



An Chomhairle Náisiúnta Eacnamaíoch agus Shóisialta
National Economic & Social Council

Advancing the Low-Carbon Transition in Irish Transport

Research Series

Paper No. 13

May 2019

National Economic and Social Council

Constitution and Terms of Reference

1. The main tasks of the National Economic and Social Council shall be to analyse and report on strategic issues relating to the efficient development of the economy and the achievement of social justice.
2. The Council may consider such matters either on its own initiative or at the request of the Government.
3. Any reports which the Council may produce shall be submitted to the Government, and shall be laid before each House of the Oireachtas and published.
4. The membership of the Council shall comprise a Chairperson appointed by the Government in consultation with the interests represented on the Council, and
 - Three persons nominated by agricultural and farming organisations;
 - Three persons nominated by business and employers organisations;
 - Three persons nominated by the Irish Congress of Trade Unions;
 - Three persons nominated by community and voluntary organisations;
 - Three persons nominated by environment organisations;
 - Five other persons nominated by the Government, including the Secretaries General of the Department of Finance, the Department of Business, Enterprise and Innovation, the Department of Housing, Planning, Community and Local Government, the Department of Public Expenditure and Reform.
5. Any other Government Department shall have the right of audience at Council meetings if warranted by the Council's agenda, subject to the right of the Chairperson to regulate the numbers attending.
6. The term of office of members shall be for three years. Casual vacancies shall be filled by the Government or by the nominating body as appropriate. Members filling casual vacancies may hold office until the expiry of the other members' current term of office.
7. The numbers, remuneration and conditions of service of staff are subject to the approval of the Taoiseach.
8. The Council shall regulate its own procedure.



An Chomhairle Náisiúnta Eacnamaíoch agus Shóisialta
National Economic & Social Council



Advancing the Low-Carbon Transition in Irish Transport

Dr Laura Devaney and Dr Diarmuid Torney
School of Law and Government
Dublin City University

Research Series

Paper No. 13

May 2019

The NESC Research Series provides analysis of economic, social or environmental evidence and policy. The views are those of the authors and do not represent the collective view of the Council.

A list of the full set of NESC publications is available at www.nesc.ie

Table of Contents

Acknowledgements and Executive Summary	iv
Acknowledgements	v
Executive Summary	vi
Chapter 1 Introduction	1
1.1 The Decarbonisation Challenge	2
1.2 Governance for Low-Carbon Transition	3
1.3 Advancing the Low-Carbon Transition in Irish Transport	4
Chapter 2 Low-Carbon Transition—Challenges and Opportunities	5
2.1 Competing Perspectives on Climate Governance	6
2.2 Bottom-up Innovation and Experimentation	7
2.3 Top-down Steering	8
Chapter 3 Transport Trends in Ireland—Context and Trends	9
3.1 Ireland’s Low-Carbon Policy Framework	10
3.2 Transport Sector Emissions	11
3.3 Irish Emissions in a European Context	12
3.4 Progress and Challenges in Advancing Low-Carbon Transport	13
Chapter 4 Research Approach	15
Chapter 5 How the Transport System Operates—Inherent Complexities of the Sector	18
5.1 Complexities of the Transport Sector	19
5.2 Internal Tensions	19
5.3 External Interactions	21
5.4 The Promise of a Social Practice Approach in Acknowledging Sectoral Complexities	24
Chapter 6 What Drives the Transport System—Contested Institutional Priorities	25
6.1 Legacies and (Mis)Alignment	26
6.2 Lack of Prioritisation of Low-Carbon Transition	27
6.3 Alternative Framings of Low-Carbon Transition	28
6.4 Emphasis on Passenger Transport Over Freight	29

Chapter 7 Who Shapes Transport Outcomes—A Fragmented Governance Landscape	33
7.1 Institutional Fragmentation	34
7.2 Key Institutions in Transport Governance	36
7.3 The Fragmented Governance Landscape in Action	42
7.4 Overcoming Institutional Fragmentation	44
Chapter 8 Conclusions and Recommendations	47
8.1 Introduction	48
8.2 Acknowledging Complexities in the Sector	48
8.3 Challenging Institutional Priorities	49
8.4 Interrogating the Institutional Landscape	50

List of Figures

Figure 1:	Transport CO2 Emissions by mode, 1990-2016	12
Figure 2:	Emissions Share by Transport Sector, Ireland and EU28, 2015	12
Figure 3:	Land Transport Passenger-km Modal Share, 2015	13
Figure 4:	Total Road Freight Tonne-km, 1999-2016	13
Figure 5:	Illustrative Mapping of Irish Transport Governance Institutions	35

List of Case Studies

Case Study A:	International Best Practice in Freight	22
Case Study B:	Freight Transport Standards	30
Case Study C:	All-Day Transportation in Zurich	31
Case Study D:	Governance of Light Rail (Luas)	43
Case Study E:	LEV Taskforce	46

Abbreviations

ASI

Avoid, Shift, Improve

CIÉ

Córas Iompair Éireann

CNG

Compressed Natural Gas

CRR

Commission for Railway Regulation

DCCAIE

Department of Communications, Climate Action & Environment

DTTAS

Department of Transport, Tourism and Sport

EPA

Environmental Protection Agency

EV

Electric Vehicle

FTAI

Freight Transport Association Ireland

GHG

Greenhouse-Gas

HGV

Heavy Goods Vehicle

IPCC

Intergovernmental Panel on Climate Change

LEV

Low Emission Vehicle

LGV

Light Goods Vehicle

NDP

National Development Plan

NPF

National Planning Framework

NTA

National Transport Authority

P&R

Park and Ride

R&D

Research and Development

R&I

Research and Innovation

RSA

Road Safety Authority

SEAI

Sustainable Energy Authority of Ireland

TII

Transport Infrastructure Ireland

TOD

Transport-orientated Development

Acknowledgements and Executive Summary

Acknowledgements

The authors would like to thank the National Economic and Social Council (NESC) for providing the opportunity to undertake this research. We are particularly grateful to the project steering committee, Dr. Rory O'Donnell, Dr Larry O'Connell and Dr. Jeanne Moore from the NESC Secretariat, and Laura Behan, head of the Climate Change Unit in the Department of Transport, Tourism and Sport. We are also very grateful to the 15 interviewees from across a range of stakeholders who gave generously of their time and expertise. Finally, we are grateful to Paula Hennelly in the NESC Secretariat for administrative support.

Executive Summary

Ireland is at a critical juncture in developing a response to climate change and transitioning to a low-carbon economy. Stark warnings from the Intergovernmental Panel on Climate Change (IPCC) highlight the risks involved in exceeding 1.5 degrees of warming as well as the scale of the challenge facing humanity if we are to remain within that threshold (IPCC, 2018). Despite important developments, emissions projections from the Environmental Protection Agency (EPA) show that Ireland will, in a best-case scenario, achieve a one per cent reduction in emissions in the non-traded sector by 2020, relative to a 20 per cent decarbonisation target (EPA, 2018b).

Governance institutions are key enabling factors for decarbonisation across economy and society. The international literature on governance of low-carbon transition points to the importance of both bottom-up innovation and experimentation and top-down direction from central government in creating change. Drawing on desk-based and interview research, this report examines how a low-carbon transition in Irish transport could be better facilitated by modifications to governance institutions and the broader policy system.

Our research identifies three main themes that emerged from interviews with key stakeholders. The first concerns how the transport system operates, where we highlight complexities inherent in the sector. This includes tensions between public and private, rural and urban, and the role of special interests as well as complex external interactions with broader policy objectives and systems, including planning, health and education. Our second key theme concerns the drivers of the transport system. We show how contestation between institutional priorities has shaped the development of a carbon-intensive transport system to date. Low-carbon transition has yet to be embedded in these priorities, and there is disagreement over what low-carbon transition might entail and across transport sub-sectors. Our third key theme identifies who shapes transport outcomes. We paint a picture of a fragmented governance landscape, and profile the key actors and how they relate to each other. We highlight the impact of fragmentation as reported by stakeholders, as well as institutional opportunities for enhanced co-ordination

Building on research findings, this report identifies a set of recommendations and poses a number of questions for stakeholders who wish to strengthen low-carbon transition in Irish transport. These align with our three key research themes.

1. **Acknowledging complexities in the transport sector**, transport governance ought to be built upon the following principles:
 - **Adopt a collaborative, adaptive and reflexive approach to policy making.** This requires input from a diverse range of public, private and civil society actors. Stakeholder engagement is essential to enhance transparency, legitimacy and trust in decision-making, and generate better outcomes.
 - **Support bottom-up approaches to low-carbon transport** to take account of geographical and technical variations and the rural-urban divide. Inherent complexities entail different transport solutions in different geographical areas and sub-sectors. Understanding, developing and tailoring transport solutions to local contexts will be crucial.
 - **Understand transport as a social practice** to promote positive behaviour change. This approach considers the socio-cultural, technical and governance forces that shape practices of travel. Designing and implementing appropriate combinations of these interventions will be critical to advancing low-carbon transition.
2. **Challenging institutional priorities** that to date have not included a strong focus on low-carbon transition, the following steps ought to be pursued:
 - **Align transport policy making with international sustainable mobility thinking** that promotes an 'Avoid, Shift, Improve' (ASI) framework for both passenger and freight transport. This could more clearly emphasise a hierarchy that focuses on reducing journeys in the first place, achieving modal shift, and improving mode efficiencies.
 - **Provide high-level direction from the highest levels of central government.** This will signal a new direction of travel to investors, consumers and citizens. This includes leadership from the Department of Transport, Tourism and Sport (DTTAS) but should also be underpinned by a whole-of-government approach to climate action.
 - **Align mandates of transport governance actors with low-carbon transition.** Institutional mandates could be revised to include a statutory commitment to prioritise low-carbon transport. More detailed carbon accounting, and a heavier weight assigned to this, could feature in project appraisals to inform decisions about transport investments.
 - **The public sector should lead by example.** This could include not just central government but also, for example, local authorities switching fleets to electrified alternatives. Civil service incentives and human resources could give greater priority to low-carbon transition in their hiring, promotion and travel schemes.

3. **Interrogating the institutional landscape**, we suggest the following as potential institutional remedies:

- **Taskforces:** The Low Emission Vehicle (LEV) Taskforce provided a structured forum to bring together the key actors to unblock policy action for electric vehicle (EV) incentivisation. Consideration could be given to replicating this model for other sectoral challenges. Such taskforces could combine insights from public, private, academic and civil society organisations.
- **Hubs and public-private partnerships:** Multi-modal transport hubs that connect public, private and active transport modes hold promise for decarbonising Irish passenger transport, along with enhanced (re)distribution hubs to decarbonise freight. Public-private partnerships may help to progress such low-carbon hubs, combining funding and expertise for change.
- **Forums for peer learning:** Villages, towns and cities across Ireland need further opportunities to learn from each other to scale up innovative low-carbon transport solutions. A variety of settlement sizes could learn from one another's experimental approaches, while recognising important differences across the transport landscape.
- **Deliberative forums for stakeholder and citizen participation:** Structured inclusion of private and civil society actors can enhance transparency and moderate the impact of lobbying by special interests. Public information offices could be established, with structured citizen assembly processes and town-hall-style meetings.
- **Research infrastructure for transport policymaking:** More diverse and inclusive transport research is needed, as well as channels of communication and absorptive capacity for more evidence-based policy making. This includes the potential for intermediary institutions for enhanced knowledge exchange between academia and government, and practice-orientated participatory backcasting approaches to create implementable transition frameworks.

Chapter 1

Introduction

1.1 The Decarbonisation Challenge

Ireland is at a critical juncture in developing a response to climate change and transitioning to a low-carbon economy and society. The stark warnings contained in the recent report of the Intergovernmental Panel on Climate Change (IPCC) further highlight the risks involved in exceeding 1.5 degrees of warming, as well as the scale of the challenge facing humanity if we are to remain within that threshold (IPCC, 2018). The costs of the transition will be much less than the costs of doing nothing. However, the report also noted that the scale of transition needed to limit global warming to 1.5 degrees is ‘without documented historic precedent’ (IPCC, 2018: 22).

Despite important developments, emissions projections from the Environmental Protection Agency (EPA) show that Ireland will, in a best-case scenario, achieve a one per cent reduction in emissions in the non-traded sector by 2020. This is relative to a 20 per cent decarbonisation target, as set out under the EU Effort Sharing Decision (EPA, 2018b).

The transport sector in Ireland is particularly central to enabling a transition to a low-carbon economy and society. In 2016, transport accounted for one-fifth of Ireland’s greenhouse-gas (GHG) emissions. Emissions in the sector have risen rapidly in recent decades and remain stubbornly coupled to economic growth. This is evidenced by a decline in emissions during the economic crisis, followed by robust emissions growth in the period since 2012. The year 2017 saw a decrease in transport emissions following four years of strong growth, but this was driven by a decrease in fuel tourism rather than any meaningful or supported shift to a low-carbon system (EPA, 2018a). Strong growth in the sector’s emissions is projected by the EPA in the coming years (EPA, 2018b).

Tackling rising GHG emissions in the transport sector is critical from a policy perspective in the short to medium term because transport falls within the scope of Ireland’s EU Effort Sharing target. In the longer term, Ireland will not be able to meet its commitment to at least an 80 per cent aggregate decarbonisation of electricity generation, transport and the built environment by 2050 (Government of Ireland, 2014).

1.2 Governance for Low-Carbon Transition

Governance institutions are key enabling factors for decarbonisation across economy and society. The NESC report, *Ireland and the Climate Change Challenge*, identified the importance of an effective, enabling institutional and policy framework to drive and measure progress on addressing climate change at a national level (NESC, 2012). In the transport sector, a forum hosted by NESC in 2015 on the opportunities and challenges for climate mitigation in transport explored the key technical, organisational and socio-political challenges in decarbonising transport in Ireland (NESC, 2015).

The NESC forum recognised that the transport sector has many distinctive features that contribute to creating a complex governance and institutional challenge. Transport crosses more areas and sectors than any other, such as household and organisational behaviour, and intersects more with democratic governance. Participants in the forum noted positive developments in Irish transport in recent years, including a policy evolution towards smarter travel, more people-centred design, investment in the Luas and some cycling infrastructure. Participants also noted a range of challenges. There was hesitancy about making the right public investments. There were concerns that, even when needs were identified and recognised—such as the potential for greater modal shift in Dublin—policy responses were constrained by limited resources. Other barriers such as legislative, institutional and informational were noted, including a lack of research on what works for effective behaviour change. The forum identified the institutional environment as a key enabler of decarbonisation of the transport sector. In particular, the forum identified: i) a need for more stakeholder engagement; ii) a need for better links across and beyond government departments, including with local authorities; iii) a tension between short-term and long-term concerns and priorities, and iv) that governance approaches need to recognise the many distinctive features of the transport sector.

1.3 Advancing the Low-Carbon Transition in Irish Transport

This report picks up where the 2015 NESC forum left off. It examines how a low-carbon transition in Irish transport could be better facilitated by modifications to governance institutions and the broader policy system. It examines the extent to which governance institutions are sufficiently committed to low-carbon transport as a key objective, and asks how they can play a stronger role in driving a low-carbon transition. We reflect on positive developments in Irish transport as well as persisting gaps, overlaps, legacies and competing priorities and mandates that have impeded the transition to date.

The report is underpinned by desk research conducted by the project team (Dr. Diarmuid Torney and Dr. Laura Devaney) as well as 15 semi-structured interviews conducted by one of the project team (Dr. Laura Devaney) with key stakeholders.

The report is structured as follows. The next chapter identifies challenges, opportunities and international best practice in low-carbon transition, emphasising the respective roles of bottom-up innovation and experimentation and top-down steering. Chapter 3 outlines the policy context and sets out transport trends in Ireland, thereby identifying the scale of the low-carbon challenge. Chapter 4 outlines our research approach. Chapters 5 to 7 present the core findings of the research, structured around three key themes that emerged from interviews with key stakeholders. Chapter 5 discusses how the Irish transport system operates and draws attention to complexities inherent in the sector. Chapter 6 identifies motivations and drivers of the transport system, highlighting contested institutional priorities in the Irish context. Chapter 7 maps key actors that shape transport outcomes and the fragmented governance landscape in which they operate. Chapter 8 concludes with recommendations on how to strengthen governance of Irish transport to deliver low-carbon transition.

