

Public Consultation to Inform a Policy Framework for the Development of District Heating in Ireland

Response: [REDACTED]

Introduction

DCCAE are to be complimented on an exceptionally clear, well-designed, well-presented and well-referenced consultation paper.

The recommendations made here follow a (necessarily brief and abridged) initial description of a number of basic assumptions and/or realities attached to any possible framework attempting to ramp up the contribution of district heating (DH) to national decarbonisation and/or energy efficiency objectives in Ireland.

A number of the most crucial realities addressed here relate (notwithstanding the first statement above) to matters and/or issues not actually covered or addressed in the consultation paper. They are particularly included here since neglect of them could lead, at best, to serious risk of upfront error in calculating potential returns on investment (ROI) offered by DH in Ireland, and could, at worst, be fatal to long term acceptance of DH as a viable and prudent source of consumer energy in Ireland.

The recommendations made here also follow, and are designed to be fully consistent with, a series of recommendations previous made to DCCAE on (successively) the draft National Energy and Climate Plan 2021-2030 (NECP)¹, the Biofuels Obligation Scheme², Implementation of the Clean Energy Package³, Ireland's Long Term Strategy (LTS) 2020-2050⁴, Removing Barriers to Energy Efficiency in the Rental Sector by Addressing the 'Split-Incentive Problem'⁵, and Ireland's Long Term Building Renovation Strategy⁶.

In all such cases, as much as here once again, consistent and reasoned arguments have been made, and evidence provided, for the overwhelming need for government to generate a fully joined-up, whole-of-government, totally comprehensive and fully concerted strategy to fully deliver on Irish decarbonisation potential over the shortest possible time-frame achievable.

In particular, all previous recommendations, along with those made here, have been (and are) supplied to support the overwhelming need for Irish climate and energy policy to concentrate efforts on generating a series of joined-up, time-bound and quantified measures capable of achieving the total decarbonisation of the electricity, industry, transport and buildings (both residential and commercial) sectors (i.e. the CO2 fraction of the inventory) well before 2040.

1 Available at: <https://www.dccae.gov.ie/en-ie/energy/consultations/Documents/42/submissions/Pat%20Finnegan.pdf>

2 Available at: <https://www.dccae.gov.ie/en-ie/energy/consultations/Documents/44/submissions/P%20Finnegan%20submission.pdf>

3 Awaiting (28th February 2020) upload at: <https://www.dccae.gov.ie/en-ie/energy/consultations/Pages/Public-Consultation-on-the-Implementation-of-the-Clean-Energy-Package.aspx>

4 Awaiting (28th February 2020) upload at: <https://www.dccae.gov.ie/en-ie/climate-action/consultations/Pages/Public-Consultation-on-Ireland%E2%80%99s-Long-term-Strategy-on-Greenhouse-Gas-Emissions-Reduction.aspx>

5 Awaiting (28th February 2020) upload at: <https://www.dccae.gov.ie/en-ie/energy/consultations/Pages/Public-Consultation-on-removing-barriers-to-energy-efficiency-in-the-rental-sector.aspx>

6 Awaiting (28th February 2020) upload at: <https://www.dccae.gov.ie/en-ie/energy/consultations/Pages/Public-Consultation-on-removing-barriers-to-energy-efficiency-in-the-rental-sector.aspx>

