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The uptake of new domestic energy technology in the 1950s–1960s: how women got involved in France and the Netherlands

Abstract

Access to clean and affordable energy services and technologies is a global concern as stated in global conventions and goals. Different energy needs and interests are identified between men and women. In the search for a just energy transition, the question emerges how to design an energy policy that reflects and needs of energy users. This paper aims to create insights based on a comparative gender analysis of household energy technology uptake in France and the Netherlands in the 1950s and 1960s when the households took up new electrical appliances in their homes. The analysis of this period in France and in the Netherlands shows that women were chosen as the target group in order to make the households' uptake of new technologies and uses successful. Lessons can be learnt from the history of electrification of households' demand in the Netherlands and France that put women at the centre of energy technology adoption in households, given that the uptake of the new technologies and behaviour change required by the current energy transition targets households as homogenous entities.

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Plan of the article

- Introducing the gender and energy nexus
- The needs of female energy users
- Involving women: energy system changes in France and in the Netherlands
 - Supply side actors: targeting women's demand for energy
 - Demand side actors: women talking to women
 - The role of policy: are women becoming invisible in the current energy transition?
- Discussion
- Conclusion

INTRODUCING THE GENDER AND ENERGY NEXUS

- 1 This paper focuses on women's role in electrification and uptake of new energy household technology in France and the Netherlands in the 1950s and 1960s. To analyse the observations made in this historical perspective paper, we use gender analysis of the gender-energy nexus research rooted in development studies with empirical data mainly from the Global South. The clean cooking debate is an example of this type of research in a Global South context. Post-world war, electrification of the home was a promise to relieve women's burden in their everyday life referring to the same arguments as those framing the clean cooking debate in the Global South today. Gender approaches are developed and applied to analyse unequal access to energy and to reveal injustices in energy policy and programmes.
- 2 Considering free market economy and non-discrimination law, policymakers make the assumption that industrial countries have gender-neutral energy policies. In the definition of Khamati-Njenga and Clancy, a gender-neutral energy policy is based on the assumption that a good policy, programme or project will benefit women and men equally in meeting their practical needs. However, the few scientific publications on gender and energy policy in the North conclude the opposite.¹ Women and men reveal different preferences for energy policy options, especially when it comes to energy transition and the adoption of renewable energy. Furthermore, energy consumption

is not gender-neutral.² Purchasing power, preferences, needs and everyday practices and routines are shaped by and shaping norms of social institutions.³ To involve women in the uptake of new energy technology is essential towards a just energy transition. In order to stimulate women's role as agents in the domestic household energy use, gender should be reflected in the energy policy in order to engender the energy transition.

This paper aims to create insights on the role of women in energy transitions based on a comparative historical analysis of household energy through a gender analytical lens. After the Second World War in France and the Netherlands, national energy companies started promoting national energy sources for both commercial and household use. We take an energy systems approach in our perspective, meaning that we make a distinction between the different roles of the different actors in the different phases of the energy chain. We focus on three actors in our analysis: the electricity supplier in France, the manufacturers of electrical appliances in the Netherlands and the households in both countries. Energy transition means in reality that a new energy source is introduced in society often complementary to already existing energy sources⁴ and is supported by institutions and public policies, public or private firms and technological supply chains as well as users and social demand.⁵ We take the two supplier roles as illustrative for the process. The first one had

¹ Joy S. Clancy & Ulrike Röhr, "Gender and energy: is there a Northern perspective?", *Energy for Sustainable Development*, vol. 7, n°3, 2003, 44-49; Joy S. Clancy, Viktoria Daskalova, Mariëlle Feenstra, Nicolò Franceschelli, Margarita Sanz, *Gender perspective on access to energy in the EU*, Study for the FEMM Committee of the EU Parliament, PE 596.816 (Brussels, 2017); Cornelia Fraune, *A gendered perspective on energy transformation* (IPSA World Congress, Poznan, Poland, 2016); Sarah E. Wiliarty, "Gender and energy policy making under the first Merkel government", *German Politics*, vol. 20, n°3, 2011, 449-463.

² Clancy & Röhr, "Gender and energy: is there a Northern perspective?" (cf note 1); Riita Rätty & Annika Carlsson-Kanyama, "Energy consumption by gender in some European countries", *Energy Policy*, vol. 38, n°1, 2010, 646-649; Alain Beltran, "Introduction: Energy in history, the history of energy", *Journal of Energy History/Revue d'Histoire de l'Énergie*, n°1, 2018.

³ Fraune, "A gendered perspective on energy transformation" (cf note 1); Beltran, "Introduction: Energy in history, the history of energy" (cf note 2).

⁴ Beltran, "Introduction: Energy in history, the history of energy" (cf note 2); Yves Bouvier, "Energy consumers, a boundary concept for the history of energy", *Journal of Energy History/Revue d'Histoire de l'Énergie*, n°1, 2018.

⁵ Frank W. Geels, "The Dynamics of Transitions in Socio-Technical Systems: A Multi-Level Analysis of the Transition Pathway From Horse-Drawn Carriages to Automobiles

interest in selling its appliances to equip the homes, the second one had interest in educating households in a proper usage of electricity. When electrical appliances penetrated households' homes and transformed their daily energy usage in France in the fifties, *Électricité de France* (EDF) sent female energy advisors to the households to stimulate the proper use of electric appliances addressing mainly women's needs. The Netherlands used a similar approach to promote the uptake of new energy technologies in households to secure domestic energy demand. Companies like Philips used their marketing of household appliances to stimulate access to electricity and the use of natural gas for heating and cooking. Marketing of these companies considered women as the main target group recognizing their role as the main users of household energy.