Chapter 2

Low-Carbon Transition—Challenges and Opportunities

2.1 Competing Perspectives on Climate Governance

The task of decarbonisation is complex and multi-faceted. From a governance perspective, it cuts across traditional demarcation lines in terms of politics, sectors and geography. Decarbonisation requires action from public and private sectors, multiple levels of governance from global to local, and, within government, includes government ministries, autonomous agencies and semi-state operators.

All of this adds up to a complex governance landscape. Such a complex and multi-layered system can facilitate experimentation and learning, but it can also generate confusion over responsibility for delivery of public goods as well as blurred lines of accountability (Zipper, 2018). The literature on sustainable energy transitions also emphasises the challenge of path dependency. Research on *carbon lock-in*, for instance, reveals how techno-institutional complexes create inter-locking path dependencies in both technologies and governance systems that are resistant to change (Unruh, 2000, 2002).

Similarly, social practice theory highlights how everyday practices, including how we eat, wash and travel, are shaped by a range of socio-cultural, technical and governance forces (Shove 2003; Warde, 2005). Path dependencies and lock-in can thus occur through the tools, technologies, infrastructure, rules and regulations available and perpetuated. Path dependency can limit opportunities for behaviour change in the transition to a low-carbon future.

Other theoretical perspectives, meanwhile, emphasise the ability of government to steer economy and society towards sustainability. For example, the literature on transition management suggests that governments can do so by providing a long-term vision for the direction of transition. However, this approach under-estimates the need for political legitimacy for transition, and the role of politics (Andrews-Speed, 2016). It also downplays the power of incumbent interests and veto players (Kuzemko *et al.*, 2016).

2.2 Bottom-up Innovation and Experimentation

Climate governance, particularly in the wake of the landmark 2015 Paris Agreement, is increasingly characterised by polycentricity (Jordan *et al.*, 2018). The Paris Agreement marked a shift from the top-down global climate governance architecture that characterised the Kyoto Protocol towards a bottom-up approach that grants greater autonomy to states to determine their level of contributions. Paris also sought to capture the diffuse set of climate actions by a variety of non-state actors, including cities, municipalities and businesses, through the Lima-Paris Action Agenda.

Polycentric governance systems involve many centres of decision-making that are formally independent of each other (Ostrom, 2010, 2012). Experimentation and learning are important features of such systems. Indeed, for Ostrom (2012: 365), this is the great promise of a polycentric approach, which ‘encourage[s] experimentation and learning from diverse policies adopted by multiple scales’. Sabel and Victor (2016) argue that the Paris architecture should be taken a step further to allow for greater experimentation and learning among this diverse sphere of public and private governance actors. This focus on learning is echoed in other work on polycentric climate governance (e.g. Dorsch and Flachslund, 2017; Rayner and Jordan 2013). However, Jordan *et al.* (2015) caution that the optimism that characterises some of this literature rests on untested assumptions.

Drawing on the polycentric governance tradition, what is particularly important is the ability of the governance system to capture and scale up social, political and technological innovations to make them truly transformational (Ostrom, 2010, 2012; Dorsch and Flachslund, 2017). This is partly about information and lesson-sharing, but the sociotechnical transitions literature also emphasises the importance—but also the difficulties associated with—challenging powerful incumbents and retiring infrastructure before the end of its operational life (EEA, 2018b; Geels *et al.*, 2017).

Innovation is crucial to address societal challenges such as climate change. This includes developing and implementing new ideas, methods, policies and technologies. A supportive innovation system of appropriate institutions, economic conditions, infrastructure, education, research and political context is a critical enabling factor.

The ultimate aim of any innovation system is to support ideas through the invention process to have a socioeconomic effect (Lundvall, 2007). The innovation system facilitates this through creating and diffusing new knowledge, supplying financial and human capital resources, creating positive external conditions, and facilitating markets (Johnson and Jacobsson, 2001; Foxon *et al.*, 2004). Policy contributions play a particularly important role in transition-orientated innovation systems, given the complexities and uncertainties that typify this landscape (Purkas *et al.*, 2017). Policy interventions must correct not only traditional market failures (e.g. related to environmental pollution and inconsistent technology diffusion) (Jaffe *et al.*, 2005)) but increasingly the number of ‘structural innovation systems failures’ that exist

(Coenen *et al.*, 2015). This includes addressing problems associated with incomplete physical infrastructure; the lack of necessary competencies and resources; excessively tied or loose networks that limit the generation of new ideas and/or knowledge exchange, and institutional laws, norms, and risk-taking tendencies that inhibit innovation (Coenen *et al.*, 2015).

Facilitating transformative change, however, requires an innovation and policy approach that moves beyond correcting structural failures and incremental business-as-usual approaches (Weber and Rochracher, 2012). Addressing ‘transformational systems failures’ is also a critical ingredient. This includes policy co-ordination, directionality, demand articulation and reflexivity failures (Coenen *et al.*, 2015: 486) that are more complex to correct in policy and practice but are a necessary step for transformative change.

2.3 Top-down Steering

Despite the importance of innovation, experimentation and learning in polycentric climate governance, purposeful steering of transitions through top-down governance arrangements remains a critical ingredient of effective climate governance. Recent research coinciding with 10 years of the UK Climate Change Act shows clearly that top-down governance has a crucial role to play (Averchenkova *et al.*, 2018; Fankhauser *et al.*, 2018). In particular, the UK Climate Change Act has been found to have caused significant changes in long-term investment decisions in the power sector, involving a shift away from coal and gas (Fankhauser *et al.*, 2018: 24-25). However, it has been less successful in driving more granular change at the level of individual policies within sectors.

For a long time, debates on climate governance involved a polarised debate between advocates of top-down and bottom-up governance approaches. In fact, both are necessary but not sufficient in isolation to facilitate low-carbon transition. The governance challenge requires both high-level, top-down direction and bottom-up innovation and experimentation. The institutional challenge is to create appropriate linkages between these approaches.

The theoretical insights developed in this chapter are used to frame the research that follows and the resulting recommendations for advancing the low-carbon transition in Irish transport. The next chapter sets out the key policy context as well as trends in the Irish transport sector. This helps to underscore the importance and scale of the challenge facing low-carbon transition in transport.

Chapter 3

Transport Trends in Ireland—Context and Trends

3.1 Ireland's Low-Carbon Policy Framework

Ireland is committed to substantial decarbonisation by mid-century. In 2014, the Government agreed a National Policy Position that commits to a long-term vision of low-carbon transition based on an aggregate reduction in CO₂ emissions from electricity generation, the built environment and transport of at least 80 per cent by 2050 relative to 1990 levels, and an approach to carbon neutrality in the agriculture and land-use sector, including forestry (Government of Ireland, 2014).

EU membership also provides a crucial policy context for Ireland. The EU's 2020 climate and energy package set a target of 20 per cent reduction in GHGs relative to 1990 levels, 20 per cent share of renewables, and 20 per cent increase in energy efficiency. The GHG target was subdivided into a 21 per cent reduction (relative to 2005) target for the Emissions Trading sector, and individual member-state targets for the non-ETS sector under the Effort Sharing Decision. Ireland's target for GHG emissions in the non-ETS sector (including transport) is a 20 per cent reduction relative to 2005 levels by 2020. Separately, under the Renewable Energy Directive, member states were given national targets for renewable energy deployment. Ireland's target for 2020 is 16 per cent, which is broken down into targets for electricity (40%), heat (12%), and transport (10%)(Government of Ireland, 2010).

Under the 2021–2030 Effort Sharing Regulation (2018/842), Ireland is required to reduce emissions in the non-ETS sector by 30 per cent relative to 2005 levels. Each year from 2021–2030, Ireland is entitled to use ETS allowances (up to the equivalent of 4% of 2005 non-ETS emissions) and forestry and land-use credits (up to 5.7%) if these sectors absorb more carbon than they emit. Assuming maximum use of these flexibilities, Ireland's required reduction over the period 2021–2030 will be of the order of 20.3 per cent (EPA, 2018b).

Emissions projections from the Environmental Protection Agency (EPA) show that Ireland will, in a best-case scenario, achieve a one per cent reduction in emissions in the non-traded sector by 2020 (EPA, 2018b). The scale of the decarbonisation challenge in Ireland is considerable, though not unique in a European

3.2 Transport Sector Emissions

Concerning low-carbon transition in Irish transport specifically, *Smarter Travel—A Sustainable Transport Future* is the most recent overarching government transport policy document (DTTAS, 2009). Published in 2009, it set out a vision for transport to 2020 centred on the following goals: i) to reduce overall travel demand; ii) to maximise the efficiency of the transport network; iii) to reduce reliance on fossil fuels; iv) to reduce transport emissions, and v) to improve accessibility to transport.¹

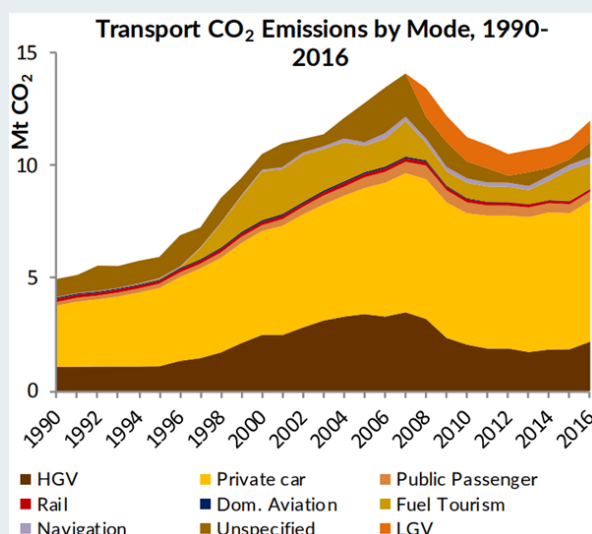
Between 1990 and 2017, however, GHGs from transport in Ireland increased by 133.2 per cent—more than any other sector in the national inventory. Emissions from road transport increased by 140 per cent. In 2017, the latest year for which data are available, emissions decreased by 2.4 per cent, the first year of decline following four consecutive years of GHG growth in the sector (EPA, 2018a). However, this decrease was driven primarily by a decrease in fuel tourism and was not the result of policies or deliberate action to promote lower-carbon transport. The number of passenger diesel cars increased by 10.3 per cent in 2017, and the number of passenger petrol cars decreased by 6.0 per cent, reflecting continued skewed fuel taxation policies.

Transport emissions are projected to increase by 17–18 per cent relative to 2005 levels over the period 2017–2020 (EPA, 2018b). From 2020–2025, emissions in the sector are projected to further increase, driven by growth in diesel fuel consumption in both the passenger car and freight sectors. From 2025–2030, a decline in emissions driven by falling diesel consumption is projected, resulting from predicted accelerated deployment of electric vehicles. Combined, the overall projected trend in transport emissions over the period 2020–2030 is relatively flat. However, Ireland has a demanding 2030 target under the EU climate and energy framework. Stable, rather than rapidly decreasing, emissions over this time horizon will not be tenable.

In terms of the sectoral distribution of emissions, road transport accounts for most CO₂ emissions from the transport sector (DTTAS, 2018). Within this, private car use accounted for 52 per cent in 2016, while goods vehicles accounted for 26 per cent. Fuel tourism is another substantial contributor to sectoral CO₂ emissions, though it declined considerably between 2016 and 2017 as a result of converging prices either side of the border (EPA, 2018a). Figure 1 shows the composition of Ireland’s transport CO₂ emissions over time. It illustrates the cyclical nature of transport emissions, strongly coupled with economic growth.

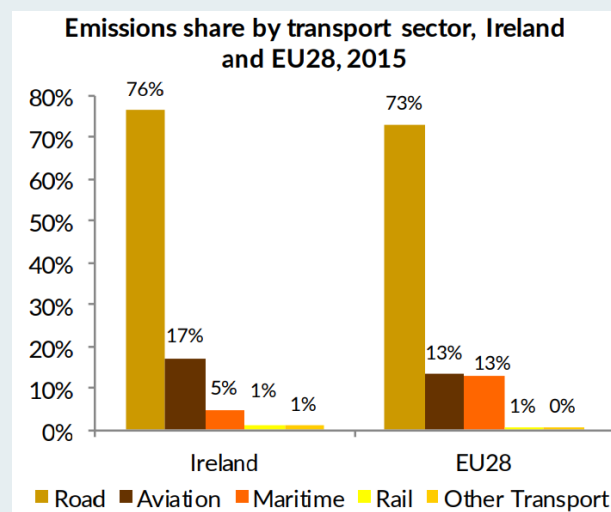
¹ For an overview of the institutional and political challenges encountered with respect to delivering Smarter Travel, see Rau *et al.* (2015).

Figure 1



Source: DTTAS, 2018.

Figure 2



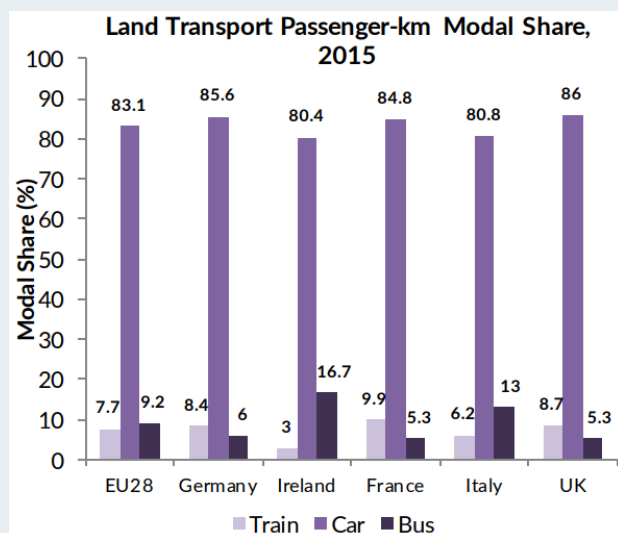
Source: DTTAS, 2018.

3.3 Irish Emissions in a European Context

In a comparative European perspective, Ireland's CO₂ emissions from transport have grown much faster than the EU28 average since 1990. EU28 transport emissions (including aviation but excluding international shipping) grew by 23 per cent between 1990 and 2015, compared to 131 per cent growth in Ireland over the same period (EEA, 2018a). This was driven by Ireland's strong economic growth between 1990 and 2007. It is also important to note that Ireland's return to growth in transport emissions since the crisis mirrors a wider EU trend. Since 2013, EU28 transport emissions have been increasing as well; they grew by almost two per cent in 2015 (EEA, 2018a).

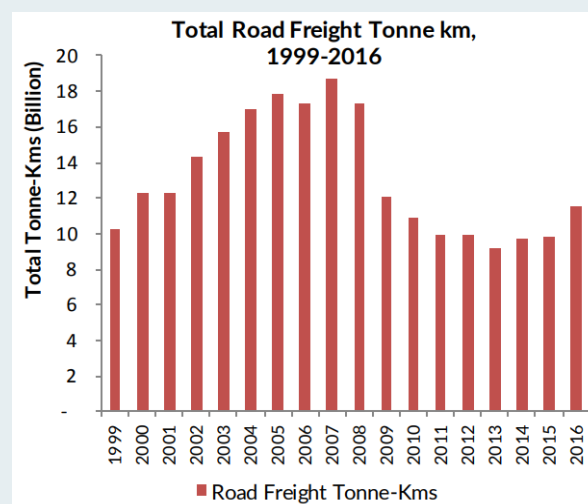
Figure 2 shows the breakdown of transport emissions in Ireland compared to the EU28. It shows that Ireland's road-based emissions as a share of total transport emissions, at 76 per cent, are broadly in line with the EU28 average of 73 per cent. Figure 3 provides a comparative European perspective on land transport passenger km by modal share. This shows that Ireland's share of land transport passenger km by car (80.4%) is also broadly in line with the EU28 average. However, it shows that rail use is significantly lower, while bus is significantly higher, than the EU28 average. This highlights unique nuances for consideration when determining Ireland's low-carbon transport future.

