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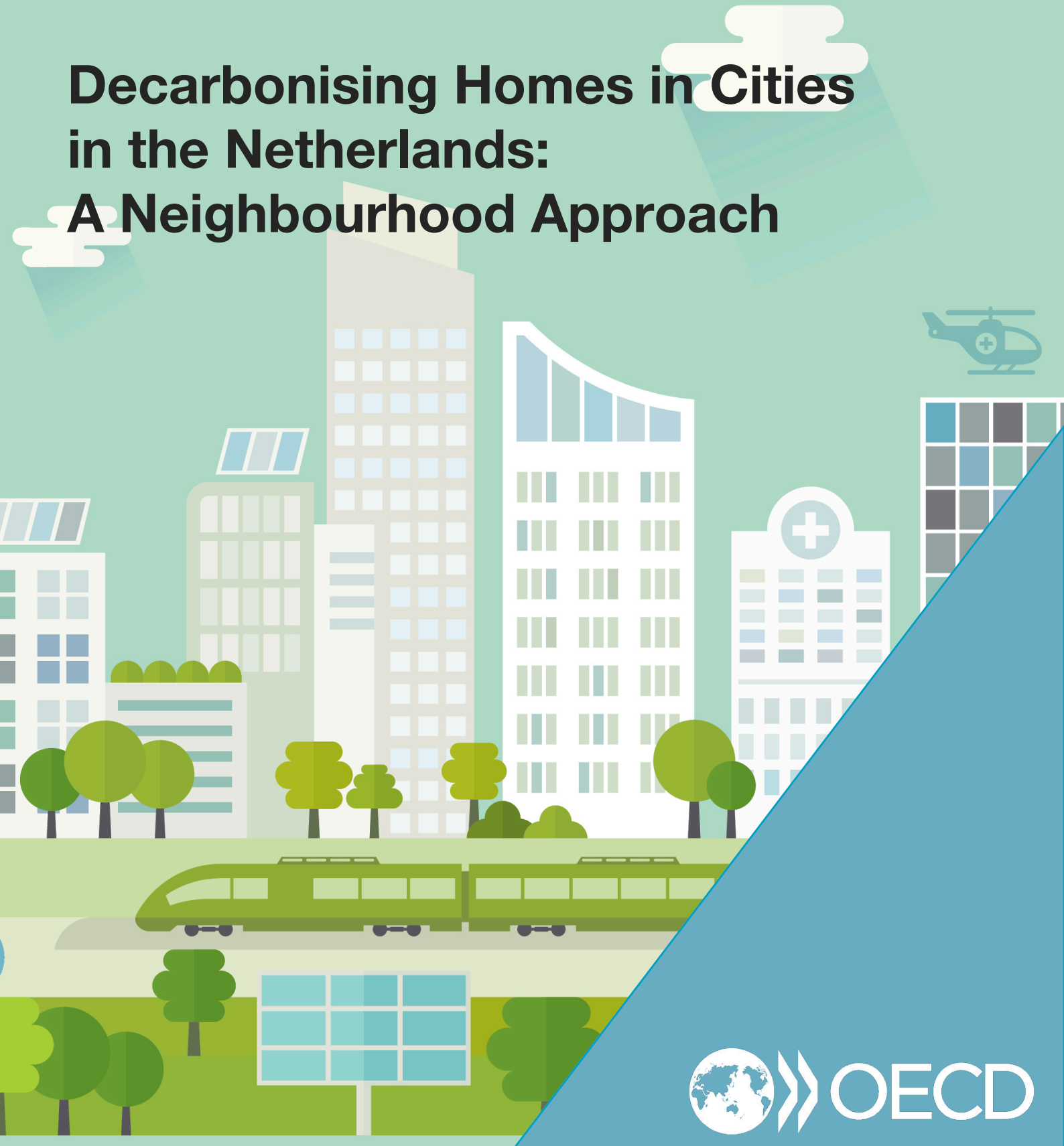
Decarbonising Homes in Cities in the Netherlands: A Neighbourhood Approach



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This paper was authorised for publication by Lamia Kamal-Chaoui, Director, Centre for Entrepreneurship, SMEs, Regions and Cities, OECD.

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Preface

With nearly 40% of global energy-related CO_2 emissions stemming from buildings and construction, improving energy efficiency in buildings will be critical to achieving net zero. In the European Union, 85% to 95% of today's buildings will still be standing in 2050 so the construction of new carbon-efficient homes can only be part of the solution. Policies to drive the energy transition and in particular the heat transition in existing homes will therefore be critical.

These require two important considerations. The first is to improve the capacities and indeed the willingness of homeowners and tenants to invest in sustainability measures, not least to help address often high upfront costs. The second is to emphasise the local perspective. Decarbonising buildings requires targeted actions that take into consideration the local climate, local building stock and locally available heating sources such as residual heat from local wastewater treatment plants. Local governments, therefore, need to be on the frontline to drive the energy transition in the built environment.

This is why the Dutch government has devoted increasing policy attention to the role of municipalities in accelerating the energy transition in the built environment. From the 2019 Dutch Climate Agreement to the 2022 Sustainability Measures in the Built Environment Acceleration Programme (PVGO), the Netherlands has deployed several policy instruments to accelerate building decarbonisation at the neighbourhood level. As of March 2023, the national government is supporting 66 pilot neighbourhoods in natural gas-free heating and cooking and is preparing to scale up the lessons learned from the pilot projects nationwide via the National Programme for Local Heat Transition (NPLW).

This report assesses the policies that the Netherlands has implemented to decarbonise existing housing stock at the national and local levels and offers recommendations grounded in the OECD Checklist for Public Action that was published in the OECD 2022 synthesis report Decarbonising Buildings in Cities and Regions. We hope that other countries will also find inspiration from this report in developing their own building decarbonisation strategies.

Lamia Kamal-Chaoui

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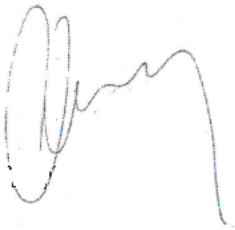
Organisation for Economic Development and Co-operation



Chris Kuijpers

Director-General for Housing and Construction,

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Foreword

Heat transition is critical to decarbonising buildings. In 2020, heating and hot water accounted for 78% of household energy consumption in the European Union (EU) and 79% in the Netherlands. About 90% of homes in the Netherlands depend on natural gas for heating, the highest share in the EU, and significantly above the EU average (27% in 2019). In recognition of this, the Netherlands has committed to phasing out natural gas by 2050, a goal given even greater urgency in the wake of the global energy crisis triggered by Russia's war of aggression against Ukraine.

However, there can be no one-size-fits-all solution to phase out natural gas. Levels of available sustainable heating sources, the energy efficiency of the building stock and energy poverty vary significantly across municipalities in the Netherlands. Place-based actions that also factor in the different capacities and willingness of homeowners and tenants are therefore critical to driving building decarbonisation in an effective, efficient and inclusive manner. Indeed, the Netherlands has rolled out an innovative programme of 66 natural gas-free neighbourhood pilot projects across 59 municipalities. These projects have enabled municipalities to identify local bottlenecks and develop, test and implement customised, feasible and scalable solutions to drive the energy transition in each pilot neighbourhood.

This report, *Decarbonising Homes in Cities in the Netherlands: A Neighbourhood Approach,* comes at a critical juncture for national and local policy makers worldwide to accelerate action towards decarbonising buildings. It offers lessons from the Dutch experience under three pillars of the OECD Checklist for Public Action to Decarbonise Buildings in Cities and Regions: i) planning a shared vision across national and local governments; ii) leading by example through pilot projects; and iii) engaging citizens in building decarbonisation initiatives.

As part of the OECD Programme on Decarbonising Buildings in Cities and Regions led by the Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), this report is the first case study applying the policy framework presented in the OECD report *Decarbonising Buildings in Cities and Regions* published in March 2022. The present case study provides a deep dive into the Netherlands' experience to demonstrate the potential of cities and regions to advance the decarbonisation of buildings.

Based on a policy dialogue with more than 100 stakeholders and a survey on decarbonising buildings carried out across 26 local governments, key findings from this report call on national and local governments to join up their efforts to **start** a pilot project, **scale up** existing pilot projects and **speed up** sustainable measures by removing common bottlenecks. Going forward, the OECD Programme on Decarbonising Buildings in Cities and Regions will continue to deliver further data, policy analysis and recommendations to support policy makers in the OECD and partner countries in their efforts to decarbonise buildings and shape a more sustainable urban future.

Acknowledgements

This publication was prepared by the OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), led by Lamia Kamal-Chaoui, Director, as part of the OECD Programme on Decarbonising Buildings in Cities and Regions in the Programme of Work and Budget of the Regional Development Policy Committee (RDPC). The case study was supported financially by the Ministry of the Interior and Kingdom Relations (BZK) of the Netherlands and benefitted from in-kind contributions from Canada, Finland, Iceland, Japan, Korea, the United Kingdom and the United States.

The case study and underlying policy dialogue were co-ordinated by Takeshi Miyamori, Senior Policy Analyst, with the support of Ji Soo Yoon, Junior Policy Analyst, under the supervision of Aziza Akhmouch, Head of the Cities, Urban Policies and Sustainable Development (CITY) Division, Soo-Jin Kim, Deputy Head of Division, and Tadashi Matsumoto, Head of the Sustainable Development and Global Relations Unit in the CFE. The report was drafted by a core CFE team composed of Takeshi Miyamori and Ji Soo Yoon, with input and desk research from Mateo Ledesma Bohorquez, Junior Policy Analyst.

The authors are grateful to Robert Dijksterhuis, Saskia Hesselink and Joram Snijders from the BZK for their excellent collaboration and support throughout the policy dialogue. Special thanks are extended to all civil servants from participating municipalities, in particular, Amsterdam, Deventer, Leusden, Rotterdam, Schiedam and Utrecht, as well as experts from the Netherlands Environmental Assessment Agency (PBL), the Netherlands Enterprise Agency (RVO), the Natural Gas-Free Neighbourhoods Programme (PAW), the Association of Netherlands Municipalities (VNG), the Association of Housing Corporations (Aedes), Woonplus Schiedam, Platform31 and Climate Alliance Netherlands for their input during the onsite missions of the OECD team in July and October 2022.

The report builds on the results of the OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands, which was conducted from August to September 2022. Warm thanks are herein conveyed to the local and regional governments that responded to the survey (list in Box 2.1). The authors would also like to thank the BZK, RVO, VNG and Platform31 for disseminating the survey to Dutch municipalities.

Furthermore, thanks are extended to all the stakeholders who provided comments on the report, in particular: delegates of the OECD Working Party on Urban Policy (WPURB), Saskia Hesselink (BZK), Aline Fisette (National Programme for Local Heat Transition), Nico Hoogervorst (PBL), René Schellekens (RVO), Merian Koekkoek and Ilongka Marselis (VNG), Merel Toussaint (municipality of Leusden), Lydia Hameeteman and Alexander van Steenderen(municipality of Rotterdam), Inge van Beek (municipality of Tilburg), Wanka Lelieveld (Cooperative WOW), Jan Engels (Climate Alliance Netherlands), Renée Heller (Amsterdam University of Applied Science), Henk Visscher (TU Delft Urban Energy Institute), Hayo Flink and Emile Klep(Woonplus Schiedam), Clara Camarasa (International Energy Agency) and Kristina Klimovich (Energy Efficiency Hub, International Energy Agency).

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Table of contents

FIGURES

TABLES

BOXES

Abbreviations and acronyms

Aedes	*Aedes Vereniging Van Woningcorporaties*, Dutch Association of Housing Corporations
BZK	*Ministerie van Binnenlandse Zaken en Koninkrijksrelaties*, Ministry of the Interior and Kingdom Relations
CO_2	Carbon dioxide
Cooperative WOW	*Coöperatie Warmtenet Oost Wageningen*, Cooperative Heat Grid East Wageningen
CPI	Consumer Price Index
DEEL	*Duurzame Energie voor Elke Leusdenaar*, Sustainable Energy for Every Leusdener
DEGO	*Datavoorziening Energietransitie Gebouwde Omgeving*, Data Provision Energy Transition Built Environment
ECW	*Expertise Centrum Warmte*, Netherlands Heating Expertise Centre
EPC	Energy performance certificate
EU	European Union
EZK	Ministry of Economic Affairs and Climate Policy
FBW	Fossil Free and Affordable Housing
FTE	Full-time equivalent
GHG	Greenhouse gas
GMM	General Members' Meeting
IEA	International Energy Agency
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPO	Interprovincial Consultation Committee
ISDE	*Investeringssubsidie duurzame energie en energiebesparing*, Energy Savings Investment Subsidy Scheme
KLP	*Kennis- en leerprogramma*, Knowledge and Learning Programme
kWh	Kilowatt-hour
NDCs	National Determined Contributions
NPLW	*Nationaal Programma Lokale Warmtetransitie*, National Programme for Local Heat Transition
NZE	IEA Net Zero Emissions by 2050 Scenario
OECD	Organisation for Economic Co-operation and Development
PAW	*Programma Aardgasvrije Wijken*, Natural Gas-free Neighbourhood Programme
PBL	*Planbureau voor de Leefomgeving*, Netherlands Environmental Assessment Agency
PGVO	*Programma Versnelling verduurzaming Gebouwde Omgeving*, Dutch Sustainability Measures in the Built Environment Acceleration Programme
PV	Photovoltaics
RES	*Regionale Energie Strategie*, Regional Energy Strategy
SEEH	*Subsidie energiebesparing eigen huis*, Own Home Energy Savings Grant
TWh	Terawatt-hour
UvW	Union of Water Boards
VNG	*Vereniging van Nederlandse Gemeenten*, Association of Dutch Municipalities
VTCB	*VvE Transitie Centrum Brabant*, VvE Transition Centre Brabant
VvE	*Vereniging van Eigenaren*, Owners' Association
Wcw	*Wet collectieve warmtevoorziening*, Collective HeatSupply Act
Wgiw	*Wet gemeentelijke instrumenten warmtetransitie*, HeatTransition Act
WWTP	Wastewater treatment plant

Executive summary

The climate emergency, energy efficiency measures in COVID-19 recovery plans and the ongoing global energy crisis stemming from Russia's war of aggression against Ukraine have exacerbated the Netherlands' imperative to phase out natural gas in the built environment. About 90% of homes in the Netherlands depend on natural gas for heating, by far the highest share in the European Union (EU) (where the average share was around 27% in 2019). The Dutch government aims to transition 1.5 million out of 8 million homes away from natural gas by 2030 and make all homes gas-free by 2050.

Key findings

- **Challenges and opportunities for the decarbonisation of buildings differ across municipalities in the Netherlands,** notably in terms of energy efficiency in building stock, the availability of clean heating sources and human resources that can be devoted to decarbonisation activities.
  - The energy efficiency level of building stock differs significantly across municipalities, ranging from less than 3% of buildings in the municipality of Almere with energy performance labels below C (D to G) to close to 40% in the municipality of The Hague.
  - The availability of clean heating alternatives to fossil fuel-fired boilers (e.g. district heating, heat pumps, renewable heat technologies and other emission-free heating solutions) varies across the Netherlands. For example, in the case of district heating, some municipalities (such as Deventer and Schiedam) are located close to wastewater treatment plants or ports that can provide residual heat, while others (such as Leusden) have no locally available heating source nearby.
  - Human resources to manage building decarbonisation activities also vary widely. For example, large municipalities such as Amsterdam, Rotterdam and Utrecht have more than 30 staff working on building decarbonisation, whereas smaller municipalities typically only have 2 or 3 staff and lack specialists in the built environment.
- **The Dutch government has developed an effective national framework to guide municipalities in decarbonising buildings.**
  - The Dutch Climate Agreement (2019) mandated each municipality to develop a Heat Transition Vision by the end of 2021, with a timeline for phasing out natural gas by 2050 at the neighbourhood level. By November 2022, almost all 345 municipalities in the Netherlands had submitted their Heat Transition Vision to the national government.
- **The national pilot project Natural Gas-free Neighbourhood (PAW) has enabled municipalities to innovate and develop energy transition processes.**
  - Jointly launched by the national government, the Association of Dutch Municipalities (VNG), the Interprovincial Consultation Committee (IPO) and the Union of Water Boards (UvW), the programme provided up to EUR 5 million to each of 66 selected neighbourhoods in 59 municipalities to help them experiment with and scale up natural gas-free measures.
  - The PAW has served as a successful bridge between national and local action (via staff seconded across levels of government), provided flexible funding (for municipalities to allocate based on their needs) and offered policy continuity (with a long-term timeline of 2019-28 announced from the onset).

- The neighbourhood approach adopted by the Netherlands is particularly beneficial because the building stock tends to differ across neighbourhoods in the Netherlands, even within the same municipality. For example, among the 112 neighbourhoods forming the municipality of Rotterdam, all residential buildings in the neighbourhood of Europoort were built between 1965 and 1974, whereas most residential buildings in the neighbourhood of Blijdorp were built between 1930 and 1945. This similarity of building stock within a neighbourhood creates a profitable business case for companies for the collective installation of heat solutions (such as district heating) and allows residents of the same neighbourhood to purchase energy efficiency materials at a lower price per unit, for example in terms of insulation materials.
- Neighbourhood-level communication has also proven to be effective. Behavioural change can be maximised by leveraging the power of social influence of neighbours. For example, many municipalities have promoted individuals' success stories on heat pumps or insulation. Municipalities have encouraged individual residents to form groups of "neighbourhood ambassadors" to spread good practices. For instance, the municipality of Leusden hired a neighbourhood counsellor to oversee citizen initiatives and work as an intermediary between them and the municipality. Other municipalities have also offered credible data to residents. For example, the municipality of Rotterdam developed the WHAT map, which shows the cheapest alternative solutions to natural gas based on where the buildings are located.

Key challenges

- **Although most Dutch municipalities submitted their Heat Transition Vision by the end of 2021, the level of ambition and implementation still varies greatly across municipalities**. While 42% of municipalities responding to the OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands reported that they included quantitative targets on insulation in their Heat Transition Vision, only 20% did so on renewable energy and 11% on (hybrid) heat pumps. Only 12% of respondents have completed their implementation plan, 68% are still preparing theirs and 21% have no plan to complete one yet.
- **The number of neighbourhood pilot projects remains limited and there is potential to scale them up both citywide and nationwide.** Despite the achievements of the PAW, many municipalities have not yet started any pilot neighbourhood project (i.e. 46% of respondents to the OECD survey). Knowledge and know-how gained through a given pilot neighbourhood should be used to scale up the natural gas-free measures in other neighbourhoods as well.
- **Labour shortage is a critical bottleneck to speed up the heat transition.** The lack of staff dedicated to building decarbonisation in municipalities and the lack of skilled labour in the built environment are slowing down the heat transition in the Netherlands. According to the OECD survey, 50% of municipalities said that they need national government support to invest in skills and training. Also, only 20% of surveyed municipalities offer special training to local enterprises such as heat pump installers on a sustainable heat transition. Most of the municipalities that provide training do so in co-operation with private companies and universities. More government-coordinated training programmes, targeted to local specificities, should be considered to speed up the transition process.

Policy recommendations: Start, Speed up, Scale up (3S)

In response to the three challenges identified above, national and subnational governments in the Netherlands need to join forces in order to *start, scale up and speed up* the implementation of home decarbonisation strategies.

- **START with a neighbourhood pilot project**

  The neighbourhood level offers an appropriate scale to test decarbonisation solutions. It is therefore important to encourage more municipalities to start a neighbourhood pilot project. **For the national government**, the new National Programme for Local Heat Transition (NPLW) introduced in January 2023 will need to support all municipalities in the Netherlands in the heat transition, especially targeting municipalities that have not yet started a neighbourhood pilot project and identifying their specific obstacles through dialogue platforms. **For subnational governments**, the objective should be to: i) identify locally available sustainable heating sources and energy efficiency of building stocks for each neighbourhood; ii) understand the social structure of the neighbourhood community and develop local frameworks and communication strategies with residents; and iii) build strong networks of local stakeholders, including heating suppliers and insulation companies to detect bottlenecks throughout the entire transition process.

- **SCALE UP by leveraging existing pilot projects and inter-municipal networks**

  The existing pool of 66 PAW pilot neighbourhoods offers a wide range of building decarbonisation solutions, from district heating to collective electric heat pumps. It also captures diverse characteristics in terms of energy source, the energy efficiency of building stock, home ownership and municipality size. Leveraging existing pilot projects is key to scaling up decarbonisation measures in the built environment. **For the national government,** it is essential to help non-PAW municipalities identify the most "benchmarkable" PAW municipality/neighbourhood in order to minimise the trial-and-error phase. **For subnational governments**, it is important to actively harness existing inter-municipal networks or organisations, such as the VNG, Platform31 and the NPLW, to learn from each other. By exchanging ideas and concerns, municipalities can also collectively elevate their voice *vis-à-vis* the national government to request support on common bottlenecks.

- **SPEED UP by removing common bottlenecks**

  Tackling barriers such as labour shortages and the willingness of citizens to invest in new alternative technologies is a prerequisite to speed up the heat transition process. **For the national government**, developing mechanisms to monitor the time required to install sustainable alternatives (as is currently done for hybrid heat pumps compared to a gas boiler, through the Hybrid Heat Pumps programme announced in May 2022) could speed up the process through close collaboration with industry and education institutions. As recommended by the OECD report *Policy Options for Labour Market Challenges in Amsterdam and Other Dutch Cities* (2023), the national government could also take the lead in implementing a skills taxonomy and skills-based labour market for a sustainable built environment. **For subnational governments**, it is key to engage residents as co-ordinators of the heat transition. While large municipalities may be able to afford to hire sustainability experts who can hold awareness-raising events and visit residents, small- and medium-sized municipalities could engage some of their own residents as heat transition champions. In addition, municipalities could engage more closely with local employers in the building sector to better anticipate local skill needs, providing job-skill matching platforms at the local level and supporting small- and medium-sized enterprises (SMEs) in bundling their staff training needs.

1 Context: Why decarbonise homes in the Netherlands?

This chapter discusses the need for the Netherlands to decarbonise homes within the global, European and Dutch context in light of the climate emergency, COVID-19 recovery plans and the recent energy crisis. Buildings and construction account for nearly 40% of global energy-related CO_2 emissions and in the European Union (EU), 85% to 95% of today's buildings will still be standing in 2050. Retrofitting existing homes to increase energy efficiency could significantly contribute to reaching net zero goals while helping the Netherlands and its municipalities reduce energy demand to navigate the current energy crisis.

Introduction

Decarbonising buildings is a vital step towards a net zero future where buildings operate on clean and affordable energy. Globally, buildings and construction account for nearly 40% of energy-related CO_2 emissions and fossil fuels still meet over 60% of the heating energy demand of buildings (IEA, 2022[1]). When the mitigation potential of buildings is fully exploited, buildings will be one of the biggest contributors to reaching a net zero future.

Many countries are targeting their efforts on reducing energy demand through energy efficiency measures in the context of a green recovery and energy crisis mitigation. Many COVID-19 recovery plans across the world feature energy efficiency measures and retrofitting building stock (OECD, 2022[2]). The current energy crisis triggered by Russia's war of aggression against Ukraine is a stark reminder to reduce energy demand through energy efficiency measures such as insulation, while replacing fossil fuel imported from Russia with sustainable and future-proof energy sources.

In this context, the Netherlands needs to phase out natural gas in buildings to tackle climate and energy challenges as well as to advance net zero goals. In the Netherlands, 90% of homes are dependent on natural gas for heating, which is by far the highest figure in Europe (the EU average is around 27% in 2019). In the Netherlands in 2021, the combustion of natural gas for space heating alone caused 24.5 megatonnes (Mt) of greenhouse gas (GHG) emissions, which approximately accounted for 15% of total GHG emissions in the country (CBS, 2022[3]). The Netherlands plans to achieve a 49% reduction in national GHG emissions by 2030 compared to 1990 levels (Government of the Netherlands, 2019[4]). For the built environment, this means that the Dutch government aims to take 1.5 million homes (out of 8 million homes in total) off natural gas by 2030 and make all homes gas-free by 2050.

In order to achieve this ambition, newly constructed buildings should not be connected to natural gas and existing buildings have to be disconnected from natural gas pipes. However, in the Netherlands, the share of newly constructed buildings is below 1% of total stock annually (0.9% in 2021) and in the EU, 85-95% of today's buildings will still be standing in 2050 (EEA, 2022[5]). Furthermore, residential buildings (homes) account for about 72% of total emissions generated by the built environment in 2020 (CBS, 2022[6]; 2022[3]). This is why retrofitting existing homes is an effective pathway to increase energy efficiency and to switch from fossil fuel heating to sustainable energy sources in order to accelerate building decarbonisation and navigate the current energy crisis.

Implementing sustainability measures "behind the front doors" requires a meticulous approach, taking into account both social and local aspects. From the social perspective, each homeowner or tenant may have different preferences about heating sources and varying levels of willingness to invest in sustainability measures. This is also partly why implementing new sustainability measures in existing buildings is more challenging compared to new buildings. For this reason, this report focuses on existing homes.

From the local perspective, there are significant territorial disparities in terms of income levels, stakeholders to be engaged and regulatory conditions. Decarbonising buildings also requires technical actions that take into account the specificities of the local climate, local building stock and particularly locally available heating sources. Consequently, this report analyses measures to decarbonise buildings through a local lens.

This chapter will start by setting the global and European context and the Dutch-specific context surrounding the need to decarbonise homes. Following chapters will focus on why local actions are important in decarbonising buildings and how the national and local governments in the Netherlands are implementing decarbonisation measures.

Global context

The built environment is critical for the net zero transition

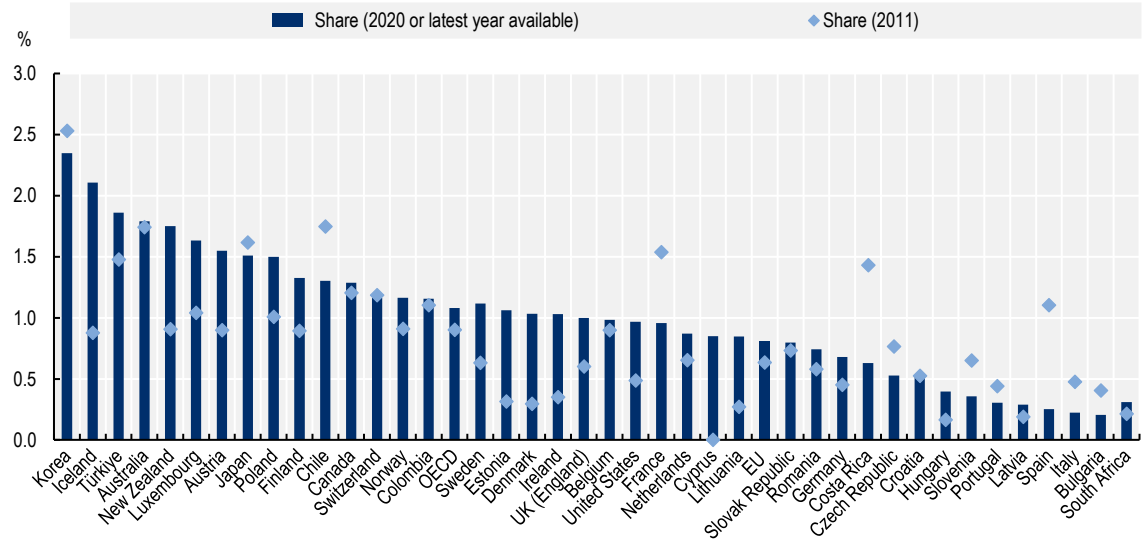
Buildings account for about 28% of total final global energy consumption and 30% of end-use sector CO_2 (carbon dioxide) emissions from the operational energy used to heat, cool and power them, including indirect emissions from electricity and heating (IEA, 2022[7]). When including emissions from materials and construction, buildings account for nearly 40% of global energy-related carbon emissions (UNEP, 2021[8]). Despite the gradual shift away from fossil fuels, direct emissions from the building sector have risen by 0.5% since 2010, driven by energy demand and derailing the sector from the goal of achieving carbon neutrality by 2050 (IEA, 2022[7]; 2022[9]). This trend is also confirmed in the EU where the decarbonisation of building stock is far from being on track and well below the desired levels (BPIE, 2022[10]).

The 2020-30 decade is key for accelerating action to fully capture the decarbonisation potential of buildings

The decade ahead is crucial to implement the measures to capture the full decarbonisation potential of buildings. According to the IEA, retrofitting 20% of the existing building stock to zero carbon by 2030 is an ambitious but necessary milestone toward the Net Zero Emissions by 2050 Scenario (NZE). To achieve this goal, an annual deep renovation rate of over 2% is needed from now to 2030 and beyond (IEA, 2021[11]). Similarly, the Intergovernmental Panel on Climate Change (IPCC) report underlines the importance of this decade in accelerating the acquisition of know-how and skills to achieve high energy efficiency in buildings and set the building sector on the path towards realising its full potential (IPCC, 2022[12]).