- 4 We aim not only to analyse how energy systems focused on women as agents of change, but also contribute to the current debate on energy transition. Do the lessons learned in the long energy history of France and The Netherlands provide policy recommendations for the recent uptake of new energy technologies? Stimulating more energy efficient energy sources and usages, was supposed to benefit especially the women who are traditionally responsible for household energy. However, traditional policy assumptions that switching to clean and efficient energy sources will save women time and contribute to their empowerment is contested. The European experience in the fifties and sixties when households equipped their homes with electrical appliances to relieve women from their domestic chores, left the question of freedom of choice by women for the equipment and energy sources.
- 5 We argue that lessons can be learnt from the history of electrification of domestic uses in the Netherlands and France that put women at the centre of energy technology adoption in households, while the uptake of the new technologies and behaviour change required by the current

energy transition targets households as homogenous entities. We acknowledge that the two countries have different energy transitions histories and different socio-political contexts. We will focus in this article on two historical periods: the electrification of domestic uses in the 1950s -1960s and the uptake of renewable energy and energy efficiency technology today. At the time of electrification of households' usage in France in the 1950s the energy supplier put in place an organisation based on housewives' councillors who addressed the concerns of women. In the Netherlands, housekeeping schools and information campaigns for new household technology targeted women specifically. We see that addressing women as the main household energy user is missing in the current changes in the energy system towards more renewable energies, energy efficiency and sobriety which tends to overlook women as key domestic stakeholders of the current energy transition. We find conceptual anchors in the gender-energy nexus literature to develop our gender analysis for a historical perspective. We argue that the current challenge of how to increase the participation of households in the energy transition towards decarbonisation can be enhanced through the lessons learnt in the previous energy transition towards electrification.

The remainder of this article is divided into three parts: the first theoretical part introduces gender analysis of energy technology uptake by describing the needs-based approaches. The second comparative historical part is dedicated to a gender analysis of the historical uptake of new energy technologies in both France and the Netherlands. Two interviews were conducted with a key respondent in both countries to verify our findings from the literature review. Finally, we conclude on the lessons we can learn from both European countries to compare with the specificities of the gender roles in the current energy transition.

THE NEEDS OF FEMALE ENERGY USERS

In energy history, consumers are less studied than energy consumption, while differences of consumption patterns between consumers can

(1860-1930)", *Technology Analysis and Strategic Management*, vol. 17, n°4, 2005, 445-476.

be identified.⁶ Gender analysis of interventions of energy transition over time shows a strong emphasis on households as a homogeneous entity, not reflecting the reality of a more fluid and diverse composition of households.⁷ In both France and the Netherlands, single female-headed-households are increasing in the last decades due to demographic aging and they have needs and energy consumption patterns that are not considered within the policies.⁸ As a consequence, energy transition policies may miss their targets in the end. Very few gender-disaggregated data on energy use are available to inform policymaking and track progress of implementation of interventions.⁹ A policy, programme or project failing to recognise that the needs of men and women are different, can be considered gender-blind.¹⁰ The question remains how to design such a policy that recognizes both women's and men's needs for energy services.

- 8 Over the past two decades, extensive research has shown the interdependencies between gender relations and energy policy targeting domestic uptake of new energy technologies.¹¹ The energy needs and interests of men are often given higher priority in energy policy than those of women.¹² The needs-based approach is pre-

dominantly used in gender and energy research in the Global South but provides equally a conceptual framework to understand energy needs in a Northern context.¹³ Women's needs are categorized in a needs-based approach around their triple role in society: as reproducers and family caregivers, as producers and as community members. This results in three corresponding needs categories: practical needs, productive needs and needs to carry out community tasks. A further specification can be made in energy interests. These interests can be grouped in practical interests, meeting practical and productive needs, and strategic interests necessary to participate in society.¹⁴ Table 1 illustrates this categorization of needs and interests with examples of electricity technology uptake from Europe in the 1950s. In needs-based approaches, an energy policy should reflect women's needs in order to enable them to fulfil their reproductive tasks in less labour-intensive and healthier ways.¹⁵ It does not challenge the traditional division of tasks between men and women, but recognizes the needs and interests and calls for designing an energy policy that acknowledges the needs and interests.

The needs-based approach reflects the complexity of the energy system by focusing on the use and consumption of energy services. As demonstrated in Table 1, energy is an essential

⁶ Bouvier, "Energy consumers, a boundary concept for the history of energy" (cf note 4).

⁷ Clancy & al. "Gender perspective on access to energy in the EU" (cf note 1).

⁸ Ibid.

⁹ Ibid.

¹⁰ Beatrice Khamati-Njenga & Joy S. Clancy, *Concepts and issues in gender and energy* (Leusden: ETC Netherlands, ENERGIA working paper, 2002).

¹¹ Joy S. Clancy, Tanja Winther, Margaret Njirambo Matinga & Sheila Oparaocha, *Gender equity in access to and benefits from modern energy and improved energy technology* (Leusden: ETC Netherlands, World Development Report Background Paper, 2012); Gunnar Köhlin, Erin O. Sills, Subhrendu K. Pattanayak & Christopher Wilfong, *Energy, gender and development: what are the linkages? Where is the evidence?* (Washington: The World Bank, Policy Research Working Paper 5800, 2011); Sarah E. Ryan, "Rethinking gender and identity in energy studies", *Energy Research & Social Science*, vol. 1, 2014, 96-105.