Figure 3



Source: DTTAS, 2018.

Figure 4



Source: DTTAS, 2018.

Goods vehicles (HGVs and LGVs) accounted for 26 per cent of Ireland's transport emissions in 2016. Figure 4 shows total road freight measured in tonne km since 1999. The trend closely follows the economic cycle. Of particular note, there was a 17 per cent increase between 2015 and 2016, though overall the figure remains well below the peak of 2007 for now (DTTAS, 2018).

3.4 Progress and Challenges in Advancing Low-Carbon Transport

Despite its turbulent emissions profile, there have also been several positive developments in Irish transport, including infrastructural, policy, educational and behavioural initiatives that have worked towards reducing carbon intensity in the sector. These include the development of Greenway cycling infrastructure across Ireland, the cross-city Luas, the Biofuels Obligation Scheme and the TaxSaver initiative for promoting public transport. Successes in the sharing economy include the development of car- and bicycle-sharing schemes, particularly in urban centres, with essential support from institutions such as Dublin City Council to improve parking facilities, access and regulations related to these transport modes. However, such low-carbon solutions tend to remain on the periphery of everyday transport, failing to create the transformative change required in the system.

Overall, Ireland has made limited progress to date in decarbonising the transport sector. Emissions have risen since the economic crisis and are projected to rise steeply until the end of this decade. Ireland faces very challenging decarbonisation targets for 2020 and 2030, and is not on a pathway consistent with the long-term decarbonisation envisaged in the National Policy Position on Climate Action and Low-Carbon Development. Establishing this current transport context is essential to understand situational nuances before making any recommendations for how this system might better deliver on decarbonisation objectives.

The next chapter details the methodological approach applied in this research to examine the institutional context and opportunities for advancing the low-carbon transition in Irish transport.

Chapter 4

Research Approach

One of the most reliable methods for ascertaining people's opinions, motivations, perceptions and attitudes is to simply ask them. The qualitative interview, defined by Berg (2009: 101) as a 'conversation with a purpose', is thus regarded as an important and reliable source of data collection. Interviews can explore complex, value-laden issues on a one-to-one basis, allowing for agendas, institutional conflicts and biases to be exposed (Gray, 2004). Adopting a semi-structured format additionally enables a skilful interviewer to clarify and develop answers, investigate motives and probe the meaning behind responses (Bell, 2006).

Semi-structured interviews were used to probe stakeholder realities and experiences of Irish transport governance, the institutional opportunities and challenges encountered, and the prevalence of low-carbon objectives in their decision-making. The interviews were kept at a broad strategic level to identify overall transport governance gaps and overlaps, consider the role of governance institutions in advancing the low-carbon transition, and assess how governance of the transport sector can be enhanced to better deliver on Ireland's decarbonisation objectives.

Purposive sampling and snowballing techniques were adopted that involved the selection of strategically chosen individuals based on their position, sectoral affiliation and expertise, as well as leveraging the recommendations of a project advisory steering group. Fifteen interviews were conducted in total with public, private, academic and civil society stakeholders throughout October and November 2018. This included individuals from passenger and freight transport perspectives as well as a number of national and local departments, agencies, campaign groups and representative bodies involved in Irish transport. While not representative of the entire sector, this sampling strategy ensured diversity in responses and a comprehensive spread of institutional perspectives across multiple transport modes, scales and professional spheres.

All interviews took place face-to-face in a location that suited each interviewee. A pre-designed interview question schedule was sent to participants in advance and was used to guide the discussion. This enabled a level of data consistency across interviewee categories. Each interview lasted approximately 60mins and was digitally recorded for thematic analysis (Braun and Clarke, 2006). Interviewee responses were protected by the anonymity clauses outlined in a letter of consent that each participant was asked to sign. Field notes were written up immediately after each interview to capture the principal ideas, concerns, institutional opportunities, blockages and solutions discussed. These field notes were shared among the research team and formed a principal foundation for the analysis. The analysis was inductive in its approach, allowing for the emergence of themes from the data as opposed to forcing preconceived nodes or a pre-determined framework.

Cross-checking and corroboration of interview progress and themes amongst the research team and the project steering group bolster the reliability and objectivity of the results obtained.

Combined with insights from desk-based research, the next three chapters outline the results of the stakeholder interviews. They detail three key themes related to how the transport system operates, what drives the transport system, and who shapes transport outcomes.

Chapter 5

How the Transport System Operates—Inherent Complexities of the Sector

5.1 Complexities of the Transport Sector

The first theme to emerge from the key informant interviews relates to the inherent complexities reported to exist in the Irish transport sector. Transport fulfils multiple functions in society, including travel for work, education, leisure, shopping and other purposes, and distribution of freight and consumer goods, among others. Transport is a derived demand and a practice that is often habitual, and even semi-conscious, in everyday life. From a governance perspective, the myriad of transport modes complicates the institutional governance landscape and creates inertia when attempting to gain consensus to decarbonise the entire transport system.

5.2 Internal Tensions

As highlighted by interviewees, the Department of Transport, Tourism and Sport (DTTAS) is responsible for aviation, road, rail, maritime, freight, passenger, walking and cycling categories. This is perceived to pull transport governance in different directions, often resulting in limited funding and support for low-carbon transport options (e.g. walking and cycling) after other (often more carbon-intensive) transport modes receive priority attention.

Transport is further governed and enacted by a wide variety of actors across the public and private spheres, often with competing interests. Blurring responsibilities across public and private boundaries raised particular questions for interviewees in terms of the role of privatisation in decarbonising Irish transport and the weighting that should be assigned to this. This includes potential positive influence through the introduction of innovations, enhanced efficiencies and the creation of industry standards in both passenger and freight categories. However, how these initiatives interact with public bodies, government departments, rules and regulations is questionable; several private sector participants reported attempts to operate in this space and being impeded by poor communications, governmental silos, short-term contracts and a lack of transparent and organised private sector inclusion in strategic transport planning and design phases.

Adding to the complexity of the system, many interviewees noted the power of vested interests, trade unions, the media and community voices within the institutional architecture. Examples provided include the negative public reaction to the BusConnects initiative for the Dublin region, as well as the planning refusal for pedestrianising College Green in Dublin. In this latter case, interviewees reported significant influence from private carpark owners, property developers and heritage lobbyists over the planning (and ultimate refusal) process. Interviewees alluded to ‘the tail wagging the dog’ in these contexts, whereby smaller elements of the transport system end up controlling the entire sector. The power of the motor industry was noteworthy for interviewees also, including through its sponsorship of radio and media outlets, which is believed to normalise dependence on the private car. For example, news headlines related to BusConnects were reported to focus on the impacts on traffic congestion and car use, despite the positive modal-shift aims of these plans. Resistance from publics can also play a role in transport decision-making, as experienced by interviewees over the installation of cycling, light-rail and bus infrastructure in local areas.

While it is important to hear societal concerns, the power of minority complaints fostered much frustration for several interviewees, who believed that they can hold disproportionate influence over actions taken. This is particularly obvious in the landscape of ‘parish pump’ politics perceived to exist in Ireland, where local politics, concerns and priorities can often undermine decisions, sway national politicians and dissuade political action and infrastructure investment for the greater good. This is a distinctive feature of the Irish electoral system that results in national politicians being very sensitive to local needs. The relative strength of local to national government plays a role here, with weak local institutions resulting in local demands and complaints being channelled through the national scale (Rau *et al.*, 2015).

The largely silent voices of the wider population that would benefit from progressive transport decisions and low-carbon actions further adds to this complexity. Political desires to maintain local votes were thus conceived by interviewees to lead to a prioritisation of constituent over national interests, influencing decisions, for example, related to Metro North, the M50 and BusConnects. Here, the reality of the wider political system being grounded in principles of representative democracy may hamper progress of the low-carbon transition in Ireland. It may also create disproportionate regional divides and intensify negativity about continued investment in transport in Dublin (noted as the political territory of most transport ministers of late) to the neglect of the rest of the country.

A rural-urban divide was also highlighted by most key informants to dominate the Irish transport system, resulting in continuous tensions regarding settlement patterns and housing policy, as well as animosity over transport investment. While a Dublin and Eastern-based focus may be justified on the basis of population density, other regional cities were reported by interviewees to miss out in transport planning and infrastructure, and rural towns and villages often left even further behind. Naturally, the low-carbon transition will mean different transport solutions in rural and urban locations. Buses, for example, may hold more potential to

achieve modal shift outside of Dublin due to dispersed population densities. Electric vehicles (EVs) may also hold more promise to reduce emissions for those in isolated locations who rely on private cars (and from where most Irish transport emissions emanate (DTTAS, 2018)). However, who represents rural interests in Irish transport governance raises an institutional dilemma in this regard, with consistent Dublin-based transport ministers of late as well as a lack of mandated power in the National Transport Authority (NTA) to impose strategic travel plans outside of the Greater Dublin Area. For example, for one interviewee, the NTA was perceived to be ‘institutionally stretched’ since its mandate expanded from its original founding purpose as the Dublin Transport Authority.

5.3 External Interactions

Moving beyond a focus on internal complexities in the transport sector in terms of mode, sectoral voices, and uneven geographies and power relationships, transport also interacts with more areas of life and economic activity than any other (NESC, 2015). Transport provides access to education, employment, healthcare, social and leisure activities, and the globalisation of goods and services. Intersections with tourism and energy industries were also particularly prominent for interviewees. In the case of tourism, while Greenway developments were reported to promote a positive low-carbon cycling culture, they were criticised for their singular focus as a tourist attraction. As several interviewees noted, Greenways rarely connect to urban cores to represent a viable low-carbon transport mode for work, education and social activities.

Meanwhile, developments in the energy sector are particularly relevant if the low-carbon transport transition promotes a shift towards vehicle electrification. It is important to recognise that a shift to EVs will only fully decarbonise transport if the electricity source is decarbonised (Barkenbus, 2017). Investment and progression in Irish renewable energy generation and storage will thus be essential if electrification is to contribute to low-carbon transition aims.

The issue of electrification is particularly prominent and pressing in the freight arena, with interviewee suggestions that electrifying freight, including heavy freight vehicles, may be closer than many initially assume (see Case Study A). This has implications for technology lock-in and pathway dependency, as described in the literature (see Chapter 2). For example, it includes decisions around continued investment and institutional support for alternative freight transport modes in Ireland such as compressed natural gas (CNG), as called for by a recent Freight Transport Association Ireland (FTAI) report (2018). CNG is promoted as having lower carbon content but is fundamentally still a fossil fuel, with potential for significant methane leakage. As a result, *Transport & Environment* (2018) report its GHG effects as only comparable to best-in-class diesel. Freight electrification, if realised, could thus make significantly higher contributions to the low-carbon transition, especially if the energy source used is also decarbonised.

Case Study A: International Best Practice in Freight

Developing low-carbon solutions is particularly challenging in the freight sector. There are persistent fears over technology lock-in and technological difficulties in electrifying fleets due to the weight and size of vehicles.

While a focus on sustainable consumption and avoiding transporting excess commodities in the first place is the first essential step for decarbonisation, freight electrification may also be closer than anticipated. For example, collaborating with EV manufacturer Arrival, the Royal Mail UK piloted three electric commercial vehicles in August 2017. This accelerated into a roll-out of nine vehicles in London by September 2018, 100 more EVs on order and plans to upgrade its 50,000-strong fleet nationwide. This success has been attributed to pioneering technology that combines ultra-lightweight composite materials with custom-built power electronics and motors. Overcoming issues of weight, size and range anxiety, Arrival has ‘optimized the maximum range to weight ratio for inner city deliveries with battery packs enabling up to 100 miles of range on 3.5, 6 and 7.5 tonne trucks’ (Lambert, 2017a). This is reducing carbon footprints as well as operating costs.

Similarly, in Germany, Deutsche Post DHL has been experimenting with EVs since 2016. Collaborating with Ford, it had over 6,000 electric delivery vans (‘StreetScooters’) as of March 2018. Its version of electric trucks enables a range of c.80-200km with a load volume capacity of 20 cubic meters, equating to approximately 200 parcels or 1,350kg (Lambert, 2017b). Combined, the 6,000-strong fleet saves c.20,000 tonnes of carbon emissions per year. DHL is now also emerging as an important EV manufacturer to meet rising demand, including an order of 200 electric vans from British milk delivery service, Milk&More (Lambert, 2018).



Ireland is often reported to be limited in vehicle efficiency improvements and EV transitions due to its position as a ‘technology taker’. Growing potential, especially in a UK manufacturing context (left-hand drive) thus holds particular promise for low-carbon Irish freight vehicles in the future. Arrival is further experimenting with autonomous electric freight vehicles, revealed at the Volvo Group Innovation Summit in Berlin in 2018 (Stenqvist, 2018). Showcasing potential for first-mover benefits, Royal Mail Fleet’s Managing Director Paul Gatti concluded: ‘Our research has shown that electric vans are a good operational fit with our business... It also means we are on the front foot for future changes in emissions legislation’ (Lambert, 2018).

Additional external interactions further complicate the development and governance of Irish transport; interviewees repeatedly linked the sector to land use and settlement patterns. For many interviewees, the creation of longer commuting patterns represents one of the biggest failures of the current system, outpacing any improvements in technological efficiencies for carbon savings. Ireland also performs especially poorly against its EU counterparts in terms of population density rates (McHugh, 2017). Research participants thus saw addressing spatial and settlement patterns as key to advancing the low-carbon transport transition.

However, interviewees highlighted how previous spatial strategies failed to permeate all government departments and land-use decision-making, including the Department of Health when locating new hospitals or the Department of Education when deciding the location of new schools. For interviewees, this resulted in departmental decision-making that prioritised access to low-cost sites at the expense of any low-carbon concerns or consideration for environmental or transport impacts. This has led to a proliferation of new schools, for example, on the outskirts of town, increasing dependency on the private car, congestion and emissions for these journeys.

The progression of transport-orientated development (TOD) can play a role in addressing land-use challenges. In this approach, urban development seeks to maximise the provision of housing, employment, public services and leisure space in close proximity to high-frequency, quality public transport nodes and active transport options (Cervero and Murakami, 2009). Ongoing research by NESC continues to explore the potential for TOD in Ireland (NESC, n.d.).

However, as highlighted by several participants, TOD is not a new idea. It has been around for decades and perceived to be largely ignored by government officials in Irish planning. TOD was instead seen as something that other nations have done better, with international best-practice examples cited by participants in Sweden, Germany and France. It is also important to note that, while living in more densely populated areas can increase the likelihood of walking and taking public transport as a mode of travel, 65 per cent of journeys taken by people residing in densely populated areas in Ireland are still by private car (National Travel Survey, 2016). This highlights the importance of high-quality public and active transport options within a TOD and compact growth framework, but also a socio-cultural shift that neither option can guarantee to change behaviour effectively.

For many interviewees, all this connected with ideas of ‘compact’ development promoted in the National Development Plan (NDP) and National Planning Framework (NPF), with benefits including the reduction of emissions from the transport sector. A lack of alignment in planning pre-applications reported by An Bord Pleanála however, shows little change from embedded, dispersed and sprawling settlement patterns (Boland, 2018). This highlights the importance of socio-cultural norms and expectations regarding one-off housing developments in Ireland and perceptions of ‘the good life’ that require further probing and challenging to fully realise the environmental ambitions of TOD or the associated compact development frameworks.

5.4 The Promise of a Social Practice Approach in Acknowledging Sectoral Complexities

Recognising the complexity of governance, technical, and socio-cultural influences, a social practice lens can assist with achieving necessary behaviour change towards low-carbon transport. Such an analytical framework draws on expanding international research on sustainable behaviour change that notes the flaws of reductionist strategies, where behaviour is considered the result of individual attitudes or values, or something that can be influenced by economic pricing alone (Davies *et al.*, 2014). Taking everyday practices rather than individuals as the unit of intervention, this approach draws attention to the often habitual, and even semi-conscious, routines of everyday life and the forces that shape these (including the practice of travelling) (Shove, 2003; Warde, 2005).