Basic assumptions on forcing factors / fundamental realities

- 1) Any new DH scheme in Ireland is almost by definition, a multi-decadal project. Establishment costs are so high and internal rates of return (IRR) likely so low, that no other financial perspective than a multi-decadal approach is likely to be remotely feasible or bankable commercially. In practice, this likely means any new Irish DH schemes will likely have a payback period > 25 years, and a decent ROI only after 40-60 years.
- 2) As such, known (or even 'known unknown') project hazards need to be accounted for prior to design (never mind establishment)
- 3) The Irish climate in 2050 will be radically different from that of today, and even more radically different by 2060-2070. This is almost inevitably the case absent radical and immediate global decarbonisation efforts undertaken over the next 10 years, of which there is currently absolutely no signal. Even under scenarios where relatively substantial global decarbonisation gets under way in the relatively near future, the Irish climate in 2050 is very likely to be nearing 2°C warmer than pre-industrial levels (c. 1°C warmer than today) by 2050. Even greater local warming is distinctly possible if known, but incommensurable, carbon cycle feedbacks kick in (*see document in note 6, Annex 2 – Current Science*). Furthermore, within the overall warming trend, a recognised characteristic of climate forcing is a statistical perturbation of the distribution of both heating and cooling events, with extremes of both tending to become more frequent, more intense, longer lasting, and less and less seasonally predictable.
- 4) Valid projections for heating demand out to 2050, and certainly beyond, cannot be considered as a simple (unadjusted) extension of historic heating demand in 2015-2020. Since the financial viability of DH is particularly dependent on local heat demand as forced by local climatic conditions, project IRR's, consequent potential long term profitability (and therefore upfront financiabilty) will likely be considered by financial intermediaries as a relatively high risk investment market absent any guarantees of demand and/or protection from intermittency. Furthermore, parallel decarbonisation efforts are almost certain to either directly reduce demand for DH and/or actively compete for consumers on a technological basis. This is especially true from a multi-decadal perspective.
- 5) Given an almost certain radical increase in cooling demand in buildings in Ireland out to 2050 and beyond, concentrating projects exclusively on heat is very unlikely to prove cost optimal. Given the almost complete absence of either a tradition of, or enthusiasm for, DH in Ireland, along with the almost complete current absence of infrastructure capable of delivering it, the economics of DH in Ireland is heavily handicapped by the very high front-end fixed costs associated with initially installing the necessary infrastructure. These costs tend to dwarf the cost of any associated heat source. Given this fact, along with an almost certain significant shift in demand on a multi-decadal basis, the marginal cost of installing a cooling network at the same time as a heating network is very likely to prove far less than avoided costs incurred by concentrating on heat alone.
- 6) A current heat map is not at all the same thing as a map of actual DH potential in 30-40 years time. Notwithstanding the excellent work performed in generating the PETA heatmaps, it has to be recognised that a map of the current heat produced by, or consumed in, Irish buildings currently almost entirely supplied by fossil-fuelled energy (with very little attached penalties) is not at all representative of the likely demand for heat in the same areas throughout a multi-decadal future. It is already government policy that decarbonisation of Irish buildings should be stepped up radically in the future, and that fossil fuels should be substituted by renewable energy sources (RES) wherever and whenever possible. While policy does not amount to action, there is little doubt that Irish consumers are becoming increasingly conscious of the hazards they are facing from unmitigated climate change, and therefore also becoming increasingly prepared to take individual action. Household decarbonisation is becoming increasingly, and

rapidly, more and more cost-effective from the individual perspective. With or without increasingly robust government policy, with or without associated grants for RES, it is almost inevitable that a map of energy supply and energy demand for Irish buildings in 2040 will look very different from a heat map in 2016. DH will only be able to be part of this transition if it can a) be delivered very quickly, and b) remain cost competitive with other technologies over time.

6) Flood - and particularly storm surge - hazards will almost certainly radically increase over the next 30-50 years. Since DH is almost by definition installed at least 1 metre below ground level, it is, of all currently available decarbonisation technologies, uniquely exposed to flood hazard. While there appears to be a remarkable shortage of literature assessing potential damage to DH infrastructure from flooding, it is hard to assume from any initial perspective that prolonged⁷ inundation from highly polluted, toxic and caustic floodwater in low lying industrial areas characterised by large stocks of chemicals and petrochemicals such as (e.g.) Cork or Dublin, would not in all likelihood be possibly detrimental in greater or lesser degree to (e.g.) DH pipe insulation and isolation, with consequent effect on both thermal and economic efficiency. The Intergovernmental Panel on Climate Change (IPCC) currently estimates predicted global average sea-level rise of c. 40 cm by c. 2050, but does not rule out more than this. (In fact the IPCC cautions that more than this is thoroughly possible). Additionally, average global sea level rise is not at all necessarily the same as local sea level rise. The Dutch government - world leaders in maritime flood defence - are currently planning on defending a rise of 2m by 2100 if the Paris Agreement temperature objectives are met (currently very unlikely) and 3m if not. Increased intensity and frequency of local storms predicted by current climate models likely imply that surge heights of 3m – 5m over sea level are to be expected in Ireland well before the end of the century. Taken together, current projections imply that truly precautionary storm driven coastal flood defences in Ireland should be of the order of 7 – 8m ODM well before 2100. Yet the DH scheme in Ringsend mentioned in the consultation paper is situated on a peninsular currently only planned to be defended to a maximum height of 4.6m ODM⁸.

