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BRIEFING PAPER FEBRUARY 2023

## THE CASE AGAINST THE HYDROGEN LEVY

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The Energy Bill in Parliament proposes to introduce a new levy on consumer bills to fund hydrogen development.<sup>1</sup> This levy would add to households' bills, during a cost-of-living crisis, but will not bring them any benefit. Hydrogen is highly unlikely to be used to decarbonise home heating. Parliamentarians should amend the Energy Bill to remove clauses 65 to 67 to prevent the introduction of the hydrogen levy.

Hydrogen will have a role in the UK's transition to net zero. However, independent analysis does not support its use to heat homes: it is inefficient, expensive and brings safety risks. The government should therefore fund its hydrogen revenue support mechanism through normal government spending, rather than unfairly charging consumers. E3G has previously urged the government to support green hydrogen produced from renewable electricity.<sup>2</sup>

### Hydrogen is only part of the decarbonisation puzzle

Hydrogen is a potential alternative to fossil fuels because it produces no greenhouse gas emissions when burnt with pure oxygen, only heat and water.<sup>3</sup> There are several methods for producing hydrogen, but only one is zero carbon: green hydrogen. It is produced using zero carbon electricity, through electrolysis.

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<sup>1</sup> On 6 July 2022, the government introduced an Energy Bill (HL Bill 39-EN), previously known as the Energy Security Bill, to the House of Lords. The Energy Bill is wide reaching and includes measures that will significantly affect the UK's energy sector. As well as hydrogen, the bill makes provision to leverage funds for low carbon capture, use and storage, and carbon dioxide transport and storage.

<sup>2</sup> E3G, 2021. **Between hope and hype – hydrogen vision for the UK**

<sup>3</sup> Burning hydrogen in atmospheric air rather than pure oxygen also produces nitrogen oxides, which are harmful to human and environmental health (UK government, 2015, **Nitrogen dioxide: health effects of exposure**)



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Blue hydrogen, by contrast, is produced from fossil fuels and carbon emissions are captured and stored (CCS) underground. However, CCS is an energy intensive process, and therefore relies on 100% renewable energy to avoid generating additional emissions.

Hydrogen has been touted as a solution for decarbonising various sectors, but in reality there are limits to its usefulness. Hydrogen could support decarbonisation in some industrial processes – such as manufacturing, which requires very high temperatures – and serve as a chemical feedstock. However, it is not a cost effective or efficient solution for heating homes. It is more costly than natural gas and heat pumps, reduces the UK’s energy security and is not guaranteed to reduce emissions. Further evidence is provided below.

The UK government has backed a “twin track” approach of pursuing and supporting the development of both green and blue hydrogen.<sup>4</sup> The hope is that hydrogen will eventually be used to decarbonise sectors of the economy that are harder to electrify. The revenues raised through the levy would be used to support both fossil fuel-derived hydrogen, and green hydrogen.

## A hydrogen levy would raise energy bills unfairly

The government should not further increase the burden on households by introducing new energy levies. Energy bills have more than doubled from an average of £1271 in 2021 to £2500 this year, even after the government’s Energy Price Guarantee.<sup>5</sup> Energy prices are predicted to fall in 2023, however, they remain significantly higher than pre-pandemic prices.<sup>6</sup> National Energy Action estimates that from April, 8.4 million UK households will be in fuel poverty.<sup>7</sup> Although the wholesale price of gas has reduced recently, prices are expected to stay above their historic average before the Russian invasion of Ukraine.

The government’s new revenue support mechanism for hydrogen will fund fossil fuel-derived blue hydrogen, which means gas companies who have made record profits from the energy crisis could receive support levied from consumer bills.

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<sup>4</sup> For more analysis of the UK’s Hydrogen Strategy, see E3G, 2021, **Lifting the lid on the UK Hydrogen Strategy**

<sup>5</sup> Ofgem, 24 November 2022, **Latest energy price cap announced by Ofgem**

<sup>6</sup> Cornwall Insight, 2023, **Winter 2023-24 price cap forecasts fall further below 2022-2023 EPG, but long-term prospects remain uncertain**

<sup>7</sup> National Energy Action, 1 December 2022, **8.4 million UK households will be in fuel poverty from April**

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The government has declined to estimate what the cost to consumers might be for the additional levy, which it says will be introduced from 2025.<sup>8</sup> Existing social and environmental levies on energy bills operate like a flat tax paid by all household energy consumers and come to £152 per year. However, unlike existing levies – such as the Warm Homes Discount fuel payment, and the Energy Company Obligation fuel poverty scheme – a levy for hydrogen development would not return a benefit to the most energy-poor members of society. This is because hydrogen will not be used at scale to heat UK homes.

## Hydrogen will not heat homes

A major peer-reviewed survey of 32 independent scientific studies found that none supported the widespread use of hydrogen for heating.<sup>9</sup> The House of Commons Science and Technology Select Committee has concluded low carbon hydrogen will have at most a limited role in replacing natural gas in heating homes.<sup>10</sup> Chris Skidmore MP, author of the recent Net Zero Review, has said that “overwhelmingly this should be a transformation to cheaper electricity” for heating. He does not think the UK should embrace the idea of repurposing gas networks to run hydrogen boilers.<sup>11</sup>

Hydrogen is a poor choice for heating for several reasons. It is very energy inefficient and would be more expensive for consumers than electrifying heat.<sup>12</sup>

- > **High costs for consumers:** Analysis shows that replacing fossil gas with hydrogen will raise bills for consumers. Heating a home with blue hydrogen would cost at least 70 to 80% more than using gas, and it could be considerably higher. The cost of CCS involved in producing blue hydrogen is a significant factor here.<sup>13</sup>
- > **Energy (in)security:** Heating homes with blue hydrogen would require 45% more gas than is imported today, as gas is used to produce hydrogen. This would further expose the UK to international price volatility, geopolitical events and bad actors, thus weakening the UK’s energy security.<sup>14</sup>

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<sup>8</sup> UK Parliament, 2022, **Impact assessment for the Energy Bill**

<sup>9</sup> Rosenow, J., 2022, **Is heating homes with hydrogen all but a pipe dream? An evidence review**

<sup>10</sup> UK Parliament, 19 December 2022, **Hydrogen is not a Panacea for reaching Net Zero, warn MPs**

<sup>11</sup> The Times, 2023, **Gas boilers should be banned in a decade says net zero tsar**

<sup>12</sup> H2 Science Coalition, 2022, **Briefing on the Energy Bill**

<sup>13</sup> Cornwall Insight, 2022, **Insight Paper – Hydrogen**

<sup>14</sup> H2 Science Coalition, 2022, **Briefing on the Energy Bill**



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- > **An inefficient path to net zero:** Green hydrogen for heating would require around six times the amount of renewable energy as heat pumps, which is more than the amount required to decarbonise the entire electricity grid.<sup>15</sup> It would take 150 GW of renewable electricity to create the hydrogen to generate 70 GW of domestic heat; heat pumps can generate the same heat with just 27 GW of renewable electricity.<sup>16</sup> As a result, the cost of operating a heat pump to heat a home would be around half the cost of using a boiler fuelled by green hydrogen.<sup>17</sup>
  - > **Delivery risks:** The very high levels of carbon capture required for blue hydrogen have not been successfully demonstrated at commercial scale.<sup>18</sup>

Green hydrogen could potentially provide energy storage once there are high enough levels of renewable generation. But given the uncertainties, this should not be funded through an energy bill levy and should be funded through direct Exchequer funding instead.

## The Energy Bill must be amended

Given the weight of evidence that hydrogen will not be an affordable or zero carbon option for domestic heating, it would be wrong to levy the costs of hydrogen production on domestic consumers. The levy would increase bills at a time of deep economic insecurity, in support of a technology which:

- > Consumers are not guaranteed to benefit from.
- > Is an expensive heating option compared to both gas and heat pumps.
- > Could increase the UK's energy insecurity if used for domestic heating.
- > Could support fossil fuel firms enjoying profits from the energy crisis.

**Parliamentarians should amend clauses 65 to 67 of the Energy Bill to prevent the costs of hydrogen production being recovered from domestic consumers.**

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<sup>15</sup> Ibid,

<sup>16</sup> Hydrogen Science Coalition, 2022, **Hydrogen for heating? A comparison with heat pumps (Part 1)**

<sup>17</sup> ICCT, 2021, **Hydrogen for heating?**

<sup>18</sup> E3G, 2022, **Making carbon capture work**



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## About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

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