

Examining the Determinants of Residential Solid Fuel Use in Ireland

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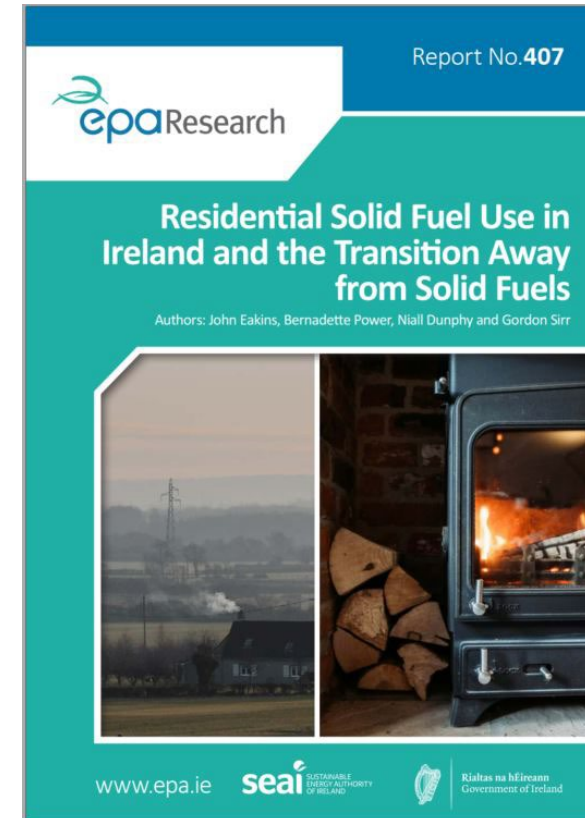
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Project Overview

- Irish Environmental Protection Agency (EPA) Funded Project (Jan 2019-Apr 2021)
- Residential Solid Fuel Use in Ireland and the Transition Away from Solid Fuels
- Final Report published in April 2022
- <https://www.epa.ie/publications/research/epa-research-2030-reports/research-407-residential-solid-fuel-use-in-ireland-and-the-transition-away-from-solid-fuels.php>



Project Rationale

- Most recent Irish Environmental Protection Agency (EPA) Air Quality report states that while
 - *“air quality in Ireland is generally good, there are concerning localised issues that are impacting negatively on the air we breathe”.*
 - *“Air quality monitoring results in 2021 showed that fine particulate matter (PM_{2.5}) mainly from burning solid fuel in our homes (and nitrogen dioxide (NO₂) mainly from road transport), remain the main threats to good air quality.” (EPA, 2022)*
- This research project looked to provide a deeper understanding of the residential solid fuel sector in Ireland, with a focus on the quantification of non-traded solid fuel use (defined as informally traded or own indigenous produce).
- This was achieved through the use of existing data sets and the development of new quantitative and qualitative data on household solid fuel use.



Existing Data Sets on Residential Solid Fuel Use

- Examined Census 2011 and 2016 data which provides information on the share of central heating fuels across Irish households.
- Examined CSO Survey on Household Environmental Behaviours 2014 data set and the SEAI BER data set which provides information on Primary and Supplementary Heating Fuels that are used to heat Irish homes.



Existing Data Sets on Residential Solid Fuel Use – Findings 1

- **Greater Insight into Primary and Supplementary Users of Solid Fuels:**
- Solid fuels are used by proportionally more households to supplement their primary non-solid fuel source of space heating than as a primary source of heating.
- ~ 16% use solid fuels for Primary space heating purposes
- ~ 47-54% use solid fuels for Supplementary space heating purposes

(Based on CSO Household Environmental Behaviours 2014 data set and the SEAI BER data sets)

- Update to the CSO Household Environmental Behaviours data set published in 2021
- ~11% of households use a solid fuel (coal, peat, wood) as their main fuel or energy source
- ~27% of households use a solid fuel (coal, peat, wood) in an open fire for supplementary heating
- ~30% of households use a solid fuel (coal, peat, wood) in a stove for supplementary heating
- Supports an energy stacking rather than an energy ladder hypothesis