Given the low share of annual new construction in the total building stock in developed economies, the renovation of the existing building stock is a core element for achieving the sector's decarbonisation targets for 2030 and 2050. Despite large variations across countries, new housing represents less than 3% of the total housing stock in OECD countries and the OECD average is 1.1% (Figure 1.1).

Figure 1.1. Share of new annual housing construction in total housing stock



Source: OECD (2021[13]), *OECD Affordable Housing Database*, https://www.oecd.org/housing/data/affordable-housing-database/ (accessed on 24 October 2022).

Space heating plays a fundamental role since it accounts for 50% of emissions reductions in the IEA's NZE driven by electrification and demand reductions from energy efficiency and behavioural changes (IEA, 2022[7]). In fact, the 2022 mitigation report from the IPCC (2022[12]) concludes that policy packages that combine ambitious sufficiency, efficiency and renewable energy measures can lead to net zero GHG emissions by 2050.

EU context

In the EU, building renovation for energy efficiency has been widely recognised as a fundamental component of National Recovery and Resilience Plans. It is estimated that 8.4% (EUR 39.9 billion) of Recovery and Resilient Facility funds have been allocated to energy renovation activities. Residential buildings are getting more than half (58%, i.e. EUR 23 billion) of the funds allocated to energy renovation (E3G, 2021[14]). Building renovation was already a top priority of the European Commission, as highlighted by the Renovation Wave Strategy, a flagship initiative of the European Green Deal launched in 2020 (Box 1.1).

Box 1.1. European Commission Renovation Wave Strategy

In 2020, as part of the European Green Deal, the European Commission launched a Renovation Wave Strategy that aims to double annual rates of energy renovations in the next ten years and create green jobs by supporting energy efficiency renovations with public funding. The expected outcome is to renovate 35 million building units by 2030.

The initiative has three focus areas:

- Tackling energy poverty and worst-performing buildings.
- Renovating public buildings and social infrastructure.
- Decarbonising heating and cooling.

The strategy also aims to break down the barriers to building renovation by using policy instruments, funding and technical assistance, including:

- Information, incentives and legal certainty for owners and tenants.
- Finance via NextGenerationEU and other EU and private funds.
- Increased capacity for public authorities and training for workers.
- Market development for sustainable construction products.
- Neighbourhood-based and community-led approaches.

Source: EC (2020[15]), *A Renovation Wave for Europe – Greening Our Buildings, Creating Jobs, Improving Lives*, https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en (accessed on 26 October 2022).

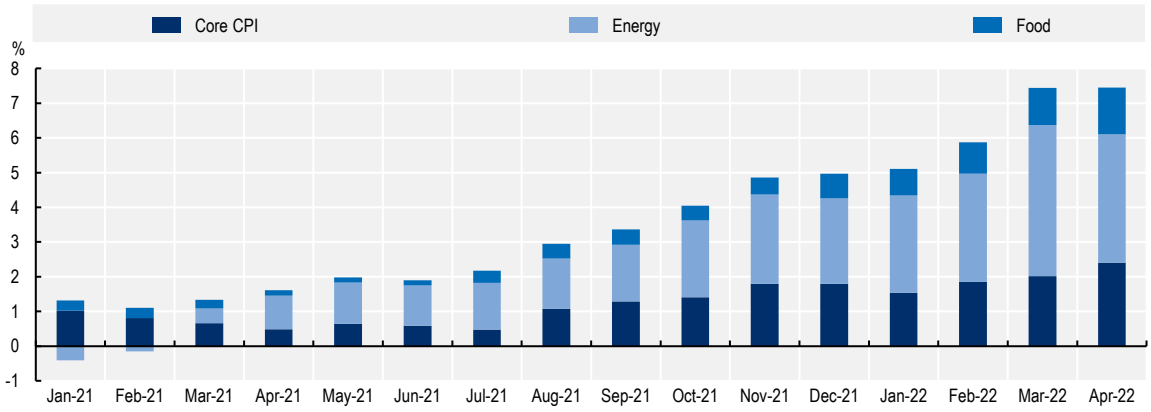
The global energy crisis is a stark reminder of the need for energy efficiency

The global economy has been hit hard by Russia's invasion of Ukraine and energy prices are contributing significantly to inflation at a time when the cost of living was already rising rapidly around the world (Figure 1.2). In this context, reducing energy consumption in buildings has become an even more critical and urgent issue (European Committee of the Regions, 2022[16]). The rise of energy prices is particularly hitting households, for whom prices of natural gas in the first half of 2022 were significantly higher than in

the same period of 2021 (Figure 1.3). Furthermore, the International Monetary Fund (IMF) (2022[17]) concluded that an average European household will see a rise of about 7% in its cost of living in 2022 relative to what was estimated in early 2021. Higher energy prices impose a heavier burden on low-income households because they spend a larger share of their budget on energy (Figure 1.4). Rising energy prices have made the issue of energy poverty even more urgent. Based on the indicator "inability to keep home adequately warm" from the European Commission, it is estimated that in 2020, about 36 million Europeans were struggling with energy poverty (European Parliament, 2022[18]).

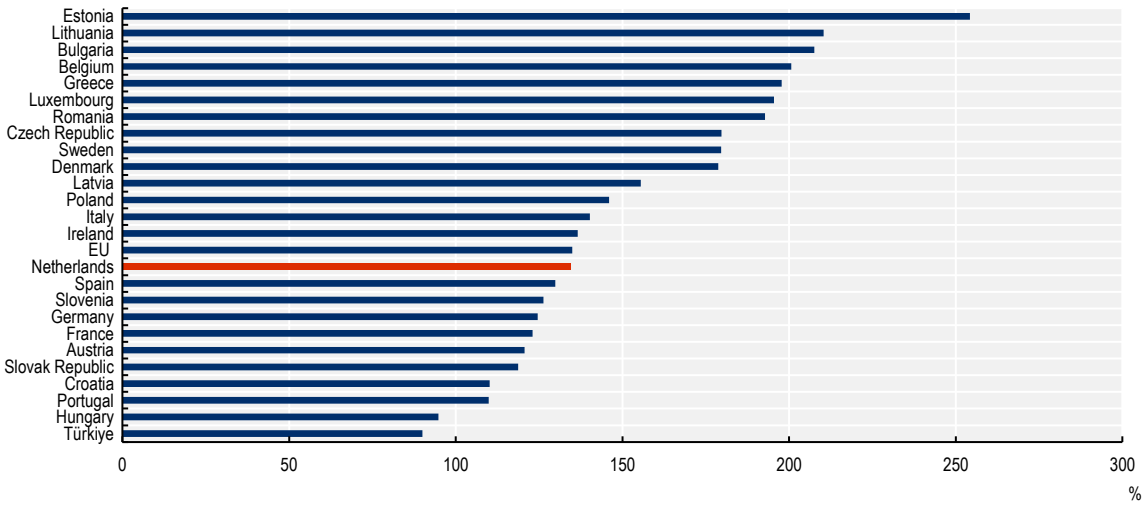
Figure 1.2. Energy prices significantly contribute to inflation in the euro area

Headline inflation – contributions to euro area inflation



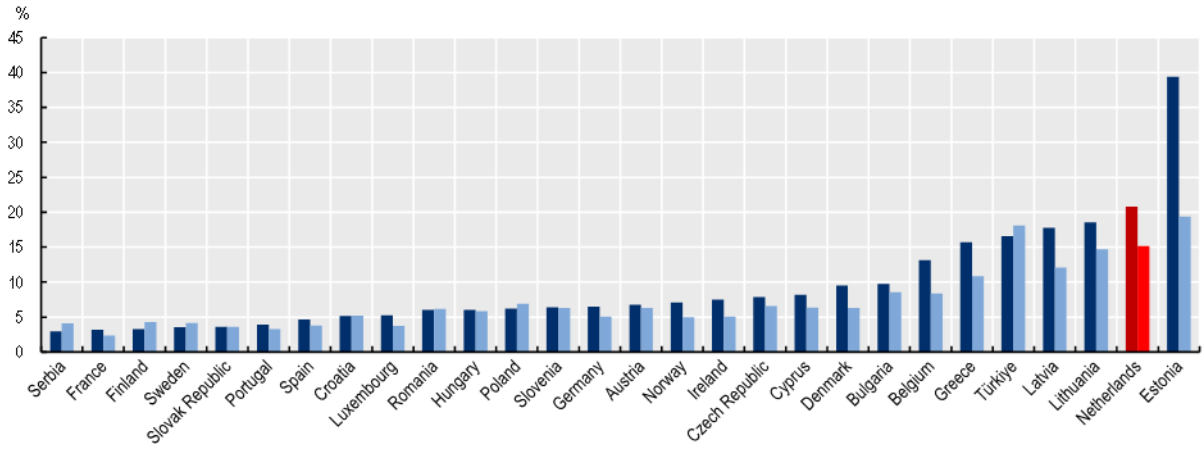
Note: CPI: Consumer Price Index.
Source: OECD (2022[19]), "Why governments should target support amidst high energy prices?", https://www.oecd.org/ukraine-hub/policy-responses/why-governments-should-target-support-amidst-high-energy-prices-40f44f78/.

Figure 1.3. Change in natural gas prices for households' consumers compared with previous year, same semester, first half of 2022



Note: The estimation is made based on the difference between gas prices, all taxes and levies included, between the first semester of 2021 and the first semester of 2022.
Source: Authors' elaboration based on Eurostat (2022[20]), *Change in Natural Gas Prices for Household Consumers Compared with Previous Year, Same Semester, First Half 2022*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Change_in_natural_gas_prices_for_household_consumers_compared_with_previous_year,_same_semester,_first_half_2022_(%25)_.png (accessed on 24 October 2022).

Figure 1.4. Impact of the recent energy price surge on household budgets differs between EU countries and income groups



Note: 2015 consumption weights for different household groups are adjusted with the 2016-21 evolution of the corresponding items' weights in the Harmonised Consumption Price Index.
Source: Blake, H. and B. Tim (2022[21]), "Surging energy prices are hitting everyone, but which households are more exposed?", https://oecdecoscope.blog/2022/05/10/surging-energy-prices-are-hitting-everyone-but-which-households-are-more-exposed/ (accessed on 8 December 2022), updated with more recent data from Eurostat from 31 November 2022.

Given the current energy crisis, it is critical to protect vulnerable households and firms without adding to inflationary pressures and increasing public debt burdens (OECD, 2022[22]). In light of this context, governments are introducing policies and fiscal support programmes to mitigate the impact of energy costs on households, especially the most vulnerable. According to the World Economic Forum (2022[23]), such fiscal support has reached USD 276 billion in Europe as of August 2022, mainly in the form of cost-of-living allowances. Table 1.1 features some examples of fiscal support programmes in OECD countries. However, fiscal support is not enough if it is not reinforced by demand reduction and efficiency measures, which also need to ensure that efforts to strengthen energy security do not hamper the need to accelerate the green transition. Strengthening energy grids and investing in energy efficiency and green technologies will need to be high on policy agendas to reach net zero emissions goals (OECD, 2022[22]; 2022[24]).

Table 1.1. Examples of fiscal support programmes to address high energy prices in OECD countries

Country	Name	Description
France	Energy cheque	A new exceptional energy cheque of between EUR 100 and EUR 200 was paid to 40% of the poorest households by the end of 2022. This measure complements the extension of the tariff shield in 2023.
Germany	Energy relief plan	The plan aims to help ease the energy crisis for industries and households with EUR 200 billion in support. The fund is set to last until 2024 and will finance energy price caps and subsidies. Households can benefit from a price cap of 80% of their usual consumption starting in March 2023 until the end of April 2024.
Netherlands	Energy price cap	From 1 January to 31 December 2023, the energy price of all small consumers of energy – households, self-employed people, small businesses, and associations –are capped to reduce the cost of energy bills. More specifically, for maximum gas consumption of 1 200 m^3, the price are capped under EUR 1.45 per m^3. For maximum consumption of 2 900 kWh of electricity, EUR 0.40 per kWh. For 2022, small consumers received a EUR 190 discount on energy bills both in November and December.

Country	Name	Description
Spain	Gas prices cap	The Spanish government set a cap of gas prices to lower the electricity bill for households. It is expected that the average electricity price will fall significantly to around EUR 130 per megawatt-hour on average over the year, compared to EUR 210 in the first quarter of 2022.
United Kingdom	Energy Price Guarantee	This scheme will reduce the unit cost of electricity and gas so that a household with typical energy use in the UK pays, on average, around GBP 2 500 a year on their energy bill. The scheme entered into effect on 1 October 2022 and will run until April 2023. On average, a household will save GPB 1 000 a year (based on current prices from October 2022). Energy suppliers will be fully compensated by the government for the savings delivered to households.

Source: OECD's elaboration drawing on Government of France (2022[25]), "Exceptional energy check in 2022: 100 to 200 € additional", https://www.service-public.fr/particuliers/actualites/A15168?lang=en (accessed on 24 October 2022); Ofgem (2022[26]), *Energy Price Cap Explained*, UK Office of Gas and Electricity Markets, https://www.ofgem.gov.uk/information-consumers/energy-advice-households/check-if-energy-price-cap-affects-you#:~:text=Energy%20Price%20Guarantee (accessed on 25 October 2022); La Moncloa (2022[27]), "Government of Spain caps gas prices to lower electricity bills for households, businesses and industry", https://www.lamoncloa.gob.es/lang/en/gobierno/councilministers/paginas/2022/20220513_council-extr.aspx (accessed on 25 October 2022), Government of the Netherlands (2022[28]), *Price Cap for Gas, Electricity and District Heating*, https://www.government.nl/topics/energy-crisis/cabinet-plans-price-cap-for-gas-and-electricity (accessed on 14 November 2022); DW (2022[29]), "German government presents energy relief plan", https://www.dw.com/en/germany-presents-new-200-billion-relief-plan-in-response-to-soaring-energy-prices/a-63279609 (accessed on 20 March 2023).

Energy-efficient buildings can further contribute to the reduction of energy demand while accelerating the green transition. In the EU, this ambition is supported by the REPowerEU Plan that aims to reduce energy demand as well as dependence on Russian fossil fuels and fast forward the green transition, while increasing the resilience of the EU-wide energy system (Box 1.2).

Box 1.2. REPowerEU Plan

The REPowerEU Plan aims to rapidly reduce the EU's dependence on Russian fossil fuels by fast-forwarding- the green transition and joining forces to achieve a more resilient energy system. Building on the Fit for 55 package of proposals and completing the actions on energy security of supply and storage, the main strands of action under the plan are saving energy by promoting energy efficiency and enhancing preparedness; diversifying energy supplies; quickly substituting fossil fuels by accelerating the EU's clean energy transition and smartly combining investments and reforms.

In regards to the building sector, the REPowerEU Plan proposes the following initiatives:

- Increasing the binding Energy Efficiency Target from 9% to 13% compared to the 2020 Reference Scenario (750 Mtoe in final and 980 Mtoe in primary energy consumption, respectively) under the Fit for 55 package.
- Reducing VAT rates on energy-efficient heating systems, building insulation, efficient appliances and projects.
- A Solar Rooftop Initiative, which aims to install solar panels on new public and commercial buildings and new residential buildings.
- Scaling up heat transition measures by doubling the rate of deployment of heat pumps and integrating geothermal and solar thermal energy in modernised district and communal heating systems.

Source: EC (2022[30]), *REPowerEU: Affordable, Secure and Sustainable Energy for Europe*, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en (accessed on 24 October 2022).

Dutch context

The current energy crisis combined with the climate crisis has accelerated the momentum to speed up sustainability actions in the Netherlands. In response to the climate crisis, the Dutch Climate Agreement stated a goal to achieve a 49% reduction in national GHG emissions by 2030 compared to 1990 levels (Government of the Netherlands, 2019[4]). While less than 20% of natural gas demand in the Netherlands was met by imports from Russia as of 2021 (CBS, 2022[31]), in May 2022, Gazprom, the main Russian energy exporting company, decided to cut off completely natural gas supply to the Netherlands. Like many EU member states, the Netherlands therefore needs to quickly replace natural gas with an alternative energy source.

The Netherlands has the highest dependency on natural gas for heating in the EU

Both in the EU and in the Netherlands, heating represents the biggest share of energy consumption. In 2020, space heating accounted for 62.8% of the total energy consumption of households in the EU and 67% in the Netherlands (RVO, 2020[32]). When combining space heating with water heating, heating accounts for about 78% of the final energy consumption of households in the EU and 79% in the Netherlands (Eurostat, 2022[33]; RVO, 2020[32]).

However, the composition of energy used for heating differs across the EU. Among the EU 27 countries, the Netherlands is the most dependent on natural gas for heating, with gas accounting for 85% of the energy used for space heating in residential buildings (Figure 1.5). Moreover, approximately 90% of homes in the Netherlands are heated with natural gas, compared with 48.2% of homes in Germany (BMWI, 2019[34]; Government of the Netherlands, 2022[35]). This dependence on natural gas for heating residential buildings has also remained high in the Netherlands over the 2017-21 period (Figure 1.6). There is therefore a pressing need to find alternatives to natural gas for heating buildings, particularly homes, in the Netherlands.

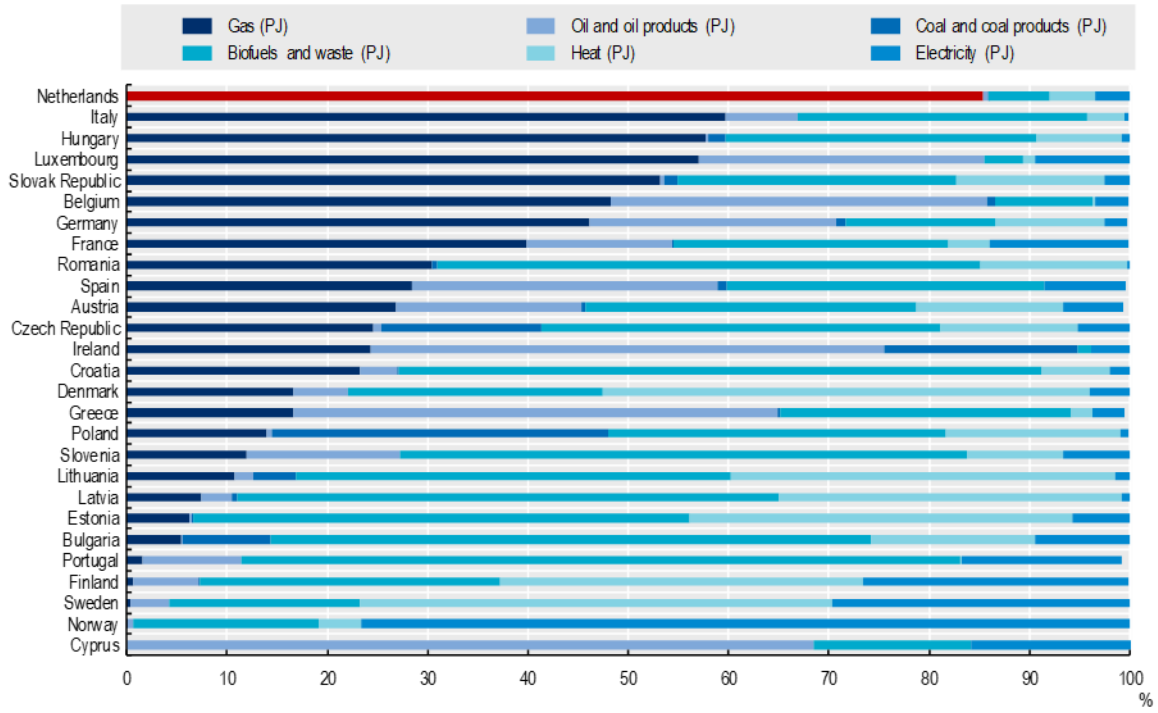
Dutch policy responses towards the heat transition in homes

Due to the Netherlands' high dependence on natural gas for heating, the main climate goal for the built environment in the Netherlands is to phase out natural gas by 2050. As an intermediate goal, 1.5 million of the almost 8 million dwellings in the Netherlands should be heated without natural gas by 2030 (Government of the Netherlands, 2022[35]). To achieve the goals set in the Dutch Climate Agreement, the Netherlands focuses on three areas, namely: i) sustainable collective heating solutions such as district heating; ii) energy demand reduction solutions such as insulation; and iii) energy-efficient heating equipment such as heat pumps.

The Dutch government introduced an area-specific approach focused on the heating transition

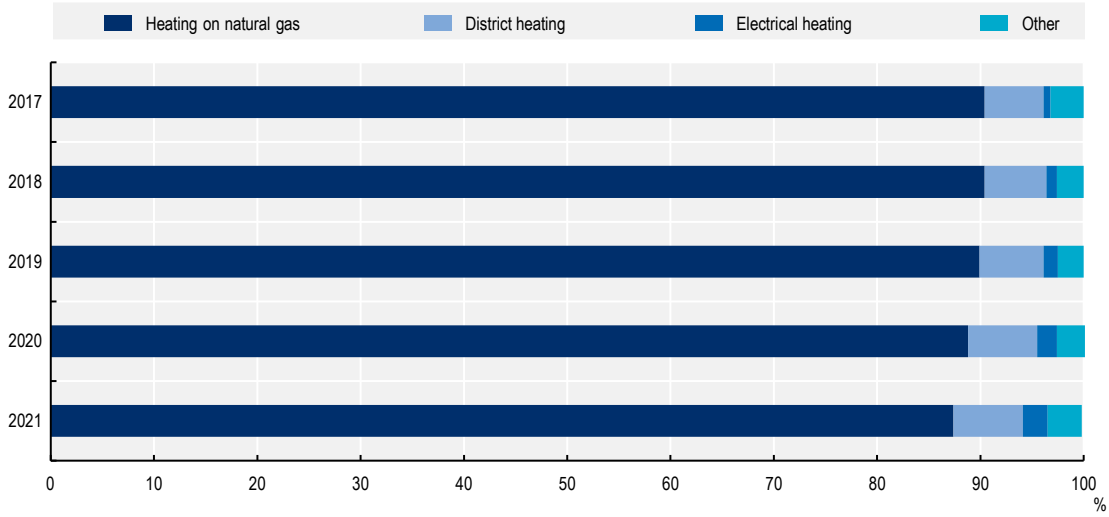
To ensure the success of the transition, the Dutch government works closely with the municipalities to identify optimal solutions to phase out natural gas in each local context. The national government provides financial and technical assistance to municipalities so that they can develop a neighbourhood-by-neighbourhood action plan for sustainability measures. For some sustainable heating solutions, this area-specific approach is inevitable since collective heating solutions such as district heating require at least a neighbourhood to make a business case (Government of the Netherlands, 2022[35]). By working closely with municipalities, the national government plans to provide 500 000 new connections to district heating networks in existing buildings by 2030 (Government of the Netherlands, 2022[35]).

Figure 1.5. Energy use for space heating in residential buildings by source, EU27, 2019



Source: OECD calculations based on IEA (2022[36]), "Residential sector detailed data and indicators", https://doi.org/10.1787/4c7e5c8b-en (accessed on 4 November 2022).

Figure 1.6. Share of different heating systems in residential buildings in the Netherlands, 2017-21



Source: Government of the Netherlands (2021[37]), *Regional Climate Monitor*, https://klimaatmonitor.databank.nl/jive (accessed on 27 October 2022).

The National Insulation Programme aims to phase out the worst-performing buildings

Properly insulated homes reduce energy demand and contribute to making energy bills more affordable. This is particularly important in the context of the current surge of energy prices. In the Netherlands, 1.5 million out of 8 million homes in the Netherlands still have an energy label E or worse. The Dutch government has therefore introduced a National Insulation Programme, which aims to insulate 2.5 million homes by 2030, with a particular focus on buildings with an energy label E, F or G. The National Insulation Programme is financially supported by the Energy Savings Investment Subsidy Scheme (ISDE) for owner-occupied homes and the Own Home Energy Savings Grant (SEEH) for Owners' Associations (VvE) (Government of the Netherlands, 2022[35]).

The Hybrid Heat Pumps Programme aims to standardise (hybrid) heat pumps as a new norm

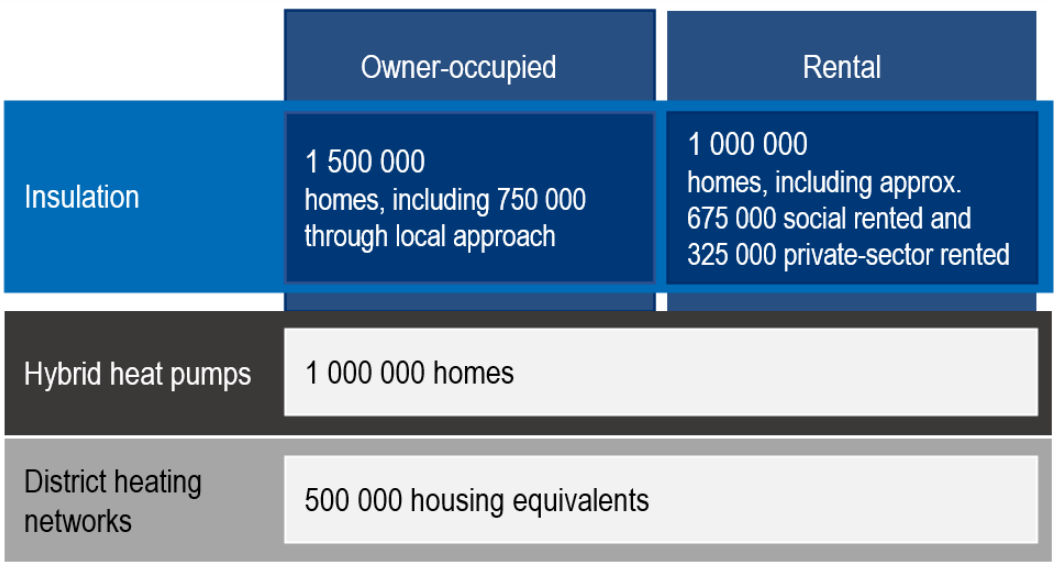
According to the IEA's Net Zero Emissions by 2050 Scenario (NZE), heat pumps offer a major technology for electrifying space heating. The EU has a large potential for heat pumps to cut dependence on natural gas due to the region's heavy reliance on natural gas for heating and surging gas prices (IEA, 2022[38]). Heat pumps are known to be at least three to five times more energy-efficient than traditional natural gas boilers. Furthermore, if the electricity mix for using the heat pump is composed of low-carbon or renewable energy sources, this increases action towards decarbonising space and water heating. According to the IEA NZE, the number of heat pumps installed globally should rise from 180 million in 2020 to around 600 million in 2030 (IEA, 2021[11]).

In light of the importance of heat pumps in building decarbonisation, the Netherlands announced a Hybrid Heat Pumps Programme in May 2022. Hybrid heat pumps are heat pumps that are connected to a central heating boiler. Heat pumps provide a large share of the heat in the house but central heating boilers are used when it is very cold outside or when the house needs to be warmed up quickly. The hybrid heat pumps allow residents to use up to 60% less natural gas to heat homes (Milieu Centraal, n.d.[39]). The Hybrid Heat Pumps Programme was launched from a practical point of view. In the Netherlands, about 1.5 million homes out of 8 million are energy-labelled E, F or G in which the insulation level is not enough for fully electric heat pumps. Given the average life expectancy of 15 to 20 years of hybrid heat pumps, the national government plans to promote hybrid heat pumps while promoting insulation until it reaches a point where most buildings can switch to fully electric heat pumps. Also, for some homes, hybrid heat pumps can also be a definitive gas-free solution, when used in combination with green gas (Government of the Netherlands, 2022[35]).

By January 2026, hybrid heat pumps are expected to become the standard for heating homes. This means that when installing new heating systems or replacing gas boilers, hybrid heat pumps will be mandatory (RVO, 2022[40]). The programme aims to install 1 million hybrid heat pumps by 2030. This programme is also supported by the ISDE, which subsidises on average 30% of the purchase price of a hybrid or fully electric heat pump. For this purpose, the government has put aside EUR 150 million per year for the 2025-30 period to roll out the installation of heat pumps across the Netherlands (Government of the Netherlands, 2022[35]).

An overview of policy objectives for sustainability measures in residential buildings is provided in Figure 1.7.

Figure 1.7. An overview of policy objectives for sustainable residential buildings by 2030 in the Netherlands



Note: The figure excluded the policy objectives for non-residential buildings.
Source: Government of the Netherlands (2022[35]), *Beleidsprogramma versnelling verduurzaming gebouwde omgeving*, https://www.rijksoverheid.nl/ministeries/ministerie-van-binnenlandse-zaken-en-koninkrijksrelaties/documenten/rapporten/2022/06/01 (accessed on 18 October 2022).