¹² Elizabeth Cecelski, *Rethinking gender and energy: old and new directions* (Leusden: ETC Netherlands, ENERGIA/EASE, 2004); Joy S. Clancy, Margaret Skutsch & Simon Batchelor, *The gender-energy-poverty nexus: finding*

the energy to address gender concerns in development (Leusden: ETC Netherlands, ENERGIA, 2002).

¹³ Cecelski, "Rethinking gender and energy: old and new directions" (cf note 12); Clancy & al. "The gender-energy-poverty nexus: finding the energy to address gender concerns in development" (cf note 10); Clancy & al. "Gender equity in access to and benefits from modern energy and improved energy technology" (cf note 11); Köhlin & al. "Energy, gender and development: what are the linkages? Where is the evidence?" (cf note 11); Shonali Pachauri & Narasimha D. Rao, "Gender impacts and determinants of energy poverty: are we asking the right question?", *Current Opinion in Environmental Sustainability*, vol. 5, n°2, 2013, 205-215; Jyoti K. Parikh, "Gender issues in energy policy", *Energy Policy*, vol. 23, n°9, 1995, 745-754

¹⁴ Clancy et al. "The gender-energy-poverty nexus: finding the energy to address gender concerns in development" (cf note 12)

¹⁵ Clancy et al., "Gender equity in access to and benefits from modern energy and improved energy technology" (cf note 11).

Energy Form	Women's needs and interests		
	Practical needs	Productive needs	Community tasks
	<i>Practical interests</i>		<i>Strategic interests</i>
Electricity	<ul style="list-style-type: none"> - Improved comfort and personal hygiene: hot water at home and heating - Domestic burden relief: use of washing machine, vacuum cleaner - Improved working conditions at home: lighting 	<ul style="list-style-type: none"> - Increased possibility of activities during evening hours - Provided refrigeration for food production and sale - Power for specialised enterprises 	<ul style="list-style-type: none"> - Street lights made streets safer allowing participation in other activities (e.g. women's group meetings) - Opening horizons through radio, TV and telephone

Table 1: Examples of electricity uptake in the 1950s addressing women's needs and interests using the needs-based approach

Source: based on Clancy, Skutsch & Batchelor, "The gender-energy-poverty nexus: finding the energy to address gender concerns in development", 2002 (cf note 12), examples own source.

source for food production and storage, (hot) water supply, lighting and housekeeping. With the extension of the electricity grid and the gas connections in France and the Netherlands, different kind of companies reached out to women and involved them in the decision making in the uptake of technologies, as explained in the next section. Practical interests were served when electricity became more affordable, technological interventions created household appliances and economic welfare provided the financial means to purchase those appliances to ease the burden of everyday time-consuming household tasks, like washing. The extension of electricity and natural gas network provided a cleaner and cheaper energy source for women to cook and heat their homes than the polluting biomass like coal and firewood they used before.¹⁶

10 Although women's practical energy needs might be met by the accessibility of energy services, the question is whether the strategic interests of female energy users are recognised by energy suppliers and other actors in the energy system. The history of energy system changes shows an evolution in the way women's needs and interests were taken into consideration in history. The 1950s and 1960s illustrate that it was possible to

specifically target women in the uptake of domestic energy technology because of the behaviour changes required at home. The oil crisis in the 1970s places the energy policy at the technocratic level despite some energy saving campaigns. But since then, the education campaigns are gender neutral as illustrated by the ongoing energy transition. The needs-based approach lacks the enforcement tools to ensure a policy design that acts upon the identified needs. In search of an approach that can be used to integrate end-users' needs in an energy policy, recognizing needs of energy users emerged in gender and energy analytical frameworks.

INVOLVING WOMEN: ENERGY SYSTEM CHANGES IN FRANCE AND IN THE NETHERLANDS

In this section the electrification history of households' uses in France and in the Netherlands are described using a gender lens. We identify how women's practical, productive and community needs as domestic energy users are recognised in the energy interventions promoting demand electrification. The uptake of electricity and electrical appliances was aimed not only to benefit women but more generally to the benefit of welfare, economic development and utilities.¹⁷ Over the years, new issues appeared in household energy policy

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¹⁶ Cynthia Cockburn & Ruza Furst-Dilic, *Bringing technology home: gender and technology in a changing Europe* (Buckingham, United Kingdom: Open University Press, 1994).

¹⁷ Ibid.

such as decarbonisation and energy efficiency to address climate change impacts. Societies have been constantly experiencing energy transitions, in the understanding of energy system changes. In the 1950s and 1960s, electrification and the uptake of electrical appliances to facilitate house-keeping by households have been a key turning point in the economic and social development of Europe. The current energy transition towards decarbonization represents a steppingstone to tackle pressing issues such as access to clean and affordable energy for all citizens and reduce energy consumption through energy efficiency and sobriety/conservation. In order to be just, the current energy transition has to be inclusive and ‘leave no one behind’, as expressed in the Green Deal of the European Union¹⁸. The needs-based approach in gender analysis is instrumental to reveal the needs of different energy users and the role of different energy actors, like suppliers and manufacturers, in the energy system to recognise and address those.

12 Geels’ investigation of the transitions (2005) shows that socio-technical system changes require an alignment of different elements to penetrate the existing socio-technical regime. The European energy sector has been through different transformations and crises over time. Starting from the electrification at the beginning of the 20th century based on hydropower and coal, the discovery of oil and gas in the North Sea at the end of the 1950s ignited another energy shift. The 1970s was characterised by the use of nuclear in the production of electricity in France and the oil crisis. The current energy transition aiming at switching the system form fossil fuels to low carbon energy sources. However, the transformation in the supply side also requires adjustments of the demand side.¹⁹ Technologies are not the only drivers of these changes. Changes are also driven by the interests of different actors in the system, by the energy policies and also by the needs of society, including those of women.