A social practice approach thus recognises that, while infrastructure and technology development (such as that associated with TOD) can ensure that citizens and businesses have access to low-carbon transport options, it is just one piece of the behaviour-change puzzle. Supporting rules, institutions and legislation is also essential to ensure that appropriate funding, human resources, incentives and deterrents are delivered to promote desired behavioural changes. Re-orientating research and innovation (R&I) policy, for example, and committing research and development (R&D) funding represents an avenue for success from an institutional perspective, including government and industry funding for low-carbon transport technology development (such as electrification). At a more local governance level, positive incentives towards public transport and active travel modes are necessary at the same time as deterring private car use (e.g. through measures like taxation, tolling, congestion charging, parking bays and road space allocation).

Acknowledging socio-cultural elements for holistic behaviour change is the final essential element of a social practice approach, including addressing individual knowledge and skills as well as wider social norms and expectations (such as those associated with housing preference). This could be enhanced by institutions by developing and rolling out further education and awareness campaigns around low-carbon transport and its co-benefits; school initiatives to further experiment with, teach and embed lower-carbon transport living, and dedicated research funds targeted at understanding behavioural aspects of transport and why people travel and live as they do.

At present, the range of internal and external complexities evident in the Irish transport sector was conceived by interviewees to pull Irish transport priorities, decision-making, policy and action in different directions. The institutional landscape and governance process is further complicated by the drivers of the system, in particular contested institutional priorities, as explored next from the perspective of interviewees.

Chapter 6

What Drives the Transport System— Contested Institutional Priorities

6.1 Legacies and (Mis)Alignment

The second theme to emerge from the research relates to contested priorities in Irish transport governance that result in a lack of importance and urgency assigned to a low-carbon agenda. Firstly, according to interviewees, Ireland's approach to transport policy is shaped by a number of political and historical legacies. These legacies are perceived to be rooted in prioritising automobility and growth of the private car in passenger transport, and the construction of motorways to connect regional cities for economic purposes in freight (e.g. to mobilise goods and services and attract foreign direct investment nationwide). These two legacies have enabled increasingly dispersed and sprawling settlement patterns as people are facilitated to live further from the urban cores (generally the spaces of employment and recreation) and able to travel and commute further distances, often by private car. Cheap fossil fuels and liberal approaches to housing planning in Ireland furthered this pattern of settlement sprawl and car dependency.

These legacies form the backdrop for the push to decarbonise transport in Ireland. The low-carbon vision for the transport sector, as defined in the National Mitigation Plan, is as follows:

Moving to a low carbon society represents a significant challenge for Ireland's expanding transport sector where the use of fossil fuels is firmly embedded in driving culture. To address the challenge of transitioning from conventionally fuelled vehicles to alternative fuels and technologies an ambitious national target was established whereby all new cars sold in Ireland will be zero carbon emission or zero emission-capable by 2030 as well as many of our public transport buses and rail lines. The ultimate aim is to decarbonise the national passenger car fleet by 2050 and increase the use of alternative fuels in the freight sector (DCCAE 2017: 94).

With an emphasis on technological fixes to decarbonise Irish transport, the above vision is out of line with sustainable mobility thinking internationally that prioritises an 'Avoid, Shift, Improve' (ASI) framework for passenger and freight sectors (Stucki, 2015; EEA, 2016). This advocates, first of all, reducing the need to travel and/or the journey length in the first place (reduce demand). This can be supported, for example, through appropriate land-use planning and ICT-supported demand management. The second part of the framework promotes a modal shift for remaining journeys to more active (walking and cycling) and public transport modes and alternative freight transport modes (for example, from road- and aviation-

based freight to rail, maritime and alternative ‘last mile delivery’ options). Finally, the ASI framework seeks to improve the efficiency of all transport modes in a way that reduces their environmental footprint, primarily through technological developments in vehicles and the energy sources that they use (EEA, 2016). The predominant focus of the National Mitigation Plan (DCCAE, 2017) on this third aspect is noteworthy, at the expense of avoiding and shifting travel options in the first place to truly facilitate ‘systemic change’ (EEA, 2016).

Transport-orientated recommendations from the Irish Citizens’ Assembly (2018), a deliberative forum comprising 99 ordinary citizens, went a step further, with an emphasis on modal shift (for example, encouraging state investment in public transport, bus lanes, cycling infrastructure and park and ride nodes) as well as technological improvements (for example, promoting the use of electric vehicles). However, it too failed to address a sustainable consumption angle in the avoidance of journeys and reducing travel distances in the first place (the ‘A’ of the ASI framework) (Citizens’ Assembly, 2018).

Indeed, emphasis on ASI solutions is lacking in the overall transport governance system in Ireland, as evidenced also in the key informant interviews undertaken. None of the 15 interviewees referenced the ASI framework in interview, while only one voluntarily explored the concept of travel avoidance as part of the low-carbon solution for Ireland.

6.2 Lack of Prioritisation of Low-Carbon Transition

According to institutional interviewees, climate action or low-carbon transition rarely featured as a top priority in their institutions. For example, participants across passenger and freight institutions alluded to the key transport policy documents guiding their institutional decision-making, with limited reference to environmental policies like the National Mitigation Plan, and instead emphasis on aspects such as transport safety, cost and connectivity policy ambitions. Exceptions to this lie in some niche areas such as cycling promotion campaigns and advocacy groups, car- and bicycle-sharing initiatives, and some academic research, but these elements tend to operate on the periphery of everyday transport.

The lack of a low-carbon vision is a wider systemic issue across governance institutions in Ireland, perceived by interviewees to largely stem from a lack of prioritisation of climate action in government. Key informants, for example, pointed to perverse incentives in the civil service that prioritise larger engine sizes and individual motorised transport over low-carbon alternatives for civil servants. Failure of governing actors to ‘lead by example’ was also repeatedly cited by participants, some of whom expressed a wish to see local authorities convert their fleets to electric alternatives with a perceived added benefit of enhancing charging infrastructure for all.

Leadership by example was seen as key to achieving political legitimacy for climate action by interviewees to achieve the required transformative change across

sectors. Such leadership is perceived to be lacking at present in the make-up of the Irish government (e.g. as evidenced in the lack of support for environmentally focused initiatives in Budget 2019). Recent commitments by Minister Bruton to develop a whole-of-government climate plan by spring 2019 suggests increased attention to the climate topic, along with the work of the Joint Oireachtas Committee on Climate Action, due to report its recommendations in early 2019 for strengthening Ireland's response to climate change. Recent budgetary commitment to cycling infrastructure from DTTAS and requests to establish a dedicated cycling office in the National Transport Authority (NTA) hold further promise (DTTAS, 2018a). It remains to be seen if this initiative is the sign of more transformative change in the transport sector and, indeed, the wider political system.

For the interviewees, enthusiastic and climate-aware ministers are important to enhance political legitimacy and advance the low-carbon transition, but are, for the most part, seen to be lacking, not just in the Department of Transport, Tourism and Sport (DTTAS) but also in other government departments. For example, interviewees alluded to the Department of Finance as holding important powers to adjust taxation structures around vehicles and fuels to incentivise the uptake of low-carbon alternatives. A number of interviewees also drew attention to what they perceived to be a lack of ministerial commitment to the BusConnects scheme. They saw this as something that might undermine modal shift attempts in Ireland that are in line with international ASI best practice. Overall, interviewees perceived it to be crucially important for government to send the right signal to transport agencies, institutions, industry, operators and consumers for low-carbon investment and action.

6.3 Alternative Framings of Low-Carbon Transition

A further challenge to making progress is the lack of consensus on the meaning of low-carbon transition in Irish transport, with interviewees debating the benefits of alternative framings. For example, solely focusing on *low-carbon* aspects of transport was deemed to be limiting by some key informants, compared to a potential wider focus on *sustainable* transport that could incorporate social and economic benefits (e.g. related to health, physical activity, well-being and financial cost). The case of electric vehicles (EVs) in passenger transport illustrates this point clearly. While they are a potential low-carbon transport solution, EVs continue to contribute to urban congestion, dispersed settlement patterns, sedentary lifestyles, competition for urban space and single vehicle occupancy preferences (Brueckner, 2018). One interviewee, for example, pointed to a recent shift in Norway away from incentivising EVs now that these additional impacts have materialised, with progression towards car-free cities (electric or otherwise) now being prioritised. Social impacts may also arise in sourcing elements for the creation of EV batteries (e.g. increases in child labour have been reported in mines in the Congo in the search for cobalt (Peyton, 2018)).

A low-carbon framing was nevertheless deemed desirable by several interviewees in the sector, who perceived it as being easier to establish and quantify exact

carbon targets as opposed to the more ‘woolly’ sustainability term that can mean different things to different people. If emissions are the priority, as IPCC (2018) suggests, then, according to some participants, a low-carbon framing might be the most appropriate way to garner concerted action and policy attention. For one public sector interviewee, to implement this transition in a ‘smart way’ could allow it to capture wider sustainability advantages and co-benefits (e.g. in terms of congestion reduction, a more physically active population and less air and noise pollution). Committing to ‘zero’ as opposed to ‘low’ carbon transport would indicate even greater political commitment to transition in this space.

6.4 Emphasis on Passenger Transport Over Freight

Contested priorities were also noted by interviewees in the context of a consistent and repeated research and policy focus on passenger transport at the expense of the freight, aviation and maritime sectors. For example, the lack of attention to freight throughout research and policy has impeded decarbonisation progress in this sector. Interviewees reported tendencies towards developing broad-brush ‘transport’ solutions that are not relevant to all. Different solutions will be required to advance the low-carbon transition in freight. Even in the freight sector, further differences were reported by one interviewee who highlighted the difference between dedicated transport and logistics businesses (required to have qualified and trained transport managers) compared to ‘own account’ companies that manage significant fleet numbers (e.g. food companies) even though their primary business is not transport.

The ability to advance the low-carbon transition and change behaviour throughout the freight industry is thus seen to be highly variable, as experienced by interviewees. However, given that freight is already responsible for 26.2 per cent of transport emissions (combined HGV and LGV) and set to increase up to 2030, carbon contributions from this transport sub-sector are too large to ignore. The need for proactive solutions is also obvious in the context of growing emissions from this sector as the economy recovers (DTTAS, 2018). Industry standards can help to address competing priorities while working towards decarbonisation but only if they are adopted by all freight categories and supported by the wider institutional architecture. This has not been the case to date, as reported by interviewees and illustrated in Case Study B.

Even regarding the passenger category, participants felt that the priority tends to be on commuting patterns alone, despite the fact that this form of travel represents only 29 per cent of total trips taken each day (National Transport Survey, 2016). This has implications for holistic and connected transport planning, investment, policy and construction. Failure in Ireland to develop and recognise the need for ‘all-day transportation systems’ was emphasised by one interviewee in this context, with best-practice developments in Zurich towards a transport system also orientated towards leisure activities serving as inspiration for more balanced priorities in this regard (see Case Study C).

Case Study B: Freight Transport Standards

The TruckSafe accreditation scheme is promoted by the Freight Transport Association of Ireland (FTAI). TruckSafe is a best-practice industry standard in the Irish freight industry, rolled out on a voluntary basis. Based on a series of planning, reporting and inspection processes, bronze, silver or gold standards are administered by FTAI with the aim of promoting best practice in the operations of goods vehicles (FTAI, 2018). With environmental and carbon-reduction policies required at all levels (and additional management and monitoring of sustainable operations for silver and gold awards), the potential of the TruckSafe standard to contribute to the low-carbon transition in the Irish transport sector is obvious.

From an institutional perspective, however, the TruckSafe standard was reported by interviewees to have not been sufficiently recognised at government level to date. This includes rewarding companies that engage in the voluntary scheme. Key informants reported struggles to reach the correct staff members in DTTAS to promote and reference the scheme in its communications, which has limited uptake of the standard and associated emissions reduction benefits across the freight industry. It could be enhanced through further referencing and promotion of the scheme by DTTAS.

Further institutional support in making low-cost elements mandatory in freight may also quickly reduce emissions in the sector, in combination with industry standards (e.g. for eco-driving training to become mandatory, with companies supported by the state to invest in such training). A culture of enforcement and compliance is also reported by interviewees to be missing in the freight sector. This further limits the uptake of industry standards like TruckSafe and causes some in the industry to question why they should invest in positive changes while others do not. With issues of competitiveness at stake, there is a need to enhance the level of inspections, implementation and follow-up by relevant authorities in the institutional framework (including the Road Safety Authority) to bring consistency and oversight to the freight sector. This is essential to reward those making progress through such voluntary best-practice schemes.



The overall lack of prioritisation of transport research was also alluded to by key informants in an Irish context, reflected, for example, in the lack of a dedicated transport research institution in Ireland. This compares, for instance, to the establishment of Teagasc for the agriculture sector, despite a similar emissions profile. Funding for transport research was also deemed to be less than for other sectors.

Tackling the lack of a low-carbon priority throughout Irish transport governance is a first step to enact necessary transition supports and initiatives. Aligning transport policies and institutions with a low-carbon agenda, garnering political support and

legitimacy around the urgency of the problem and gaining consensus on appropriate framings is essential. Achieving this in practice, however, would be difficult, given the level of fragmentation reported within the Irish transport institutional architecture, as explored in the next chapter from the perspective of those operating in the sector.

Case Study C: All-Day Transportation in Zurich

The creation of an ‘all-day transportation’ system in Zurich, Switzerland showcases best practice in connecting transport and land-use planning, understanding and responding to travel behaviour, and progressing passenger transport development and priorities beyond a commuter focus. Recognising that c.40 per cent of journeys people make were for leisure activities in Zurich (e.g. to mountains, hikes, ski slopes, etc), the need to develop high-quality public transport links to places of recreation was prioritised. Understanding the reasons why people travel was crucial in this context, along with a strong leading role by Zurich’s local government.

Zurich is ranked second in the Sustainable Cities Mobility Index 2017. This index assesses urban mobility across the three pillars of sustainability: people, planet and profit (Arcadis, 2018). Second to Hong Kong, Zurich scores particularly highly in its economic and environmental credentials (emissions and pollution basis). Zurich is rated 7th in the environmental dimension while Hong Kong is ranked 53rd, raising questions regarding the weighting and prioritisation of ‘sustainability’ over ‘low-carbon’ elements in the overall result.

Zurich has a challenging population profile; its number of residents (415,000) is exceeded by the number of people working in Zurich (450,000) and the population of the larger metropolitan region (1 million) (Arcadis, 2018). This results in a high volume of trips within and outside the city. Local government efforts and commitments towards long-term sustainability frameworks, including the development of an overarching mobility plan, have been key to the city’s transportation successes. *Strategien Zurich 2025*, published in 2012, included a commitment to upgrade, expand and improve public transportation, even though the city already has one of the most efficient networks in the world (Curtis and Scheurer, 2017). The strategy also included priorities for developing a safer cycling network and pathways to replace diesel buses with electric trolleybuses to further improve the environmental profile of the system.

Moving beyond passenger transport priorities and to further ease road congestion and emissions, the Zurich strategy also includes plans for project *Cargo Sous Terrain*. Addressing the freight sector, this encompasses ‘a subterranean logistics network [that] will transport goods between Swiss economic centers via a network of tunnels’ by 2030 (Arcadis, 2018: 20). It is proposed that autonomous vehicles will then distribute goods from a number of reloading hubs in the cities.

With bus or tram stops available at intervals of 300 metres, the quality, resilience and efficiency of the public transport network in Zurich is exemplary. This is reflected in its high public transport usage, with trips per capita standing at 401 per year, the highest of 21 cities assessed by Curtis and Scheurer (2017). Zurich delivers one of the highest densities of rail stations, retaining ‘regional light rail or branch lines to primarily service recreational areas along coastlines and mountains, a type of infrastructure that typically did not survive the post-war era of rapid motorization in other cities’ (Curtis and Scheurer, 2017: 101). Additional cable cars and ferries address topographical challenges. Zurich is a model city for all-day transportation development, with multi-directionality and mode type expanded across the entire cantonal region. It provides inspiration to Ireland in terms of the transport approach and priorities adopted, as well as the strong leading role of local government institutions in planning, mapping out and delivering success.