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2 Rationale: Why are local actions critical for decarbonising homes in the Netherlands?

This chapter explores why local actions are important for the decarbonisation of buildings in the Netherlands. Disparities across cities in terms of heating sources, human resources and the energy efficiency level of building stock, call for locally customised approaches. Moreover, energy poverty differs greatly across and within places, which can challenge the decarbonisation ambition. Municipalities are more familiar with local conditions and closer to their citizens than the national government. Therefore, they have a key role to play in developing and implementing local decarbonisation measures in co-operation with the national government.

Introduction

The Netherlands has the ambition to achieve climate neutrality by 2050, which requires cutting greenhouse gas (GHG) emissions, phasing out natural gas for heating and increasing the energy performance of buildings (Government of the Netherlands, 2019[1]). Although the Netherlands has made significant progress in the implementation of this ambition, outcomes and progress are uneven across municipalities, mainly due to the differences in locally available energy (heating) sources, the use of energy performance certificates, the deployment of efficient heating systems and ownership patterns.

This chapter discusses why local actions are critical for decarbonising buildings. It first presents key findings from previous OECD work on decarbonising buildings in cities and regions (OECD, 2022[2]). It then applies these findings to the case of the Netherlands, by documenting regional disparities in levels of locally available resources, energy efficiency of housing stock and energy poverty in the Netherlands. The data analysis in this chapter includes insights from an OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (hereinafter the OECD Dutch City Survey) (Box 2.1).

Box 2.1. OECD Survey on Decarbonising Buildings in Cities in the Netherlands

To gain a granular understanding of the energy transition in the built environment in the Netherlands at the municipal level, the OECD conducted an online survey from mid-August to the end of September 2022. The survey consisted of five sections: i) general information on municipalities; ii) Heat Transition Vision; iii) natural gas-free neighbourhoods; iv) individual approaches for retrofitting residential buildings; and v) multi-level governance.

In total, 26 municipalities participated in the survey and together they account for 16.4% (about 3.8 million inhabitants) of the total population in the Netherlands. Based on the OECD-European Commission Degree of Urbanisation classification, the respondents represent all 3 types of settlement, with 14 cities, 8 towns and suburbs, and 4 rural areas.

Table 2.1. Surveyed subnational governments, by population and type of settlement

Municipality	Population (2022)	Type of settlement
Amsterdam	882 633	City
Rotterdam	655 468	City
Utrecht	361 699	City
Tilburg	224 459	City
Almere	217 828	City
Apeldoorn	165 611	City
Zaanstad	157 166	City
Leeuwarden	125 504	City
Maastricht	121 151	City
Westland	112 448	City
Delft	104 572	City
Deventer	101 446	City
Zeist	65 987	Town and suburb
Lasingerland	64 110	City
Oosterhout	56 535	Town and suburb
Weert	50 346	Town and suburb
Utrechtse Heuvelrug	49 981	Town and suburb
Waadhoeke	46 309	Rural area

Geldrop-Mierlo	40 131	Town and suburb
Oldambt	38 521	Rural area
Leusden	30 713	Town and suburb
Nuspeet	28 223	Town and suburb
Brunssum	27 674	City
Baarn	24 876	Town and suburb
Sluis	23 141	Rural area
Oirschot	19 061	Rural area

Note: Data on 2022 population are extracted from official government sources, while the type of settlement is estimated based on the Global Settlements Human Layer (GSHL) with population data from 2020.
Source: EC (2022[3]), *Global Settlements Human Layer (GSHL)*, https://ghsl.jrc.ec.europa.eu/p2022Release.php (accessed on 25 October 2022); CBS (2022[4]), *Regional Key Figures: The Netherlands*, https://opendata.cbs.nl/#/CBS/nl/dataset/70072ned/table?ts=1668419012743 (accessed on 14 November 2022).

Policies to decarbonise homes need to be locally customised

The role of subnational governments as key drivers in decarbonising buildings has been highlighted in the OECD report *Decarbonising Buildings in Cities and Regions* (2022[2]) (Box 2.2).

According to the report, the heterogeneity of local conditions in local climate, local building stock and other factors leads to a wide range of technically and economically viable pathways to building decarbonisation. The rest of this chapter, therefore, focuses on the disparities in terms of the level of resources, energy efficiency of building stock and energy poverty across municipalities in the Netherlands that lead to different heat transition approaches across places.

Box 2.2. OECD 2022 *Decarbonising Buildings in Cities and Regions* report

The OECD report *Decarbonising Building in Cities and Regions* (2022[2]) is the first attempt by the OECD to document the critical role of subnational governments in driving the decarbonisation of buildings in a shared responsibility with national governments. Key findings and recommendations call for countries, regions and cities to develop effective multi-level governance approaches to unlock the subnational potential for decarbonising buildings. The OECD Checklist for Public Action provided in the report outlines key actions for national governments to establish the enabling environment and for local and regional governments to unleash their potential to decarbonise buildings (Box 3.1).

Key findings

- **Cities and regions provide locally tailored actions for building decarbonisation**. Cities and regions have more advantage than the national government in terms of familiarity with local building stock and also close relationships with local businesses and citizens. They should therefore take a different approach to decarbonising buildings due to different local conditions such as climate, the carbon intensity of buildings, the share of old building stock, the rate of new construction and housing affordability.
- **Cities and regions are implementing ambitious policy measures at the subnational level**. According to the OECD survey on Decarbonising Buildings in Cities and Regions (OECD Global City Survey 2021), overall, 88% of the cities and regions surveyed demand higher energy efficiency standards than the national level in building energy codes and 25% even call for a net

zero energy level. Also, cities and regions can implement sustainable measures for public buildings that they own and are also responsible for building regulations.

- **Cities and regions contribute to generating co-benefits in health, energy affordability and the labour market**. Energy efficiency improvements in buildings bring benefits including local job creation, improvement of health as a consequence of improved indoor air quality and reducing energy bills. The OECD survey on Decarbonising Buildings in Cities and Regions (OECD Global City Survey 2021) revealed that 89% of cities and regions valued "Reduced cost of paying the energy bill for low-income households" to be the most important benefit of energy efficiency improvement in buildings.
- **Cities and regions face considerable co-ordination, funding, capacity, awareness and regulatory challenges**. Most cities and regions surveyed (86%) have their own plans or strategies but many face challenges in implementing them. The surveyed cities and regions reported that inadequate budgets (76%) and human resources (48%) are the 2 biggest obstacles to effective policy development and implementation on the local level. Also, they pointed out that "Broader engagement of citizens and the private sector/greater awareness raising" (57%) and "Stricter building energy codes/minimum legal requirement" (38%) are their key priorities.
- Scaling up the role and actions of cities and regions for decarbonising buildings, through innovative data, analysis and policy guidance directed to national and subnational governments, is important. **Collaboration across levels of government is fundamental in implementing effective measures**.

Source: OECD (2022[2]), *Decarbonising Buildings in Cities and Regions*, https://doi.org/10.1787/a48ce566-en (accessed on 18 October 2022).

Resources for the decarbonisation of buildings differ across Dutch cities and regions

Locally available heating sources differ across cities and regions

The availability of clean heating alternatives to fossil fuel-fired boilers differs across cities and regions. Clean heating alternatives include heat pumps, district heating, renewable heat technologies and other emission-free heating solutions (IEA, 2022[5]). Among the clean heating alternatives, in the Netherlands, district heating accounts for 6.7% of homes and heat pumps (electric heating) account for less than 2% of homes in 2020 (CBS, 2022[6]).

District heating has the largest share among the clean heating alternatives in the Netherlands. It is one of the promising sustainable alternatives for replacing natural gas for space heating when it uses low-carbon energy sources. According to the International Energy Agency (IEA), the heat network should be connected to renewable heat sources (such as bioenergy, solar thermal, heat pumps and geothermal) and be integrated into secondary heat sources (such as biomass, waste heat from industrial installation and data centres) to be in alignment with the Net Zero Emissions by 2050 Scenario (NZE) (IEA, 2022[7]).

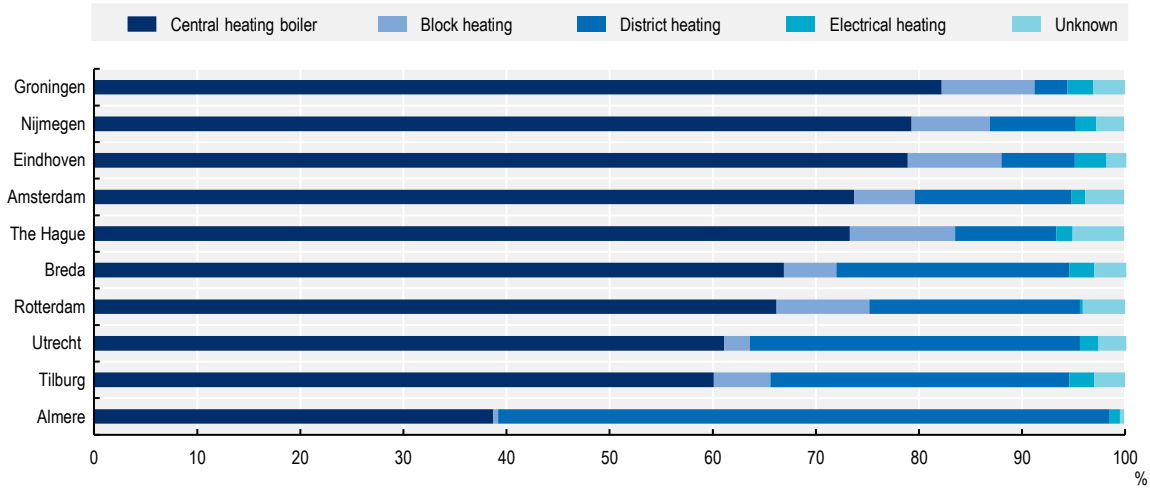
Acquiring heat from secondary heat sources, particularly biomass and residual heat, fundamentally recycles heat that otherwise would be wasted (Werner, 2017[8]). As a consequence, district heating contributes to a circular economy approach, which puts back resources into use again. According to the OECD *Circular Economy in Cities and Regions* report, the use of energy sources and embedded technologies in buildings to enhance resource efficiency is one of the ways to achieve the circularity of the built environment (OECD, 2020[9]).

District heating consists of a central heating source, distribution and delivery, making it a total energy system and infrastructure (IEA, 2022[7]). Given these components of district heating, connection to district heating varies particularly at the local level because the district must first have guaranteed heat sources that are available for heating. For this reason, locally available heating sources contribute to shaping municipalities' sustainable heating strategies. For example, in the municipality of **Deventer**, the neighbourhood of Zandweerd was chosen as the first place to be disconnected from the gas grid. One of the primary reasons for this selection was that near the district, there is a wastewater treatment plant (WWTP) that can provide residual heat for low-temperature heating (Municipality of Deventer, 2021[10]). Similarly, in the municipality of **Schiedam**, the neighbourhood of Groenoord was chosen as the first natural gas-free neighbourhood in the municipality due to the proximity to a large heat surplus in the province of Zuid-Holland (Municipality of Schiedam, 2022[11]).

Figure 2.1 shows the share of heating systems in the top ten municipalities by population size in the Netherlands and reflects the diversity across territories – despite the small sample – in terms of the share of central boilers and district heating.

Figure 2.1. Heating systems used in the ten largest (by population) municipalities in the Netherlands

Breakdown by type of heating system in each municipality



Source: Author's elaboration drawing on data from CBS (CBS, 2022[6])*Woningen; hoofdverwarmingsinstallaties, regio (Homes; Main Heating Installations, Region)*, https://opendata.cbs.nl/statline/?dl=2238E#/CBS/nl/dataset/84948NED/table?ts=1662998109340 (accessed on 27 September 2022).

Buildings with different types of ownership require different decarbonisation approaches

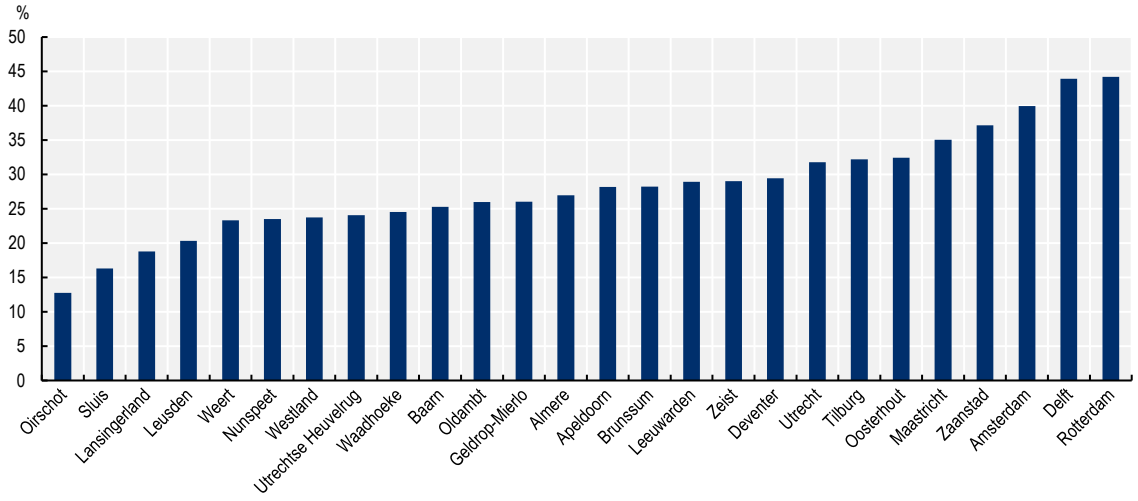
The Netherlands has one of the largest social housing sectors in the EU (accounting for 30% of all households) and social housing is managed by housing corporations (OECD, 2020[12]). Among many other duties, housing corporations are responsible for maintaining homes, including by investing in sustainable heat sources. The social housing sector works closely with local governments and follows the area-specific approach led by the municipalities (BZK, 2022[13]). In addition, it is estimated that social housing companies have a comparative advantage in collective negotiations with energy companies since they own large numbers of homes.

In order to achieve the goals set by the Dutch Climate Agreement, about 450 000 homes from the social housing sector must become natural gas-free by 2030 (Government of the Netherlands, 2019[1]). In June 2022, the National Performance Agreements for Public Housing were signed by the Dutch government, the Dutch Association of Housing Corporations (Aedes), the Association of Dutch Municipalities (VNG) and other stakeholders. The agreements foresee the end of the social housing landlord levy as of 1 January 2023 under the condition that 75 000 tenants benefit from insulation and 50 000 homes are taken off the gas annually until 2030 (Aedes, 2022[14]; Government of the Netherlands, 2022[15]).

Thus, the municipalities can strategically align their decarbonising building goals with the local housing corporations' sustainable retrofit plans. For instance, when selecting the 24 front-running districts for phasing out natural gas, the municipality of **Utrecht** considered the districts where the share of social housing managed by housing corporations is larger than 50% of the total housing stock (Municipality of Utrecht, 2021[16]).

However, the share of social housing differs greatly across municipalities in the Netherlands, which leads to different strategies in each municipality to leverage these assets. Figure 2.2 shows that shares of social housing in the 26 municipalities that responded to the OECD Dutch City Survey vary between 13% in Oirschot and 44% in Rotterdam, compared to 34.1% in the Netherlands and 7% in OECD countries (OECD, 2022[17]).

Figure 2.2. The share of social housing in Dutch municipalities



Note: This graph shows the share of social housing in the 26 municipalities that responded to the OECD Dutch City Survey.
Source: Government of the Netherlands (2022[18]), *Klimaatmonitor*, https://klimaatmonitor.databank.nl/jive (accessed on 12 December 2022).

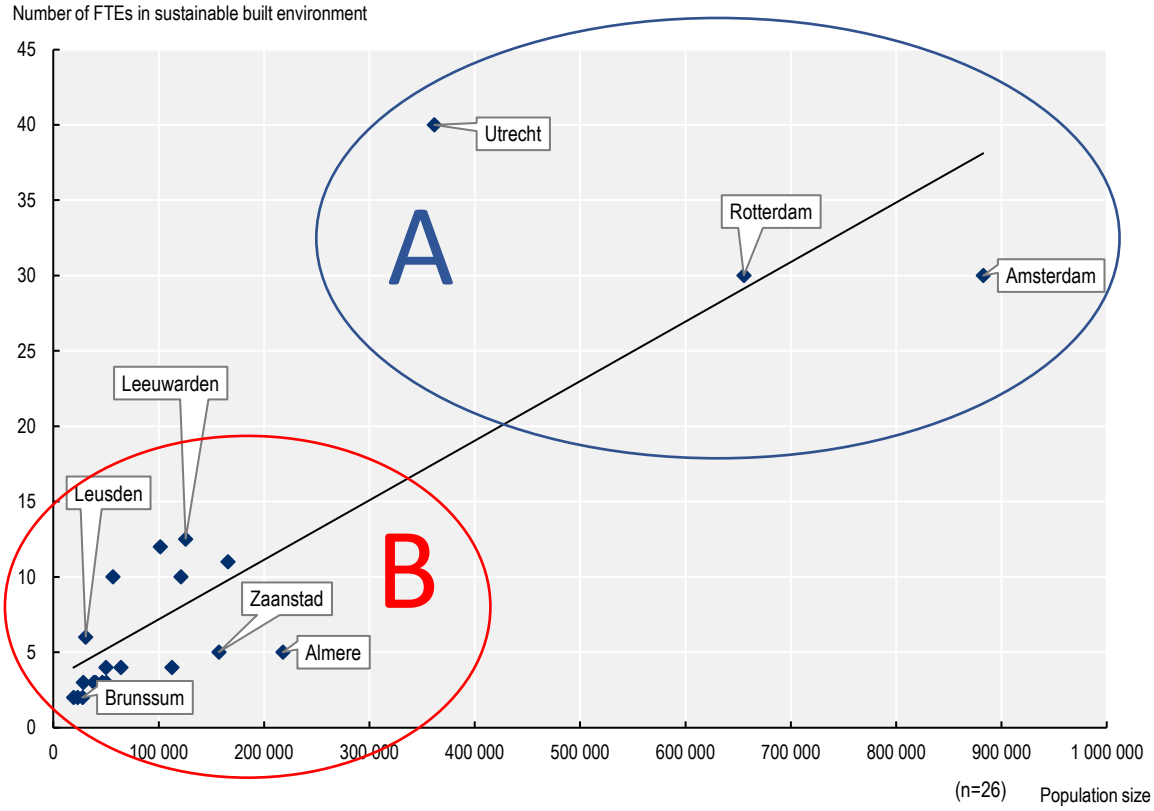
Cities devote different levels of human resources to the sustainable built environment

Municipalities in the Netherlands face different capacity challenges to address building decarbonisation. Most of the surveyed municipalities reported that they lack the staff to co-ordinate and manage building decarbonisation activities. Figure 2.3 shows the number of full-time equivalent (FTE) staff in each municipality devoted to a sustainable built environment compared to the entire population of the municipality. Large cities such as Amsterdam, Rotterdam and Utrecht had more than 30 staff working on building decarbonisation (hereafter Group A). Among the three big cities, Utrecht showed the highest share of civil servants compared to its population level. In contrast, Figure 2.4 shows a much smaller human resources capacity in medium- and small-size municipalities (hereafter Group B).

The lack of capacity and knowledge at the subnational level can limit the overall potential of the Netherlands to achieve its energy transition in the built environment. For example, none of the surveyed municipalities (except for Numpset) with less than 9 staff working on building decarbonisation provided any training on sustainable built environment-related issues, while half (50%, i.e. 4 out of 8) of the municipalities with more than 10 staff have done so.

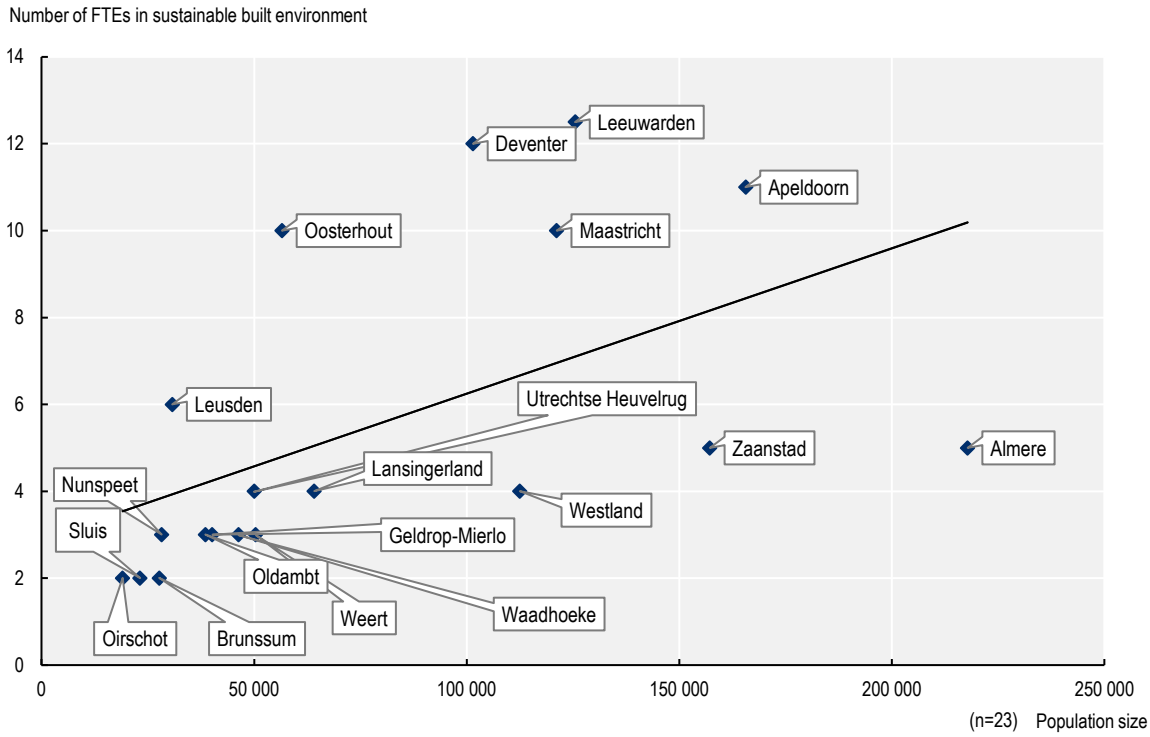
The energy transition is a shared responsibility that goes beyond the sectoral energy department of a municipality. A wide range of specialists, including urban planners, energy project managers and experts in stakeholder engagements, communication and monitoring, must work together to achieve the goals of building decarbonisation.

Figure 2.3. Number of staff working on the sustainable built environment compared to the entire population, by municipality



Note: Results are based on a sample of 22 respondents. Municipalities were grouped into Groups A and B based on the number of sustainable built environment FTEs and total population size. This graph comes from self-reported data from the OECD survey.
Source: OECD Dutch City Survey (2022); OECD calculations based on CBS (2022[4]), *Regional Key Figures: The Netherlands*, https://opendata.cbs.nl/#/CBS/nl/dataset/70072ned/table?ts=1668419012743 (accessed on 14 November 2022).

Figure 2.4. Number of staff working on the sustainable built environment compared to the entire population (except Utrecht, Rotterdam and Amsterdam)



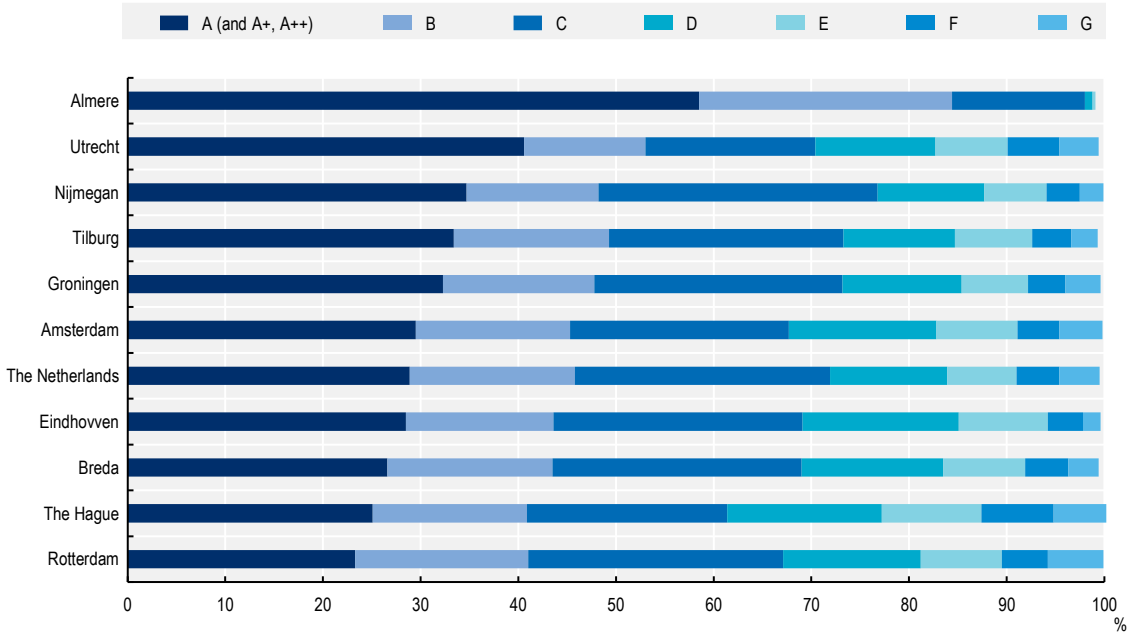
Note: Results are based on a sample of 19 respondents. Municipalities were grouped into Groups A and B based on the number of sustainable built environment FTEs and total population size. This graph comes from self-reported data from the OECD survey.
Source: OECD Dutch City Survey (2022); OECD calculations based on CBS (2022[4]), *Regional Key Figures: The Netherlands*, https://opendata.cbs.nl/#/CBS/nl/dataset/70072ned/table?ts=1668419012743 (accessed on 14 November 2022).

Energy efficiency levels of housing stock differ across cities and regions

Cities are confronted with different energy needs, shaped in particular by the heterogeneous mix of energy efficiency levels of the local building stock. The energy label of building stock, or energy performance certificate (EPC), categorises buildings by their level of energy efficiency, ranging from A (most efficient) to G (least efficient). Figure 2.5 shows the share of energy labels from A (A+ and A++ included) to G in the ten largest municipalities in the Netherlands in 2022. The municipality of Almere had the highest share of dwellings within the bands of A to A++ EPC level, marking about 60% of the local housing stock, whereas the municipality of Rotterdam had the lowest share of dwellings within the bands of A to A++ EPC.

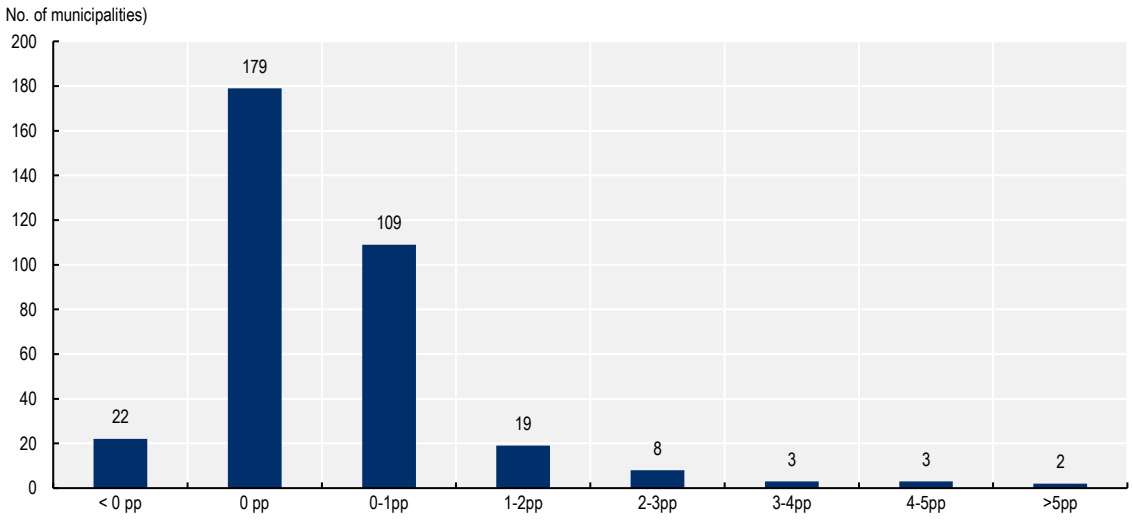
Heating and hot water supply are two major components for decarbonising residential buildings in the Netherlands. They account for nearly 80% of final energy consumption in residential buildings, which is predominately driven by natural gas consumption (RVO, 2020[19]). In this context, the challenge for the Netherlands is to provide alternative heating solutions that are less reliant on natural gas. Although district heating and electrification (in the form of heat pumps) are becoming popular measures to phase out natural gas in residential buildings, the speed of their adoption varies across cities and regions (Figures 2.6 and 2.7)

Figure 2.5. Breakdown of residential buildings in the ten largest Dutch municipalities, by energy label, 2022



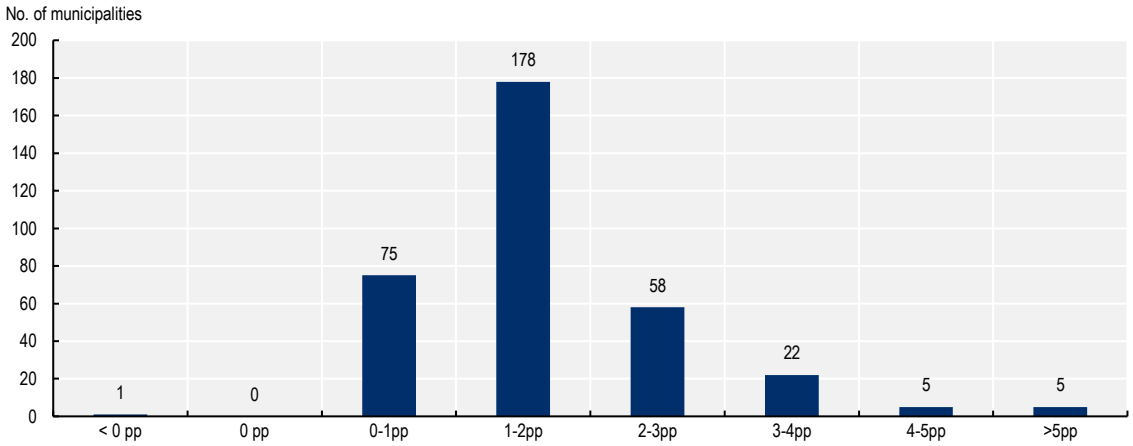
Note: About 58% of homes in the Netherlands have an energy label (RVO, 2022[20]).
Source: OECD calculations based on Waarstaatjegemeente (n.d.[21]), *Homepage*, www.waarstaatjegemeente.nl (accessed on 4 November 2022.