¹⁸ European Commission, *The European Green Deal*, COM (2019) 640 final (Brussels: EU, 2019).

¹⁹ Vaclav Smil, *Energy Transitions: History, Requirements, Prospects* (Santa Barbara: Praeger/ABC CLIO, 2010).

Supply side actors: targeting women’s demand for energy

France and the Netherlands were undergoing 13 strong societal changes through the electrification of domestic usages in the 1950s – 1960s. Electric appliances were made available to improve household welfare and specially to relieve women from burdensome household chores. Women were therefore targeted to take up new domestic equipment in their kitchen and adapt their behaviour to new energy uses. Where EDF, the French energy supplier – which was nationalised at that time – was the main actor of this process to help women to use their new appliances and electricity properly, the appliances manufacturers were at the forefront in the Netherlands in close collaboration with energy suppliers to stimulate domestic energy use.

The “fée electricity” (electricity fairy) is a note- 14 worthy gendered symbol in France of how electricity promised well-being and modernity to women and was associated with their emancipation.²⁰ As early as the end of the 1920s electrical devices slowly start penetrating the homes. Hot water from the tap as well as “vacuum cleaners and small appliances”²¹ relieved housewives who could afford these appliances from burdensome chores. The electrification of the French homes required to boost the uptake of new electrical appliances and adjust energy consumption practices. The process started rather slowly. In the mid-fifties less than one household in ten had a refrigerator or a washing machine. In 1960, 25% of the households were equipped with a refrigerator and a washing machine. The sixties saw an acceleration in the investment of households in refrigerators, washing machines or vacuum cleaners and televisions.²²

²⁰ Bruno Foucart, “Les représentations de la femme électricité au temps des expositions universelles ou les métamorphoses d’une fée 1889-1937”, *Bulletin d’histoire de l’électricité*, n°19-20, 1983, 7-20.

²¹ Françoise Werner, “Du ménage à l’art ménager: l’évolution du travail ménager et son écho dans la presse féminine française de 1919 à 1939”, *Le Mouvement social*, vol. 129, 1984, 74.

²² Evelyne Renaudat, “La consommation domestique de 1950 à 1980”, *Recherches et Prévisions*, n°18-19, 1989, 23-25.

15 Incentives and education were provided by the state and the market so that society and especially women, could adopt the new technologies and adjust their behaviours²³ and transform the traditional domestic behaviours.²⁴ The electrification of households' demand in France had to benefit all households and all members of the households. Since the introduction of electric household appliances mainly targeted the kitchen and aimed at easing the domestic chores, women had a key role to play in the uptake of the new technologies. As main user of electrical households' appliances in the home, women had high expectations on how this electrified equipment could make their life more comfortable.²⁵ But how to encourage women to change their habits related to their everyday domestic chores (heating water, bringing wood or coal to heat the stoves, hand-washing clothes etc.)?

16 Against this background, the French national energy supplier, EDF, stepped in and started developing the education of women in order to inform them on the proper use of electricity when equipped with electric household appliances in the 1950s. To achieve this task EDF created the position of housewives' councillors within the departments of the company as early as 1953. The company recruited women in the main distribution centres of the company and trained them to deliver knowledge about the company and the technical side of electricity (connections, energy tariffs etc.) as well as know-how on the use of electric household appliances. The company had up to 109 housewives' councillors among its staff between the 1970s and the 1980s following up the evolution of the electric household appliances and the changing practices (from hot water heaters and electrical stoves to washing machines and deep freezers in the sixties and the dish washers and

dryers in the seventies).²⁶ Because of the quick evolutions of the technologies, housewives' councillors were offered continuous training to be kept up to date as confirmed by our interviewee who started as EDF housewives' councillor in 1954:

“Every year we [housewives' councillors] also attended the Home Exhibition and training was offered to us for a week, we were also invited by manufacturers that wanted to show us their new appliances.”

In the Netherlands, economic development, technological innovations and household welfare are the characteristics in the decades after the recovery of WWII in the Netherlands.²⁷ As mentioned by our Dutch interviewee, an expert in domestic history and housekeeping practices,

“Owning household appliances, like washing machines and refrigerators, was an indicator of welfare and social status. It implied a relief of everyday drudgery of housewives and women working as professional cleaners and food processors, like employed housemaids.”

The uptake of new appliances was enabled by different interventions both by the government and the market. The main actors in this Dutch process were the electric appliances manufacturers. Illustrative is the introduction of refrigerators in the Dutch homes. The Dutch law for liberation of retail establishment (*Vestigingwet*) from 1961 created the possibility for all retailers to sell dairy products. If supermarkets wanted to compete with the door-to-door retailers with dairy, it became necessary for households to refrigerate their food they would buy in bulk from supermarkets. Therefore, Albert Heijn, one of the leading supermarkets in the Netherlands, created a saving system for their customers and closed a deal with an appliance provider to enable households to buy a refrigerator with a discount, which was at that time the price of

²³ Robert L. Frost, “Machine liberation: inventing housewives and home appliances in interwar France”, *French historical studies*, vol. 18, n°1, 1993, 109-130.

²⁴ Alain Beltran & Patrice Carré, *La vie électrique. Histoire et imaginaire (XVIIIè-XXIè siècle)* (Paris: Belin, 2016).

²⁵ Danièle Faure, “La conseillère ménagère à EDF”, *Bulletin d'histoire de l'électricité*, n°19-20, 1992, 199-213.

²⁶ Ibid.

²⁷ Ruth Oldenziel & Carolien Bouw, *Schoon genoeg. Huisvrouwen en huishoudtechnologie in Nederland 1898-1998* (Nijmegen, The Netherlands: SUN, 1998).

a month salary. In 1962 only 19% of the Dutch households had a refrigerator; ten years later this increased to 88%. The uptake of vacuum cleaners went even faster, 3% of the households owned one in 1957, while in 1964, 96% of the households owned an electric vacuum cleaner.²⁸

- 19 The appliance that brought the most relief for women in daily drudgery is the washing machine. The family laundry would take women roughly two days' work every week (as reported by Dutch interviewee). Despite the much-needed support and ease of this time-consuming work, the first imported washing machines were extremely expensive, equalling almost two-month salaries.²⁹ An option offered by the appliances stores in the Netherlands was the possibility to lease a washing machine. If a couple of neighbours would share the costs, a leased washing machine was in reach of women from the working class. A Dutch plumber developed the Bico washing machine, more affordable than the American-imported Hoover.³⁰ Demonstration shows and cabaret performances were organised in the local theatres and community halls, to introduce and learn this new technology to the housewives with a separate meeting for their husbands to arrange payment schemes.³¹

Demand side actors: women talking to women

- 20 In the education and information campaign promoting the uptake of new energy technology in the 1950s and 1960s, we observe a similar approach in both countries; housekeeping schools played a key role to teach women how to use the new appliances and the energy properly. In addition to involving housekeeping schools, EDF in France gave a key role to housewives' councillors as part of EDF staff. EDF recruited and trained women to occupy the positions of housewives' councillors.

²⁸ Annegreet van Bergen, *De goede jaren: hoe Nederland in een halve eeuw steeds welvarender werd* (Amsterdam: Atlas Contact, 2018).

²⁹ Annegreet van Bergen, *Een (ongewone) geschiedenis van doodgewone dingen* (Amersfoort: Historisch Nieuwsblad, 2019).

³⁰ Ibid.

³¹ <https://www.haagshistorischmuseum.nl/tentoonstelling/de-spinazieacademie-125-jaar-haags-huishoudonderwijs>

The EDF housewives' councillors were ensigned with two missions as described below.

21 First, they were responsible for training female teachers from the housekeeping schools for girls that educated girls to become good housewives, who were then granted a recognized degree (CAP d'Arts ménagers). Attending these schools for all girls was made mandatory by a law in 1942 but the schools dated back to the end of the 19th century.³² In the sixties, these schools adapted to the societal evolution and focused more on the education of the consumers, including the users of electricity and gas and of electric household appliances. As early as 1953, EDF signed a partnership with companies manufacturing electric household appliances and created training centres dedicated to the teachers from the housekeeping schools so that they could test the new appliances. The main aim of EDF training centres was to show teachers of housekeeping schools how to use the new kitchen equipment and how the new electric devices could improve the life quality of women and their satisfaction when using these new devices.³³ Housekeeping schools and their teachers were expected to have a multiplier effect on the diffusion of information regarding the proper use of electric household appliances and electricity in the homes.

22 The second mission of the housewives' councillors was to welcome visitors in the distribution centres and inform them about the new energies and equipment, while showing them around the exhibitions. The housewives' councillors would also organise home visits and home conferences, especially in remote rural areas in order to encourage women to use electricity properly.³⁴ This practice was based on the experience in Sweden in the thirties to support rural electrification.³⁵ As quoted by the French interviewee:

³² Joël Lebeaume, *L'enseignement ménager en France. Sciences et techniques au féminin, 1880-1980* (Rennes : Presses Universitaires de Rennes, 2014).

³³ Faure, "La conseillère ménagère à EDF" (cf note 25).

³⁴ Ibid.

³⁵ Sven-Olof Olsson, "Le ménage électrique et la « libération » des femmes suédoises", *Bulletin d'histoire de l'électricité*, n°19-20, 1992, 249-260.

“in cooperation with the EDF commercial agent, we had a van equipped with a facsimile of a kitchen and went to all rural exhibitions at the end of the summer, when local people had the money from the harvest and were able to invest in the improvement of their homes and kitchens or of their farms with water pumps for example, and this was all made possible thanks to the electrification of the countryside.”

23 Although they were not selling any electrical devices, they were advising women on the use of the right appliance adapted to their needs, on the electrical consumption of the devices and on their rational usage. Such advice could be delivered during home visits especially in social housing in urban areas or in rural areas. They then explained to housewives what electricity was for, how it was metered and billed, how to use electricity properly and how to adjust their behaviour to this new technology in order to improve their comfort at home and their satisfaction.

24 The role of “these women talking to women” (French interviewee) gradually disappeared by the end of the eighties when the domestic sphere and the support of the uptake of electrical appliances was no longer the focus of the EDF company. By the end of the eighties communication and public relations were given priority over the domestic sphere, which transformed the role of the housewives’ councillors from educating women to more commercial and communication positions.³⁶ However, the history of housewives’ councillors at EDF shows how women were targeted in their role of agent of change within the household consumption practices, in their role as decision maker regarding the household purchases of equipment and in their role of main energy users in the management of households. The diffusion of affordable electricity together with the development of cost-effective electric household appliances were combined with bank credit systems that allowed households to upgrade their homes and kitchens. Such a conjunction

of factors created a lot of expectations among women to improve their daily life. The electrical usage helped women meet their practical needs through better lighting at home, easier cooking, facilitating domestic chores and saving time, while it did not modify the gender-balance among the household.³⁷ The time spent on the domestic chores may have diminished but the time saved was used for diversifying domestic tasks and looking after the children.³⁸

In the Netherlands, the information campaigns 25 for the uptake of new energy technologies in the 1950s was a joint effort of energy supply actors and the housekeeping schools. A unique role in the Dutch history is assigned to the housekeeping schools (*huishoudscholen*). These girls-only vocational training schools were established in 1888 and quickly spread through the country to become one of the main vocational educational institutions for girls after WWII until they disappeared in the 1970s. The housekeeping schools were founded to educate those that were responsible for cooking food and cleaning in households: girls as potential housewives and housemaids. After the WWII, fewer households had staff for their housekeeping. Nevertheless, the housekeeping schools remained popular. The modern household technology was considered as too technical and complex to be taught from mothers to daughters.³⁹ In the academic year 1976-1977 there were 629 housekeeping schools registered in the Netherlands with a total of 209.000 students (all girls).⁴⁰ New technologies, such as cooking on gas stoves, and using microwaves, vacuum cleaners and washing machines, were taught and salespersons of producers gave demonstrations and guest lectures.⁴¹

³⁷ Clancy, Skutsch & Batchelor, “The gender-energy-poverty nexus: finding the energy to address gender concerns in development” (cf note 12).

³⁸ Olsson, “Le ménage électrique et la « libération » des femmes suédoises” (cf note 35).

³⁹ Oldenziel & Bouw, *Schoon genoeg* (cf note 27).

⁴⁰ <https://www.digibron.nl/viewer/collectie/Digibron/id/498dbe3094f9dc9c75542d968e324co>

⁴¹ Els Kloek, *Vrouw des huizes: een cultuurgeschiedenis van de Hollandse huisvrouw* (Amsterdam: Balans, 2009)

³⁶ Faure, “La conseillère ménagère à EDF” (cf note 25).

26 The feminist movement was a strong advocate for this educational opportunity for girls since it improved their possibilities to find a better position as a housemaid.⁴² Women's groups advised housekeeping school on their curriculum and their members were frequent guest lecturers or even employees. One of the most influential women's organisations (*Nederlandse Vereniging van Huisvrouwen*, NVVV) was founded in 1912. They served as a trade union and formal representative of housewives and household labour both in corporate and political decision-making processes. Unique is their authority as certifier of household appliances. In close cooperation with designers and manufacturers, they advised on design, use and safety of household appliances. Their certificate "approved by the NVVV" is used extensively in marketing campaigns and promotion of many new household appliances that entered Dutch households in the last century.⁴³

27 Despite the initial support of the feminist movement of the housekeeping schools, in the 1950s feminists criticized that the housekeeping schools supported the traditional cultural belief in the stereotypical Dutch breadwinner-model: the man works fulltime outside the house in a paid profession and his wife takes care of the housekeeping and raising the children.⁴⁴ The housekeeping schools professionalised housekeeping, without the financial independency and empowerment if women would work outside the house. This traditional cultural belief is among the reasons why the Netherlands has one of the lowest participation of women in the workforce within the EU and the popularity of part-time positions for women.⁴⁵ During the economic boost of the 1950s, women were discouraged from entering the workforce. On the contrary, the social status of families was decreased when the woman had to work, implying that the

husband was not able to provide for his family.⁴⁶ This breadwinner-model is still persistent, with the average workweek being 36 hours for men and 26 hours for women.⁴⁷

The educational and information campaigns in France and Netherlands both demonstrate how women were effectively targeted as energy users in households in the decades after WWII. Their role as housekeepers and managers of domestic energy use was recognised. Their needs to reduce the drudgery of time- and manual labour-intensive household tasks were acknowledged through rapid innovation and widespread introduction of household appliances. As Winther et al. (2020) demonstrate, appliances are highly gendered, demonstrating unequal power relations between men and women over purchase, use, custody and decision-making. They contest the assumption that the availability of appliances reduces women's drudgery to save their time, providing the opportunity for education and empowerment. It is however an enabling factor for women's empowerment and participation in society but it is not challenging socio-cultural gender relations, as was already addressed by Dutch feminist movements in the 1950s.⁴⁸

The role of policy: are women becoming invisible in the current energy transition?

The deployment of electrical appliances in French and Dutch homes represents a striking example of how female needs were taken into consideration and addressed. At that time, they were acknowledged as stakeholders in the decision-making process at households' level. We observe in the current energy transition discourse an invisibility of women and the gendered needs. Women are not targeted, not involved, not addressed and current energy policies are not recognised their needs and as a result energy

⁴² Ibid.

⁴³ Oldenziel & Bouw, *Schoon genoeg* (cf note 27).

⁴⁴ Joke Kool-Smit, "Het onbehagen bij de vrouw", *De Gids*, vol. 9/10, 1967, 267-281.

⁴⁵ EIGE (European Institute for Gender Equality), *Gender Equality Index 2017 - Measuring gender equality in the European Union 2005 -2015*, 2017 (<http://eige.europa.eu/gender-equality-index>).

⁴⁶ Kloek, "Vrouw des huizes: een cultuurgeschiedenis van de Hollandse huisvrouw" (cf note 41).

⁴⁷ Centraal Bureau Statistiek, *Verskil arbeidsdeelname mannen en vrouwen weer kleiner*, 2019. <https://www.cbs.nl/nl-nl/nieuws/2019/03/verschil-arbeidsdeelname-mannen-en-vrouwen-weer-kleiner>.

⁴⁸ Kool-Smit, "Het onbehagen bij de vrouw".

policy are gender neutral.⁴⁹ In this section, we identify how women and their energy needs become invisible in the current energy system change in the Netherlands and in France.

30 Today the energy transition aims at decarbonising the supply side, at reducing energy consumption and decreasing the CO₂ emissions. This is the new frame shaping the evolution of the socio-technical systems in both countries. The context of the twenty first century is undoubtedly different from the history of electrification of the households' practices in the 1950s and 1960s. It is no longer a matter of equipping the kitchen, but rather wider behaviour changes ranging from taking up new energy technologies, such as renewable energies and smart meters, to the fabric of the building (insulation, retrofitting) and to reduce energy consumption in the homes (buying energy efficient equipment, changing practices and behaviours, saving energy). We argue that unlike the electrification of domestic usages in the fifties and sixties, the current policy overlooks the role of women as agent of change in the urgent changes required.

31 A study carried out on the perception of the energy transition by the French showed a clear distinction between men and women: 79% of women considered that France should be more committed in the climate change policy, 87% of women thought that France should make more efforts towards energy saving, 78% of women prioritise investment in renewable energies.⁵⁰ Similar surveys in the Netherlands observed the same gendered difference.⁵¹ Although these studies show a greater awareness of woman towards climate and energy transition issues, women' participation or recognition as

decisionmakers in the energy transition is still limited. In 2017, 27.2% of energy jobs in France are occupied by women according to UFE⁵² revealing discrepancies between men and women in the choice of education, professions but also wages despite incentives from the ministry of education and the ministry of gender equality. The Dutch government implements a combination of financial incentives and information campaigns to stimulate energy efficiency for home-owners through tax benefits and retrofitting subsidies aiming at zero-emission households and all-electric households to outsource the use of natural gas.⁵³ These policy interventions target homeowners or households, without acknowledging the diversity of households and the energy needs and rights of the individual household members.

DISCUSSION

The examples of the domestic energy technology uptake in France and in the Netherlands in 1950s and the 1960s, illustrate how women were targeted in order to make the electrification successful. This is a key lesson to draw for the current energy transition. The current energy system transformation requires an uptake of new energy technologies and a change in consumption behaviour to reduce the use of energy. Indeed, the decarbonisation of energy is a source of new technologies that need to be adopted by households. Energy policy design and implementation remain gender-blind, assuming that they benefit both men and women equally. However, the decisions are dominated by male professionals following the traditional segmentation of the labour market between technical male jobs and non-technical female jobs.⁵⁴ Even if the

⁴⁹ Clancy & al., "Gender perspective on access to energy in the EU" (cf note 1); Mariëlle Feenstra & Joy S. Clancy (eds.), "A view from the North: gender and energy poverty in the European Union", *Engendering the Energy Transition* (Basingstoke: Palgrave Macmillan, 2020).

⁵⁰ Heinrich Böll Stiftung, *Le rapport des français à l'énergie* (France : Une étude Harris Interactive, 2017).

⁵¹ Joy S. Clancy & Mariëlle Feenstra, *Women, gender equality and the energy transition in the EU*, Study for the FEMM Committee of the EU Parliament, PE 608.867 (Brussels 2019)

⁵² <https://ufe-electricite.fr/actualites/edito/article/l-energie-une-histoire-d-hommes-et-de-femmes>.

⁵³ Ministry of Economic Affairs and Climate Policy, *Integrated National Energy and Climate Plan 2021-2030* (The Hague, The Netherlands, 2019).

⁵⁴ Elizabeth Allen, Hannah Lyons & Jennie C. Stephens, "Women's leadership in renewable transformation, energy justice and democracy: redistributing power", *Energy Research & Social Science*, vol. 57 (101233), 2019, 1-11; Clancy & Feenstra, "Women, gender equality and the energy transition in the EU" (cf note 51).

renewable energy sector attracts more female employees than the traditional energy sector, they are still employed in positions with little decision-making responsibility, indicating a failure in recognizing unequal gender relations in the energy system and in the influence of women in policy-making decisions.⁵⁵

33 Men are considered as the main decision-makers regarding the maintenance work at home leaving the women in the “routine reproductive” activities aiming at reducing energy consumption.⁵⁶ Motivations of women to participate in energy transition, e.g., saving the future generations, green responsibility, producing well-being at home, etc., are different from those of men, who tend to be more interested in energy efficient technology for innovation motivations and saving on energy expenditure.⁵⁷ That is also the reason why women can act as key drivers of innovations within the households to make the use of energy greener and more efficient in the home, thus serving their needs (improving the environment), interests (reducing the energy bills) and capacities (using a variety of technologies from low tech to high tech, including apps). Linking a gendered preference to energy sources, like women prefer renewable energy, requires systematic academic studies and are highly contextual.⁵⁸

34 The first challenge towards engendering the energy transition concerns the lack of disaggregated-data on women’s needs regarding access to adequate energy services. Such data would help decision makers recognize that women have different energy needs than men due to different economic, social or biological situations. Disaggregated data would contribute acknowledging that there is not *an* energy consumer but

rather energy consumers.⁵⁹ Data on energy needs and access should be gender disaggregated to allow a better knowledge of these specificities. Without this first step, women’s energy needs won’t be recognized as a policy object and won’t be put on the policy agenda.⁶⁰ It also requires acknowledging the fact that women have lower income than men and therefore face financial obstacles when it comes to invest in energy efficient appliances, retrofitting measures and/or renewable energies. Policy interventions, such as special tariffs and subsidies, should account for gender differentiations to ensure a just and inclusive energy transition. This also implies recognizing that women are more vulnerable to energy poverty and that energy efficiency measures and renewable energy programmes should target them to allow them to reduce their energy consumption and costs.

The second obstacle for a more gender just 35 energy transition refers to the limitations of the current enabling framework to allow women to be part of the energy transition. As shown by the energy communities, participation of women is very limited because of the lack of time they have due to other tasks they have to carry out at home. In the Netherlands, social housing cooperatives invest in refurbishment of their housing stock and try to encourage the participation of tenants in stakeholder meetings and training of energy efficiency measures at home. Women rarely volunteer to participate in such meetings.⁶¹ Besides the lack of available time, women often have the feeling that they don’t have the adequate technical knowledge and as such consider that they are not legitimate to join these meetings.⁶² Even energy communities, that are rec-

⁵⁵ Clancy & Feenstra, “Women, gender equality and the energy transition in the EU” (cf note 51).

⁵⁶ Saska Petrova & Neil Simcock, “Gender and energy: domestic inequalities reconsidered”, *Social and cultural geography*, 2019, 1-19.

⁵⁷ Nynke Tjalma, *Welke componenten van campagnes over energiebesparing zijn het meest effectief* (Amsterdam: AlphaOne, 2016)

⁵⁸ Bouvier, “Energy consumers, a boundary concept for the history of energy” (cf note 4).

⁵⁹ Ibid.

⁶⁰ Clancy & al. “Gender perspective on access to energy in the EU”, 2017, (cf note 1); Clancy & Feenstra, “Women, gender equality and the energy transition in the EU” (cf note 51).

⁶¹ Koen Straver, *Rapportage Energiearmoede: effectieve interventies om energie efficiëntie te vergroten en energiearmoede te verlagen* (Amsterdam: ECN-E—17-002, 2017).

⁶² Karina Standal, Marta Talevi, Hege Westskog, “Engaging men and women in energy production in Norway and the United Kingdom: The significance of social practices and gender relations”, *Energy Research and Social Science*, vol. 60 (101338), 2020, 1-9.

ognized as being more open and approachable for community members, are far from showing gender equality. The lack of disaggregated data on their member profiles is a first challenge but on the other hand, women still face issues with their time management, financial restrictions but also their own self-imposed limitations and women do not express their voice in the matter of energy transition. They don't claim their participatory rights.

36 More generally, systemic factors, such as the institutional and political arrangements underpin the organisation of the energy sector. The permanence of business-government-consumer relations result in limited recognition of women's energy service needs and therefore the lack of adequate inclusive policies. It is not only a matter of equal energy access but more a matter of how to promote equal possibilities for each individual to guarantee a healthy and comfortable functioning in the daily life by ensuring the adequate level of energy services meeting their individual needs. The current political discourse of just transitions shows the necessity to guarantee participation, empowerment and choices of all in energy decision making at different levels, from households, to communities to national and EU policy making as well as ownership of energy production units by prosumers. Energy becomes an essential condition to allow the development and the achievement of other rights.⁶³ Hence, energy intervention needs a gender focus to go deepen the understanding of women as energy users in households and communities.

CONCLUSION

37 This paper analysed the uptake of electrification and the access to energy in households through a gender lens. Women as household managers receive little attention in current energy transition policies and their potential as change agents to scale up and implement energy efficiency measures in households is

⁶³ Stephen R. Tully, "The contribution of human rights to universal energy access", *Northwestern Journal of International Human Rights*, vol. 4, 2006, 518-548.

invisible. Given the ambition of national governments to comply with international conventions to provide clean and affordable energy to all citizens, the scholarly debate on just energy transitions gains momentum for integration in energy policy. The needs-based approach illustrated in table 1, demonstrates the relevance of gender approaches in energy policy promoting the domestic uptake of energy technology to meet practical, productive and strategic needs of energy users.

38 Despite their origins from empirical research in the Global South, the applicability of gender analysis of introducing new energy technologies resonate with the electrification process and access to energy for households in the Global North during the decades after the WWII. France and the Netherlands were chosen to illustrate the uptake of electrical appliances and uses in this discussion paper. They developed different pathways for the uptake of domestic electrical usages, yet both targeted women as household energy managers. Marketing campaigns, education and training, even home visits were used to promote the new technologies and the use of electricity. This historical example is not proceeded in the current promotion of energy technologies, such as retrofitting, energy efficiency measures, deployment of domestic renewable energies, smart meters and energy communities. The current energy transition has a male-oriented focus with limit recognition of women's energy needs. More research in different countries and including the uptake of different energy technologies for domestic use, could strengthen our hypothesis that there are essential lessons to learn from energy transitions in the past to be included in the current energy transition.

39 The elements of the current energy transition that entails consumption behaviour change at home are lacking the involvement of women. Because of their domestic role, women spend more time at home and therefore are more dependent on energy services which should give them a voice in the domestic energy choices. Since the uptake of renewable energies at domestic level as well as the energy efficiency and energy saving pillars

of the energy transition need to be promoted, women can be considered as key agents of change since they are still managing the domestic chores of the households despite the slight evolution of the distribution of roles between men and women. However, this gender aspect seems to be overlooked in the current information and promotion campaigns focusing on

“households” rather than on specific members of households, thus illustrating the gaps left by the disappearance of the housewives’ councillors. Involving both women and men in the uptake of domestic energy technology, could contribute to a more just energy transition in which ‘no one is left behind’ when promoting access to clean and sustainable energy sources.

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