Chapter 7

Who Shapes Transport Outcomes—A Fragmented Governance Landscape

7.1 Institutional Fragmentation

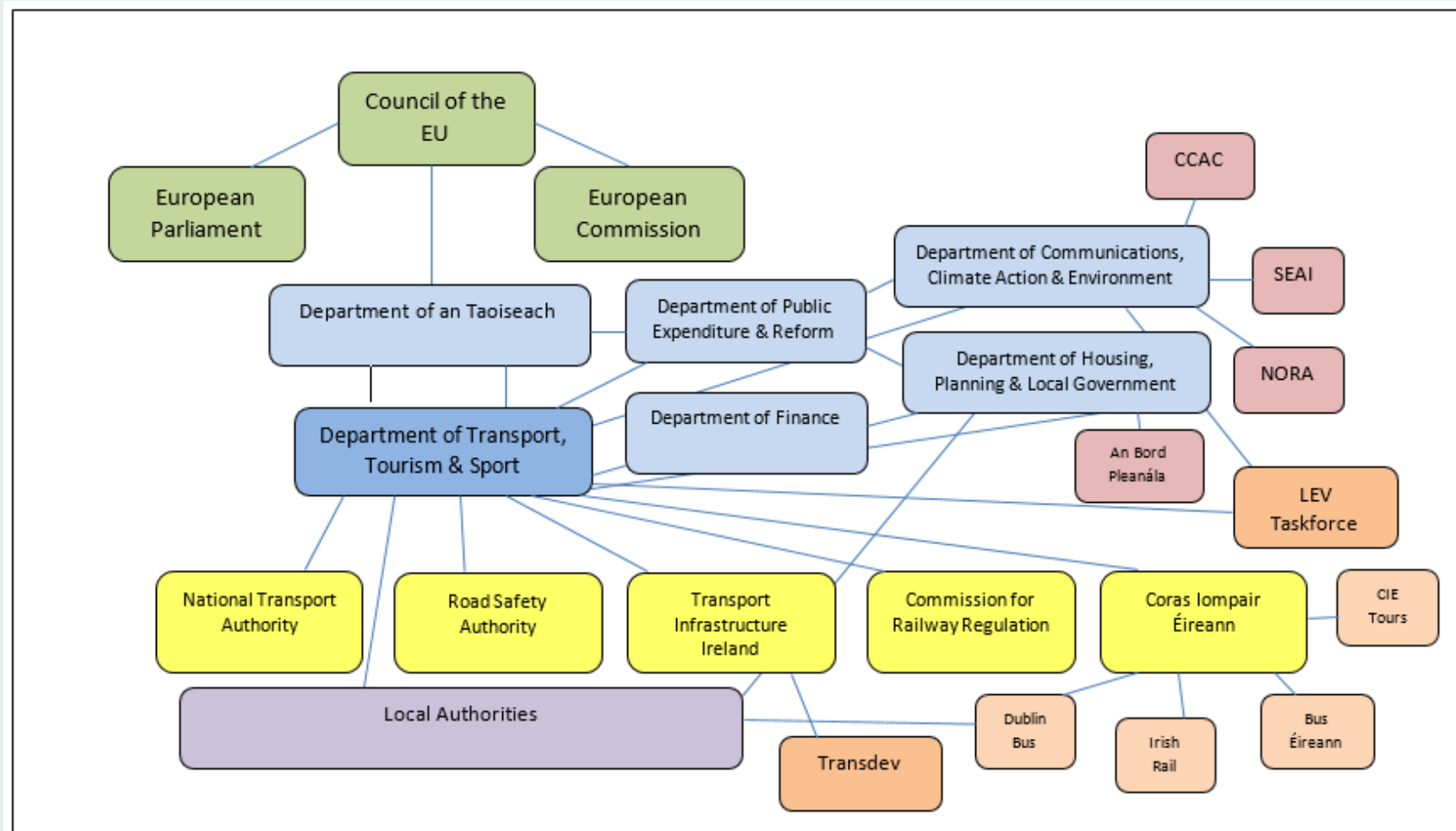
The third theme to emerge from the research relates to a governance landscape characterised by significant fragmentation. Transport is not unique in this regard. There has been a progressive ‘agencification’ of the Irish state in recent decades. Comparative research has found that, across sectors, regulatory agencies in Ireland enjoy the highest level of formal independence across 17 Western European countries (Gilardi, 2005). The array of institutions responsible for governance of the transport sector—and thus charged with decarbonising it—includes a complex ecosystem of institutions operating at various scales and with varying degrees of influence over different parts of the system.

The governance landscape for transport in Ireland is characterised by much fragmentation and complexity, the third theme to emerge from the interview data. There are over 70 bodies involved, including a myriad of agencies, local authorities, task forces and private companies. Even at a regional level, over 30 agencies manage, regulate, finance or enforce Dublin’s transport system (Thomas, 2018). Interviewees reported that this creates problems of accountability, poor forward planning, and inertia in advancing the low-carbon transition. For example, several interviewees alluded to the number of actors involved in planning, managing and maintaining roads, which prevents concerted action in the installation of cycle lanes. Different actors are responsible for motorway, national, regional and local roads as well as pavements and lighting. This has resulted in the creation of a disjointed cycle network, limiting the appeal and accessibility of this zero-carbon transport option for individuals.

Figure 5 provides a map of some of the key governance institutions relevant to the transport sector. This figure is illustrative rather than comprehensive, imposing an artificial ‘order’ and interactions on what is a more complex and nuanced system in reality. The figure would look very different if it were designed to display relevant governance institutions for particular subsectors of transport, such as road transport, public transport, or freight. Thus, Figure 5 should be interpreted as a high-level representation of the transport sector.

Interviewees identified the Department of Transport, Tourism and Sport, the National Transport Authority and Transport Infrastructure Ireland as the most influential institutions in the governance of the passenger transport sector. For freight, the Road Safety Authority was pinpointed as particularly influential. These four institutions are discussed in more detail below to highlight the respective roles of each organisation and the degree to which low-carbon transition features in their institutional mandates and structures, along with other pertinent transport authorities identified by the researchers.

Figure 5: Illustrative mapping of Irish transport governance institutions



Source: Authors' compilation

7.2 Key Institutions in Transport Governance

7.2.1 Department of Transport, Tourism and Sport

The first government department featuring ‘transport’ in its title—the Department of Transport and Power—was established in 1959. Over the years, the department’s transport remit has been combined with a number of other policy areas, including energy, communications, tourism and sport. It has undergone a total of 10 name changes since its establishment during the 16th Dáil. The department took its current form and mandate—the Department of Transport, Tourism and Sport (DTTAS)—in 2011. DTTAS’s high-level mission includes the overall ‘safe and sustainable development of transport, tourism, and sport’ in Ireland, with the intention ‘to support economic growth and social progress’ (DTTAS, 2016). The department emphasises its importance in ensuring the ‘efficiency, reliability and safety’ of Irish transport, stimulating and sustaining the economy, and reducing regional economic disparities. It also acknowledges the potential challenges and uncertainties posed by Brexit on Irish transport and tourism in particular. ‘Safety, accessibility and sustainability’ are identified as key ingredients to the department’s longer-term plans for transport network expansion on the ground and in the sea and air.

DTTAS’s strategic objectives with respect to public transport relate to public cost and infrastructure investment primarily, to ensure ‘the provision of a well functioning, integrated public transport system which enhances competitiveness, sustains economic progress, promotes balanced regional development and contributes to social cohesion’ (DTTAS, 2019). Journey avoidance, modal shift and environmental ambitions are not explicitly stated in these objectives, signalling misalignment with the ‘Avoid, Shift, Improve’ framework for sustainable mobility mooted at EU level (Stucki, 2015; EEA, 2016).

Departmental achievements listed on the DTTAS website since 2016 include a focus on increased funding and tourism numbers, supports for rural transport, and the development of regional airports. While there is acknowledgement of developments and investment in Luas and railway extensions, and the Greenway cycling and walking infrastructure, several departmental achievements and priorities are largely carbon-intensive in nature. These include, for example, consideration of Irish airport capacity and the potential to add another terminal at Dublin Airport, and a desire to increase the number of overseas visitors to Ireland (with implications for aviation and further transport emissions) – all of which have obvious economic benefits.

Integration with wider government policy on low-carbon transition is, however, outlined in DTTAS’s more comprehensive Statement of Strategy 2016-2019. This includes commitments to ‘large emissions reductions’ from the sector, the increased use of renewables, and the need to mainstream ‘climate policy across all transport sectors’ (DTTAS, 2016). The strategy places an emphasis on technological

progress and cost-effective options to meet these commitments, and recognises the need for enhanced collaboration, both internally and externally with other government departments, agencies and stakeholders. DTTAS is also responsible for preparing the transport component of mitigation and adaptation planning and reporting under the 2015 Climate Action and Low Carbon Development Act. DTTAS has both a Climate Change Unit and a Sustainable Transport Division. According to some interviewees, however, such an approach has limited impact in embedding low-carbon priorities throughout the department and associated institutional planning, policy and practice. As a result, a low-carbon mission does not form the basis of every decision made in DTTAS, from budgetary spend to infrastructural project design and prioritisation.

A total of 27 agencies and bodies are listed on the DTTAS website as residing under the aegis of the department across transport, tourism and sport categories. From a transport perspective, this includes a number of aviation and maritime (port) authorities as well as the National Transport Authority, Transport Infrastructure Ireland and the Road Safety Authority, as explored in more detail below.

7.2.2 The National Transport Authority

The National Transport Authority (NTA) is a statutory non-commercial body, operating under the aegis of the DTTAS. Originally established as a transport authority for the Greater Dublin Area under the Dublin Transport Authority Act 2008, it was renamed the National Transport Authority in the Public Transport Regulation Act 2009. Its statutory and geographic remit has expanded since, including as a result of the Taxi Regulation Act 2013 and various statutory instruments. The NTA is governed by a board of up to 12 members appointed by the Minister for Transport, Tourism and Sport. This includes three reserved positions for the chief executive of the NTA, the holder of the office of Dublin city manager and another senior manager of the NTA. A chairperson and eight other ordinary members are appointed by the minister. A separate Advisory Committee for Small Public Service Vehicles also functions within the NTA structure to provide advice to the authority or the minister on issues relevant to small public service vehicles and their drivers. Members of the Advisory Committee are also appointed by the minister and consist of a number of driver (taxi) representatives, members of An Garda Síochána, consumer, tourism and other interest groups, a disability representative and a local authority member.

At national level, the NTA is responsible for securing provision of public passenger transport services, licensing bus passenger services that are not subject to a public transport services contract, and developing and maintaining a regulatory framework for the control and operation of taxis, hackneys and limousines. Furthermore, the NTA promotes an integrated public transport network nationally; implements integrated ticketing, fares and information schemes; regulates fares, collects statistical transport data, and encourages increased public transport use. Most recently, the authority has sought to develop and implement a single public transport brand for Ireland, culminating in the development of the Transport for Ireland app and related services.

In the Greater Dublin Area (including counties Dublin, Kildare, Meath and Wicklow), the NTA is additionally responsible for preparing an integrated 20-year transportation strategy as well as a six-year integrated implementation plan and strategic traffic management plan. This additional focus is justified on the basis of the particular public transport and traffic management needs of the Eastern region of the country that comprises approximately 40 per cent of the national population and economic activity. The NTA ensures that the actions of implementing agencies are supportive of the strategy, allocates finance to these agencies, and undertakes works where it considers it more effective or economical to do so. The NTA is developing similar transportation strategies for other cities in Ireland, though these are not on a statutory basis as with the Greater Dublin Area. The NTA also administers the Smarter Travel Workplaces and Green Schools Travel programmes on behalf of DTTAS on a non-statutory basis.

The NTA has a statutory obligation to have regard for cost-effectiveness and value for money in the discharge of its functions. This is at the expense of any explicit low-carbon priorities. The NTA's Statement of Strategy 2018-2022 nevertheless sets out a vision 'to provide high quality, accessible, sustainable transport connecting people across Ireland' (NTA, 2018). Further sub-goals highlight the desire to reduce carbon emissions through promoting a shift from the private car to more sustainable transport modes.

Among interviewees, the perceived power of the NTA was varied. Perceptions of this institution ranged from high praise for its power and authority over transport actors and planning decisions (particularly in the Greater Dublin Area) to a perception that it is institutionally stretched in its renewed mandate to capture wider national interests. However, most of the interviewees saw the NTA as a principal influential actor in the transport governance landscape.

7.2.3 Transport Infrastructure Ireland

In August 2015, Transport Infrastructure Ireland (TII) was created from the merging of the National Roads Authority and the Railway Procurement Agency under the Roads Act 2015. It is a state agency responsible for national road and light-rail infrastructure (motorways, national roads and the Luas in Dublin) and aims to provide an integrated approach to transport infrastructure across both modes. Its mission is to deliver transport infrastructure and services that contribute to quality of life and support economic growth. Combining the commercial, technical and financial competencies of its legacy organisations, TII commits to achieving these objectives in a way that ensures value for money by virtue of its improved scale and united resources.

TII is governed by a board of up to 14 members, appointed by the Minister of Transport, Tourism and Sport on the basis of their experience in relation to roads, transport, industrial, commercial, financial, or environmental matters. The board is directly responsible for the exercise of TII's functions, but can delegate duties to committees with the approval of the minister. TII receives its funding from the DTTAS and from its tolling operations.

TII recognises the need for ‘major modal switch in passenger transport from car to public transport’, but also praises an improved road network for reducing congestion and thus traffic-related emissions (TII, 2019). TII identifies a range of challenges to transport and environmental systems, including demographic trends towards population growth in the urban hinterlands, the creation of longer-distance commuting patterns, and increased reliance on the private car, bolstered by a return to economic growth and increases in employment (TII, 2019). This signals TII awareness of unsustainable transport demand driven by spatial planning and settlement patterns.

TII has sustainability as one of its strategic objectives in its Statement of Strategy (2018–2022). In 2018, it developed an internal sustainability statement, and this is currently being embedded into its projects, programmes and operations.

Interviewees perceived TII decision-making however to be more influenced by road safety and development strategies, in keeping with its institutional legacies. Some interviewees suggested merging TII’s transport activities with the NTA to develop more holistic transport planning in Ireland.

7.2.4 Road Safety Authority

The Road Safety Authority (RSA) was formed in September 2006 as a statutory body following the passing of the Road Safety Authority Act 2006. As a result of the 2006 Act, functions previously undertaken by DTTAS, the National Roads Authority and the National Safety Council were transferred to the RSA, bringing all activities related to road safety under one roof for the first time in Ireland. The RSA’s mission is to make roads safer for all users, with the aim of reducing the number of deaths and injuries on Irish roads. The current national Road Safety Strategy aims to reduce collisions, deaths and injuries by 30 per cent by 2020. Environment, sustainability and emissions do not currently feature in the RSA remit, directorate divisions or management structure.

Despite the increase in car numbers by 66 per cent between 1997 and 2012, the RSA reports that road deaths have decreased by 65.7 per cent in the same period, making Ireland the fourth safest country in the EU for road collision fatalities (RSA, 2019). The RSA attributes this to the number of legislative, education, engineering and enforcement changes introduced, including, for example, enhanced alcohol testing, the penalty points scheme, vehicle testing and road upgrades. The financial benefits accrued include an estimated €1bn saving per annum in the cost of fatalities and serious injuries (RSA, 2019). The RSA also points to wider public health policy benefits to enhancing road safety, including well-being advantages associated with more walking and cycling due to a safer road environment, and environmental and emissions benefits from reducing congestion and improving driving skills. Improved driving skills is also reported to reduce fuel costs for businesses and industry.

The RSA holds particular influence in the freight sector, according to interviewees, because of its role in guiding decisions related to vehicle roadworthiness, driver

fatigue and safety—the reported top concerns of the freight industry (expressed in interviews). The RSA has no mandate related to low-carbon transport, which perhaps limits awareness and action related to this topic in the freight sector.

7.2.5 C  ras Iompair   ireann

Established in 1945, C  ras Iompair   ireann (CI  ) is Ireland’s national public transport provider. It is a statutory corporation answerable to government and responsible for most public transport in Ireland and, jointly with the Northern Ireland Transport Holding Company, the railway service between the Republic of Ireland and Northern Ireland.

Since the enactment of the Transport (Re-organisation of C  ras Iompair   ireann) Act 1986, CI   has been the holding company for the three largest internal transport companies in Ireland: Dublin Bus, Bus   ireann and Iarnr  d   ireann (Irish Rail). While the member companies retain their own independent board of directors and executive management team, CI   provides overall strategic direction and co-ordination for the group, along with a number of centralised services. CI   Tours (a fourth member company) is the largest single generator of inward tourism from the USA to Ireland, offering tours around the country (CI  , 2019). CI   was originally to have operated the Luas tram system in Dublin, but that project was transferred to the newly created Railway Procurement Agency (CI  , 2019). Similar to other transport institutions, CI   is governed by a board of up to 12 members, appointed by the Minister for Transport.

According to its 2017 annual report, CI  ’s objectives related to the delivery of ‘reliable, safe, sustainable and accessible public transport services in as efficient a manner as possible, while meeting our customers’ needs’ (CI  , 2018). Over 230 million journeys are made on its network each year (up to 263.5 million in 2017) across national, regional and local bus and rail services, making it an important cog and centre of influence for decarbonising public transport services in Ireland. Indeed, a strong emissions focus is evident, with ‘Environment’ representing the first section explored as part of its annual reporting procedure (CI  , 2018). In the 2017 report, the emphasis remained on modal shift, shifting private car use to public transport use. CI   estimates that, for every car replaced with public transport, fuel emissions improve by over 80 per cent (CI  , 2018). It also outlines additional health, social and wellbeing benefits to using public transport, including reduced stress, road accidents and congestion, and increased health and fitness. The organisation also welcomes technological improvements to the public sector fleet in the name of environment, including increased electrification options and hybrid bus fleets, as committed to in the NDP 2018-2027.

7.2.6 Other Pertinent Transport Institutions

A range of other national bodies play various roles in governance and service provision in the transport sector. The Commission for Railway Regulation (CRR), for example, was established in 2006 under the Railway Safety Act 2005. This took place in the context of the EU Railway Safety Directive (2004/49/EC). The CRR is the national safety authority for the railway sector in the Republic of Ireland. It is responsible for ensuring that rail operators manage risks to safety in an effective manner through conformity assessment, compliance supervision and enforcement, as well as ensuring European and legislative harmonisation. Again, no explicit reference to low carbon is explicitly stated in its mandate.

The Sustainable Energy Authority of Ireland (SEAI) was established under the Sustainable Energy Act 2002. It is the national energy authority, with associated statutory functions across energy efficiency, energy technology and innovation, and decarbonisation of energy supply, including renewables. SEAI is a key delivery agency for government, being allocated more than €100m of capital funding annually to support energy efficiency and renewable energy. Transport is not a significant part of its activities, but it is responsible for administering the grant scheme to incentivise EVs. Interviewees pointed to the fact that the SEAI focuses predominantly on the built environment (residential and industry) over transport, despite associated emissions profiles. Limited human resources are allocated within SEAI to the pursuit of electrifying transport, involving just one small unit and team of employees.

Regarding lowering the carbon content of transport fuel, the National Oil Reserves Agency has responsibility for administering Ireland's Biofuel Obligation Scheme under the Energy (Biofuel Obligation and Miscellaneous Provisions) Act 2010. This gave effect to the provisions of the Council Directive 2009/28/EC on the promotion of the use of energy from renewable sources. Gas Networks Ireland and ESB, meanwhile, are responsible for the rollout of fuel infrastructure for compressed natural gas (CNG) vehicles and EVs in Ireland, respectively, demonstrating further fragmentation among institutions responsible for corresponding vehicle incentive schemes. This has created problems in matching fuelling and charging infrastructure with vehicle uptake, as illustrated in FTAI's (2018) requests for government urgently to open 14 promised CNG refuelling stations to match commitments made by freight industry members in purchasing CNG vehicles. Similar contestations exist in the EV space, with the lack of charging infrastructure reported by interviewees to create range anxiety amongst potential consumers and limiting EV uptake to date.

7.2.7 Local Authorities

Finally, local authorities hold considerable influence over transport planning and governance at a local level, particularly with respect to the development of road infrastructure. They also hold the potential to identify which modes of local transport can be decarbonised and ensure that new vehicles in these sectors are powered by renewable sources. However, according to interviewees, local authorities are characterised by similar policy silos as the rest of the transport

ecosystem. They are reported to often work in isolation from one another, competing for funds and programmes, leading to diverse outcomes for transport at the local scale. For instance, comparing the cities of Limerick and Waterford, interviewees noted how different development pressures and council mentality have resulted in a continued hollowing-out of the urban core in Limerick and increased incentives given to the private car at the expense of other low-carbon transport modes (e.g. including increased car-parking infrastructure in the city). Waterford, by comparison, was reported to have benefited from an enthusiastic and forward-thinking city manager, resulting in more sustainable transport modes operating in the city, less congestion and a more liveable city overall. Such variances in performance highlight vulnerabilities at the local scale whereby advancing the low-carbon transition may become dependent on particular personalities or engaged council employees rather than representing a consistent and connected ambition for all.

While the importance of sustainability champions is well cited in the literature (Wood *et al.*, 2016), dependence on individual personalities throughout the institutional transport ecosystem was reported from within the sector to create inconsistencies in commitment, within but also beyond the local authority scale. This was seen to hamper the speed of change possible and ultimately delay progress in holistic low-carbon transition. One interviewee, for example, noted the delays encountered in achieving integrated ticketing in Ireland—an essential part of the modal shift puzzle from an ASI perspective. This interviewee largely attributed eventual success to the persistence of one departmental representative and changes in personnel in subsidiary companies where previous individuals had blocked progress. At the local authority scale, such human-resource vulnerabilities are further compounded by a lack of financial freedom. Local authorities are believed to be particularly disadvantaged by their inability to apply for European funding to invest in low-carbon infrastructure (as other European cities do). Reported failures of Irish local authorities to adhere to established sustainable transport hierarchies further reflect the silos, vulnerabilities and inconsistencies in the system.

7.3 The Fragmented Governance Landscape in Action

Case Study D showcases an example of how the fragmented governance landscape is playing out in practice in the Irish context, further highlighting elements requiring improvement.

Case Study D: Governance of Light Rail (Luas)

The operations and management of Irish light rail (Luas) is characterised by fragmented institutional arrangements, with numerous contracts splitting responsibilities across a plethora of public and private actors. With both central government and TII having oversight functions, this includes separate contracts for everyday operations, depots and driver management, park and ride (P&R) facilities, advertising and maintenance. According to key informants, the short-term nature of many light-rail contracts further creates insecurity in the system.

According to interviewees, blurred accountability lines in the Luas system inhibits holistic light-rail planning and investment, leading to missed opportunities to connect the system to other forms of active mobility (e.g. providing bicycle locking facilities at P&Rs) and/or EV and car-sharing schemes (e.g. overcoming legislative constraints on reserving places solely for EVs). The fragmented and short-term nature of contracts, meanwhile, is also believed to prohibit long-term investment in the sub-sector. Examples cited include the potential to install new technologies on trams to make them more energy-efficient or investing in renewable energy (e.g. solar panels) to power elements of the infrastructure and depots/offices.



Fragmented decision-making is also reported by interviewees to have led to planning failures to connect recent Luas extensions to the M50 and develop more P&R nodes. Interviewees warned that further problems in rider capacity may also occur as a result of disconnected land-use and transport planning (e.g. with respect to upcoming housing and retail development at the extremities of the Luas lines, namely Saggart and Cherrywood). Technology lock-in generated by one institution in the system may also prevent the installation of higher-capacity or more efficient trams to meet demand and enhance user experience, according to one interviewee.

For some interviewees, public-private relations in the governance of this transport sub-sector are tense. Compared to international experiences, private-sector actors have struggled to shape Irish transport planning and implementation. The fragmented governance landscape in Ireland has thus resulted in missed opportunities for enhanced sustainability in public transport, limiting investment opportunities from the supply side and multi-modal shifts from the demand side.

Institutional solutions may include fewer, more long-term contracts and dedicated fora (and budgets) for inclusive and collaborative light-rail planning and investment. There is also potential for more transparent participation by contracted operators.

The characteristics illustrated in Case Study D were reported by interviewees in other transport sectors. For example, during the application for planning permission for the pedestrianisation of College Green, Dublin City Council, the NTA, Dublin Bus, Luas operators, cycling campaigners, trade unions, private carpark owners and city businesses, among others, reportedly vied for influence in this planning process. There was no structured forum for their inclusion or early engagement for compromise-seeking and consensus-building. Interviewees highlighted a failure to account for the impacts of the plaza on the wider city .

Interviewees also criticised the building of two separate Luas lines initially, with later work required to connect them. For several interviewees, similar questions now arise on progression of the Metro line that will again disrupt the Luas track. The lack of connected, forward-looking and long-term thinking was paramount for interviewees. One participant in particular claimed that the Irish transport system is plagued by planning ‘on the hoof’. This interviewee stressed a need for institutions to conduct project assessments up front that take into account social, economic, infrastructural and end-user impacts as well as the ‘fit’ of the project within the wider transport system.

Another participant spoke of difficulties in connecting with the ‘right’ people in DTTAS and shock at realising that, after years of communications with the department, their message was not being forwarded to the right unit or staff. This inhibited action, support and change in freight industry standards, including emissions reductions. Perceived silos and fragmentation within DTTAS was a key issue for this participant, reflecting the failure of the Department to mainstream ‘climate policy across all transport sectors’.

Overall, many interviewees argued that addressing institutional complexities and fragmented governance is essential to advance low-carbon transition in transport. Similarly with respect to the incentivisation of EVs, one interviewee pointed to limited EV mandate and powers in DTTAS, with electrification and utility interests seen to reside with DCCAE, vehicle grant schemes with SEAI, and charging infrastructure responsibilities with ESB. Moreover, they argued that DCCAE has ‘enough on its plate’ and that EVs will never represent a top priority for DCCAE, compared to what it could in DTTAS. They further highlighted that this setup is unusual internationally, whereby EV roll-out tends to reside solely with national transport departments.

7.4 Overcoming Institutional Fragmentation

One governmental attempt to overcome challenges of institutional fragmentation involved the creation of a taskforce focused on increasing the deployment of EVs. Case Study E discusses how this focused taskforce succeeded in bringing together the diverse range of state actors as well as providing a forum for interaction with a wider array of stakeholders. This model holds promise for delivering progress in other areas of low-carbon transport.

While the LEV Taskforce provides an institutional fix to fragmentation in a specific sub-sector, broader institutional arrangements will be needed to address the wider transport system. Pursuing individual transport solutions in isolation may still give rise to unintended consequences. For example, EVs reduce emissions but do not address congestion or promote active mobility.

A more profound approach to dealing with fragmentation would involve further institutional mergers, particularly the creation of one holistic transport authority. This approach was advocated by several interviewees. It is also advocated by Zipper (2018) with respect to the amalgamation of transit agencies in the United States to promote more unified transport management and enable more coherent allocation of street space. This allocation mission could be devised in Ireland to prioritise space in keeping with the lowest carbon options. Some interviewees proposed merging TII and NTA in order to bring coherence to public transport planning and roads development.

Resistance to change by agencies that are reluctant to cede control may be a barrier to more unified transport management (Zipper, 2018). Because of this, other interviewees advocated using existing powers and levers in the governance system to create desired changes. Indeed, several interviewees recognised existing expertise and solutions in institutions, and pointed to the need to leverage this knowledge in order to implement progressive decisions, assign budget and regulatory power and scale up low-carbon initiatives.

Regardless of the approach taken, creating a more coherent and connected system is required to advance the low-carbon transition. This would ensure that transport decisions and actions are cognisant of other sectoral developments, complementarities are maximised between modes, co-benefits are achieved, and unintended consequences or rebound effects are accounted for.

The final chapter combines findings from both the desk-based and field research (including the three key interview themes) to provide conclusions and recommendations with respect to advancing the low-carbon transition in Irish transport.

Case Study E: LEV Taskforce

The 2016 Programme for a Partnership Government pledged to make Ireland a leader in the take-up of EVs, and committed to ‘establish a dedicated taskforce involving relevant government departments, agencies, industry and representative groups, to work on this goal and to set ambitious and achievable targets’ (Government of Ireland, 2016).

In the EV policy space, DTTAS is responsible for policy development related to mode share, DCCAIE is responsible for policy development related to transport fuels and electricity generation, and vehicles are a joint responsibility. A range of other actors are involved, including SEAI as implementing agency for the EV purchase grants and the public engagement programme, the National Transport Agency as implementing agency for the Small Public Service Vehicle scheme, and ESB as the actor responsible for developing public charging infrastructure. Meanwhile, the Department of Finance has responsibility for fiscal policy (including relating to vehicle and fuel taxation) and the Department of Public Expenditure and Reform has oversight of public spending. Finally, local authorities are responsible for decisions around charging for parking at public charging points.

The objective of the LEV Taskforce is to ‘[p]resent a range of measures and options that will assist in accelerating the deployment of LEVs in Ireland’ (LEV Taskforce 2018). It is chaired jointly by DTTAS and DCCAIE, and includes representatives across the public sector, including all of the actors mentioned in the previous paragraph. It has also conducted consultations with a wide range of industry, stakeholder and representative groups during the course of its work.

The LEV Taskforce consists of three working groups, dealing respectively with: i) market growth stimuli, visibility and public leadership, ii) infrastructure, regulation, pricing, and iii) legislation and building regulations. It has helped to develop joined-up thinking on key policy issues and has been particularly useful in bringing in the wider range of governance actors that have a role in this policy space. Its recommendations on further incentives were broadly enacted in Budget 2018, including introduction of a zero per cent Benefit in Kind rate for EVs.

It was also noted, however, that its work on EVs was more straightforward than in other transport arenas because it was relatively clear to participants what the challenges were and what needed to be done to overcome them. This contrasts with the taskforce’s work on alternative fuels, where there is less clarity on future pathways and policy options.

Chapter 8

Conclusions and Recommendations

8.1 Introduction

The time is opportune for transformative approaches to low-carbon transition. Calls for climate action are growing worldwide. Increasingly tangible effects of climate change are being felt in Ireland and elsewhere; for example, through increased extreme weather events. There is growing awareness of the co-benefits and opportunities that the low-carbon transition offers. These moments of crisis and climate awakening make it a good time to garner societal and political support for low-carbon transition.

This report is cognisant of the need to develop enabling institutional architecture to advance the low-carbon transition, while at the same time recognising the additional factors, processes and framings that will exert influence. The following recommendations therefore reflect proposed changes to both the institutional framework and connections to the wider governance system, political processes and society. They build on the three key themes that emerged from interviews with key stakeholders, combining and aligning bottom-up and top-down governance processes to transform how the transport system operates, what drives it, and ultimately who shapes transport outcomes.

8.2 Acknowledging Complexities in the Sector

Our first key research theme concerned how the transport system operates, where we highlighted the inherent complexities of the sector. These include internal tensions between public and private, rural and urban, and special interests versus the public interest. We also noted the complex ways in which transport interacts with broader policy objectives, sectors and systems. Most prominently, transport is intimately connected with our systems of spatial planning, but through, for example, decisions on locating hospitals and schools, transport is also connected to the health and education sectors. In advancing the low-carbon transition, these complexities need to be accounted for in three key ways:

- **Collaborative, adaptive and reflexive policymaking** will be critical to developing a low-carbon transport system. This will require input from a diverse range of public, private and civil society actors. While there have been some positive attempts to bring such stakeholders together in transport (e.g. the NESC 2015 forum), more is required to develop common agendas, complementary ambition and concerted action. Stakeholder engagement is essential to enhance

transparency and democracy in decision-making processes, ensure greater credibility, legitimacy, trust and uptake of decisions and ultimately generate better outcomes (Fiorino, 1990).

- **Bottom-up approaches to low-carbon transport** are needed to take account of geographical variations, differing technical possibilities and the rural-urban divide in Ireland. These complexities mean different transport solutions in different geographical areas and sub-sectors (e.g. passenger compared to freight). For example, rural towns and villages rely more heavily on buses as a public transport option, while EVs might hold more promise to decarbonise isolated rural households. Understanding, developing and tailoring transport solutions to local contexts will thus be crucial.
- **Understanding transport as a social practice** is essential to promote positive behaviour change across freight and passenger transport categories. This takes the practice of travel as the primary unit of intervention (rather than the individual) and considers the socio-cultural, technical and governance forces that shape these (Shove, 2003; Warde, 2005). Designing and implementing appropriate combinations of these interventions will be critical to advancing low-carbon transition.

8.3 Challenging Institutional Priorities

Our second key theme concerns the drivers of the transport system. We showed that historical legacies and contestation between institutional priorities have shaped the development of a carbon-intensive transport system to date. Low-carbon transition has yet to be embedded in these priorities, and there is persisting disagreement over what low-carbon transition might entail. To align institutional priorities with a low-carbon ambition:

- **Transport policy-making should align with international sustainable mobility thinking** that promotes an 'Avoid, Shift, Improve' (ASI) framework for both passenger and freight transport. This could more clearly emphasise a hierarchy that focuses on: reducing journeys in the first place (demand management); achieving modal shift (from private car to active and public transport modes and road- and aviation-based freight to rail, maritime and 'last-mile delivery' options), and improving mode efficiencies (including a move away from the internal combustion engine, electrifying the system and promoting the sharing economy).
- **High-level direction from the highest levels of central government** is critical to steer investors, consumers and citizens towards a low-carbon future. This includes leadership from the Department of Transport, Tourism and Sport (DTTAS) to guide the plethora of transport institutions that operate under its remit. It must be underpinned by a whole-of-government approach and enhanced policy co-ordination that prioritises climate action and low-carbon living. Mandated responsibilities for climate action and commitment across

government could be considered, such as re-establishing the position of Minister of State for Sustainable Transport.

- **The mandates of transport governance actors should align with low-carbon transition**, from state agencies to local authorities. These could be revised to include a statutory commitment to develop and prioritise low-carbon transport options. Current institutional mandates in the sector do not include a strong commitment to low-carbon transition and, for the most part, according to interviewees, do not dominate everyday thinking, decision-making and actions. More detailed carbon accounting, and a heavier weight assigned to this, could also feature in project appraisals to inform institutional decisions about transport investments.
- **Leadership by example in the public sector** is important to promote low-carbon options and showcase commitment to more sustainable practices. This could include not just central government but also, for example, local authorities switching fleets to electrified alternatives. The civil service could also give priority in hiring and promotion to environmental expertise across physical and social sciences and those who have made carbon savings through their work. Civil service incentives could also be better aligned with a low-carbon mission, including, for example, the car mileage regime that currently prioritises larger engine sizes and discourages public and active transport use.

8.4 Interrogating the Institutional Landscape

Our third key research theme identified who shapes transport outcomes. We painted a picture of a fragmented governance landscape, and profiled the key actors and how they relate to each other. Building on this analysis, we suggest below a number of institutional mechanisms that could be pursued in order to overcome or ameliorate this institutional fragmentation.

- **Taskforces:** The LEV Taskforce provided a structured forum to bring together the key actors to unblock policy action for EV incentivisation. Consideration could be given to replicating this model for other sectoral challenges. Such taskforces could combine insights from public, private, academic and civil society organisations, with the aim of providing a robust and balanced evidence base for transport policy-making.
- **Hubs and public-private partnerships:** The creation of multi-modal transport hubs that effectively connect public, private and active transport modes holds promise in the Irish passenger transport context. This includes enhanced park and ride facilities at the edge of cities to alleviate issues with sprawling settlement patterns and curb fossil-fuelled private car use through prioritising pedestrian greenways, bicycle storage facilities, car-pooling initiatives, EV charging points, and high-frequency bus, rail and Luas lines. Similar distribution hubs could be established to decarbonise freight, acknowledging the road dependency of many of our port connections currently, and to increase the use

of rail and electric freight transport options. Public-private partnerships may be an appropriate business model for progressing such low-carbon hubs to leverage funding and expertise from both professional spheres.

- **Forums for peer learning:** Villages, towns and cities across Ireland need further opportunities to learn from each other in order to scale up innovative low-carbon transport solutions. There are a variety of settlement sizes that could learn from one another's experimental approaches, while recognising important differences across the transport landscape. This would introduce a much-needed level of reflexivity into the system and allow low-carbon transport innovations (technological, social and economic) to be tested, compared and revised in local conditions.
- **Deliberative forums for stakeholder and citizen participation:** Structured inclusion of private and civil society actors can enhance transparency and moderate the impact of lobbying by special interests. Building on the model of the Citizens' Assembly, further engagement of the public in low-carbon transport planning is also required to enhance buy-in and ensure locally relevant decisions and success. Public information offices could be established, with structured citizen assembly processes and town-hall-style meetings.
- **Research infrastructure for transport policy-making:** There is a need for more evidence-based policymaking to advance the low-carbon transition in Irish transport. This requires more diverse, interdisciplinary and inclusive transport research, as well as channels of communication and absorptive capacity in the policy-making system, including the potential for 'learning' or intermediary institutions for enhanced knowledge exchange between academia and government. Increased support for social and behavioural sciences to understand why passengers and freight companies travel as they do should be combined with pioneering insights from engineering fields for enhanced technology adoption. Participatory backcasting research that adopts a social-practice orientation could help to create implementable transition frameworks for change.

Bibliography

- Andrews-Speed, P. (2016), 'Applying Institutional Theory to the Low-Carbon Energy Transition', *Energy Research & Social Science*, vol. 13, pp. 216-25.
- Arcadis (2018), *Sustainable Cities Mobility Index 2017 Bold Moves*, Arcadis (available at: <https://www.arcadis.com/en/global/our-perspectives/sustainable-cities-mobility-index-2017/>, date of access: 12 December 2018).
- Averchenkova, A., Fankhauser, S. & Finnegan, J. (2018), *The Role of Independent Bodies in Climate Governance: The UK's Committee on Climate Change*, London: Grantham Research Institute on Climate Change and the Environment.
- Barkenbus, J. (2017), 'Electric Vehicles: Climate Saviors, or Not?', *Issues in Science and Technology*, vol. 33 no. 2, pp.55.
- Bell, J. (2006), *Doing your Research Project: A guide for first-time researchers in education, health and social science*, 4th ed., UK: Open University Press.
- Berg, B.L. (2009), *Qualitative Research Methods for the Social Sciences*, 7th edition, Boston: Pearson Education.
- Boland, C. (2018), *The National Development Plan – Delivering for the Environment*, Dublin: Environment Ireland.
- Braun, V. & Clarke, V. (2006), 'Using thematic analysis in psychology', *Qualitative Research in Psychology* 3, no. 2: 77-101.
- Brueckner, M. (2018), 'Why the electric vehicle revolution will bring problems of its own', *The Conversation* (available at: <https://phys.org/news/2018-04-electric-vehicle-revolution-problems.html>, date of access: 12 December 2018).
- Burck, J., Hagen, U., Marten, F., Höhne, N., & Bals, C. (2018), *Climate Change Performance Index 2019*, New Climate Institute (available at: <https://newclimate.org/wp-content/uploads/2018/12/CCPI-2019-Results.pdf>, date of access: 12 December 2018).
- CCAC (2016), *First Report of the Climate Change Advisory Council*, Dublin: Climate Change Advisory Council.
- CCAC (2017), *Annual Review 2017*, Dublin: Climate Change Advisory Council.
- CCAC (2018), *Annual Review 2018*, Dublin: Climate Change Advisory Council.
- Cervero, R. & Murakami, J. (2009), 'Rail and property development in Hong Kong: Experiences and extensions', *Urban Studies*, vol. 46, no.10, pp.2019-2043.
- CIÉ (2018), *CIÉ Group Annual Report: year ended 31 December 2017*, Dublin: Córas Iompair Éireann.

CIÉ (2019), 'CIÉ Group of Companies', Córas Iompair Éireann (available at: <https://www.cie.ie/index.html>), date of access: 4/2/19).

Citizens' Assembly (2018), *Third Report and Recommendations of the Citizens' Assembly: How The State Can Make Ireland A Leader In Tackling Climate Change*, The Citizens' Assembly (available at: <https://www.citizensassembly.ie/en/How-the-State-can-make-Ireland-a-leader-in-tackling-climate-change/Final-Report-on-how-the-State-can-make-Ireland-a-leader-in-tackling-climate-change/Climate-Change-Report-Final.pdf>), date of access: 12 December 2018).

Council of the European Union (2018), 'Governance of the Energy Union: Council confirms deal reached with the European Parliament', 29 June 2018, <https://www.consilium.europa.eu/en/press/press-releases/2018/06/29/governance-of-the->

[energy-union-council-confirms-deal-reached-with-the-european-parliament/](#), (accessed on 5 December 2018).

Curtis, C. & Scheurer, J. (2017), 'Performance measures for public transport accessibility: Learning from international practice', *Journal of Transport and Land Use*, vol. 10, no. 1, pp. 93-118.

Davies, A.R., Fahy, F. & Rau, H. (2014), *Challenging consumption: Pathways to a more sustainable future*, London: Routledge.

DCCAE (2017), *National Mitigation Plan*, Dublin: Department of Communications, Climate Action and Environment.

DCCAE (2018a), *Initial Public Consultation: National Energy & Climate Plan (NECP) 2021-2030, Ireland*, Dublin: Department of Communications, Climate Action and Environment.

DCCAE (2018b), *Update Report on the National Mitigation Plan Actions*, November 2018, Dublin: Department of Communications, Climate Action and Environment (available at: <https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/15/Update%20Report%20on%20National%20Mitigation%20Plan%20Actions%20Final%20031218.pdf>), date of access: 9 December 2018).

Dorsch, M.J. & Flachsland, C. (2017), 'A Polycentric Approach to Global Climate Governance', *Global Environmental Politics*, vol. 17, no. 2, pp. 45-64.

DTTAS (2009), *Smarter Travel—A Sustainable Transport Future*, Dublin: Department of Transport, Tourism and Sport.

DTTAS (2016), *Statement of Strategy 2016-2019*, Dublin: Department of Transport, Tourism and Sport.

- DTTAS (2018), *Transport Trends: An Overview of Ireland's Transport Sector 2018*, Dublin: Department of Transport, Tourism and Sport (available at: <http://www.dttas.ie/sites/default/files/publications/corporate/english/transport-trends/transport-trends-2018.pdf>, date of access: 7 October 2018).
- DTTAS (2018a), 'Ross announces new Office to deliver on cycling as funding increases by 33%' (available at: <http://www.dttas.gov.ie/press-releases/2018/ross-announces-new-office-deliver-cycling-funding-increases-33>, date of access: 31/1/19)
- DTTAS (2019), 'Public Transport' (available at: <http://www.dttas.ie/public-transport>, date of access: 4/2/19).
- EEA (2016), *Transitions towards a more sustainable mobility system, TERM 2016: Transport indicators tracking progress towards environmental targets in Europe*, European Environment Agency, Luxembourg: Publications Office of the European Union.
- EEA (2018a), 'Greenhouse gas emissions from transport', <https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-10>, (accessed on 7 October 2018).
- EEA (2018b), *Perspectives on Transitions to Sustainability*, Copenhagen: European Environment Agency, (available at: <https://www.eea.europa.eu/publications/perspectives-on-transitions-to-sustainability>, date of access: 9 December 2018).
- EPA (2018a), *Ireland's Provisional Greenhouse Gas Emissions, 1990–2017*, Wexford: Environmental Protection Agency (available at: http://www.epa.ie/publics/reports/air/airemissions/ghgemissions2017/Report_GHG%201990-2017%20November%202018_Website.pdf, date of access: 9 December 2018).
- EPA (2018b), *Ireland's Greenhouse Gas Emissions Projections, 2017–2035*, Wexford: Environmental Protection Agency (available at: http://www.epa.ie/publics/reports/air/airemissions/ghgprojections2017-2035/EPA_2018_GHG_Emissions_Projections_Summary_Report.pdf, date of access: 19 Jul 2018).
- European Commission (2018), 'The Commission calls for a climate neutral Europe by 2050', European Commission (available at: http://europa.eu/rapid/press-release_IP-18-6543_en.htm, date of access: 12 December 2018).
- European Commission (2018), *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank: A Clean Planet for All: A European Strategic Long-Term Vision for a Prosperous, Modern, Competitive and*

Climate Neutral Economy, Brussels: European Commission, COM(2018) 773 final, 28 November 2018.

European Environment Agency (2018), *National Policies and Measures on Climate Change Mitigation in Europe in 2017*, Copenhagen: European Environment Agency.

Fankhauser, S., Averchenkova, A. & Finnegan, J. (2018), *10 years of the UK Climate Change Act*, London: Grantham Research Institute on Climate Change and the Environment (available at: http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2018/03/10-Years-of-the-UK-Climate-Change-Act_Fankhauser-et-al.pdf, date of access: 9 December 2018).

Fiorino, D.J. (1990). 'Citizen participation and environmental risk: A survey of institutional mechanisms', *Science, Technology, & Human Values*, vol. 15, no. 2, pp. 226-243.

FTAI (2018), 'Lack of fuelling sites parks cleaner HGV ambitions, says FTAI', 15 November 2018, available: http://www.ftai.ie/news-item/Lack_of_fuelling_sites_parks_cleaner_HGV_ambitionsx_says_FTAI_x15_November_2018_x/, date of access: 31/1/19).

Geels, F.W., Sovacool, B.K., Schwanen, T. & Sorrell, S. (2017), 'Sociotechnical Transitions for Deep Decarbonization', *Science*, vol. 357, no. 6357, pp. 1242-44.

Gilardi, F. (2005), 'The formal independence of regulators: a comparison of 17 countries and 7 sectors', *Swiss Political Science Review*, vol. 11, no. 4, pp. 139-167.

Government of Ireland (2010), *National Renewable Energy Action Plan—Ireland* (available at: [http://www.dccae.gov.ie/documents/The%20National%20Renewable%20Energy%20Action%20Plan%20\(PDF\).pdf](http://www.dccae.gov.ie/documents/The%20National%20Renewable%20Energy%20Action%20Plan%20(PDF).pdf), date of access: 13 April 2017).

Government of Ireland (2014), *Climate Action and Low-Carbon Development: National Policy Position Ireland*, Dublin: Department of Communications, Climate Action & Environment.

Gray, D.E. (2004), *Doing Research in the Real World*, London: Sage.

IPCC (2018), *Global Warming of 1.5 °C*, Geneva: Intergovernmental Panel on Climate Change.

Jordan, A., Huitema, D., Hildén, D., Van Asselt, H., Rayner, T., Schoenefeld, J.J., Tosun, J., Forster, J. & Boasson, E.L. (2015), 'Emergence of Polycentric Climate Governance and its Future Prospects', *Nature Climate Change*, vol. 5, pp. 977-82.

Jordan, A., Huitema, D., van Asselt, H. & Forster, J. (Eds.) (2018), *Governing Climate Change: Polycentricity in Action?*, Cambridge: Cambridge University Press.

- Kuzemko, C., Lockwood, M., Mitchell, C. & Hoggett, R. (2016), 'Governing for Sustainable Energy System Change: Politics, Contexts and Contingency', *Energy Research & Social Science*, vol. 12, pp. 96-105.
- Lambert, F. (2017a), 'Royal Mail unveils new electric truck made by Arrival', Electrek (available at: <https://electrek.co/2017/08/23/royal-mail-new-electric-autonomous-truck-arrival/>), date of access: 12 December 2018).
- Lambert, F. (2017b), 'Ford unveils its new electric truck made with DHL', Electrek (available at: <https://electrek.co/2017/08/16/ford-new-electric-truck-dhl/>), date of access: 12 December 2018).
- Lambert, F. (2018), 'The "British milkman" is going electric with 200 new electric vehicles from DHL', Electrek (available at: <https://electrek.co/2018/05/28/british-milkman-electric-vehicles-dhl/>), date of access: 12 December 2018).
- McHugh, R. (2017), 'Ireland has one of the Least Dense Populations in the EU', Business world (available at: <https://www.businessworld.ie/news-from-ireland/Ireland-has-one-of-the-least-dense-populations-in-the-EU--568338.html>), date of access: 12 December 2018).
- National Travel Survey (2016), 'Why we travelled', Dublin: Central Statistics Office (available at: <https://www.cso.ie/en/releasesandpublications/ep/p-nts/nts2016/whwt/>), date of access: 12 December 2018).
- NESC (2012), *Ireland and the Climate Change Challenge: Connecting 'How Much' with 'How To'*, Dublin: National Economic and Social Council.
- NESC (2015), *NESC Forum: Opportunities & Challenges for Climate Mitigation in the Irish Transport Sector*, Dublin: National Economic and Social Council (available at: [http://www.nesc.ie/assets/files/downloads/Events/Transport-Forum-](http://www.nesc.ie/assets/files/downloads/Events/Transport-Forum-2015/Transport15_Highlights.pdf)
- [2015/Transport15_Highlights.pdf](http://www.nesc.ie/assets/files/downloads/Events/Transport15_Highlights.pdf), date of access: 3 July 2018).
- NESC (n.d.), Transport Oriented Development (available at: <https://www.nesc.ie/work-programme/land-use-land-value-urban-development/transport-oriented-development/>), date of access: 21 March 2019).
- NTA (2018), *Statement of Strategy 2018-2022*, Dublin: National Transport Authority.
- O'Halloran, M. & O'Sullivan, K. (2018), 'Each Government department to adopt specific climate change targets', Irish Times, 19 November, <https://www.irishtimes.com/news/environment/each-government-department-to-adopt-specific-climate-change-targets-1.3702128> (accessed on 9 December 2018).
- Ostrom, E. (2010), 'Polycentric Systems for Coping with Collective Action and Global Environmental Change', *Global Environmental Change*, vol. 20, no. 4, pp. 550-57.

- Ostrom, E. (2012), 'Nested Externalities and Polycentric Institutions: Must We Wait for Global Solutions to Climate Change before Taking Actions at Other Scales?', *Economic Theory*, vol. 49, no. 2, pp. 353-69.
- O'Sullivan, K. (2018), 'Naughten Admits Plan to Cut Carbon Emissions is Not Working', *Irish Times*, 30 August, <https://www.irishtimes.com/news/environment/naughten-admits-plan-to-cut-carbon-emissions-is-not-working-1.3611689> (accessed on 9 December 2018).
- Peyton, N. (2018), 'Electric car demand fuelling rise in child labour in DR Congo – campaigners', *Reuters* (available: <http://www.mining.com/web/electric-car-demand-fuelling-rise-child-labour-dr-congo-campaigners/>, date of access: 12 December 2018).
- Rau, H., Hynes, M. & Heisserer, B. (2015), 'Transport policy and governance in turbulent times: Evidence from Ireland', *Case studies on transport policy*, vol. 4, no.2, pp.45-56.
- Rayner, T. & Jordan, A. (2013), 'The European Union: The Polycentric Climate Policy Leader?', *WIREs Climate Change*, vol. 4, no. 2, pp. 75-90.
- RSA (2019), 'About Us', Road Safety Authority (available at: <http://www.rsa.ie/en/Utility/About-Us/>, date of access: 4/2/19)
- Sabel, C.F. & Victor D.G. (2016), *Making the Paris Process More Effective: A New Approach to Policy Coordination on Global Climate Change*, Muscatine, IA: The Stanley Foundation (available at: <https://www.stanleyfoundation.org/publications/pab/Sabel-VictorPAB216.pdf>, date of access: 4/2/19).
- Sargent, N. (2018), 'Senators outraged as Ministers "dishonour" Climate Act obligations', *Green News*, 4 December 2018, <https://greennews.ie/senatoes-outraged-ministers-dishonour-climate-act-obligations/> (accessed on 5 December 2018).
- Shove, E. (2003), *Comfort, Cleanliness and Convenience: The Social Organization of Normality*, Oxford and New York: Berg.
- Stenqvist, L. (2018), 'Ground-breaking solution for future autonomous and electric freight transport', LinkedIn (available at: <https://www.linkedin.com/pulse/ground-breaking-solution-future-autonomous-electric-lars-stenqvist?trk=eml-email-feed-ecosystem-digest-01-recommended-articles-14-TixCompany&midToken=AQH0QOo-vRBgcQ&fromEmail=fromEmail&ut=3uBzAomPROYEo1>, date of access: 12 December 2018).
- Stucki, M. (2015), *Policies for Sustainable Accessibility and Mobility in Urban Areas of Africa*, Africa Transport Policy Programme (available at: https://www.ssatp.org/sites/ssatp/files/publications/SSATPWP106-Urban%20Mobility_IO

.pdf, date of access: 12 December 2018).

Thomas, C. (2018), 'Lengthy List of Transport Bodies Makes It Hard to Know Who to Blame', *Dublin Inquirer* (available at: <https://www.dublininquirer.com/2018/02/28/lengthy-list-of-transport-bodies-makes-it-hard-to-know-who-to-blame>, date of access: 12 December 2018).

TII (2019), 'European and National Funding', *Transport Infrastructure Ireland* (available at: <http://www.tii.ie/about/about-tii/funding/>, date of access: 4/2/19).

Transport & Environment (2018), 'Transport running on fossil gas is as bad for the climate as diesel, petrol and marine fuel – report', *Transport and Environment* (available at: <https://www.transportenvironment.org/press/transport-running-fossil-gas-bad-climate-diesel-petrol-and-marine-fuel-%E2%80%93-report>, date of access: 12 December 2018).

Unruh, G.C. (2000), 'Understanding Carbon Lock-In', *Energy Policy*, vol. 28, no. 12, pp. 817-30.

Unruh, G.C. (2002), 'Escaping Carbon Lock-In', *Energy Policy*, vol. 30, pp. 317-25.

Warde, A. (2005), 'Consumption and theories of practice', *Journal of Consumer Culture*, vol. 5, no.2, pp. 131-153.

Wood, B.E., Cornforth, S., Beals, F., Taylor, M. & Tallon, R. (2016), 'Sustainability champions? Academic identities and sustainability curricula in higher education', *International Journal of Sustainability in Higher Education*, vol.17, no. 3, pp.342-360.

Zipper, D. (2018), 'Bikeshare, Scooters, Cars, Trains, Bridges: One Agency to Rule Them All', *CityLab* (available at: https://www.citylab.com/perspective/2018/11/transit-city-department-scootershare-ridehail-bikeshare/576982/?utm_source=newsletter&silverid=%25%25RECIPIENT_ID%25%25&utm_campaign=citylab-daily-newsletter&utm_medium=email, date of access: 12 December 2018).

National Economic and Social Council Publications

No.	Title	Date		
			15. The Taxation of Farming Profits	1976
1.	Report on the Economy in 1973 and the Prospects for 1974	1974	16. Some Aspects of Finance for Owner-Occupied Housing	1976
2.	Comments on Capital Taxation Proposals	1974	17. Statistics for Social Policy	1976
3.	The Economy in 1974 and Outlook for 1975	1974	18. Population Projections 1973-86: The Implications for Education	1976
4.	Regional Policy in Ireland: A Review	1975	19. Rural Areas: Social Planning Problems	1976
5.	Population and Employment Projections: 1971-86	1975	20. The Future of Public Expenditure	1976
6.	Comments on the OECD Report on Manpower Policy in Ireland	1975	21. Report on Public Expenditure	1976
7.	Jobs and Living Standards: Projects and Implications	1975	22. Institutional Arrangements for Regional Economic Development	1976
8.	An Approach to Social Policy	1975	23. Report on Housing Subsidies	1976
9.	Report on Inflation	1975	24. A Comparative Study of Output, Value-Added and Growth in Irish and Dutch Agriculture	1976
10.	Causes and Effects of Inflation in Ireland	1975	25. Towards a Social Report	1977
11.	Income Distribution: A Preliminary Report	1975	26. Prelude to Planning	1976
12.	Education Expenditure in Ireland	1976	27. New Farms Operators, 1973 to 1975	1977
13.	Economy in 1975 and Prospects for 1976	1975	28. Service-type Employment and Regional Development	1977
14.	Population Projects 1971-86: The Implications for Social Planning – Dwelling Needs	1976	29. Some Major Issues in Health Policy	1977

30. Personal Incomes by County in 1973	1977	46. Irish Forestry Policy	1979
31. The Potential for Growth in Irish Tax Revenues	1977	47. Alternative Strategies for Family Support Income	1980
32. The Work of NESC: 1974-1976	1977	48. Transport Policy	1980
33. Comments on Economic and Social Development; 1976-1980	1977	49. Enterprises in the Public Sector	1980
34. Alternative Growth Rates in Irish Agriculture	1977	50. Major Issues in Planning Services for Mentally and Physically Handicapped Persons	1980
35. Population and Employment Projections 1986: A Reassessment	1977	51. Personal Incomes by Regions: 1977	1980
36. University and Selectivity: Strategies in Social Policy	1978	52. Tourism Policy	1980
37. Integrated Approaches to Personal Income Taxes and Transfers	1978	53. Economic and Social Policy 1980-83: Aims and Recommendations	1980
38. University and Selectivity: Social Services in Ireland	1978	54. The Future of the National Economic and Social Council	1981
39. The Work of NESC: 1977	1978	55. Urbanisation: Problems of Growth and Decay in Dublin	1981
40. Policies to Accelerate Agricultural Development	1978	56. Industrial Policy and Development: A Survey of Literature for the Early 1960s to the Present	1981
41. Rural Areas: Change and Development	1978	57. Industrial Employment and the Regions 1960-82	1981
42. Report on Policies for Agricultural and Rural Development	1978	58. The Socio-Economic Position of Ireland within the European Economic Community	1981
43. Productivity and Management	1978	59. The Importance of Infrastructure to Industrial Development in Ireland: Roads, Telecommunications and Water Supply	1981
44. Comments on Development: Full Employment	1978	60. Minerals Policy	1981
45. Urbanisation and Regional Development in Ireland	1979		

61. Irish Social Policy: Priorities for Future Development	1981	of the Implications of recent Demographic Changes for Education, Social Welfare and the Health Services	1984
62. Economic and Social Policy 1981: Aims and Recommendations	1981	76. The Role of Financing the Traded Sectors	1984
63. Population and Labour Force Projections by County and Region, 1979-1991	1981	77. The Criminal Justice System: Policy and Performance	1985
64. A Review of Industrial Policy	1982	78. Information for Policy	1985
65. Farm Incomes	1982	79. Economic and Social Policy Assessment	1985
66. Policies for Industrial Development: Conclusions and Recommendation	1982	80. The Financing of Local Authorities	1985
67. An Analysis of Job and Losses in Irish Manufacturing Industry	1982	81. Designation of Areas for Industrial Assessment	1985
68. Social Planning in Ireland: Its Purposes and Organisational Requirements	1983	82. Manpower Policy in Ireland	1986
69. Housing Requirements and Population Change: 1981-1991	1983	83. A Strategy for Development 1986-1990	1986
70. Economic and Social Policy 1982: Aims and Recommendations	1983	84. Community Care Service: An Overview	1987
71. Education: The Implications of Demographic Change	1984	85. Redistribution Through State Social Expenditure in the Republic of Ireland: 1973-1980	1988
72. Social Welfare: The Implications of Demographic Change	1984	86. The Nature and Functioning of Labour Markets	1988
73. Health Services: The Implications of Demographic Change	1984	87. A Review of Housing Policy	1989
74. Irish Energy Policy	1984	88. Ireland in the European Community: Performance, Prospects and Strategy	1989
75. Economic and Social Policy 1983: Aims and Recommendations A Review		89. A Strategy for the Nineties: Economic Stability and Structural Change	1990
		90. The Economic and Social Implications of Emigration	1991

91. Women's Participation in the Irish Labour Market	1992	105. Opportunities, Challenges and Capacities for Choice	1999
92. The Impact of reform of the Common Agricultural Policy	1992	106. Review of the Poverty Proofing Process	2001
93. The Irish Economy in a Comparative Institutional Perspective	1993	107. Benchmarking the Programme for Prosperity and Fairness	2002
94. The Association between Economic Growth and Employment	1993	108. National Progress Indicators	2002
95. Education and Training Policies for Economic and Social Development	1993	109. Achieving Quality Outcomes: The Management of Public Expenditure	2002
96. A Strategy for Competitiveness, Growth and Employment	1993	110. An Investment in Quality: Services, Inclusion and Enterprise, Overview, Conclusions and Recommendations	2002
97. New Approaches to Rural Development	1995	111. An Investment of Quality: Services, Inclusion and Enterprise	2003
98. Strategy into the 21 st Century: Conclusions and Recommendations	1996	112. Housing in Ireland: Performance and Policy	2004
99. Strategy into the 21 st Century	1996	113. The Developmental Welfare State	2005
100. Networking for Competitive Advantage	1996	114. NESC Strategy 2006: People, Productivity and Purpose	2005
101. European Union: Integration and Enlargement	1997	115. Migration Policy	2006
102. Population Distribution and Economic Development: Trends and Policy Implications	1997	116. Managing Migration in Ireland: A Social and Economic Analysis	2006
103. Private Sector Investment in Ireland	1998	117. The Irish Economy in the Early 21 st Century	2008
104. Opportunities, Challenges and Capacities for Choice, Overview, Conclusions and Recommendations	1999	118. Ireland's Five-Part Crisis: An Integrated National Response	2009
		119. Well-being Matters: A Social Report for Ireland	2009

- | | | | |
|---|-------------|--|-------------|
| 120. Next Steps in Addressing Ireland's Five-Part Crisis: Combining Retrenchment with Reform | 2009 | 132. Quality and Standards in Human Services in Ireland: Disability Services | 2012 |
| 121. The Euro: An Irish Perspective | 2010 | 133. Quality and Standards in Human Services in Ireland: A Synthesis Report | 2012 |
| 122. Re-finding Success in Europe: the Challenge for Irish Institutions and Policy | 2010 | 134. The Social Dimensions of the Crisis: The Evidence and its Implications | 2012 |
| 123. Supports and Services for Unemployed Jobseekers: Challenges and Opportunities in a Time of Recession | 2011 | 135. Five Part Crisis, Five Years On: Deepening Reform and Institutional Innovation | 2013 |
| 124. Quality and Standards in Human Services in Ireland: Overview of Concepts and Practice | 2011 | 136. Ireland's Environmental Data: Inventory, Assessment and Next Steps | 2014 |
| 125. Promoting Economic Recovery and Employment in Ireland | 2012 | 137. Jobless Households: An Exploration of the Issues | 2014 |
| 126. Draft Framework for Sustainable Development for Ireland: NESC Response | 2012 | 138. Social Housing at the Crossroads: Possibilities for Investment, Provision and Cost Rental | 2014 |
| 127. Quality and Standards in Human Services in Ireland: Policing and the Search for Continuous Improvement | 2012 | 139. Wind Energy in Ireland: Building Community Engagement and Social Support | 2014 |
| 128. Quality and Standards in Human Services in Ireland: Residential Care for Older People | 2012 | 140. Homeownership and Rental: What Road is Ireland On? | 2014 |
| 129. Quality and Standards in Human Services in Ireland: The School System | 2012 | 141. Ireland's Rental Sector: Pathways to Secure Occupancy and Affordable Supply | 2015 |
| 130. Quality and Standards in Human Services in Ireland: Home Care for Older People | 2012 | 142. Housing Supply and Land: Driving Public Action for the Common Good | 2015 |
| 131. Quality and Standards in Human Services in Ireland: End-of-Life Care in Hospitals | 2012 | 143. The Dynamics of Environmental Sustainability and Local Development: Aquaculture | 2016 |

144. Moving Towards the Circular Economy in Ireland **2017**
145. Urban Development Land, