around the Makassarplein many old tenement apartment blocks were refurbished, like the Gorontalo project executed between 2007 and 2014. After its transformation some apartments were rented outside the social housing category.

In a block of characteristic Amsterdam School architecture along the Hoofdweg in *De Baarsjes* neighbourhood, 60 apartments were retrofitted of which 34 were sold thereafter. *Czaar Peterbuurt*-development with 520 apartments and 50 shops is one of the great retrofit projects accomplished by housing associations. It was a neighbourhood with structures from the nineteenth century. Several old houses and other buildings were transformed into large apartments. The renovation started in 2009 and was completed in 2016. Some of the apartments were sold after the transformation of old buildings into a new complex.



Figure 6: Koningsvrouwen in Landlust (picture Archivolt architecten)

INTEGRAL INTERVENTIONS BOX-IN-BOX-RENOVATION

The renovation of pre-war homes according to the NRP shows only one option: an integral box-in-box-renovation. Not only sustainability but several other issues are addressed like fire safety, sound reduction between apartments and redesign of the floor plans. Stakeholders worked closely together according to agreements made.¹³ The box-in-box-renovation usually comprised all the apartments on one stairwell in uninhabited state. The attic, usually used for storage, was generally merged with another apartment. Part of the refurbished and merged apartments were sold or became free sector rentals. If one stairwell was finished the next was started until all the tenement apartment blocks were completed. In some cases, private gardens were changed into storage blocks and a community roof garden was added. Other times the stairwell was replaced by a gallery on the garden side with lifts. The inevitable choice for a box-in-box-renovation is due to a number of structural problems:

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- outdated floor plans
- high energy demand
- airtightness
- moisture problems
- noisy neighbours
- poor fire safety
- outdated pipes, channels
- shallow balconies
- weak foundations

Inside the ring road housing associations refurbish with a depreciation period of 40 years. With box-in-box-renovation the integral interventions are collectively addressed: thermal and sound insulation, fire safety, floor plan improvements and infrastructure replacements. The construction method is a dry construction one and new pipes and channels are concealed in the new walls. The sustainability goal means low temperature heating so that apartments change from Energy Performance Certificate F-G to B-A. For central heating and tap water a Natural Gas Heating Water Boiler is usually installed. The ventilation system changes from natural to mechanical. Fire and smoke resistance, sound reduction and ventilation of existing apartments are fitted according to building regulations for new housing. A box-in-box means that within existing structures of old bearing walls and wooden floors a new box is created that reduces noise, fire, smoke, and energy-use demands. The floating floors, suspended ceilings and all walls of the apartment are insulated. Because repairing the bearing walls and foundation and addressing moisture problems are necessary in Amsterdam, usually the wooden ground floor construction is replaced by concrete insulation. The advantage of this box-in-box-renovation is that floor plans can be changed and small apartments merged.

According to the NRP archives and guidelines of Eigen Haard, there are priorities among the different interventions.

1. Improve the skin of the building and reduce energy demand. Aim is applying low temperature heating LTH and mechanical ventilation, if possible with demand control ventilation DCV.¹⁴

Renovation of interwar tenement apartment blocks between 1995 and 2015 in Amsterdam usually limit themselves to these two measures, either EPC B or higher. For central heating and tap water a Gas Heating Water Boiler in the kitchen is applied. Not all dwellings have a LTH. To come to all-electric it is necessary to invest in more interventions. Investments are greater, survey systems and maintenance more complicated. These interventions are:

2. Air-source heat pump ASHP with indoor water tank for central heating and domestic hot water. The source could be air from the ventilation system or from outside. A small electric heater is still necessary in winter time.
3. Mechanical ventilation heat recovery (MVHR).
4. Photovoltaic panels.

Conclusion is that all-electric exploitation is technically possible if one is prepared to invest in additional interventions. The described cases of the NRP show that an EPC A or higher is possible with an Energy-Index between 0,71 and 1,05. So far though, there is no refurbishment of a tenement apartment block from this period to all-electric.

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Figure 7: Czaar Peterbuurt (picture Hooyschuur architecten)

New realism after 2015

Nowadays, housing associations in Amsterdam aim for an EI = $< 0,4$ (EPC A++) according to building regulations for new homes. However, in recent years they have only refurbished some small projects aimed at EPC B: out of date renovations without any ambitions.¹⁵ A similar or even worse development took place in Den Haag and Rotterdam.

The integral box-in-box-renovation from the period 1995-2015 with the characteristic brickwork facades, user preferences and sustainability within the Amsterdam ring road crystallised into a success formula for a certain period of time. Although the renovations in themselves were successful, there was no regard taken for the original interiors often with beautiful tile work, wood frames, and panel doors and wall cabinets with stained glass sliding doors. Despite the life span cost of a building, embodied energy was also not taken into account. The integral approach comprising heritage, sustainability and user preferences was already difficult but with the altered Housing Act in 2015 a new realism appeared for simple renovations of small apartments in terms of allocating tenants to the appropriate dwellings. Such new realism only appeared after the change of the Housing Act.

FINALLY

Is all-electric an option in the sustainable exploitation and replacement of inexpensive natural gas use in Dutch interwar tenement apartment blocks of housing associations? It seems that the approach between 1995 and 2015 was only possible because of the huge appreciation of real estate in the beautiful historic residential neighbourhoods in Amsterdam, part of which were sold. The complex and expensive renovations were financed by selling apartments. This explains why the interwar apartment blocks in Amsterdam were renovated and not in The Hague where simply no apartments were for sale. All-electric is too expensive for a regular renovation in the social rental sector, especially since these homes are assigned appropriately to people in relation to their income. Furthermore, the decision now taken by housing associations, municipalities and tenant organisations is not to sell apartments in their stock. That's why the expensive renovations can no longer be financed. If the objective is an all-electric exploitation of tenement apartment blocks one could draw the conclusion that someone has to pay for the investments. This is the consequence of the changed Housing Act of 2015.

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