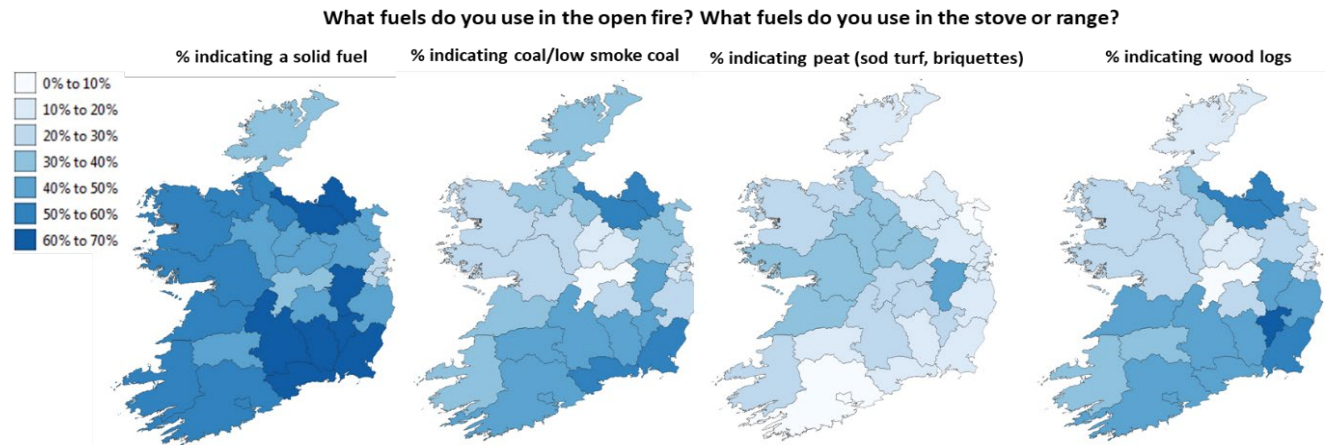
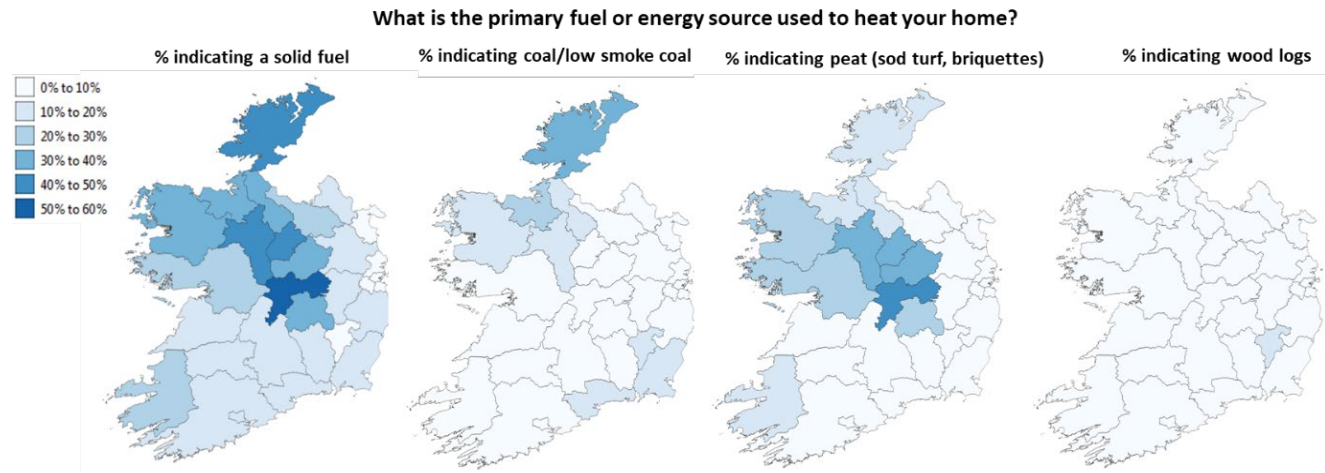
Existing Data Sets on Residential Solid Fuel Use – Findings 1

- **Greater Insight into Primary and Supplementary Users of Solid Fuels**
- Evidence of heterogeneity between primary users and supplementary users of solid fuels.
 - Primary users of solid fuels are more likely to be on lower levels of educational attainment, lower incomes (or related income measures) and living in older dwellings.
 - In contrast, the characteristics of supplementary solid fuel users are much more diverse. For example, supplementary solid fuel users can be found across all levels of educational attainment and all levels of households income.
- John Eakins, Bernadette Power, and Gordon Sirr
- ‘An Analysis of Households Choice of Solid Fuels as a Primary and Supplementary Heating Fuel’
- Energy Journal, Volume 45, Number 2 (DOI: 10.5547/01956574.45.2.jeak)



Existing Data Sets on Residential Solid Fuel Use – Findings 2

- **Location is an important factor determining solid fuel use**
(using county level data from CSO Survey on Household Environmental Behaviours 2014)



Existing Data Sets on Residential Solid Fuel Use – Findings 3

- Is there Evidence of Switching away from Solid fuels?



Number of private households (thousands) by fuel for central heating using, Census 2011 and Census 2016 data

Central heating fuel type (2011)	Central heating fuel type (2016)								
	None	Oil	Gas	Electricity	Coal	Peat	LPG	Wood	Other
None	6.2	2.8	1.9	3.2	3.1	1.7	0.1	1.0	0.2
Oil	2.4	544.2	10.2	4.4	23.2	22.5	1.2	11.2	1.6
Gas	1.5	4.6	451.5	11.3	2.5	0.6	1.8	0.8	0.5
Electricity	3.7	4.1	9.2	70.5	2.4	1.0	0.1	0.7	1.6
Coal	2.4	14.8	2.4	1.9	39.0	4.0	0.2	3.4	0.5
Peat	1.1	12.6	0.3	0.7	3.6	47.4	0.1	1.8	0.4
LPG	0.1	1.0	2.4	0.2	0.2	0.2	4.3	0.2	0.2
Wood	0.5	4.8	0.3	0.3	1.8	1.3	0.1	8.9	0.2
Other	0.1	1.0	0.4	1.6	0.4	0.4	0.2	0.2	2.4



- Census 2011 and 2016 matched data indicate that the number of households switching into solid fuels for central heating purposes outweigh those switching away from solid fuels.
- Changes in occupancy is the strongest factor associated with switching away from solid fuels. This, in turn, suggests that there are substantial habit effects in solid fuel use.
- Location and age of the dwelling were associated with switching into solid fuels.



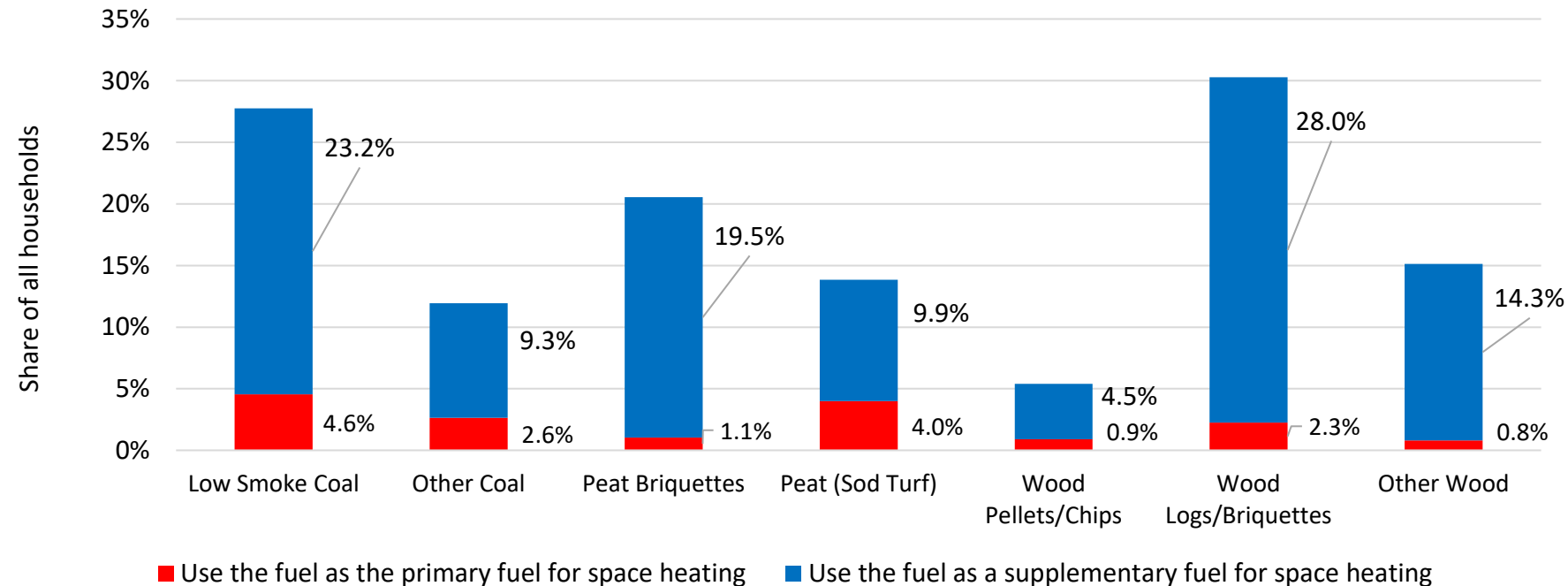
Survey on Residential Solid Fuel Use in Ireland

- Online survey administered during February and March 2020.
- 1,823 households completed the final survey.
- Solid fuels examined included low smoke coal, other coal, peat briquettes, sod peat, wood pellets/chips, wood logs/briquettes, other wood (foraged, branched).



Survey on Residential Solid Fuel Use in Ireland – Findings 1

- **Most popular solid fuels used by Irish households:**



- Low smoke coal and sod peat are the most popular solid fuels for primary heating.
- Wood logs, low smoke coal and peat briquettes are the most popular solid fuels to supplement primary non-solid fuels.

Survey on Residential Solid Fuel Use in Ireland – Findings 2

Commonly stated reasons for using solid fuels:

- ✓ Creating a pleasurable atmosphere. (lifestyle choice)
 - ✓ Heating only certain rooms/areas. (convenience)
 - ✓ Perceived lower costs relative to other fuels or energy sources. (costs)
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- Primary users were more likely to cite perceived lower costs as a reason for using solid fuels. Supplementary users were more likely to cite creating a pleasurable atmosphere in the home.



Survey on Residential Solid Fuel Use in Ireland – Findings 3

Extent of Non-Traded Solid Fuel Use:

- On an energy use basis, the non-traded sector was estimated to account for approximately a quarter of all solid fuel energy use.
- 88% of sod peat usage is non-traded.
- 55% of wood products usage is non-traded

Share of all households and solid fuels by source

	Traded	Non-traded/grey	Non-traded/indigenous	Other
Low-smoke coal	84.5%	10.5%	–	5.0%
Other coal	81.3%	16.8%	–	1.9%
Peat briquettes	81.9%	12.6%	–	5.5%
Peat (sod turf)	10.8%	38.2%	49.6%	1.4%
All Wood Products	45.2%	15.8%	35.5%	3.5%
All solid fuels	69.3%	15.3%	11.6%	3.9%

Survey on Residential Solid Fuel Use in Ireland – Findings 3

Extent of Non-Traded Solid Fuel Use:

- John Eakins, Bernadette Power, and Gordon Sirr
- ‘Informally Sourced Solid Fuel Use: Examining its Extent and Characteristics of the Users in the Residential Sector in Ireland’. Energy Policy, Volume 172, January 2023, 113293
- <https://doi.org/10.1016/j.enpol.2022.113293>
- The analysis in this paper suggests that informal wood use may have been underestimated in previous attempts, with possible implications for how overall wood energy use in the residential sector is measured.



Survey on Residential Solid Fuel Use in Ireland – Findings 4



Knowledge and risk perceptions about solid fuels:

- Solid fuel users tend to have poor knowledge of the environmental and health risks associated with using solid fuels.
 - Respondents to the survey were presented with questions which gave two solid fuel options and asked to indicate which one they consider to be the better choice for air quality and health, for example, dry/seasoned wood versus green/unseasoned wood.
 - Only 40% of households using solid fuels answered all questions correctly.
- Solid fuel users tend to have low risk perceptions about the adverse health effects associated with solid fuel use, especially those using solid fuel for primary heating.
 - Q: “Air pollution from residential solid fuel use is a severe health threat for people all over Ireland”.
 - Proportion of Primary Solid fuel users that agree (30.0%)
 - Proportion of Supplementary Solid fuel users that agree (38.8%)



Survey on Residential Solid Fuel Use in Ireland – Findings 4

Knowledge and risk perceptions about solid fuels (Upgrading of solid fuel appliances):

- Over a third of solid fuel users sampled indicated that they had replaced an open fire with a stove in the last 20 years (or since they moved in).
- Increasing the heat output within the home was cited as the most important reason for replacing an open fire with a stove. Other reasons included reducing fuel costs, a desire for comfort or aesthetic effect and a failure in the existing appliance.
- Other factors such as environmental reasons or receiving advice from family and friends, energy professionals and government organisations were not cited as being important.



Survey on Residential Solid Fuel Use in Ireland – Findings 5

Respondents Stated Policy Preferences:

- Higher support for financial incentives. More opposition for restricting solid fuel use/taxation. Evidence of differences between Primary and Supplementary Solid Fuel users in these stated policy preferences (Supplementary users tending to be more supportive of the policies listed).
- Grants for retrofitting homes and/or changing heating systems – Support (85.3%), Oppose (4.1%)
- Extending the ban on smoky coal nationally – Support (61.6%), Oppose (17.7%)
- Introducing a law banning the use of all smoky solid fuels or introducing regulations covering the quality of solid fuels that can be purchased – Support (50.9%), Oppose (24.3%)
- Introducing building regulations for new homes which will ban the use of solid fuels for space heating – Support (47.4%), Oppose (24.5%)
- Increasing the carbon tax on the use of solid fuels – Support (26.4%), Oppose (48.7%)

(residual is neither support nor oppose)



Recommendations

For (Irish) Statistical Agencies:

- A periodic survey of a nationally representative sample of households
- Such a repeated bottom-up approach would be useful in capturing trends in household solid fuel use and would complement the top-down approach used by the SEAI in its energy balance statistics.
- In addition, such a periodic survey would provide a baseline against which progress in relation to policies implemented could be measured and tracked.



Recommendations

For Policy Makers:

- The heterogeneity of solid fuel users in relation to household characteristics and levels of use is important to account for within policy design.
- For example, relying on improvements in living standards or measures which bring households out of fuel poverty would need to carefully consider whether such households transition to modern fuels as their primary fuel but maintain traditional and harmful solid fuels as their supplementary fuel. (energy ladder versus energy stacking hypothesis)



Recommendations

For Policy Makers:

- New solid fuel regulations introduced in late 2022 should be more effective in reducing particulate emissions in larger urban centres where formal or commercial purchases of solid fuels are made. There may be less certainty regarding the effectiveness in smaller urban centres where informal sources of solid fuels are more prevalent.
- The potential for substitution to alternative fuels in the non-traded solid fuel market should be carefully monitored for effective implementation of new and existing solid fuel policies.
- Policy makers need to consider the importance that cost motivations can play and the extent of price disparities between regulated and unregulated solid fuels.



Recommendations

For Policy Makers:

- Education and awareness campaigns, which work in tandem with government intervention, can play a role in encouraging a transition, especially with regard to the environmental and health impact of using solid fuels.



THANK YOU FOR LISTENING

Any Questions....

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