Figure 2.6. Change in share of low-carbon and zero-carbon district heating between 2017 and 2021



Source: Government of the Netherlands (2022[18]), *Klimaatmonitor*, https://klimaatmonitor.databank.nl/jive (accessed on 12 December 2022).

Figure 2.7. Change in share of low-carbon and zero-carbon electric heating between 2017 and 2021

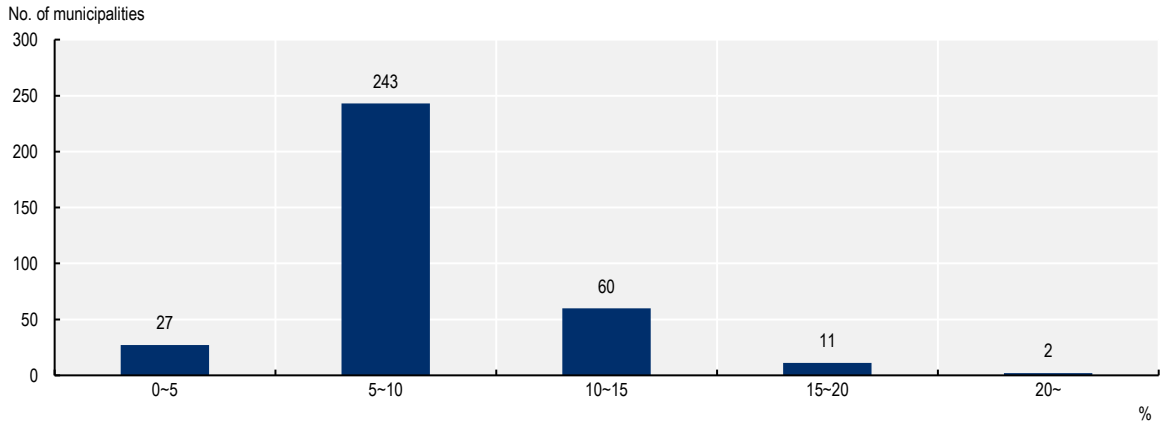


Source: Government of the Netherlands (2022[18]), *Klimaatmonitor*, https://klimaatmonitor.databank.nl/jive (accessed on 12 December 2022).

Energy poverty differs across cities and regions

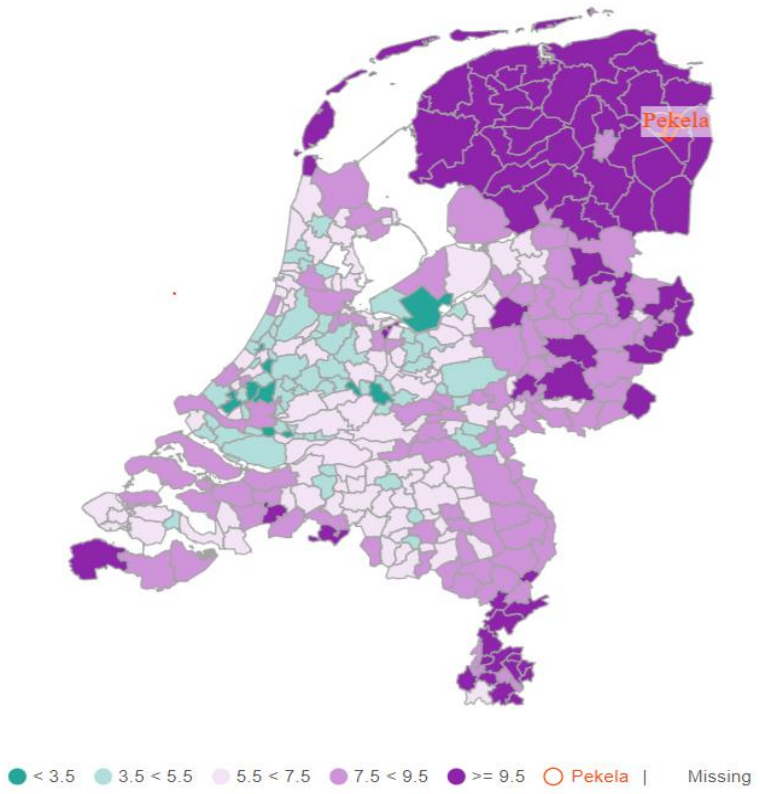
It is estimated that in 2018, 7.8% of households in Dutch municipalities were at risk of energy poverty. The risk of energy poverty was calculated according to the proportion of households whose income is among the bottom 25% in the Netherlands and whose residential gas consumption is among the top 50% in the Netherlands (VNG, n.d.[22]). Figures 2.8 and 2.9 illustrate the large variation in the level of energy poverty across cities and regions. The provinces of Drenthe, Friesland and Groningen as well as the municipality of Pekela had the highest share of energy-poor households. Municipalities in the Netherlands are implementing several policy measures and programmes to address this issue (Box 2.3). According to the surveyed municipalities, the most often-used measure (about 92%) is to provide the service of energy coaches who visit households and give advice on energy saving, followed by the provision of financial support for energy bills and energy-efficient appliances (58% respectively), and subsidies to improve the residential energy efficiency of low income households (50%) (Figure 2.10).

Figure 2.8. Number of municipalities by share of households in energy poverty, 2018



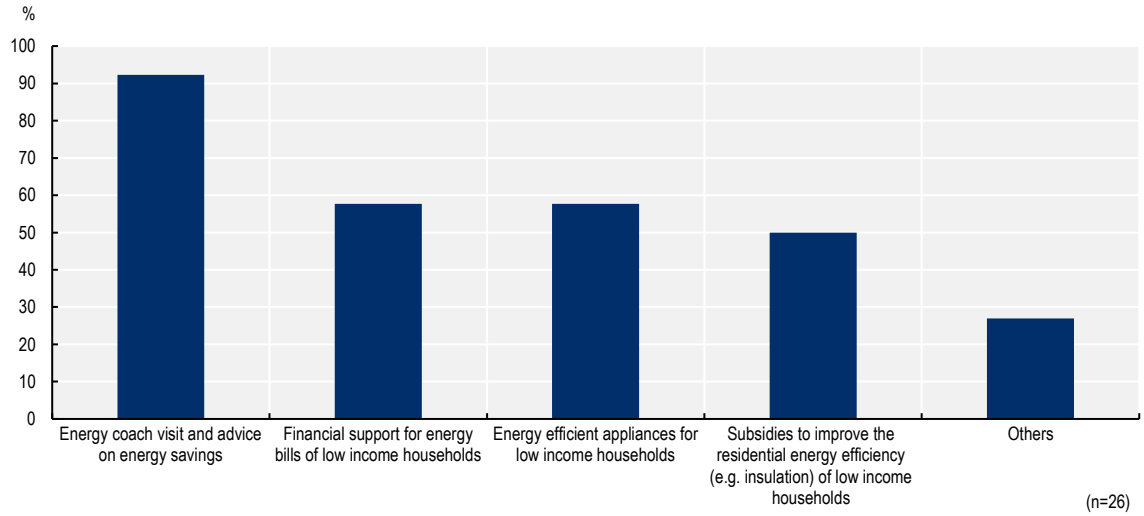
Note: Energy poverty is calculated based on the proportion of households with low income (in the bottom 25%) and high gas consumption (top 50%).
Source: VNG (n.d.[22]), *Energietransitie*, https://www.waarstaatjegemeente.nl/dashboard/dashboard/energietransitie (accessed on 8 October 2022).

Figure 2.9. The share of energy-poor households in the Netherlands, by municipality



Note: Energy poverty is calculated based on the proportion of households with low income (in the bottom 25%) and high gas consumption (top 50%).
Source: VNG (n.d.[22]), *Energietransitie*, https://www.waarstaatjegemeente.nl/dashboard/dashboard/energietransitie (accessed on 8 October 2022).

Figure 2.10. Dutch municipalities' policy measures to address energy poverty



Note: The municipalities were asked to select multiple options if applicable. The results should be read as the percentage of the total respondents that selected each policy measure.
Source: OECD Dutch City Survey (2022).

Box 2.3. Experiences from the Netherlands' municipalities to address energy poverty

Addressing energy poverty is a top priority for the Dutch national government. In light of the current energy crisis, it has provided EUR 300 million for municipalities to tackle energy poverty in 2022. Additionally, several cities and regions are also implementing programmes to address this issue, such as the municipalities of Apeldoorn, Arnhem, Assen, Ede, Helmond, Leeuwarden, Nijmegen, Rotterdam Smallingerland, The Hague and Wageningen where the following common key success factors can be identified:

- **Co-operation with housing corporations**, which have played a major role to help the local government identify the needs of households.
- **Addressing energy poverty from both social and energy perspectives** by involving not only energy experts but also social experts in the implementation of programmes related to energy poverty.
- **Focus on the just transition** by involving and empowering the vulnerable including youth and women in the design and implementation of programmes.
- **Strengthening labour markets** by training existing and new local "energy coaches" as a strategy to reduce unemployment.

Such programmes have been supporting both social housing and privately owned homes. They have provided support for the installation of energy-efficient appliances (i.e. light-emitting diodes [LEDs], photovoltaic [PV] systems) and insulation measures.

Source: BZK (2022[23]), *Tackling Energy Poverty*, https://www.volkshuisvestingnederland.nl/onderwerpen/aanpak-energiearmoede (accessed on 8 December 2022).

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3 Action: A neighbourhood approach to decarbonise homes in cities in the Netherlands

This chapter analyses current building decarbonisation measures in municipalities in the Netherlands. This chapter first analyses multi-level policy responses by using the OECD Checklist on Decarbonising Buildings in Cities and Regions. In particular, the chapter highlights three priorities for vertical and horizontal policy co-ordination: i) plan a Heat Transition Vision and implementation; ii) lead natural gas-free pilot projects; and iii) engage citizens and local stakeholders.

Introduction

As discussed in previous chapters, decarbonising the heating system in residential buildings is the backbone of building decarbonisation. Heating (space and water heating combined) accounted for about 80% of the final energy consumption of households while about 90% of homes in the Netherlands used natural gas for heating in 2020 (RVO, 2020[1]; CBS, 2022[2]). In order to meet the climate goal set by the Dutch Climate Agreement, the Dutch government needs to phase out natural gas in 1.5 million homes by 2030 and all of building stock by 2050 (Government of the Netherlands, 2022[3]).

In light of the importance of the heat transition, there has been increasing policy attention devoted to the role of municipalities in driving this transition forward. Municipalities are more familiar than the national government with local building stock, availability of local heating sources, local stakeholders and more importantly the local residents. Municipalities are in a better position to factor in the social aspect of the transition into energy strategies. In order to implement heat transition plans coupled with social solutions, municipalities need to plan even more locally tailored strategies. Such strategies in municipalities, outlining alternatives to natural gas neighbourhood by neighbourhood, are referred to as the neighbourhood approach in this report.

The findings of the OECD Survey on Decarbonising Buildings and Cities in the Netherlands (hereinafter the OECD Dutch City Survey) and interviews highlight reasons to consider the neighbourhood approach to building decarbonisation. First, the neighbourhood approach is beneficial because each neighbourhood in the country tends to have a homogeneous building stock (as opposed to another neighbourhood in the same municipality). The similarity of building stock within a neighbourhood creates a profitable business case for companies for the collective installation of heat solutions (such as district heating) and allows residents from a same neighbourhood to purchase energy efficiency materials, such as insulation materials, at a lower price per unit. Once municipalities found an effective sustainable measure for a certain type of building, they could easily apply it to the rest of the buildings in the neighbourhood. Moreover, neighbourhood-level communication has also proven to be effective. Behavioural change can be maximised by leveraging the power of social influence of neighbours. For example, many municipalities have promoted neighbourhood success stories linked to district heating, heat pumps or insulation. Municipalities have encouraged individual residents to form groups of “neighbourhood ambassadors” to spread good practices.

This chapter first provides an overview of multi-level governance on decarbonising homes in the Netherlands. Then, using the OECD Checklist for Public Action to Decarbonise Buildings in Cities and Regions (Box 3.1) (2022[4]), it analyses how Dutch municipalities are implementing a neighbourhood approach to building decarbonisation in co-operation with the national government.

Multi-level governance policy responses

Building decarbonisation involves a wide range of policies which require both national and subnational governments to play specific roles. Both horizontal and vertical policy alignment and co-ordination are key to successfully implementing building decarbonisation measures. A single national policy, such as a subsidy for heat pumps, cannot create enough momentum for the transition towards energy-efficient buildings. When the national government launches a subsidy scheme on sustainable measures, subnational governments can raise awareness of the subsidy among local residents and provide technical assistance at the local level; the OECD report *Decarbonising Buildings in Cities and Regions* developed a policy checklist to be used by both national and subnational governments (Figure 3.1) (OECD, 2022[4]). The checklist provides a comprehensive framework for policy makers to unlock the potential to scale up building decarbonisation efforts (Figure 3.2). This chapter will use the OECD checklist to assess Dutch national and local policies for decarbonising buildings in cities (summary in Box 3.1).

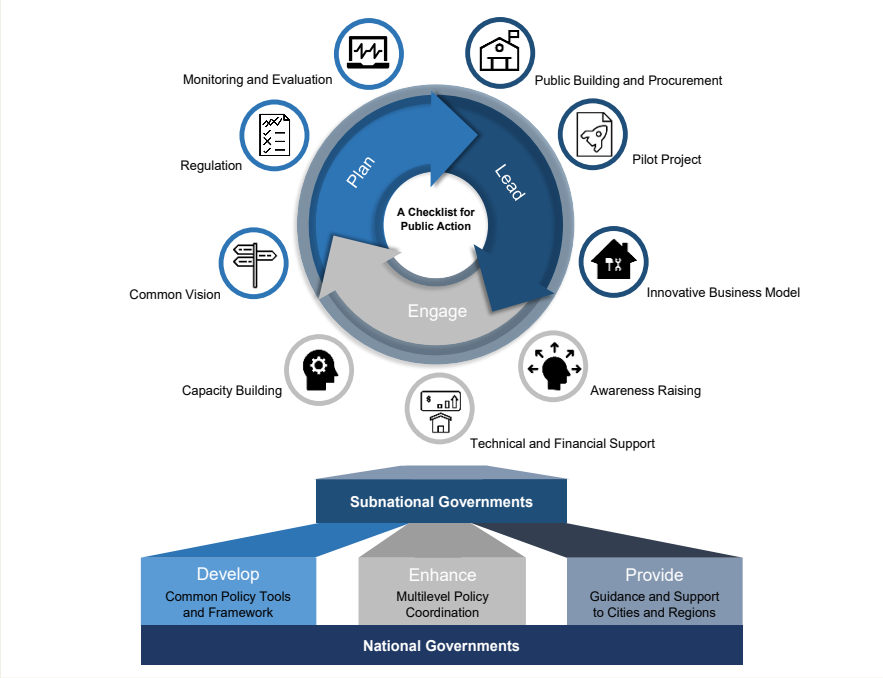
Box 3.1. A Checklist for Public Action to Decarbonise Buildings in Cities and Regions

The OECD report *Decarbonising Buildings in Cities and Regions* developed a policy checklist for both subnational and national policy makers to implement building decarbonisation policies (OECD, 2022[4]).

Subnational policy makers can play a key role in decarbonising buildings by:

- **Planning a way forward in the transition to low-carbon building stock**: Local governments can create a common vision for a broad array of stakeholders; devise effective local regulatory frameworks for building decarbonisation and co-ordinate them with national policy; and introduce an effective scheme for monitoring and evaluating policy progress.
- **Leading by example to scale up building decarbonisation**: Local governments can leverage public building procurement for broader objectives; promote pilot projects and innovative business models; and incentivise and co-ordinate renovation needs to create economies of scale.
- **Engaging a broad array of stakeholders, citizens and local businesses to take action**: Local governments can raise awareness among citizens and local businesses; provide support for low-income households and small- and medium-sized enterprises (SMEs); and build capacity in subnational governments and local industries.

Figure 3.1. OECD Checklist for Public Action to Decarbonise Buildings in Cities and Regions

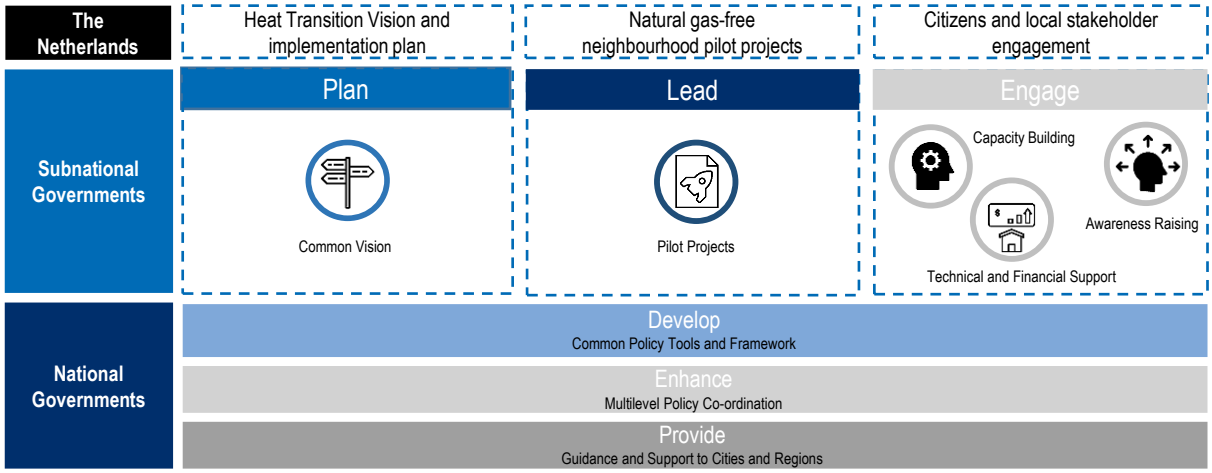


Source: OECD (2022[4]), *Decarbonising Buildings in Cities and Regions*, https://doi.org/10.1787/a48ce566-en (accessed on 18 October 2022).

National policy makers can set enabling policy environments by:

- **Developing common policy tools and frameworks across cities and regions**: National governments can set up the needed regulatory framework; strengthen incentives for energy efficiency and clean energy; and facilitate access to data and information to raise awareness.
- **Enhancing multi-level co-ordination**: National governments can create a multi-level platform to align policies across levels of government; facilitate the design and implementation of subnational plans; and incorporate multi-level policy actions into national plans.
- **Providing guidance and support to cities and regions**: National governments could consider giving financial support to pilot projects; supporting capacity building in local authorities as well as industries; and promoting new technologies for decarbonising buildings.

Figure 3.2 Applying the OECD Checklist for Public Action to Decarbonising Buildings in Cities and Regions in the case of the Netherlands



Source: Authors' elaboration based on OECD (2022[4]), *Decarbonising Buildings in Cities and Regions*, https://doi.org/10.1787/a48ce566-en (accessed on 18 October 2022).

PLAN: The national government developed an effective national framework to align policy priorities across levels of government for decarbonising buildings

The Heat Transition Vision and its implementation plan helped align priorities across national and local governments

The Heat Transition Vision and its implementation plan were successful tools to raise awareness about the heat transition among municipalities and align goals across the national and local levels. The Dutch Climate Agreement stated that each municipality should develop and adopt a vision for the heat transition by the end of 2021 (Government of the Netherlands, 2019[5]). The Heat Transition Vision should include plans for home insulation and sustainable natural gas-free heating and cooking at the municipal and neighbourhood levels. When municipalities identify potential alternatives for natural gas for each neighbourhood, they can translate their vision into implementation plans. The idea behind this approach is to create frameworks for finding scalable solutions while keeping locally tailored measures (PBL, 2021[6]). As of November 2022, almost all of the 345 municipalities in the Netherlands had submitted their Heat Transition Visions (ECW, 2022[7]). The Heat Transition Vision allowed municipalities to actively search for locally available heating sources and embed sustainability of energy infrastructure in their urban planning.

This type of multi-level governance approach in drawing energy infrastructure at the municipality level is also found in the district heating history of Denmark (Box 3.2).

Box 3.2. District heating and the concept of "zoning" in Denmark

Today, around 65% of homes in Denmark are connected to district heating, making it among the highest district heating penetration rate in the world (IEA, 2022[8]). Denmark has six large central district heating areas and small-scale heat networks (Danish Energy Agency, n.d.[9]). Moreover, more than 50% of district heat is fuelled by renewables (IEA, 2022[8]). Some of the reasons why Denmark could become a global frontrunner in district heating lie in its long history in district heating as well as strategic urban energy structure planning called "zoning".

Denmark has a long history of district heating. The first utilisation of a heat network appeared in 1903, during which residual heat from the incineration plant in Frederiksberg, Copenhagen, was used for heating (DBDH, n.d.[10]). However, momentum for district heating dates back to the second global oil crisis at the end of the 1970s, which escalated concerns over energy security, thereby leading to the first heating supply law in 1979. The law provided for the commitment to draw a heat plan for each municipality. Municipalities were asked to identify the current heating demand and estimate future heating demand as well as locally available heating sources. Then, based on the demand and supply data, municipalities had to draw up regional energy infrastructure plans with heating strategies. During this process, the concept of "zoning" was used (Danish Energy Agency, n.d.[9]).

Zoning refers to a process defining the geographical zones or boundaries for the natural gas networks and district heating networks. In the process of zoning, the municipalities could identify the most efficient and cost-effective heat supplies in cities and other areas. The zoning process ensured heat from large plants and incinerators supplied by the local district heating system (Johansen, 2022[11]). With decades of zoning practice, Denmark could maximise the locally available heating sources and build a strong district heating energy infrastructure. To date, municipalities are still responsible for "zoning" and approving heating projects (Danish Energy Agency, n.d.[9]).

The zoning practice in Denmark showcases the importance of creating an enabling environment by the national government (Heat Supply Act) and enhancing implementation by local government to ensure locally customised energy and heating systems.

Source: IEA (2022[8]), *District Heating*, https://www.iea.org/reports/district-heating (accessed on 16 January 2023), Danish Energy Agency (n.d.[9]), *Danish Experiences on District Heating*, https://ens.dk/en/our-responsibilities/global-cooperation/experiences-district-heating (accessed on 16 January 2023); DBDH (n.d.[10]), *District Heating History*, https://dbdh.dk/dhc-in-denmark/district-heating-history/ (accessed on 16 January 2023); Johansen, K. (2022[11]), "A brief history of district heating and combined heat and power in Denmark: Promoting energy efficiency, fuel diversification, and energy flexibility", https://www.mdpi.com/1996-1073/15/24/9281 (accessed on 16 January 2023).

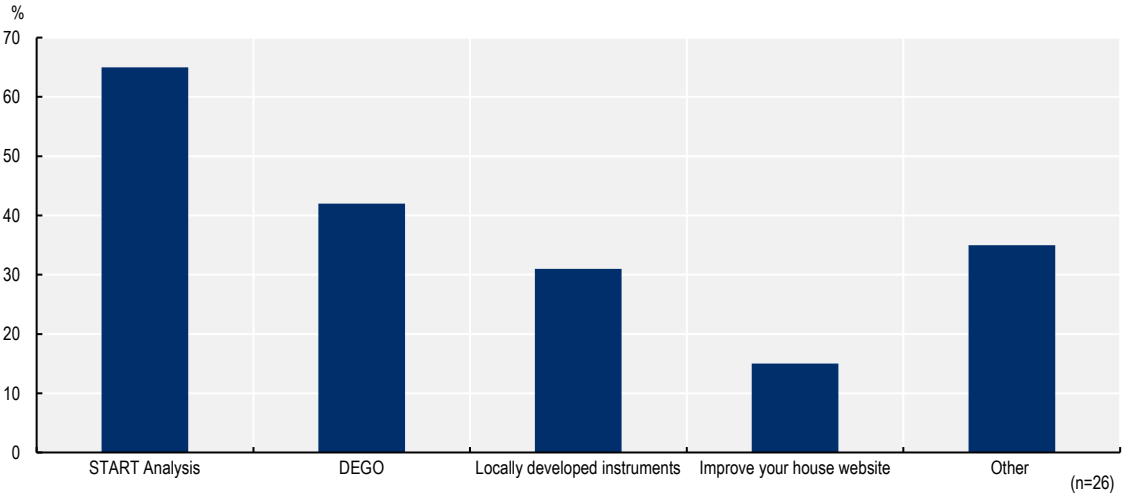
The national government provided technical support and guidance for municipalities to draft their Heat Transition Vison

According to the Dutch Climate Agreement, the national government committed to supporting municipalities in drafting their Heat Transition Vision. Two main support instruments were designed: i) Guidelines (which include *Start Analysis* and the *Guide for Local Analysis*); and ii) an information centre called the Netherlands Heating Expertise Centre (ECW) (Government of the Netherlands, 2019[5]).

As part of the first support instruments (*Guidelines*), the Netherlands Environmental Assessment Agency (PBL) developed a technical-economic simulation analysis based on national data. (Box 3.3). This tool has proved to be effective since it was reported that about 80% of municipalities used *Start Analysis* to develop

their Heat Transition Vision (Hoogervorst, 2022[12]). Similarly, 65% of the municipalities that participated in the OECD Dutch City Survey responded that *Start Analysis* was helpful in drafting their Heat Transition Vision (Figure 3.3). In addition, the Association of Dutch Municipalities (VNG) provided a user-friendly online tool called DEGO to help municipalities (especially small- and medium-sized) draft their Heat Transition Vision.

Figure 3.3. Data tools/instruments used for the Heat Transition Vision



Note: Municipalities were asked to select multiple options if applicable.
* Developed by the VNG, DEGO (*Datavoorziening Energietransitie Gebouwde Omgeving*, Data Provision Energy Transition Built Environment) is an online data platform to assist municipalities in drafting their Heat Transition Vision.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

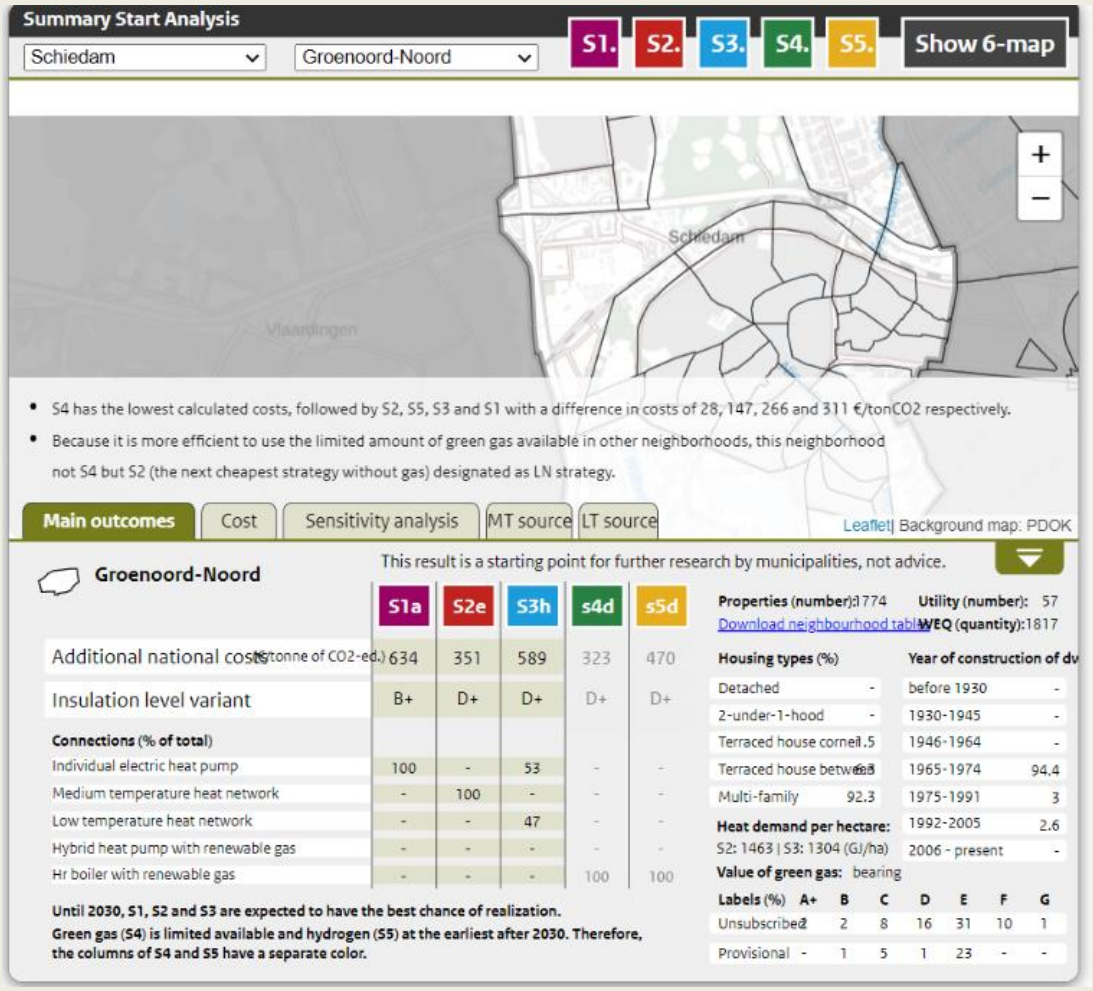
Box 3.3. *Start Analysis*: A tool to compare the costs of sustainable strategies for the built environment

As part of its Heat Transition Vision, each municipality in the Netherlands must indicate which neighbourhoods will be made sustainable with specific strategies to phase out natural gas. In order to support the elaboration of these alternative strategies, the Dutch government provided a tool called *Start Analysis*, which helps calculate the costs for five potential alternative strategies that could be implemented by 2030. The five potential strategies are: i) individual electric heat pumps; ii) heat networks with a medium- and high-temperature source; iii) heat networks with a low-temperature source; iv) green gas; and v) hydrogen. *Start Analysis* compares the expected national costs in 2030 for implementing each strategy. National costs are the total financial costs of all measures required to implement a strategy in the Netherlands, regardless of who pays those costs, including the benefits of energy savings but excluding taxes, levies and subsidies (PBL, 2020[13]).

Start Analysis took into account the technical characteristics of existing buildings, including their size, their type and their year of construction, their energy label, their location and the capacity of existing gas and electricity networks (PBL, 2020[13]). Figure 3.4 shows an example of how this information can be visualised in the form of maps accessible to all citizens and municipalities in the Netherlands. Users can select a municipality and a specific neighbourhood to view the estimated national costs for each of the five potential strategies. For example, the neighbourhood Groenoord-Noord is one of the natural

gas-free neighbourhoods in the municipality of Schiedam. The municipality plans to use a heat network using the residual heat from the port in Rotterdam (Overmorgen, 2017[14]). *Start Analysis* results are in line with the municipality's decision to connect to the heat network, showing that Strategy 2 (heat network with a medium and high-temperature source) is the most cost-efficient strategy.

Figure 3.4. Using the *Start Analysis* viewer: Example of the neighbourhood Groenoord-Noord in the municipality of Schiedam



Source (figure): PBL (2020[13]) *Startanalyse aardgasvrije buurten*, https://themasites.pbl.nl/leidraad-warmte/2020/.

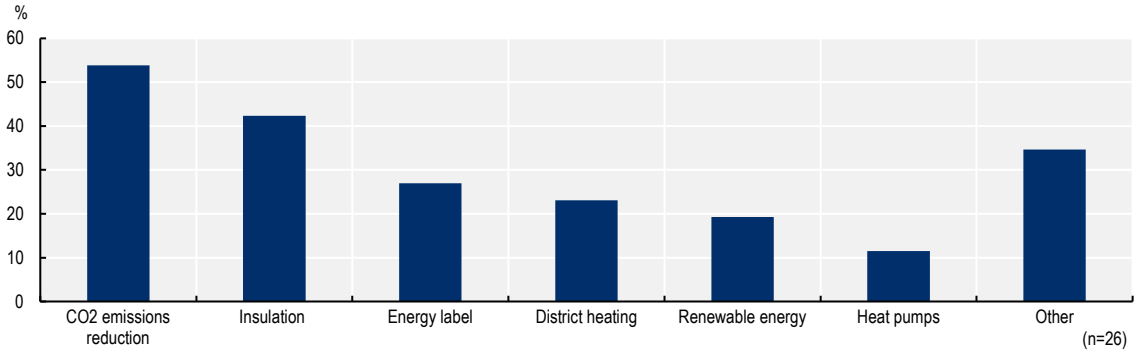
Source (box): PBL (2020[13]), *Startanalyse aardgasvrije buurten 2020*, https://www.pbl.nl/publicaties/startanalyse-aardgasvrije-buurten-2020 (accessed on 20 October 2022); Overmorgen (2017[14]), *Aardgasvrije wijken Schiedam Analyse voor de wijken Groenoord en Nieuwland*.

A second technical support instrument developed by the Dutch government is the Netherlands Heating Expertise Centre (ECW). The ECW answers potential questions from municipalities on technical solutions related to heating. For example, if some municipalities have difficulty connecting existing buildings to heat networks, they can go to the ECW website and learn tips for installing a heat network in the neighbourhood (ECW, n.d.[15]). As of January 2023, the ECW became part of the National Programme for Local Heat Transition (NPLW).

Challenge: The depth of the Heat Transition Vision and implementation plan readiness vary greatly across the municipalities

Although most Dutch municipalities submitted their Heat Transition Vision, the level of depth and detail varies across municipalities. Developing sustainable measures such as district heating might be constrained by locally available heating sources. However, common challenges for building stock such as insulation measures should first be planned for worst-performing buildings. Only 42% of the survey-respondent municipalities reported that their Heat Transition Vision included quantitative targets on insulation, about 20% included quantitative targets on renewable energy and only 11% included targets on (hybrid) heat pumps (Figure 3.5).

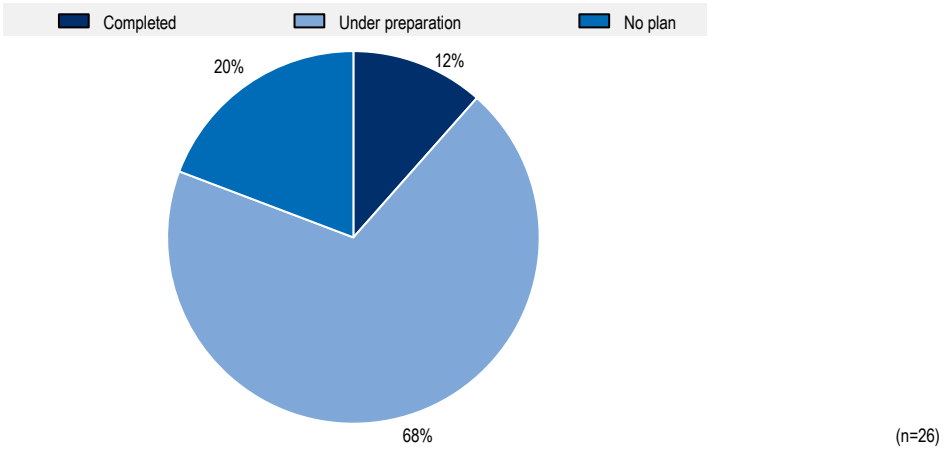
Figure 3.5. Quantitative targets that are included in the municipality's Heat Transition Vision



Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Moreover, the readiness to implement the goals set in the Heat Transition Vision varied greatly across municipalities. The Heat Transition Vision focuses on identifying technically and economically feasible alternative solutions per neighbourhood, whereas the implementation plan should lay out concrete actions on how to deliver the vision in practice. The OECD Dutch City Survey revealed that only 12% of responding municipalities have completed their implementation plan, while 68% are still preparing it and 20% have no plan to develop one because of bottlenecks related to the lack of staff and dedicated funding (Figure 3.6). Conversely, the municipalities that have completed their implementation plan highlighted the high level of motivation from citizens and local financial incentives as enabling factors.

Figure 3.6. Did your municipality develop a specific implementation plan for your Heat Transition Vision?



Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

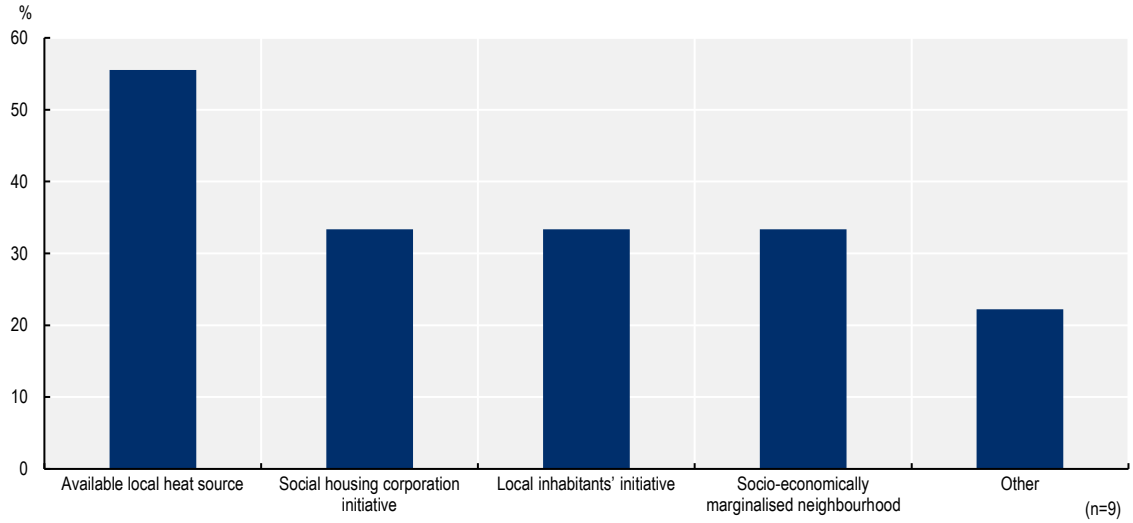
LEAD: The national pilot project Natural Gas-free Neighbourhood Programme (PAW) enabled municipalities to innovate and develop energy transition processes

The national government's decision to invest in learning from neighbourhood pilot projects gave an opportunity for municipalities to explore what is needed to start the transition

The heat transition in the built environment comes with a range of technical, social, regulatory and financial challenges. In most cases, it is hard to foresee what kind of challenge each municipality will encounter over the course of the transition process. It is possible to identify such challenges and find solutions only when the measures have been put into practice (PBL, 2021[6]). This is why the Dutch government, together with the Association of Dutch Municipalities (VNG), the Interprovincial Consultation Committee (IPO) and the Union of Water Boards (UvW), launched the Natural Gas-free Neighbourhood Programme (*Programma Aardgasvrije Wijken*, PAW). The PAW was established in 2018 to test and learn how neighbourhoods could phase out natural gas effectively and scale up such measures (PBL, 2021[6]). The PAW provided both financial resources and technical assistance for municipalities to experiment with natural gas-free measures in a neighbourhood.

In order to be selected by the PAW, municipalities had to select a neighbourhood for pilot projects and apply for PAW funding with their plan to implement natural gas-free solutions in the identified neighbourhood. After 3 rounds of selection in 2018, 2020 and 2022, 66 neighbourhoods were selected from a total of 193 applications (KWINK Groep, 2022[16]). According to the OECD Dutch City Survey, some municipalities chose the neighbourhood according to the availability of an alternative local heat source, whereas others chose it as part of a social cohesion strategy or others based on citizens' initiatives (Figure 3.7)

Figure 3.7. What were the criteria for selecting the PAW neighbourhood?



Note: Nine municipalities out of 26 answered this question.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

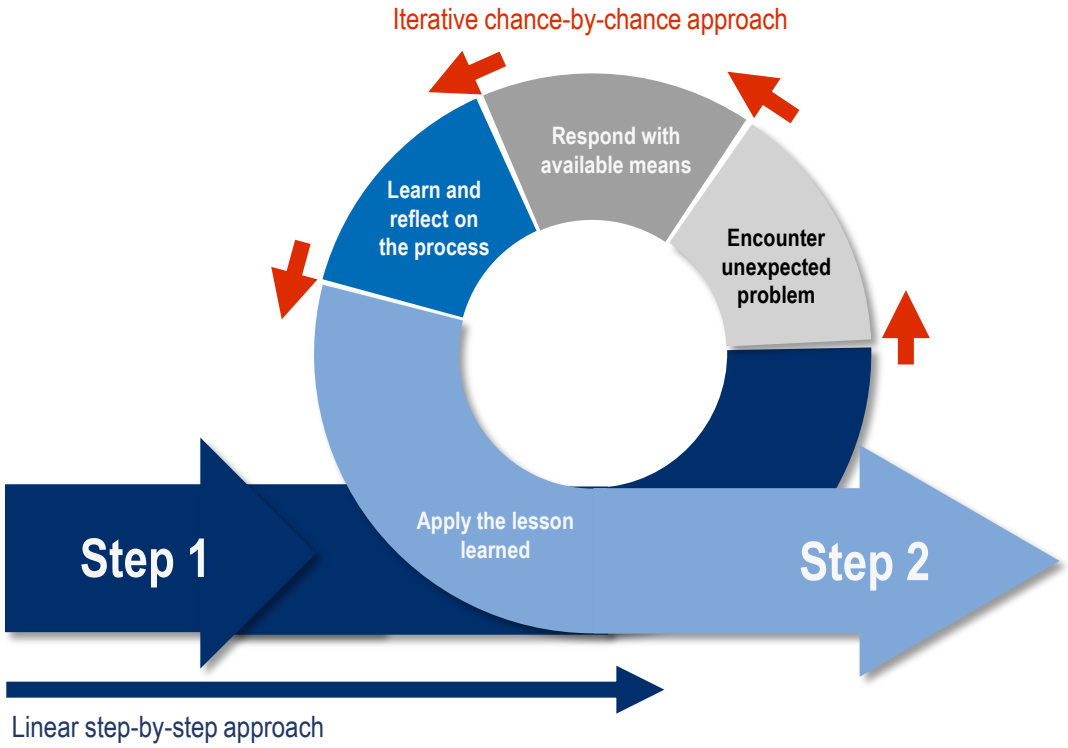
The PAW included three rounds of selection. First, 27 testing neighbourhoods were selected in 2018, 23 testing neighbourhoods in 2020 and 16 more testing neighbourhoods in 2022 (PAW, 2022[17]). With the insight and expertise gained over the past five years, the Dutch government is now preparing to end the pilot projects and scale up the lessons learnt at the national level. A new inter-administrative organisation called the National Programme for Local Heating Transition (NPLW) was introduced in January 2023 to support all municipalities in the Netherlands for heat transition (Government of the Netherlands, 2022[3]).

The pilot projects allowed municipalities to implement a step-by-step and chance-by-chance approach

Pilot projects offer practical tools to test technically and economically feasible solutions on a small scale. As a first step, municipalities start with a small neighbourhood and, gradually, they can scale up to the entire municipality. Municipalities can plan ahead what needs to be done at each stage and develop both short-term, mid-term and long-term visions. This approach is called the "step-by-step approach". However, plans do not always go as expected. For unexpected bottlenecks, municipalities can adopt a more flexible approach called the "chance-by-chance" approach. As its name suggests, it is a strategy to learn from each opportunity and to try to find adequate solutions.

Municipalities use both step-by-step and chance-by-chance approaches throughout the entire process of neighbourhood heat transition. The approaches are not mutually exclusive but rather complementary. In the first step of the process, municipalities might encounter unexpected problems and will develop strategies in response to the problems. The strategies will then require adjustments to implement the next step. As Figure 3.8 suggests, the transition process is based on a combination of a linear step-by-step approach and an iterative chance-by-chance approach.

Figure 3.8. Step-by-step and chance-by-chance approach for neighbourhood heat transition



The municipality of **Deventer** offers a good example of step-by-step planning. Deventer started a pilot neighbourhood project before the launch of the national PAW programme. When it became clear that Dutch municipalities would be assigned to take the lead in the local energy transition after the first contours of the National Climate Agreement in 2016, the municipality proactively moved forward. In 2017, the municipality, housing associations and energy network operator started a joint project called the Fossil Free and Affordable Housing (FBW) project.

Under this project, the parties set concrete questions to answer: i) where do we start?; ii) what source of heat do we choose?; iii) who is responsible for the new heat transition?; and iv) who is financing the transformation? Furthermore, regarding the selection of sustainable heating sources, they developed additional sub-questions such as: i) can we use a direct source of heat, such as geothermal or aquathermal, or is there no other option than to use electrical heat supply?; ii) do we use individual heat supply systems, such as small heat pumps, or do we prefer a collective heat supply system?; iii) can we supply a low-temperature heat, or is a high-temperature heat required, mostly for older and less isolated homes? (Otten and Nicolaas, 2020[18]).

By answering these questions, the municipality and the local stakeholders chose Zandweerd as the first pilot neighbourhood because it is located near the main sewage treatment plant and the river Ijssel where residual heat is available and new homes were planned to be built by commercial developers and housing associations. With the inhouse knowledge gained via the Zandweerd neighbourhood, the municipality plans to expand the natural gas-free approach to the district of Keizerslanden, especially the neighbourhood of Oranjekwartier and Ludgeruskwarter and to the district of Bathmen (Municipality of Deventer, 2020[19]).

The municipality of **Utrecht** offers an interesting example of chance-by-chance and step-by-step learning. In the municipality of Utrecht, the neighbourhood of Overvecht-Noord was chosen as the first neighbourhood to go natural gas-free. Overvecht-Noord was a logical choice since housing corporations own the majority of homes in this neighbourhood, so the municipality of Utrecht could combine the

sustainability investment plan of these housing corporations with the plan to switch off natural gas. Moreover, there was an old gas network that had to be replaced by 2024 at the latest. Therefore, replacing the gas pipes with a district heating network was a cost-efficient decision (Municipality of Utrecht, 2022[20]). However, what the municipality did not foresee was that not all residents agreed with the decision to phase out natural gas in Overvecht-Noord. Even though there were relevant reasons to start with Overvecht-Noord, the municipality was confronted with strong resistance from Overvecht-Noord residents in the beginning (PBL, 2021[6]).

In response to the resistance, the municipality set up a group of representatives of residents from Overvecht-Noord who closely followed the heat transition plan. The municipality also sent a letter and a flyer to all 8 800 households in the neighbourhood of Overvecht-Noord explaining the plan of phasing out natural gas in Overvecht-Noord. In addition, in December 2020, the municipality installed standing booths in front of two supermarkets where local residents could casually ask questions about the natural gas-free plan (PAW, 2021[21]). During the process, the municipality learnt that conveying the right information at the right moment was important. After this experience, the municipality is trying to extend their communication strategies to the forthcoming pilot neighbourhoods.

The municipality of **Schiedam** provides a similar example of a step-by-step and chance-by-chance approach. In 2017, the municipality of Schiedam, housing corporation Woonpulus, the province of Zuid Holland, energy provider Eneco and grid operator Stedin signed a Green Deal to phase out natural gas for heating. In 2018, as part of the deal, the neighbourhood of Groenoord was chosen as the first neighbourhood to cut off natural gas and use district heating. However, during the implementation process, particularly in 2020 and 2021, the municipality faced strong resistance from residents due to a lack of communication. The municipality and the housing corporation then learnt that they were focusing too much on the technical side rather than listening to tenants' needs. In response to this resistance, the municipality, together with the housing corporation, made a model house, where residents can come and ask questions freely and experience the warm indoor environment provided by well-insulated walls and district heating. The housing corporation created an information brochure called "*strippenkaart*" (strip card in English) which provides bullet-point energy-saving options for residents to raise further awareness (Nieuwe Energie voor Schiedam, 2022[22]). With time, the tenants better understood the municipality's plan for heat transition and more residents agreed on the district heating plan. Based on this lesson learnt, the municipality is putting a lot of effort into communication for the rest of the transition period. By 2024, the first apartments in Groenoord will be connected to the district heating network and, by 2030, the plan is for Groenoord to be a gas-free neighbourhood.

Table 3.1 below summarises both the step-by-step approach and the chance-by-chance approach with examples.

Table 3.1. Step-by-step approach and chance-by-chance approach

Step-by-step approach	Chance-by-chance approach
Strategies for what "can be planned"	Strategies for what "cannot be planned"
A step-by-step approach requires gathering all available data and making short-term, mid-term and long-term plans to meet building decarbonisation goals.	A chance-by-chance approach starts with the idea that things do not go as planned. At the implementation stage, municipalities will encounter unexpected challenges as well as opportunities. This approach requires an agile and resilient attitude of civil servants and stakeholders to embrace uncertainty and be quick to respond to unexpected circumstances, applying lessons learnt to the next steps. It is more effective to start a pilot project that requires dialogues with various local stakeholders and creates a chance to encounter and solve bottlenecks.
Example 1. The municipality of Schiedam - [Step1] In 2018, district heating was chosen as a sustainable heating option in the neighbourhood of Groenoord. o **Unexpected event**: residents' resistance. o **Lesson learnt**: First approach towards residents had too much focus on the technical side. As energy transition is also a social transition, energy transition strategies need to be coupled with efforts to meet the social needs of tenants. o **Schiedam response**: Together with the housing corporation, the municipality revised its communication plan. The municipality and housing corporation took much more time to listen and talk to the neighbourhood tenants. They created a "*strippenkart*" (strip card) to help tenants understand energy-saving options. They also created a natural gas-free model house so that tenants could see the sustainable measures and experience a warm indoor environment with well-insulated walls and district heating. - [Step2] Apply the lesson to the next pilot neighbourhoods.	
Example 2. The municipality of Utrecht - [Step1] First pilot neighbourhood Overvecht-Noord. o **Unexpected event**: residents' resistance. o **Lesson learnt**: Giving the right information at the right moment is important. o **Utrecht response**: The municipality set up a group of representatives of residents from Overvecht-Noord who followed closely the heat transition plan. The municipality also sent a letter and flyer to all 8 800 households in the neighbourhood. - [Step2] Apply the lesson to next pilot neighbourhoods.	

A neighbourhood approach contributes to different building decarbonisation solutions, including district heating, heat pumps and insulation

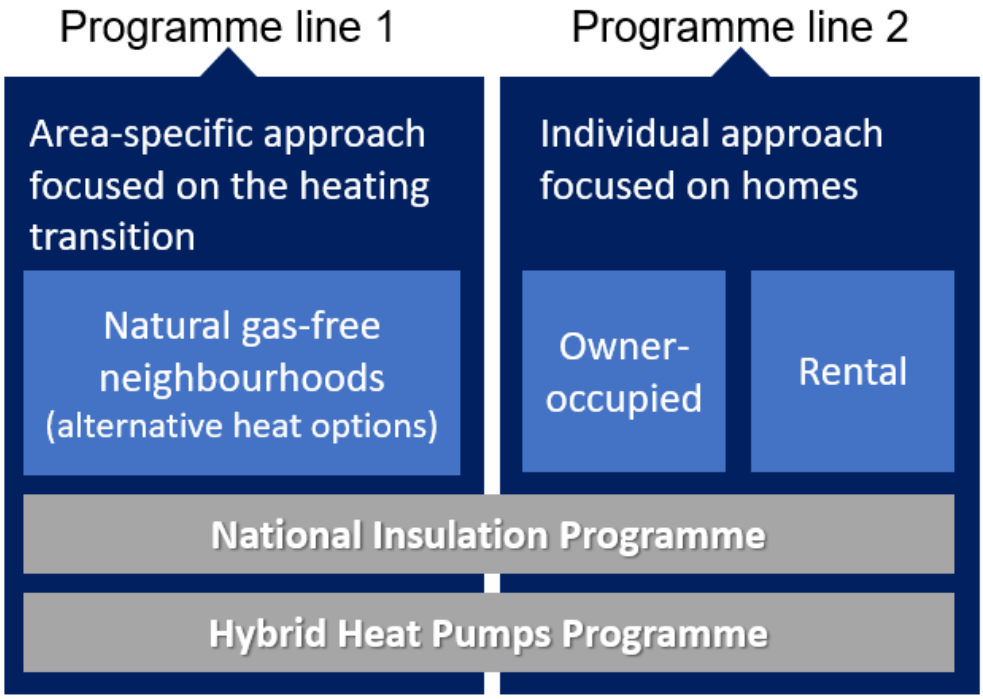
The Sustainability Measures in the Built Environment Acceleration Programme (PGVO) clearly states that area-specific approaches consist in developing measures for heat transition neighbourhood by neighbourhood and for all district heating, insulation and heat pump solutions (Figure 3.9) (Government of the Netherlands, 2022[3]).

Respondent municipalities reported that a neighbourhood approach such as the PAW was found to be effective not only for a "cleaner and sustainable environment", but also for "tackling the social issues in the district in a comprehensive approach" and "responding to local citizens' needs" (Figure 3.10).

Also, according to the OECD Dutch City Survey, most municipalities (16 out of 19) believe that a neighbourhood approach is useful for insulation, (hybrid) heat pumps and photovoltaics (PVs) (Figure 3.11)

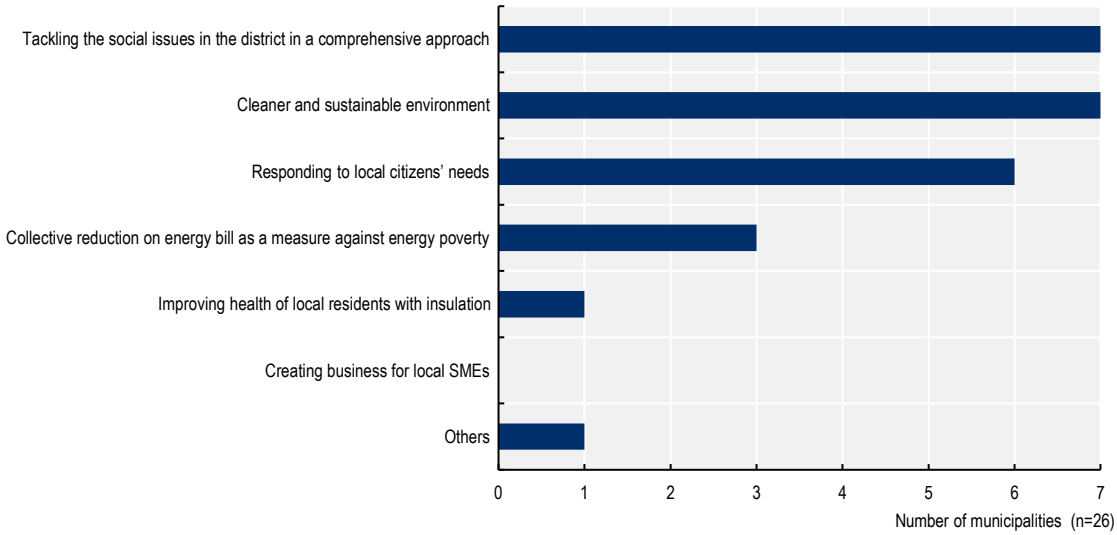
While many municipalities have adopted a neighbourhood approach for district heating, the PAW-selected municipalities of **Wageningen** (selected in 2018) and **Leusden** (selected in 2022) reveal that a neighbourhood approach can be effective for insulation and heat pump solutions as well.

Figure 3.9. Sustainability Measures in the Built Environment Acceleration Programme, 2022



Note: The PGVO has 5 programme lines in total. This report looks at the first two programme lines, most relevant to residential buildings.
Source: Government of the Netherlands (2022[3]), *Beleidsprogramma versnelling verduurzaming gebouwde omgeving*, https://www.rijksoverheid.nl/ministeries/ministerie-van-binnenlandse-zaken-en-koninkrijksrelaties/documenten/rapporten/2022/06/01/beleidsprogramma-versnelling-verduurzaming-gebouwde-omgeving (accessed on 18 October 2022).

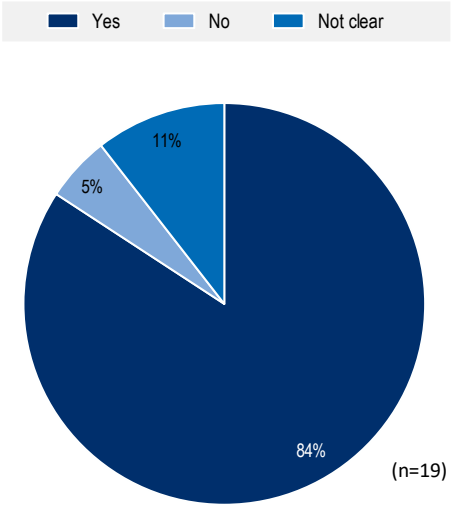
Figure 3.10. What is the biggest benefit of area-specific approaches such as natural-gas-free neighbourhood projects on decarbonising building measures?



Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

In the municipality of **Wageningen**, the neighbourhood of Benedenbuurt used a collective heat pump heat network. A joint heat pump in Dolderstraat generates the heat. Then, the heat is transferred to each household via an underground pipe network. The heat has a temperature of 60 to 70 degrees Celsius, which is suitable for winter as well (Warmtebedrijf Oost Wageningen, 2022[23]). As the collective heat pump solution requires the installation of a heat network in the neighbourhood, the neighbourhood approach was an effective tool to achieve an area-optimised heating solution.

Figure 3.11. Municipalities' perception of the usefulness of a neighbourhood approach for insulation, (hybrid) heat pumps and PVs



Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

The municipality of **Leusden** has adopted insulation and heat pump measures since it has no source of high-temperature heat. A group of local residents formed an initiative called Sustainable Energy for Every Leusdener (*Duurzame Energie voor Elke Leusdenaar*, DEEL), which works on collective energy saving in co-operation with the municipality. One of the important activities of DEEL lies in collective purchase. In August 2022, DEEL organised a collective purchase for home insulation in collaboration with Dutch company Van de Bunt Isolatietechniek from Putten (DEEL Energie Leusden, 2022[24]). Similarly, DEEL organised a collective purchase for solar panels, in which participants could get a EUR 15 discount per panel compared to the market price due to DEEL's collective negotiation (DEEL Energie Leusden, 2022[25]). By participating in the collective purchase, residents can save time in comparing options from different companies and benefit from lower prices since DEEL negotiates the price on behalf of residents. It is also easier to negotiate the price as a group than as an individual.

Other OECD countries such as Canada, Japan and Korea are also making efforts to use neighbourhood/district approaches to lead by example and scale up building decarbonisation measures (Box 3.4).

Box 3.4. Neighbourhood/district approach for building decarbonisation in Canada, Japan and Korea

Greener Neighbourhoods Pilot Program in Canada

To accelerate the retrofitting of existing buildings, Canada aims to aggregate homes and buildings in an entire neighbourhood and retrofit them all at the same time. In March 2022, the Government of Canada announced CAD 35.5 million, starting in 2022-23, for the establishment of a Greener Neighbourhoods Pilot Program NPP) to retrofit homes or units in up to 6 communities across the country using an aggregated deep retrofit approach based on the Dutch Energiesprong model. The objective of the programme is to accelerate the pace and scale of retrofits by aggregating similar homes and buildings in an entire neighbourhood to create mass demand for deep energy retrofits. This scale of project and the similarity of buildings can leverage new retrofit approaches, such as the use of prefabricated exterior panels, to reduce onsite labour time and overall project costs while reducing the energy use intensity and emissions from each building (Government of Canada, 2022[26]).

Renewable energy use promotion district in Japan

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) in Japan promotes the use of renewable energy from a district approach. The revised Building Energy Efficiency Act in 2022 introduced a new system called “renewable energy use promotion district”. Under this system, local governments can designate a specific district or a neighbourhood where it is necessary to promote the installation of renewable energy facilities such as solar panels. Once the district or neighbourhood is selected, the architects are obliged to explain to the builder the renewable energy facilities options and their capacities. The selected district or neighbourhood is also granted a special permit that exempts builders from height, floor area ratio and building coverage rate restrictions to facilitate the renewable energy facilities installation (MLIT, 2022[27]).

Zero-energy pilot districts in Korea

The Ministry of Land, Infrastructure and Transport (MOLIT) and the Korea Land and Housing Corporation (LH) work jointly in zero-energy pilot districts in Korea. In 2020, Guri Galme station area Seongnam Bokjeong District 1 in the city of Seongnam aimed to achieve an energy-sufficiency rate of above 20%. In 2021, Suwon Dangsu District 2, in the city of Suwon, aimed to achieve a 50% energy-sufficiency rate. Especially in Suwon Dangsu District 2, MOLIT and the LH plan to experiment with novel heating technologies such as the installation of heat pumps using hydrothermal energy. With pilot districts, the government plans to form a model for “zero-energy governance” involving the national government, local governments, academia and the private sector in order to scale up the measures to other districts (MOLIT, 2021[28]).

Source: Government of Canada (2022[26]), *Greener Neighbourhoods Pilot Program*, https://natural-resources.canada.ca/science-and-data/funding-partnerships/funding-opportunities/funding-grants-incentives/greener-neighbourhoods-pilot-program/24889 (accessed on 28 February 2023); MLIT (2022[27]), *建築物省エネ法第67条の２～第67条の６】建築物再生可能エネルギー利用促進区域および関連情報*, https://www.mlit.go.jp/jutakukentiku/house/03.html#cont1 (accessed on 20 January 2023); MOLIT (2021[28]), *탄소중립 실현을 위한'제로에너지 특화도시' 조성 추진*, http://www.molit.go.kr/USR/NEWS/m_71/dtl.jsp?id=95085011 (accessed on 20 January 2023).

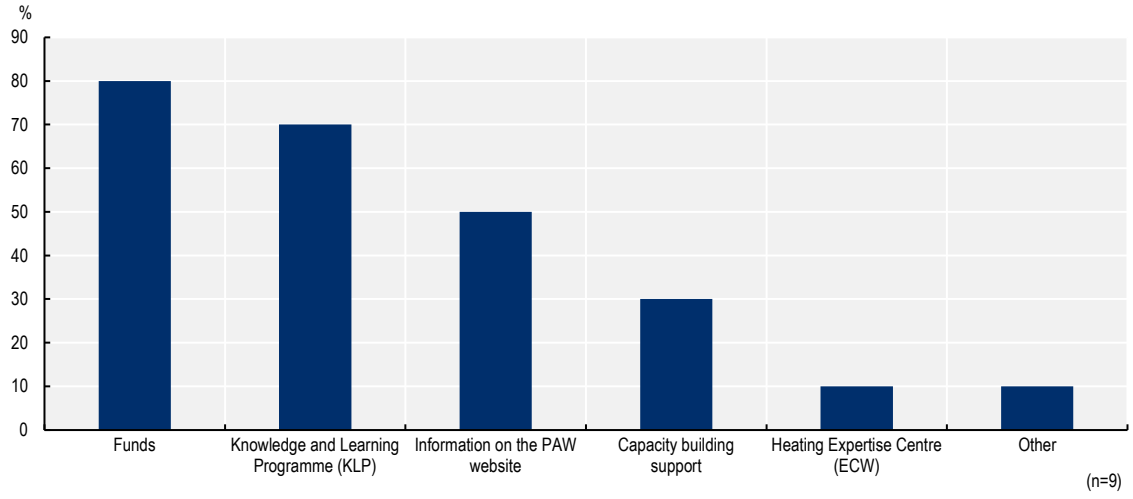
The pilot projects fostered learning through the Knowledge and Learning Programme (KLP) and PAW policy tracking

"Learning by doing" is the main objective of PAW pilot projects. By making municipalities go through the entire process from planning to implementation, an effective and scalable neighbourhood approach can be identified. However, the learning process should not stop at the municipality level. Once lessons have been learnt through the pilot project, this experience should be shared with other municipalities and, further, conceptualised so that the experience can be scaled up to a national level.

To this end, the PAW pilot programme relies on three pillars: i) pilot neighbourhoods; ii) a Knowledge and Learning Programme (KLP); and iii) a policy track. First, pilot neighbourhoods are selected as natural gas-free solution testing grounds under the PAW framework. These are where local learning takes place. Neighbourhoods encounter bottlenecks and learn how to solve them. Second, the KLP is a platform to support municipalities in disseminating best practices and raising their awareness of their role in decarbonising buildings. The PAW progress report calls it collective learning (PAW, 2021[29]). Last, policy tracking conceptualises the knowledge gained via the pilot projects and KLP and aims to put it on the national policy agenda (PAW, 2021[29]). This process is called institutional learning, with the objective of translating lessons learnt into policy change.

The KLP work is available to the public on the PAW website. Even municipalities not participating in the PAW can learn from frontrunner experience. Moreover, the KLP organises learning programmes on different topics and communicates actively with the pilot projects via a monthly newsletter. In fact, according to the OECD Dutch City Survey, 70% of the municipalities that participated in the PAW reported that the learning platform provided by the KLP was one of the most effective support tools from the national government (Figure 3.12)

Figure 3.12. What are the effective PAW support tools from the national government?



Note: Nine municipalities out of 26 answered this question. Municipalities could choose multiple options if applicable.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

PAW success factors include national-local co-operation, flexible funding and continuity

The PAW programme showcases a good example of multi-level co-operation and institutional experimentation

The PAW works as an intermediary between different levels of government and agencies. The main body of the PAW is composed of the Ministry of the Interior and Kingdom Relations (BZK), the Ministry of Economic Affairs and Climate Policy (EZK), the Association of Dutch Municipalities (VNG), the Interprovincial Consultation Committee (IPO) and the Union of Water Boards (UvW). PAW staff was seconded by both the national government and subnational governments (PBL, 2021[6]). This intergovernmental structure allowed a balance of power and responsibilities between different levels of government (Table 3.2).

In particular, this intergovernmental structure enabled agile and customised responses to different needs. For instance, after a few years of running pilot projects, many municipalities encountered a chronic labour shortage in implementing heat transition measures. Staff from the VNG and different municipalities, therefore, organised a "design sprint", in which they explored the problem of the labour market and training in heat transition. Consequently, they developed three tools to help municipalities identify the area in which they face the most severe labour shortage and how they could address the needs of potential employees.

PAW neighbourhoods and stakeholders regularly organised meetings to learn from each other. For instance, the ministries, municipalities, housing corporations and PAW stakeholders gather together once a year and hold a Congress on Natural Gas-Free Neighbourhoods. The last congress, which took place in March 2022, had 400 participants on site and 500 participants on line. It was used to share the main findings from the PAW and also exchange ideas on recurring problems (PAW, 2022[30]). In addition, a non-governmental organisation called Platform31 works as a knowledge and network organisation for Dutch municipalities. Platform31 actively organised meetings and events on themes that could help municipalities to launch pilot neighbourhood programmes.

Table 3.2. Governance structure of the PAW programme

Category	Organisation	Key role
Steering committee	Ministry of the Interior and Kingdom Relations (BZK)	• Decisions on budget • Co-ordination of the overall PAW • Co-ordination of monitoring and addressing bottlenecks in policy making
	Ministry of Economic Affairs and Climate (EZK)	• Liaison role • Taking part in decision making
	Association of Dutch Municipalities (VNG)	• Co-ordination of the KLP • Liaison role • Taking part in decision making
	Interprovincial Consultation Committee (IPO)	• Liaison role • Taking part in decision making
	Union of Water Boards (UvW)	• Liaison role • Taking part in decision making • Provision of special expertise on aquathermal and climate adaptation
Advisory committee	Members of the steering committee	• Provision of advice on the selection of pilot projects • Provision of advice on the PAW
	Association of Housing Corporations (Aedes)	
	Association of Electricity and Gas Network (Netbeheer Nederland)	
	Trade Association of Energy Companies (Energie Nederland)	

	Association of Construction and Infrastructure (Bouwend Nederland)	
	Entrepreneurs' Association of Technical Service Providers (TechniekNL)	
	Dutch Association for Sustainable Energy (NVDE)	
	Tenants' rights organisations (Woonbond)	
	Professor Anke van Hal	
	Professor Maarten Hajor	
Implementation partners	Netherlands Enterprise Agency (RVO)	• Assistance in the implementation of PAW pilot projects with local data on building stock, available subsidies, etc. • Liaison role
	Platform 31	

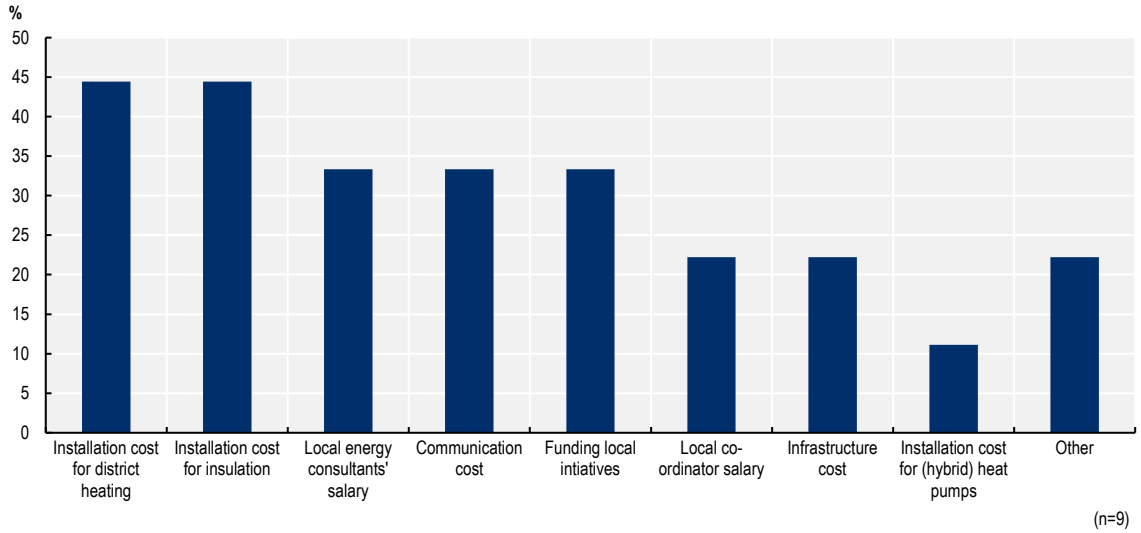
Source: PAW (2021[29]), *Kennis- en leerprogramma PAW*, https://www.aardgasvrijewijken.nl/klp-paw/default.aspx (accessed on 23 October 2022); PBL (2021[6]), *Warmtetransitie in de praktijk*, https://www.pbl.nl/publicaties/warmtetransitie-in-de-praktijk (accessed on 21 October 2022); PBL (2022[31]), *Tussen uitvoering en beleid in de warmtetransitie*, https://www.pbl.nl/publicaties/tussen-uitvoering-en-beleid-in-de-warmtetransitie (accessed on 20 October 2022).

Flexible funding of the pilot projects enabled municipalities to develop their plans

Once the pilot project fund has been approved, responsibility for the allocation of financial resources must be given to the local government. As mentioned in Chapter 2, municipalities differ in terms of heating infrastructure, energy efficiency of building stock, ownership and risk of energy poverty, among others. Sustainable heating solutions must be tailored to local conditions and financial resources allocated according to local priorities, which may differ from one place to another.

The PAW pilot programme comes with flexible funding. Municipalities are given the liberty to allocate the funds received from the national government according to their own needs, based on plans they have submitted before being selected as a pilot project. This allowed municipalities to experiment and face the challenges in their own ways. The OECD Dutch City Survey shows that the municipalities participating in the PAW allocate government funds across different items. Each pilot neighbourhood received from EUR 4 million to 5 million on average, depending on investment needs and business cases (PBL, 2021[6]). For example, in the municipality of **Leusden**, the neighbourhood of Rozendaal received EUR 4 million from the PAW and the municipality decided to use this money to reimburse part of resident's insulation costs (Gemeente Leusden, 2022[32]). On the other hand, Figure 3.13 indicates that installation costs for district heating and insulation, local energy consultants' salaries, etc. represented the major expenditure from the PAW funding.

Figure 3.13. To what item did you allocate most national government funding for your PAW pilot project?



Note: Nine municipalities answered this question. Municipalities were asked to choose three options.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

The policy continuity of the programme enabled progress both at the national and subnational levels

The policy continuity of the PAW built a foundation for solid outcomes. The PAW was launched with a clear long-term goal, which was to scale up neighbourhood-level sustainable measures for the entire country. In order to scale up the measures effectively, the national government announced that it would continue adding pilot neighbourhoods over time. From the launch of the PAW in 2018 to the National Programme for Local Heat Transition (NPLW) in 2023, the communication on policy continuity has been consistent and clear.

The anticipated continuity of PAW budgets also gave a clear signal to municipalities that there would be national government support in the long term. From the beginning, it was clearly announced that EUR 435 million would go into the PAW over the 2019-28 period (Rebel/KWINK Groep, 2021[33]). The first selection of pilot neighbourhoods in 2018 had a budget of EUR 120 million and the second selection had EUR 100 million in 2020 (PBL, 2021[6]). Moreover, the Sustainability Measures in the Built Environment Acceleration Programme (PVGO) shared budget plans for the built environment for the five years to come (see Annex 4.A) (Government of the Netherlands, 2022[3]).

More importantly, the PAW also enabled a gradual transition process. For instance, in the first round, even the PAW itself did not know exactly what selection criteria would work best, since it was unexplored territory. The selection criteria prioritised different types of sustainable heating solutions and the geographical spread of neighbourhoods (Figure 3.14). However, in the second round, natural gas-free readiness and affordability became important criteria. When the third round of selection came in 2022, there was already a range of 47 pilot projects, with a diversity of approaches. The PAW analysed what types of approaches were still lacking for the next selection, namely low-temperature heating networks and all-electric approaches, while insulation and CO_2 reduction became important selection criteria.

Figure 3.14. Location of PAW pilot neighbourhoods (municipalities)

Note: Currently, a total of 66 neighbourhoods participate in the PAW. The last 2 neighbourhoods, De Heuvel/Amstelwijk in Leidschendam-Voorburg and Anjum in Noardeast-Fryslân are not reflected in the map above (PAW, 2022[34]).
Source: Government of the Netherlands (2022[35]), *Participating Municipalities Natural Gas-free Districts*, https://www.rijksoverheid.nl/onderwerpen/aardgasvrije-wijken/deelnemende-gemeenten-aardgasvrij-maken (accessed on 7 December 2022).

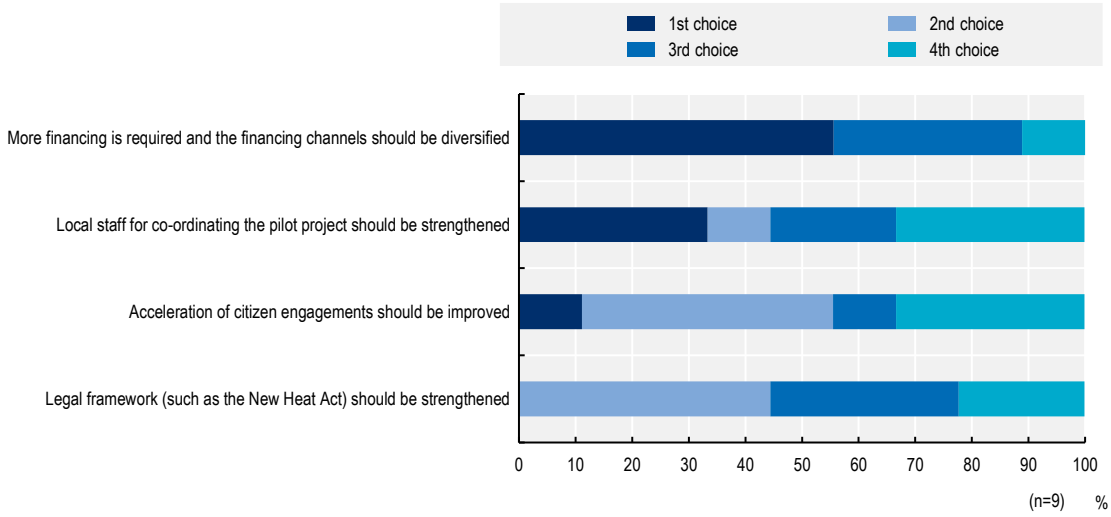
The municipality of **Leusden** is a good example of the third cohort of beneficiaries from the PAW. The municipality does not have locally available heating sources nearby for district heating. It learnt that district heating would not be a technically feasible option through the KLP and that, considering its specific situation, insulation and electrification with (hybrid) heat pumps would be the best options if financial support from the PAW could be secured. Although Leusden was not selected during the first and second rounds in 2018 and 2020, it was selected in the third round in 2022 to receive PAW funding from the national government (Gemeente Leusden, 2022[32]). The neighbourhood conditions in Leusden remained the same but Leusden stood a better chance in the third round because the selection committee specifically looked for all-electric projects which were lacking in the first and second rounds of selection.

Challenge: Scaling up a neighbourhood-level project to the entire municipality requires time and resources

The first natural gas-free neighbourhood is important because it serves as a compass to extend the measures to the rest of the municipality. Knowledge and know-how gained through the first pilot neighbourhood should be used to scale up the natural gas-free measures in other neighbourhoods as well. However, the number of pilot neighbourhoods per municipality is still limited.

According to the OECD Dutch City Survey, the municipalities that participate in the PAW responded that the main lessons learnt from the pilot projects are that "more financing is required, and the financing channels should be diversified", "local staff for co-ordinating the pilot project should be strengthened" and "acceleration of citizen engagements should be improved" (Figure 3.15).

Figure 3.15. What is the biggest lesson you learnt from participating in PAW pilot projects?



Note: Nine municipalities out of 26 answered this question. Municipalities were given the option to rank in descending order of importance (the 1st choice being the most important lesson learnt).
Source: OECD Survey on Decarbonising Building in Cities and Regions in the Netherlands (2022).

Municipalities face difficulties in scaling up measures from a given neighbourhood due to the time and resource-consuming nature of pilot projects. However, there is no shortcut. Municipalities should take the time to build on the lessons learnt from their first pilot neighbourhood and develop locally tailored strategies for the rest of the neighbourhoods.

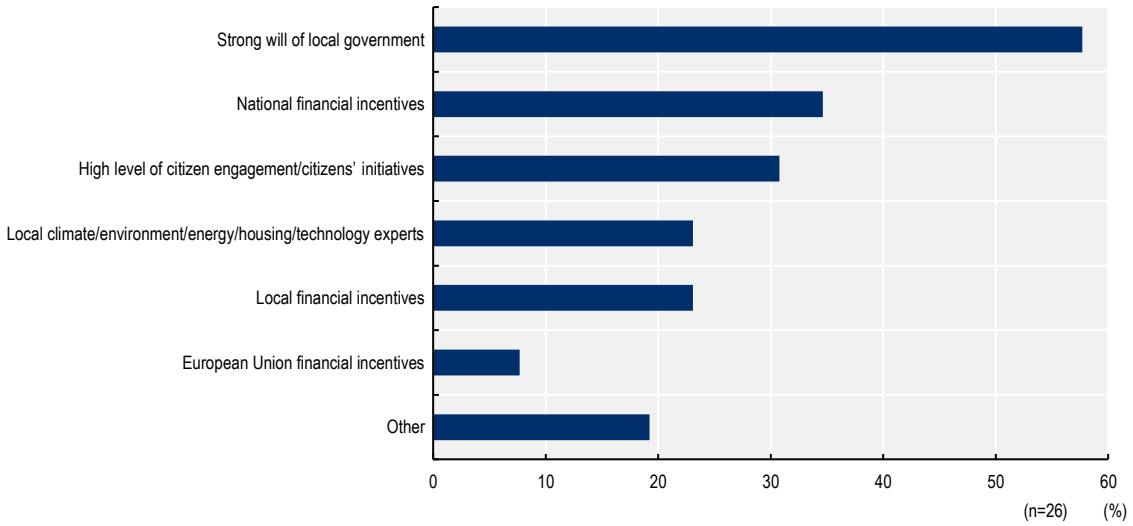
The municipality of **Utrecht** offers a good example of such an incremental approach. Utrecht started its first neighbourhood approach in Overvecht-Noord in 2017. From 2018 to 2021, the municipality focused on engaging residents and learning how to approach them. In 2018, they started a neighbourhood board group, which is composed of different residents from Overvecht-Noord who closely follow the development of natural gas-free plans. In 2020, the municipality started a dialogue about energy with residents to discuss the consequences of making Overvecht-Noord natural gas-free. Utrecht conducted a resident survey to find out what residents find most important when switching to natural gas-free energy (Municipality of Utrecht, 2022[20]). As a result of these years of engagement, the municipality learnt that affordability was the most important element when making the decision to opt for natural gas-free alternatives (Municipality of Utrecht, 2021[36]).

Consequently, the municipality gave the highest consideration to affordability when selecting its next natural gas-free neighbourhoods (Municipality of Utrecht, 2022[37]). It, therefore, prioritised neighbourhoods where they could start implementing sustainable measures without making residents pay more than when using natural gas. The municipality also prioritised neighbourhoods that have similar features to those of Overvecht-Noord, such as the share of housing corporations and the availability of a technical solution (district heating). The example of Utrecht illustrates how municipalities can take the time and resources needed in the first pilot neighbourhood to maximise the learning experience and be able to scale up the measures to the rest of the municipality.

Challenge: Municipalities without PAW support find it difficult to start pilot projects on their own

While those PAW-selected municipalities could benefit fully from the funding and knowledge-sharing platform, this was not the case for most municipalities, since selected neighbourhoods only represent a small part of the Netherlands (66 neighbourhoods, 59 municipalities). The OECD Dutch City Survey (Figure 3.16) found that the “strong will of local government” was perceived as an enabling factor for natural gas-free neighbourhoods by most of the municipalities.

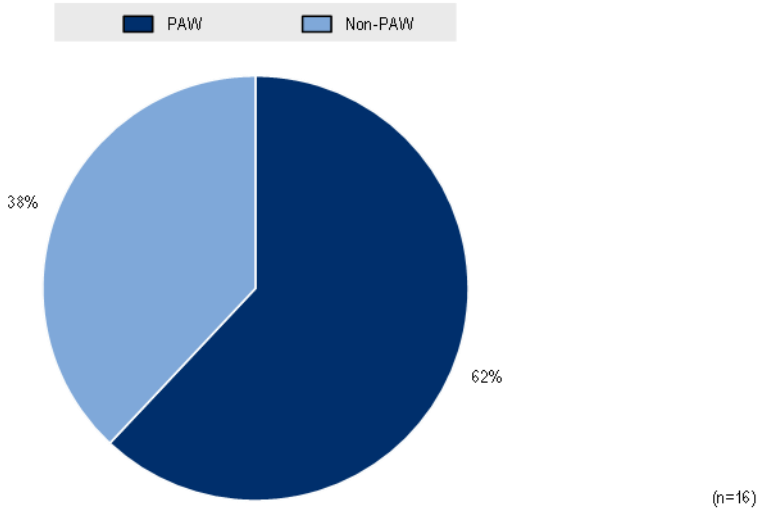
Figure 3.16. Enabling factors for the implementation of natural gas-free districts in municipalities in the Netherlands



Note: The municipalities could select multiple options if applicable.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

However, financial and technical assistance from the national government is necessary to ensure and maintain the strong will of the local government. Without financial and technical support provided by the PAW, municipalities alone find it difficult to start a natural gas-free pilot neighbourhood. According to the OECD Dutch City Survey, 16 out of 26 respondent municipalities (62%) have a natural gas-free pilot neighbourhood. Among the 16 municipalities, 10 municipalities were selected by the PAW. Only 6 out of 16 municipalities (38%) have a pilot neighbourhood without the support of the PAW (Figure 3.17).

Figure 3.17. Only 38% are starting natural gas-free neighbourhoods without PAW support



Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

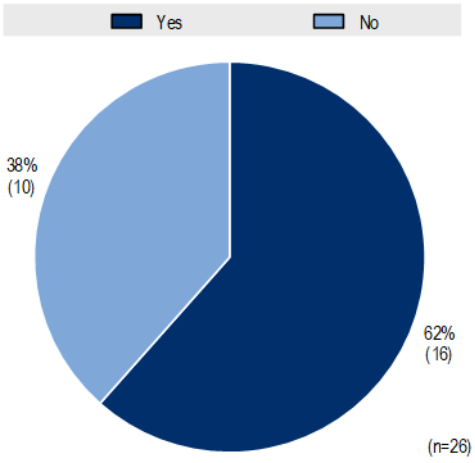
Challenge: More focus is needed on small municipalities that have not participated in pilot projects

Despite the PAW achievements, many municipalities have not started a pilot neighbourhood project yet (38% according to the OECD Dutch City Survey) (Figure 3.18). This share may actually be higher in practice since the sample of the 26 municipalities that responded to the survey reflect rather a high level of commitment to the topic of decarbonising buildings. In fact, in 2020, only 6.3% of dwellings in the Netherlands were connected to a district heating network with low or zero gas consumption and only 1.2% of households use electricity in heating with low or no gas (CBS, 2022[2]).

From the beginning of 2023, the PAW, KLP and ECW evolved into a national institute named the National Programme for Local Heat Transition (NPLW). Going beyond the 66 pilot neighbourhoods, the NPLW will embrace all Dutch municipalities and assist them to facilitate the heat transition in the built environment (Government of the Netherlands, 2022[3]). At the time of writing this report, much of the information about the NPLW is still under development. However, it will be particularly important to provide tailor-made assistance for those municipalities that have not yet experienced a pilot project.

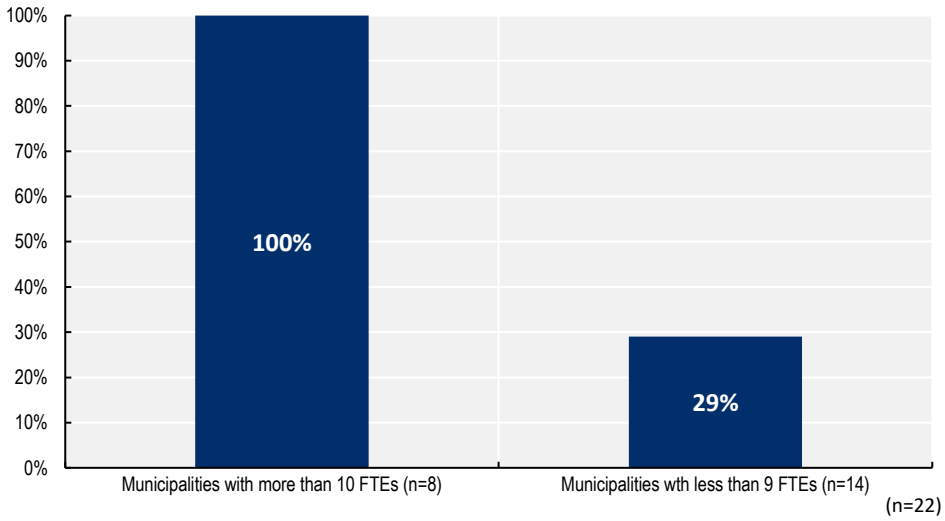
The OECD Dutch City Survey confirms that all municipalities that have more than 10 civil servants working on decarbonising buildings have already started at least 1 pilot neighbourhood whereas only 29% (4 out of 14) of municipalities that have less than 9 civil servants working on decarbonising building have started a natural gas-free neighbourhood (Figure 3.19). This shows the extent to which the varying staff capacity has an impact on implementation readiness. Without accumulated inhouse knowledge, it is difficult for small municipalities to follow the national goal to make 1.5 million homes more sustainable by 2030.

Figure 3.18. Does your municipality have at least more than one neighbourhood that has started natural gas-free measures?



Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Figure 3.19. Does your municipality have more than one neighbourhood at least that has started natural gas-free measures?



Note: Four municipalities did not answer questions on FTEs.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

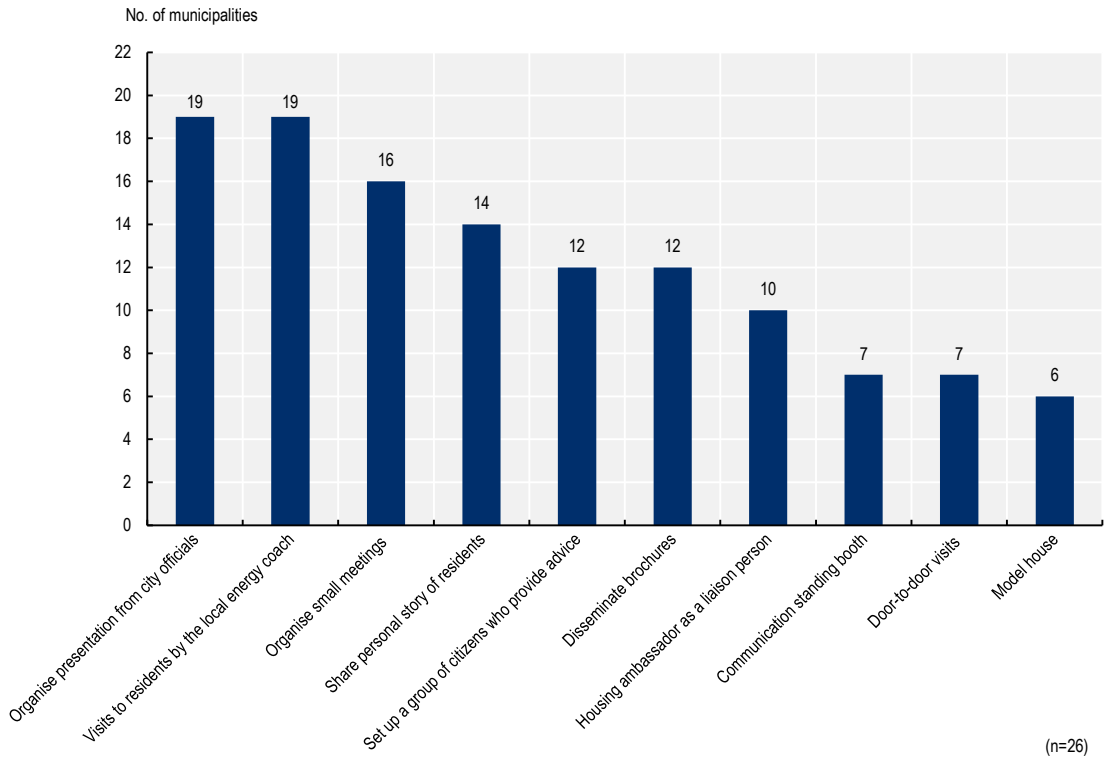
ENGAGE: A neighbourhood approach enabled municipalities to engage citizens in responding to local needs

The Netherlands is now preparing the energy transition in the built environment at a speed and scale that the country has never experienced. In order to achieve the goals set by the Dutch Climate Agreement, it is critical to steer citizens in the same direction. To this end, municipalities play a key role in engaging citizens and local stakeholders, using different communication strategies.

Communication strategies should be locally customised

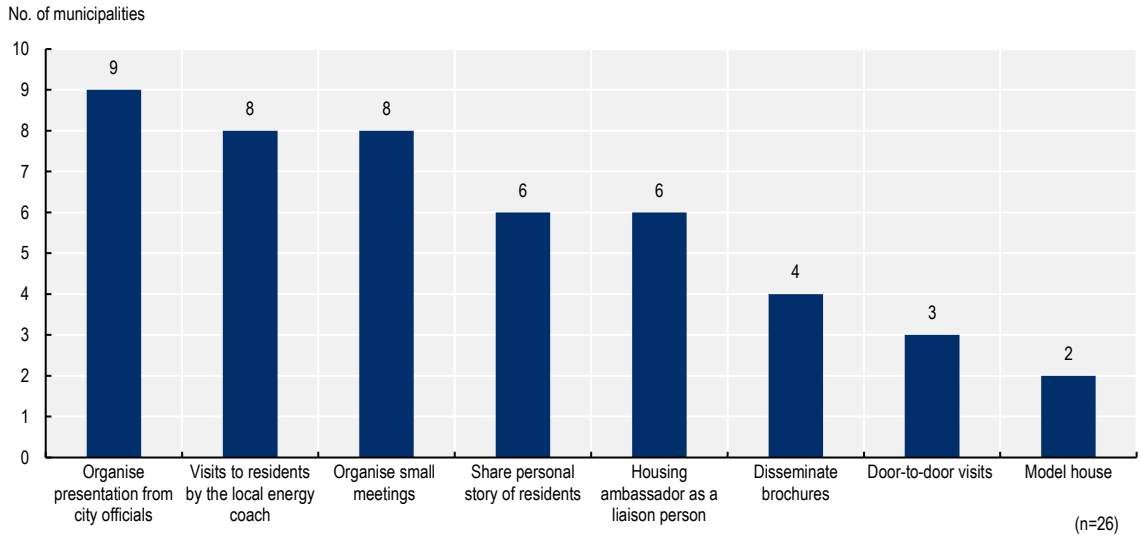
Municipalities used many different communication strategies (Figures 3.20 and 3.21). For example, some municipalities have shared the success story of retrofits of a neighbour or nominated a neighbourhood ambassador for a liaison role. Some front-running municipalities have developed their own strategies such as "setting up a network of residents" or "building a decarbonised model house". Communication at the neighbourhood level was found to be very effective, particularly presentations from city officials, visits to residents by local energy coaches and small group meetings. However, there is no one-size-fits-all communication strategy. Each municipality can develop its dedicated communication with its own strength and capability.

Figure 3.20. What communication strategies did you use?



Note: Municipalities could choose up to three options.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Figure 3.21. What are the most effective communication strategies?



Note: Municipalities could choose up to three options.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Municipalities can communicate with citizens through data-driven maps and tools

Announcements of future visions and plans can trigger a lot of questions and uncertainty among residents. One way to mitigate the uncertainty is to provide credible data and estimates. For example, the municipality of **Rotterdam** chose to start with reliable local data. In 2018, the municipality developed a map called the WHAT map (updated in 2021), which shows the cheapest alternative solutions to natural gas based on where the buildings are located. The WHAT map takes into account building types, the proximity of local heat sources, etc. to assist neighbourhoods and residents in choosing the most affordable option. Moreover, in 2019, the municipality also developed the WHEN map, which tells citizens when each neighbourhood will start natural gas-free measures (PAW, 2020[38]). Box 3.5 provides more details on this communication strategy.

Similarly, the municipality of **Amsterdam** developed a Public Space Management Map (*Beernaert Publieke Ruimte*), which is an integrated digital map of the city. The map tells citizens which alternatives to natural gas will be used by neighbourhood. For those neighbourhoods that have been selected to install district heating infrastructure, the map also shows the timeline from installation to completion (Municipality of Amsterdam, 2022[39]).

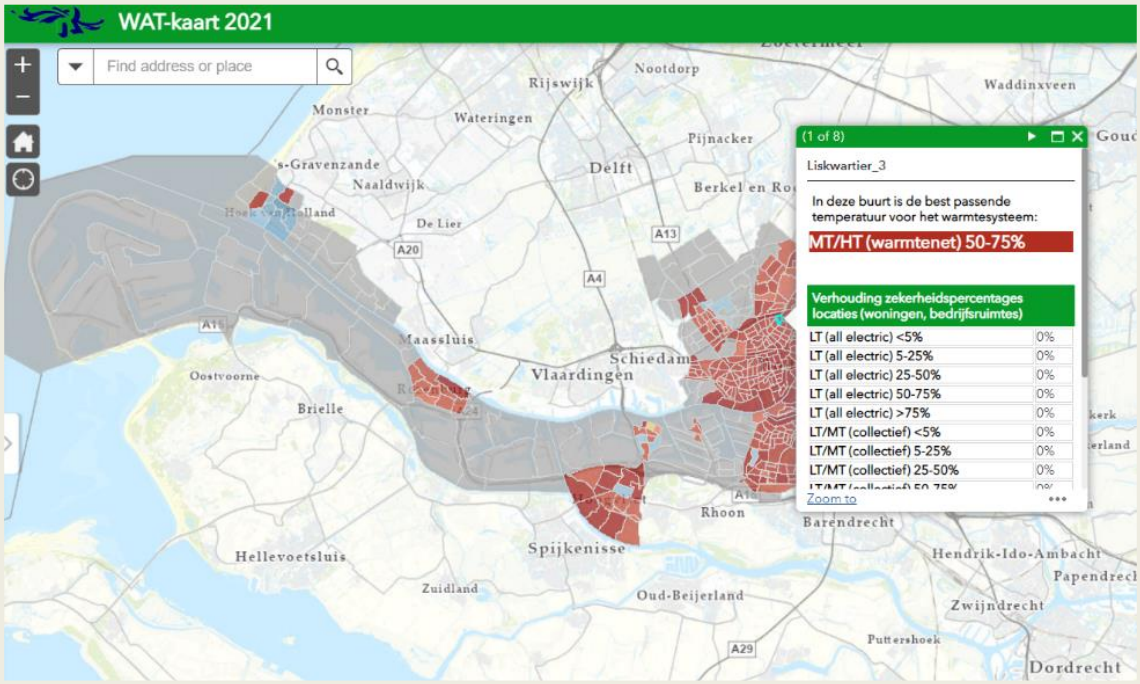
Furthermore, the municipality of Amsterdam provides a one-stop-shop called Sustainable Signpost for residents, local companies and institutions. People can find all support schemes, including subsidies through which Amsterdam is helping citizens implement sustainable measures in the built environment (Municipality of Amsterdam, 2022[40]). The database also provides an online Home Scan (*HuisScan*), which allows for finding tailored strategies and insulation tips per building in Amsterdam. In addition, the website offers a free e-book containing 50 energy-saving tips for Amsterdam citizens (Regional Energieloket, 2022[41]).

Box 3.5. Using local data as the basis of communication: The case of Rotterdam

The WHAT map answers the question "What is the most affordable alternative to natural gas in my neighbourhood?"

The WHAT map was launched as part of Rotterdam's Heat Transition Vision. For each neighbourhood, this map shows the most affordable alternative to natural gas at that moment as well as the advantage of the preferred alternative compared to other options for existing buildings (as a percentage). The map shows the various alternatives including collective heat network options at low, medium or high temperatures, as well as fully electric heating per house, with heat pumps. The percentage next to the alternative refers to the extent to which the chosen alternative is cheaper than the other options (e.g. how much cheaper is the preferred alternative compared to other options?) (Municipality of Rotterdam, 2021[42]). Figure 3.22 shows the example of the Liskwartier neighbourhood in Rotterdam. According to the WHAT map, the most affordable solution for Liskwartier is a collective heat network with medium or high temperatures.

Figure 3.22. Rotterdam WHAT map (WAT-kaart)



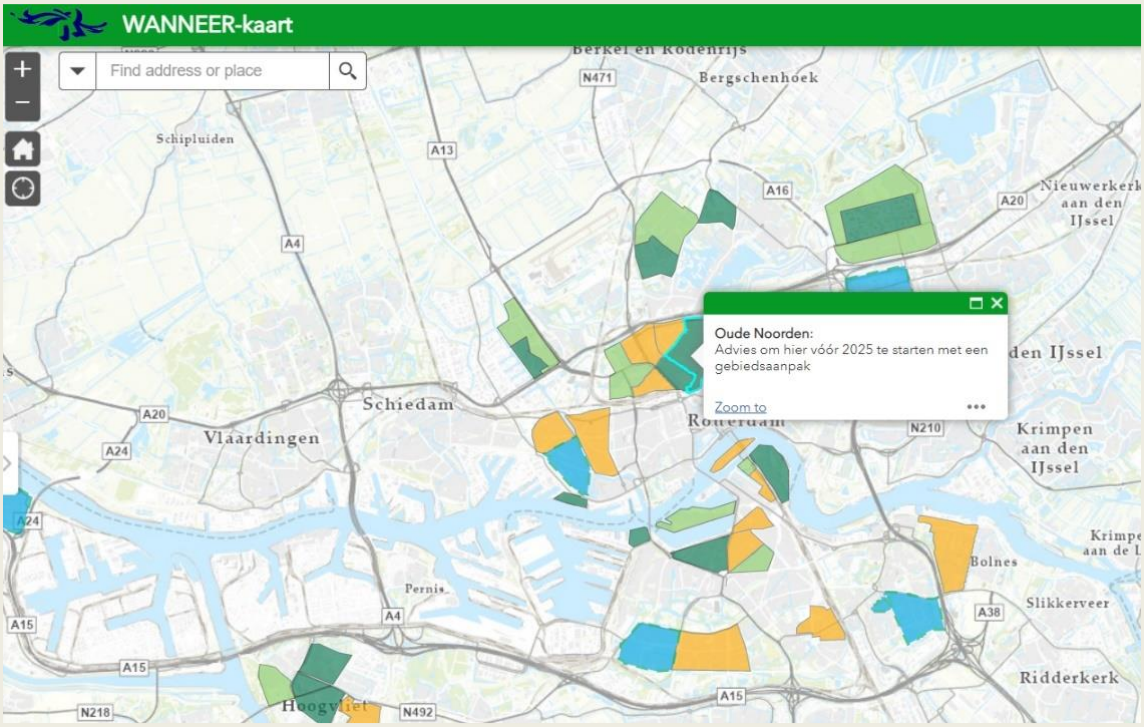
Source: City of Rotterdam (2021[43]), *Rotterdamse WAT-kaart 2021*, https://rotterdam.maps.arcgis.com/apps/webappviewer/index.html?id=6e37b7b6c0df407f881edb007e819803.

The WHEN map answers the question "When will my neighbourhood start natural gas-free measures?"

The WHEN map suggests a timeline to start working on natural gas-free area approaches in Rotterdam in the coming years. By sharing the timeline of natural gas-free plans per neighbourhood, it helps residents and property owners make building-related investment decisions such as renovation.

Figure 3.23 shows the example of the Oude Noorden neighbourhood, where the WHEN map advises starting natural gas-free measures before 2025.

Figure 3.23. Rotterdam WHEN map (WANNEER-kaart)



Source: City of Rotterdam (n.d.[44]), *WANNEER-kaart*, https://rotterdam.maps.arcgis.com/apps/webappviewer/index.html?id=8afc18c4d22448c0ac8361932b4818b8.

Municipalities can facilitate citizen initiatives

Municipalities can encourage individual residents to form a group of neighbourhood ambassadors to facilitate communication. Municipalities can also support existing resident initiatives to accelerate the heat transition in neighbourhoods.

In the municipality of **Leusden**, the pilot neighbourhood was mostly owned by individual property owners and there was no available heating source nearby. Thus, the municipality had to encourage individual residents to first invest in insulation and then heat pumps. In the absence of collective heating solutions, the municipality needed to have a communication instrument to engage citizens in the decision-making process and make them take ownership of the neighbourhood heat transition.

To this end, the municipality systematically identified individual residents who are intrinsically interested in the heat transition of their homes and formed a neighbourhood group. The group members are innovators and early adopters, who are already actively involved in heat transition-related themes. They have engaged in various activities such as neighbourhood drinks, walk-in consultations, webinars, etc. They targeted the majority of the neighbourhood and communicated with residents to foster a bottom-up approach that can lead to change (Toussaint and Former, 2022[45]).

Moreover, the municipality of Leusden has appointed an independent neighbourhood counsellor who oversees the whole neighbourhood group communication process and acts as an intermediary between the residents and the municipality. The municipality's role is therefore to organise, facilitate and monitor the environment where residents can make the best choices on sustainable solutions and investment (Toussaint and Former, 2022[45]).

In the Middenmeer district of **Amsterdam**, a group of residents started to investigate locally available residual heat for district heating. They formed a neighbourhood co-operative called MeerEnergie and collectively approached external parties such as heat network companies and the municipality of Amsterdam to collaborate. Through this collaboration, they found a local heating source in an Equinix data centre in Amsterdam Science Park. MeerEnergie also organises regular meetings called General Members' Meeting (GMM) and informs residents about the latest updates on district heating plans. This neighbourhood co-operative now aims to establish a heating company that provides heating to 5 000 homes in the neighbourhood (MeerEnergie, 2022[46]). The municipality of Amsterdam works closely with MeerEnergie to learn from the model and scale up the measure to other neighbourhoods and cities.

Similarly, in the municipality of **Wageningen**, a group of residents in the neighbourhood of Benedenbuurt started the municipality's plan for heat transition earlier than the national government. In 2016, a group of active residents gathered and discussed the old sewer replacement and concluded that it was time to install a heat network. They formed a neighbourhood initiative called Co-operative WOW (*Warmtenet Oost Wagenigen*), which launched a neighbourhood campaign to convince the rest of the residents to agree with the installation of a heat network. This campaign was composed of resident volunteers who developed information brochures and went from door to door in the neighbourhood to distribute the brochures in person. They also organised walk-in consultation hours, information evenings, etc. In parallel, the campaign formed an Owners' Association (VvE) core team, which organised meetings with the VvE chair and disseminated the idea of the heat network. Furthermore, for facilitating resident communication, the municipality of Wageningen hired an active resident from the WOW co-operative as a municipality civil servant. This way, the municipality remained constantly engaged in the neighbourhood initiative and supported the whole process (PAW, 2022[47]).

On top of these efforts, the WOW co-operative, the municipality of Wageningen and heat supplier Kelvin established the neighbourhood's own heating company called WOW (*Warmtenet Osst-Wageningen*) as a joint venture. This way, residents could take part in the decision-making process of the heating company and the company could offer lower costs for heating. Consequently, 83% of homeowners in the neighbourhood have signed up as customers (Warmtebedrijf Oost Wageningen, 2022[48]).

As the examples of Amsterdam, Leusden and Wageningen show, the key drivers of the energy transition in the built environment are not restricted to the traditional boundaries of governments. Rather, the examples showcase the fact that locally tailored communication and resident-oriented approaches are effective in accelerating sustainable measures. Therefore, municipalities should facilitate local communication and encourage neighbourhood initiatives.

Municipalities can tailor their approach according to different types of home ownership

Strategies to decarbonise buildings should take into account different types of home ownership. In the Netherlands, when people buy an apartment in a building, they become members of the Owners' Association (*Vereniging van Eigenaars*, VvE) (Government of the Netherlands, n.d.[49]). Approximately 1.2 million homes take part in the VvE, which, rather than the individual owner, organises and bears the costs of measures to enhance the sustainability of the entire building (Government of the Netherlands, 2022[3]). Initially, the VvE's main duty was to take care of the management and maintenance of the common areas of apartment buildings, such as the facade or the roof (Government of the Netherlands, n.d.[49]). Increasingly, however, VvEs are asked to make decisions on sustainability measures as well, including changing the collective heating system (Government of the Netherlands, 2022[3]). Due to the shared ownership of buildings, making decisions and reaching a consensus on sustainable measures is a challenging task. Moreover, each VvE has different rules and decision-making processes, and most of VvEs lack the knowledge and funds to implement sustainability measures.

Municipalities can provide VvEs with tailor-made approaches. For example, in the municipalities of **Eindhoven, Oosterhout, Oss, Tilburg and Waalwijk**, the municipalities, VvE managers and VvE Belang

(representative for the VvE in the Netherlands) came together and developed a platform called VvE Transition Center Brabant (*VvE Transitie Centrum Brabant*, VTCB) (VvE Transitie Centrum Brabant, n.d.[50]). The platform is to support VvEs in sustainability measures and provides a step-by-step guide book called "*campagnebox*", which tells VvEs how to start implementing sustainability measures (VvE Transitie Centrum Brabant, n.d.[50]). Through this platform, the municipalities find ways to engage VvEs by providing training courses. For instance, the municipality of Tilburg organises a three-day course every six months. The training course covers legal, technical and energy themes and aims to give advice about the bottlenecks that each VvE is facing in regard to sustainability measures (VvE Transitie Cenntrum Brabant, n.d.[51]).

Municipalities ask for regulatory change to enforce the disconnection of homes from the gas grid

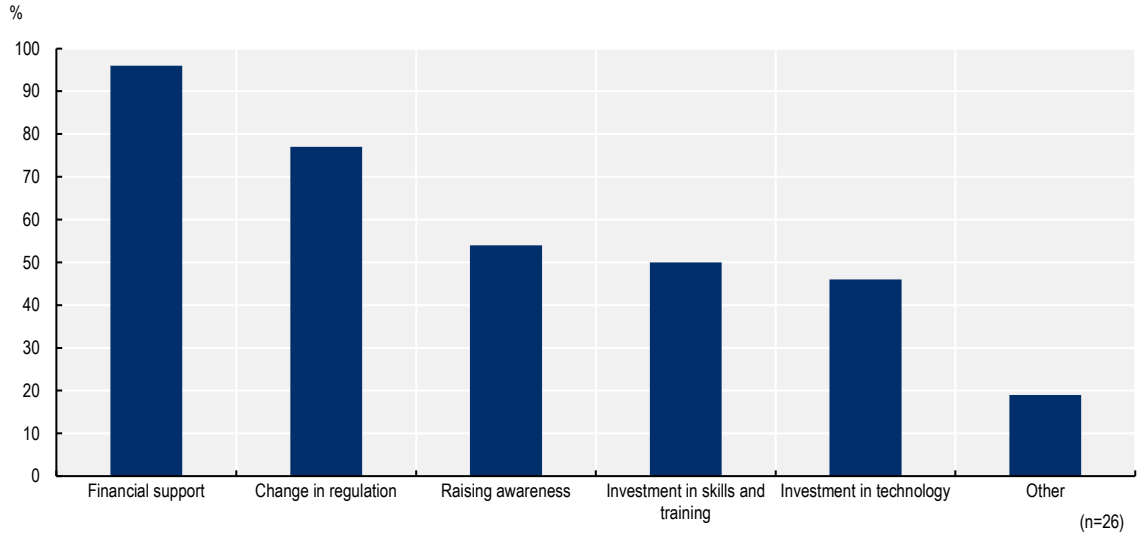
For some front-running municipalities that have already started the heat transition process in their neighbourhoods, the process of convincing local residents sometimes takes a lot more time and is more costly than expected. For instance, the municipality of **Rotterdam** selected the Heindijk neighbourhood as one of its natural gas-free pilot neighbourhoods. The municipality covered almost 96% of the cost of the whole transition process (EUR 13 000 for connection costs and EUR 500 for clean cooking per household) and the municipality's civil servants proactively engaged residents through various local events (Tabula rasa, 2020[52]). As a result, 70% of the residents in Heindijk agreed with the heat transition plan and the municipality could start a natural gas-free pilot project in the neighbourhood. However, 30% of residents still did not agree with the plan despite the financial support. This example suggests that the heat transition requires more than financial assistance. To accelerate the heat transition, some municipalities are asking for adequate regulation that allows municipalities to cut off natural gas.

The OECD Dutch City Survey also illustrates this regulatory demand from municipalities. About 77% of the municipalities that participated in the survey stated that change in regulation is part of the support they need the most from the national government (Figure 3.24). In particular, 45% of respondents stated that municipalities need a regulatory framework that allows them to enforce the disconnection of homes from the gas grid to accelerate the transition process. Notably, municipalities already having started a pilot neighbourhood project had a stronger need for a regulatory change compared to those that had not yet started such a project (Figure 3.25).

The Netherlands Environmental Assessment Agency (PBL) acutely points out that among the three levels of learning in the PAW (namely, local, collective and institutional), the outcomes of institutional learning have relatively limited visibility (PBL, 2022[31]). Institutional learning concerns translating bottlenecks into important policy changes. According to PBL analysis, since the policy track started, only a limited number of policy changes have been made. Some notable changes are the legislative proposal for the Municipal Instruments Heat Transition Act, through which municipalities can request. personal data that are important for heat transition from energy providers; adjustments to the Energy Savings Investment Subsidy Scheme (ISDE) subsidy; and a temporary scheme to shut off the gas for cooking (PBL, 2022[31]).

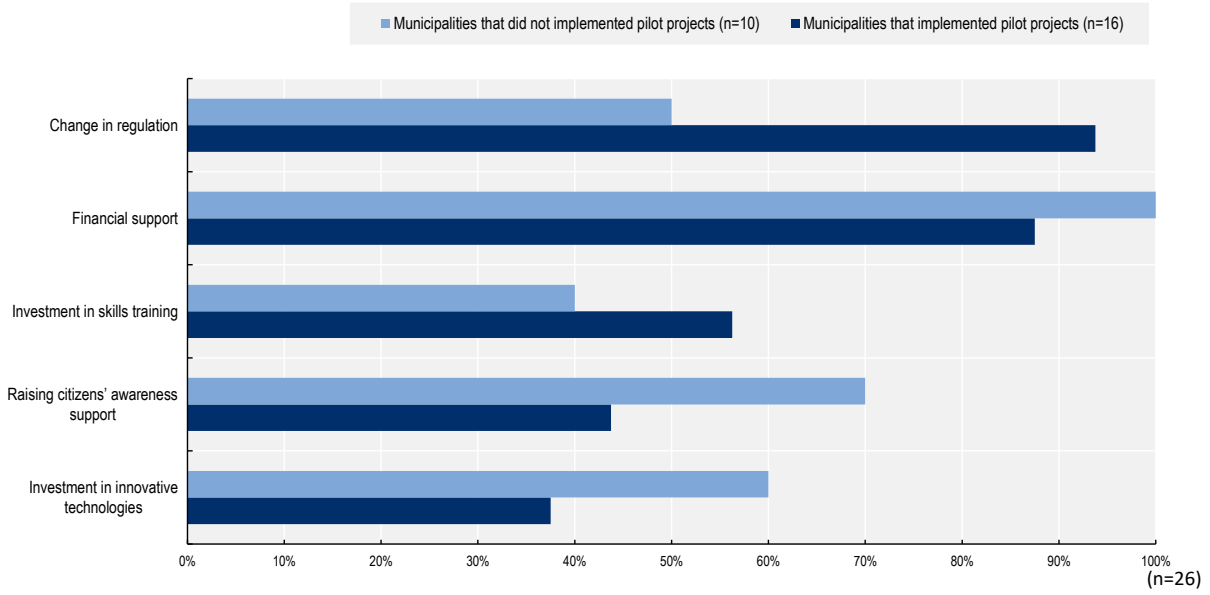
The new Heat Transition Act (*Wet gemeentelijke instrumenten warmtetransitie*, Wgiw) and Collective Heat Supply Act (*Wet collectieve warmtevoorziening*, Wcw) might bring new momentum to accelerate the heat transition. As a response to the needs of municipalities, the Sustainability Measures in the Built Environment Acceleration Programme (PVGO) mentions the possibility of introducing two new acts in 2024: a new Heat Transition Act (Wgiw) and a Collective Heat Supply Act (Wcw) (Government of the Netherlands, 2022[3]). The Wgiw would give municipalities the legal means to remove neighbourhoods from the natural gas network and make the energy supply more sustainable. Similarly, the Wcw would allow local authorities to determine by whom, where and when a collective heat supply is installed (Jetten, 2022[53]).

Figure 3.24. What kind of support do you need the most from the national government for your local heat transition?



Note: The municipalities could select multiple options if applicable.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Figure 3.25. Different needs for national government support across municipalities



Note: The municipalities were asked to select multiple options if applicable.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

In July 2022, the Minister of Climate and Energy (EZK) sent a letter to the House of Representatives regarding the progress of the Wcw. According to this letter, the Wcw bill will be presented to the House of Representatives in May 2023 and the law is now planned to be enforced on 1 July 2024 (Jetten, 2022[53]).

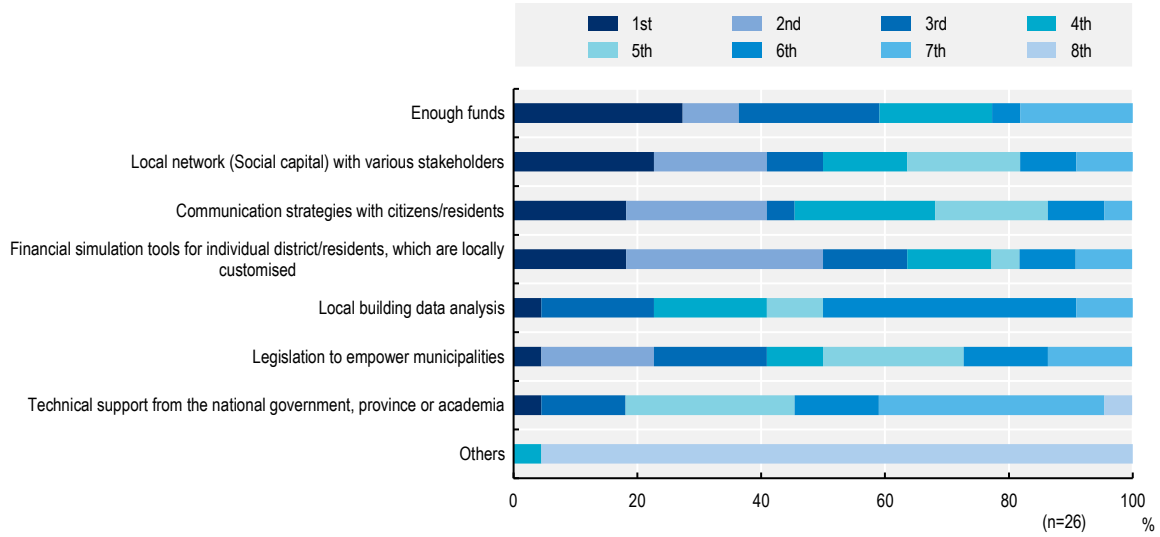
The first attempt to enforce the disconnection of homes from the gas grid in the Netherlands took place in the municipality of **Utrecht**. In December 2022, the city council of Utrecht approved a proposal to force

320 homes in the Overvecht-Noord neighbourhood to be taken off the gas. Since 2018 when the Overvecht-Noord neighbourhood was selected as the PAW pilot neighbourhood, the municipality made a lot of effort to convince residents to switch off the gas to a more sustainable energy source. However, 5% were still against the change to electric cooking and 3% abstained from voting (RTLnieuws, 2022[54]). The city council felt the necessity to force residents to switch off the gas to achieve the municipality's goal to make 8 800 homes in Overvecht-Noord and 40 000 homes in Utrecht natural gas-free by 2030 (Municipality of Utrecht, 2022[20]).

Challenge: Not all municipalities are equipped with good communication strategies

Communication with citizens requires good skills and is a time-consuming task which is not feasible for small municipalities. Especially in the early stage of communication and without inhouse expertise, the time required for communication is long. The OECD Dutch City Survey (Figure 3.26) shows that "local network (social capital) with various stakeholders" and "communication strategies with citizens/residents" are key elements for an area-specific approach to decarbonising buildings. However, municipalities with a limited number of civil servants working on the sustainable built environment cannot provide enough resources to systematically communicate with citizens. In an evaluation report of the natural gas-free neighbourhood of Heindijk in Rotterdam, it is mentioned that personal home visits by civil servants have triggered a lot of resident engagement. However, this is not necessarily feasible on a larger scale, especially when there is a lack of civil servants who work in a sustainable built environment (Tabula rasa, 2020[52]).

Figure 3.26. Enabling factors for municipalities to implement area-specific policies on decarbonising buildings



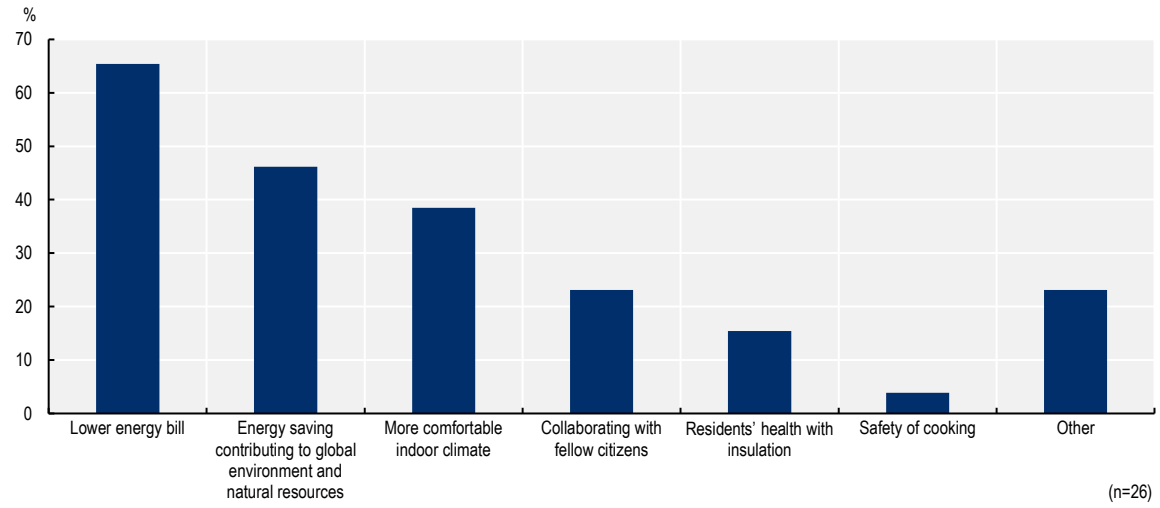
Note: The legend denotes a ranking of these enabling factors.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Moreover, the co-benefits of building decarbonisation, such as health improvement, local job creation and socio-economic development, should be promoted at a national level. When there is a strong national narrative on the co-benefits of building decarbonisation, the synergies with local government communication efforts can be exploited (Figure 3.27). For example, in Japan, as a national programme, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has supported data collection and analysis on the health benefits of home insulation, in collaboration with building and medical academia. Specifically, the study has examined electrocardiogram abnormalities in residents in cold homes, the

association between indoor temperature in winter and serum cholesterol, the perception of feeling cold in the bedroom and sleep quality, and the association between indoor temperature in winter and serum cholesterol (Umishio et al., 2021[55]; 2022[56]; Chimed-Ochir et al., 2021[57]; 2021[58]), these research results were compiled into easy-to-understand images for residents in order to disseminate the co-benefits easily (MLIT, 2021[59]).

Also, both national and subnational governments need to support diverse communication strategies. Some communication strategies include creating a sustainable model house. By allowing citizens to visit a model house and experience the comfort level of a well-insulated and gas-free house, governments can convince citizens to invest in sustainable measures for their homes. For example, Yokohama city (Japan) started a new grant in 2021 targeting insulation, retrofitting the meeting place of community association town halls and apartment buildings. By targeting a communal space for residents, the city government aimed to showcase that insulated buildings ultimately benefit local residents (City of Yokohama, 2022[60]).

Figure 3.27. Most appealing co-benefits for residents participating in natural gas-free neighbourhoods



Note: The municipalities were asked to select multiple options if applicable.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Challenge: Engaging skilled local technicians is challenging due to the labour shortage

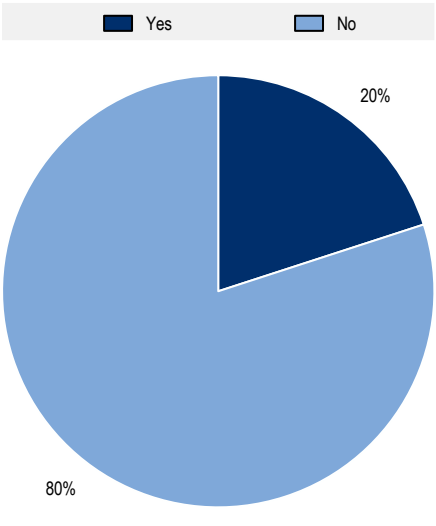
Having enough labour force in the field of heat transition is an important prerequisite to speed up and scale up measures. However, the International Energy Agency (IEA) predicts that there will be a growing labour shortage during the transition worldwide. For instance, according to the IEA's Announced Pledges Scenario (APS), the demand for heat pump installers will quadruple by 2030 (IEA, 2022[61]). Dutch municipalities are no exception.

However, a shortage of skilled local technicians is already a bottleneck in speeding up and scaling up sustainable measures in the built environment. The OECD report *Policy Options for Labour Market Challenges in Amsterdam and Other Dutch Cities* examines local labour market opportunities and challenges in Amsterdam and other large cities. According to the report, local employers are struggling to find qualified staff in most sectors and the ratio of vacancies to those employed is at its highest level since 2018. The report revealed that almost four out of five employers had difficulty filling job vacancies, mainly due to the lack of applicants and lack of skills (OECD, 2023[62]). This finding confirms the chronic labour shortage challenge in the Netherlands.

The national government and municipalities can ameliorate the labour shortage issue by providing training programmes and strengthening the certification system. However, the OECD Dutch City Survey has revealed that only 20% of municipalities offer special training for technicians for a sustainable heat transition (Figure 3.28).

Meanwhile, there are a few promising examples of municipalities that provide training for local technicians. For example, in **Apeldoorn**, the municipality signed an agreement with the Saxion University of Applied Sciences to contribute to the energy transition in the coming years. **Amsterdam** has a non-profit organisation called Jungle Amsterdam, which focuses on the energy transition, green and climate adaptation, circular economy and food and health (Municipality of Amsterdam, 2022[63]). As part of its work on the energy transition, in 2018, the organisation launched a project called FIXbrigade. The project aims to send "fixers" to people's homes and provide information on energy savings. Since March 2021, this project expanded into an apprenticeship programme, in which job seekers and interns can be trained to be fixers. Fixers learn how to implement insulation measures, identify heat leakages and provide waterside adjustment for central heating (Municipality of Amsterdam, 2022[64]). Benchmarking existing training programmes with government support could help speed up the transition process.

Figure 3.28. Does your municipality provide training for jobs in the field of the sustainable built environment?



Note: Jobs exclude volunteering jobs.
Source: OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (2022).

Other OECD countries such as Estonia promote prefabrication of insulation or other energy-efficient materials for renovation in order to solve the labour shortage problem for building decarbonisation (Box 3.6).

Box 3.6. Prefabrication and Factory Reconstruction Grant Scheme for Apartment Buildings in Estonia.

In Estonia, mass-produced multi-story apartment buildings which were built during the Soviet time dominate the residential building stock (Hamburg and Kalamees, 2019[65]). Most of these buildings do not respond to the energy performance requirements to reach the country's 2050 climate goals.

In 2015, the Estonian Ministry of Economic Affairs and Communications fund (hereafter KredEx), established financial support schemes for improving energy performance certificates (EPC) (Hamburg and Kalamees, 2019[65]). One of the major schemes is called Factory Reconstruction Grant Scheme for Apartment Buildings.

The scheme aims to solve the labour shortage problem while facilitating the adoption of a novel approach by installing prefabricated components for insulation, ventilation and other renovation tasks. The prefabrication process allows more buildings to be renovated with the same amount of labour with standardisation of renovation materials and economies of scale. This is particularly effective in larger cities such as Tallinn and Tartu where most apartment buildings were constructed during the Soviet era with a standardised design (Estonian Ministry of Economic Affairs and Communications/Tal Tech, 2020[66]).

The Factory Reconstruction Grant Scheme for Apartment Buildings is eligible for apartment buildings built on the basis of a standardised design. With factory reconstruction, factory-made wall and roof panels, already fitted with insulation, windows and ventilation pipes, are installed in the apartment building. The grant pays 50% of the eligible expenses, or up to EUR 1 000 000 per apartment association (KredEx, 2021[67]).

Source: Hamburg, A. and T. Kalamees (2019[65]), "How well are energy performance objectives being achieved in renovated apartment buildings in Estonia?", https://doi.org/10.1016/j.enbuild.2019.07.006 (accessed on 18 January 2023); Estonian Ministry of Economic Affairs and Communications/Tal Tech (2020[66]), *Long-term Strategy for Building Renovation*, https://energy.ec.europa.eu/system/files/2020-09/ee_2020_ltrs_official_translation_en_0.pdf (accessed on 18 January 2023); KredEx (2021[67]), "37 apartment associations across Estonia apply for the innovative factory reconstruction grant", https://kredex.ee/en/node/2130 (accessed on 18 January 2023).

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4 Key policy recommendations: Start, Scale up, and Speed up (3S)

Based on the challenges identified in the previous chapter, this chapter provides recommendations for both national and subnational policy makers in the Netherlands. The main recommendations are “3S” key actions: Start, *Scale up* and *Speed up*. Municipalities are first encouraged to start a neighbourhood pilot project with the help of the national government. Then, both national and subnational governments should scale up existing pilot neighbourhoods at the local and national levels. Last, both national and subnational governments should speed up the transition process by removing common bottlenecks such as the labour shortage.

Introduction

Three key challenges in terms of decarbonising homes in municipalities in the Netherlands have been identified in this report:

1. **There is growing disparity between municipalities that started a neighbourhood pilot project and those that have not**. Although most Dutch municipalities submitted their Heat Transition Vision by the end of 2021, the readiness to implement the goals set in the vision varied greatly across the municipalities. Some municipalities that started neighbourhood pilot projects as early as 2018 have already gained a lot of knowledge through their "step-by-step" and "chance-by-chance" experience. However, municipalities which are not equipped with enough funding or good communication strategies, are still struggling to follow their own Heat Transition Vision, let alone start a neighbourhood pilot project.
2. **Neighbourhood pilot projects should be scaled up citywide and nationwide**. Knowledge and know-how gained through the first pilot neighbourhood should be used to scale up the natural gas-free measures in other neighbourhoods as well. However, the number of pilot neighbourhoods per municipality across the country is still limited. In particular, small- and medium-sized municipalities require more support to scale up sustainable measures.
3. **Labour shortage is one of the main common bottlenecks to speed up the transition**. The lack of civil servants in municipalities to co-ordinate the heat transition as well as the lack of skilled labour in the built environment are impeding the transition in the Netherlands. However, according to the OECD Survey on Decarbonising Buildings in Cities and Regions in the Netherlands (hereinafter the OECD Dutch City Survey), only 20% of municipalities offer special training for technicians for sustainable heat transition. Most of the municipalities that provide training do so in co-operation with private companies and universities. More government-coordinated training programmes, targeted at local specificities, should be considered to speed up the transition process.

In response to these three main challenges, this report offers three main recommendations.

START with a neighbourhood pilot project

It is important that all municipalities start with a neighbourhood pilot project. A neighbourhood is an optimal size to test solutions to face decarbonisation challenges. The neighbourhood approach adopted by the Netherlands is particularly beneficial because each neighbourhood in the country tends to have a homogeneous building stock (as compared to other neighbourhoods in the same municipality). For example, among the 112 neighbourhoods forming the municipality of Rotterdam, all residential buildings in the neighbourhood of Europort were built between 1965 and 1974, whereas 80% of residential buildings in the neighbourhood of Blijdorp were built between 1930 and 1945 (CBS, 2022[1]; PBL, 2020[2]) This similarity of building stock within a neighbourhood creates a profitable business case for companies for the collective installation of heat solutions (such as district heating) and allows residents of a same neighbourhood to purchase energy efficiency materials at a lower price per unit, for example in terms of insulation materials. Once municipalities found an effective sustainable measure for a certain type of building, they could easily apply it to the rest of the buildings in the neighbourhood.

Also, neighbourhood-level communication has also proven to be effective. Behavioural change can be maximised by leveraging the power of social influence of neighbours. For example, many municipalities promoted success stories of a neighbour in terms of district heating, heat pumps or insulation. Municipalities have encouraged individual residents to form groups of "neighbourhood ambassadors" to spread good practices.

Moreover, building decarbonisation measures come with a range of technical, social, regulatory and financial challenges that are difficult to foresee unless they start the implementation and face bottlenecks directly, especially with local stakeholders. Therefore, municipalities should be encouraged by the national government as well as the National Programme for Local Heat Transition (NPLW) to start a neighbourhood approach and be given enough time to experiment, learn from failures and solve problems.

For the national government, the next phase could be to target those municipalities that have not yet started a neighbourhood pilot project. The Natural Gas-free Neighbourhood Programme (PAW) national pilot project has enabled municipalities to innovate and develop energy transition processes. Despite a good pool of 66 PAW neighbourhoods and a few other municipalities having started their own pilot neighbourhoods, nationwide coverage is far from reached.

The national government needs to identify the reasons behind the disparities in implementing a neighbourhood approach across municipalities. According to the OECD Dutch City survey, the support that municipalities request from the national government varied from financial support and regulatory change to investment in technology. The national government should enhance communication and diversify dialogue platforms with municipalities to better understand what kind of obstacles municipalities are facing and provide assistance based on their needs. This will be particularly important for the upcoming NPLW to support those municipalities that have not yet started a neighbourhood pilot project.

For subnational governments, they should strive to adapt their heat transition policies in line with the national government's goals to phase out natural gas by 2050. Starting a pilot neighbourhood is one way to align the local policy to the national government's area-specific approach in building decarbonisation.

While considering the benefits of the neighbourhood approach, municipalities should aim to: i) identify locally available sustainable heating sources and strategically decide natural gas alternatives for every neighbourhood; 2) understand the social structure of the neighbourhood community and develop local frameworks and communication strategies with residents; and iii) build strong networks of local stakeholders and labour force, including heating suppliers and insulation companies, to detect bottlenecks in every part of the transition process.

SCALE UP by leveraging existing pilot projects and inter-municipality network

Leveraging existing pilot projects is key to scaling up decarbonisation measures in the built environment. The pool of 66 PAW pilot neighbourhoods has a wide range of building decarbonisation solutions, ranging from district heating to collective electric heat pumps. The pilot neighbourhoods also have diverse characteristics in terms of energy source, the energy efficiency level of building stock, home ownership and size of the municipalities.

For the national government as well as the NPLW, it is important to ensure that non-PAW municipalities/neighbourhoods have access to PAW neighbourhoods accumulated experiences and lessons learnt. In particular, the national government needs to facilitate the process in which a non-PAW municipality can identify a PAW municipality/neighbourhood that resembles it the most in terms of building stock, locally available heating sources or ownership of homes. By identifying the most "benchmarkable" municipality/neighbourhood, non-PAW municipalities and neighbourhoods can minimise the trial-and-error phase and scale up decarbonisation measures.

Moreover, the national government should encourage co-operation beyond municipalities, notably within provinces. For instance, in the province of Brabant in the Netherlands, the municipalities of **Eindhoven, Oosterhout, Oss, Tilburg and Waalwijk** created a platform called VvE Transition Center Brabant (VTCB) to provide training courses for Owners' Association (VvE) managers in multi-family residential buildings. Participating municipalities can share resources for training and address common challenges collectively. Especially for small- and medium-sized municipalities, provincewide co-operation such as that of Brabant

could help draw on the know-how and expertise of larger cities. The VTCB is currently funded by the European Union to support VvEs in their sustainability plans. Both the Dutch government and the NPLW could take further initiatives to create provincewide co-operation in building decarbonisation (VvE Transitie Centrum Brabant, n.d.[3]).

Also, the Netherlands has created a regional framework called the Regional Energy Strategy (*Regionale Energie Strategie*, RES). In 2019, municipalities, provinces, water boards and the central government decided to divide the Netherlands into 30 energy regions based on renewable energy generation potential, available heating sources, etc. Often, the heat network of a windmill goes beyond the boundaries of the municipal border. The RES was created to facilitate co-ordinated work on generating renewable energy, finding sustainable heating sources as well as building energy infrastructure and storage capacity (Government of the Netherlands, n.d.[4]). For instance, one of the 30 RES regions is called the Clean Tech region, composed of the municipalities of Apeldoorn, Brummen, Epe, Heerde, Lochem, Voorst and Zutphen, the water boards Rijn en IJssel and Vallei en Veluwe and the province of Gelderland. The members of this RES region agreed to generate collectively 1.07 terawatt-hour (TWh) of large-scale renewable energy by 2030 (Clean Tech Regio, n.d.[5]).

The national government could leverage the RES platform to help municipalities further co-operate on energy transition tasks in the built environment. Creating inter-municipal training programmes for skilled labour in the built environment, convening business stakeholders and making bigger business cases could help tap into economies of scale at a regional level. Small and medium-sized municipalities could especially benefit from regional level co-operation by pooling human resources to minimise their capacity gaps.

For subnational governments, it is important to harness existing inter-municipal networks of organisations, such as the Association of Dutch Municipalities (VNG), a knowledge and network organisation, Platform31 and the NPLW. Leveraging existing networks can help municipalities learn from each other on technical aspects and financial issues as well as effective ways to communicate with residents and customise solutions to the local context. For instance, Platform31 organises learning circles for municipal policy officers on natural gas-free topics (Platform31, 2022[6]). By exchanging ideas and concerns, if needed, municipalities can also collectively elevate their voice with regards to the national government to request support on common bottlenecks.

Subnational governments should also be fully aware that neighbourhood pilot projects are the starting point for local heat transition. While implementing the first pilot projects, subnational governments should already look for the next natural gas-free neighbourhoods and start collecting citywide data on building. The municipality of **Utrecht** provides a good example of such an approach. After years of learning from the first pilot neighbourhood in Overvecht-Noord, the municipality selected the next 24 natural gas-free neighbourhoods with similar features to those of the first neighbourhood in terms of the share of social housing and locally available heating source.

SPEED UP by removing common bottlenecks

Removing common barriers such as labour shortage issue is a prerequisite to speed up the process.

For the national government, it is important to develop a monitoring framework to track progress and speed up the process. For instance, the Dutch action plan for hybrid heat pumps included a plan to innovate and standardise production and supply chains to reduce the average time for hybrid heat pump installation to approximately six hours of additional work compared to the time currently required to install a gas boiler (Government of the Netherlands, 2022[7]). Further monitoring could contribute to improving labour conditions as well as reducing working hours.

Moreover, the national government can convene municipalities to address common problems. Once the common bottlenecks have been identified, the national government could organise workshops and training to address them. For example, the PAW identified that the chronic labour shortage in the built environment is the main obstacle to heat transition in most PAW pilot neighbourhoods. As a result, the PAW organised a design sprint together with local governments, which explored the common problem of the labour market and training in heat transition. Consequently, they developed three tools to help municipalities identify where they face the most severe labour shortage and how they can respond to the needs of potential employees (PAW, 2022[8]). Also, it is imperative to work closely with industry and schooling institutions to address the shortage of skilled labour. For example, in **Apeldoorn**, the municipality drew up an agreement with the Saxion University of Applied Sciences to contribute to the energy transition in the coming years.

In addition, as recommended by the OECD report *Policy Options for Labour Market Challenges in Amsterdam and Other Dutch Cities*, the national government could also take the lead in implementing a skills taxonomy and skills-based labour market for the sustainable built environment (OECD, 2023[9]).

For subnational governments, it is important to find ways to engage citizens in their heat transition plans. The OECD Dutch City Survey confirms that "the need to accelerate citizen engagement" was the main lesson that municipalities learnt from natural gas-free neighbourhood pilot projects. Large municipalities can afford to hire employees who have expertise in the field of sustainability and these employees can hold events or organise visits to engage residents. However, small- and medium-sized municipalities do not have enough civil servants to engage citizens, let alone take other sustainable measures. For instance, according to the OECD Dutch City Survey, 7 municipalities out of 26 reported that they have less than 3 full-time equivalent (FTEs) staff members working in building decarbonisation. It is especially for these municipalities to engage a group of residents as co-ordinators and facilitators of the heat transition plan. Several municipalities support resident initiatives in their heat transition and sometimes hire members of resident initiatives as municipal civil servants. For example, **Leusden** and **Wageningen** are small municipalities with less than 40 000 residents respectively. Both municipalities encouraged and supported residents' initiatives in the heat transition of homes and later strategically hired a member of residents' initiatives in the municipality as a heat transition project officer. In addition, municipalities could engage more closely with local employers in the building sector to better anticipate local skills needs, providing job-skill matching platforms at the local level and supporting small- and medium-sized enterprises (SMEs) in bundling their staff training needs (OECD, 2023[9]).

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Annex 4.A. Government budget for sustainability measures in the built environment

Annex Table 4.A.1. Funds for sustainability measures in the built environment

	2022	2023	2024	2025	2026	Structural
Funds under CA and MJN2022						
Incentive hybrid heat pumps (F) (a)	64	96	128	150	150	0
National Insulation Programme (F) (a) (b)	303	245	360	366	402	0
Incentive for improved sustainability of public real estate (F) (a)	95	202	310	330	464	0
Energy performance requirements for new buildings, industry (a)			50	50	80	0
Implementation costs, subnational authorities and planning agencies (including other climate sectors) (a)	153	300	500	800	800	0
Structural funds for monitoring energy saving (a)	9.2	9.2	9.2	9.2	9.2	14
Mandatory recyclate percentage		3	4	4	3	3
Shift in energy taxation, 1st bracket		247	305	364	421	637
Increase in tax deduction to reduce energy taxation (compensation for green gas blending obligation) (c)		225	225	225	225	225
Total	***623***	***1 345***	***1 891***	***2 298***	***2 554***	***879***
Existing funds in (BZK) Ministry's budget						
Heating Fund	3.6	100.1	95.6	79.2	78.5	0
SEEH	14.4	5.4	3.4	0.8	1.5	0
SAH	19.3	42.2	24.0	17.0	39.0	0
Renovation Accelerator	2.0	25.5	37.5	47.5	4.0	0
Innovation scheme	1.4	6.7	6.8	5.3	20.7	0
SVOH	12	33	40	50	12.9	0
SUVIS (specific payment for ventilation in schools)	74.4					
PAW	10	1.9	2.8	0	3.6	0
Total existing funds	***135.1***	***214.8***	***196.6***	***206.8***	***138.2***	***0***
Existing Funds in (ESK) Ministry's budget						
ISDE (heating options and insulation)	100	100	100	100	100	0

Source: Government of the Netherlands (2022[10]), *Beleidsprogramma versnelling verduurzaming gebouwde omgeving*, https://www.rijksoverheid.nl/ministeries/ministerie-van-binnenlandse-zaken-en-koninkrijksrelaties/documenten/rapporten/2022/06/01/beleidsprogramma-versnelling-verduurzaming-gebouwde-omgeving (accessed on 18 October 2022).

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