7) It should not be assumed that current fuels deployed for conventional DH (waste heat, gas, biomass) are necessarily those most fit for cost effective DH throughout a multidecadal future. With appropriate infrastructure design and component engineering it is already possible to integrate solar thermal energy shares into conventional DH systems in comparable situations to those pertaining in most of Ireland up to a level of 50% of heat supplied at cost effective levels (< €50/MWh)⁹.

Whether by tradition or by neglect - very possibly a combination of both - solar PV and solar thermal energies are almost as neglected as cost-efficient decarbonisation strategies in Ireland as DH is itself. Ramping up DH should not neglect the opportunity to also ramp up distributed solar energy generation – in fact, the rational approach would be to tackle both deficiencies in parallel. Previous recommendations to DCCA have made a consistent cross-issue case for government policy to embrace a nationwide drive for a distributed national solar energy grid well before 2040 (see notes 1,2,3,4,5,6)

7 'Prolonged' almost by definition since undergrounding of DH pipes means they will be, again almost by definition, the very last component in flooded areas to be dried out unless special measures (e.g. pumping) are previously installed.

8 See: p.204, Poolbeg Peninsular – Infrastructure, Flood Prevention and Remediation (available at: <http://www.dublindocklands.ie/sites/default/files/Planning/Historical%20Schemes/Poolbeg/Section%209%20-%20Infrastructure%2C%20Flood%20Protection%20and%20remediation.pdf>)

9 See: Section 5.3.2 – Integration of solar thermal heat in Upgrading the performance of district heating networks - Technical and non-technical approaches - A Handbook, available at: https://www.upgrade-dh.eu/images/Publications%20and%20Reports/D2.5_2019-07-02_Upgrade-DH_Handbook_EN.pdf)

Ireland has also so far barely begun to tap its wind power potential - almost certainly the highest per capita such resource in the world after Scotland - with almost the entire offshore resource so far almost entirely ignored. This situation is clearly the result of government policy, the justified case for which remains almost entirely opaque and unclear. A significant factor operating against the (otherwise fully competitive) Irish wind energy industry however is undoubtedly the dis-economics created by curtailed access to the grid. Despite much labour at government level by both existing and potential wind energy operators in attempting to unblock this unquestionable impediment to ramping up wind energy in Ireland, little progress has been made over the last half decade or so. Despite contributing almost all of Ireland's progress achieved so far towards its 2020 RES-E target, the (totally achievable) remaining distance to target remains blocked by failure to reduce curtailment to any significant degree. Properly configured and well-designed future DH therefore offers a significant opportunity for the dumping of energy from otherwise-curtailed wind installations. Almost by definition, this is necessarily very cheap fuel for DH. (It is also currently 'virtual' waste heat).

Recommendations

The recommendations that follow are presented in line with the four topical subjects identified in the consultation paper. References to basic assumptions/forcing factors/fundamental realities considered above are provided where appropriate and/or necessary.

RESEARCH - Q1: *What additional research do you think needs to be carried out to support the development of district heating in Ireland?*

It will be reasonably clear from the foregoing (*assumptions 1,2,3,4,5,7 above*) that a fairly substantial degree of econometric modelling will be required to ensure that design parameters for any new DH schemes proposed in Ireland are configured to ensure that any new investment(s) are capable of responding as closely as possible to likely real-world environments for both heating and cooling evolving on a multi-decadal basis within an equally likely environment of similarly evolving capital and financial markets (which themselves will also be responding to forcing from climate change). In particular, a reasonably secure view of multi-decadal and constantly evolving IRR's and ROI's is necessary in order to avoid a currently fairly substantial risk of considerable capital investment in schemes at risk of becoming ultimately stranded assets well before payback.

All such research should also be capable of involving a high degree of sensitivity to both technological evolution and to consumer attitudes, behaviour and investment choices in the face of accelerating climate change, as well as accounting for likely feedbacks to associated impacts on social and behavioural patterns and systems.

For the sake of generating reasonably robust and forward-looking legislative and planning frameworks for genuinely multi-decadal DH, innovative research is critically needed to establish the likely most carbon effective - and therefore also likely the most long term cost effective - fuel mixes and demand response to local environmental conditions and climatic factors pertaining out to 2060-2080.

Particular concentration on the potential of the vast, secure, and almost entirely untapped local resource of distributed domestic, commercial, and industrial rooftop solar energy (PV and thermal) is strongly recommended.

Q2: *How should research (including the upcoming comprehensive assessment) be used to inform/support the development of district heating in Ireland?*

As already outlined (*assumption 4 above*) particular concentration on developing future DH based on the PETA framework and the current heat atlas risks making a number of potentially fatal category mistakes with regard to the future (multi-decadal) nature of both heating and cooling demand and the supply of future energies to meet same. The upcoming comprehensive assessment needs to take a much more realistic view of both the long term nature of DH infrastructure and projects, and of just how variable both the supply and the demand sides are likely to become under climate forcing.

Additionally the upcoming comprehensive assessment needs to take a much more positive view of the potential identified in the third category of potential DH contained in the chart in section 2.2.4 of the consultation paper (*'feasible subject to policy/regulation'*). Since both policy and regulation are subjects of both this consultation and of this response to the consultation, it is reasonably obvious that this resource – almost equal in size of heat share to the second category (already considered 'feasible') - should be promoted by the upcoming assessment to straightforwardly 'feasible', with policy, regulation and planning all to be aligned accordingly.

REGULATION

The main focus of regulation should be to ensure that implementation of the Renewable Energy (RED), Energy Efficiency (EED), Energy Performance of Buildings (EPBD), and Effort Sharing (ESD) Directives are all correctly aligned in Ireland in order to synergistically deliver the maximum amount of achievable decarbonisation in the shortest possible time, including for DH wherever this is likely to be the most carbon-effective option, (assuming that this also amounts to the long term most cost effective option) .

This is the way the EU climate and energy legislative process has always been designed, and this is the way it should be operated in Ireland. In order to facilitate this result, the fewer opt-out provisions contained in any or all of these Directives that Ireland avails of, the less costly and more efficient the results are likely to be. Furthermore, as maintained in all previous recommendations to DCCA, there is in all cases encouragement in all of the Directives for Member States not to see their provisions as the maximal extent of their ambitions, but rather as legally minimum standards that they are strongly encouraged to surpass by the greatest extent possible.

The incoming European Commission has strongly indicated that further strengthening of the entire climate/energy *acquis* is to be thoroughly expected over the short to medium term and that, furthermore, any such strengthening may be expected to be robust. In this light, full, robust, and ambitious transposition of all the provisions in the amended Directive(s) should be expedited without delay and without opt-outs unless these amount to severity approaching the level of *force majeure*.

With regard to DH in particular, the provisions of **Article 22 (Renewable Energy Communities)** and **Article 23 (Mainstreaming Renewable Energy in Heating and Cooling)** are very obviously the measures most worthy of the most attention, since both offer the largest opportunity for Ireland to legislate forcibly in favour of participative community-owned (or part-owned) heating and cooling run on renewable energies. The fact that these articles are not even mentioned or referenced in the consultation paper (while considerable attention is given to Article 24) is potentially very disturbing. However the assumption made here (*pro tem*) is that this is because robust legislation in this regard is already in preparation.

Again with particular regard to DH, the provision in paragraph 4 of Article 22 of the RED that: *'Member States shall provide an enabling framework to promote and facilitate the development of renewable energy communities. That framework shall ensure, inter alia, that: unjustified regulatory and administrative barriers to renewable energy communities are removed'* is very obviously of critical importance. Without an enabling framework for DH legislated in favour of both community participation and community-oriented decarbonisation, Ireland is very unlikely to rapidly embrace DH, or its benefits.

PLANNING

Q10: *What changes, if any, are required to existing planning and building regulations in order to support the development of district heating?*

Planning regulations for DH need to move from being merely ‘generally supportive’ of DH (p.26 in the consultation paper) to a status where basic DH infrastructure (dual heating and cooling pipes, ducting, connection and metering facilities) becomes a requirement for consent for any new developments larger than (say) c. 10 units. In this regard the example cited in the consultation paper (*ibid.*) concerning the condition imposed by An Bord Pleanála (ABP) on the Poolbeg West SDZ scheme should serve as a lead example. Given the overall economics of DH – particularly the well-recognised additional costs incurred by installing infrastructure *ex post* - it is astonishing that this condition had to be imposed by ABP rather than being required by planning law as compulsory for consent for all significant developments nationwide. Additionally, requiring developers to bear the cost of building in local DH infrastructure may well serve to incentivise them to consider going several steps further by (e.g.) building a scheme designed to maximize and share the local solar heating potential which is then distributed through a micro-DH network capable of being run on a commercial basis by (e.g.) an estate management company. Local authorities are thereby much better positioned, empowered and enabled to use their powers of *vires* to become likely key stakeholders (owners or co-owners) in the construction and maintenance of ring main DH networks serving as interconnectors between smaller (possibly more privately owned) local schemes.

Q11: *Is there potential for the revised building Regulations to act as a driver for district heating?*

In theory, under the EPBD (Article 9), all new build in Ireland should be ‘nearly zero energy’ buildings by the end of 2020. However consistent, stubborn and unconscionable opposition by past governments to establishing Passiv Haus standards as planning norms means that much ground has been lost (both in terms of fossil energy consumed and resultant emissions caused) in going beyond the minimal conditions of the EPBD and maximising the potential for the huge amount of construction activity over the last half decade or so to mitigate emissions and conserve energy. The revised building regulations clearly continue a pathway of designed minimal compliance with the EPBD rather than maximal exceedance. Rather than perceiving Passiv Haus as oppositional to both business as usual construction activity (and subsequent rectification of inefficiency by both DH and retro-fitting) government should concentrate policy on going well beyond the collective ambitions embodied in the EPBD, RED and EED’s and instead configure legislation aiming for ‘energy positive’ buildings wherever and whenever possible. Such an ambition would greatly enhance a drive for DH as a basic heat, cooling and energy interconnector (thus also obviously greatly mitigating emissions from the sector).

FINANCING

Q14: *What are the most appropriate financing mechanisms for developing district heating in Ireland?*

Q17: *Other than providing direct exchequer funding, what incentives might Government consider implementing in order to drive the development of district heating?*

Previous recommendations to DCCAIE (*see notes 1,2,3,4,5,6*) have made a consistent cross-issue case for government policy to embrace a nationwide drive for a distributed national solar energy grid well before 2040 financed by a suite of measures including an escalating carbon tax, greenbonding, accelerated capital allowances and most particularly, a new instrument named SOL (Solar Opportunity Levy). This is essentially a site value tax on properties that fail to maximise cost effective decarbonisation opportunities afforded by or within the site they occupy. Accelerated capital allowances are then created against future SOL liability in order to finance immediate decarbonisation and associated emissions reduction. Nationwide implementation of this mechanism would obviously greatly incentivise DH as both a direct small-scale response to discrete local future liability to SOL and/or (at larger scale) as an interconnector service for smaller schemes.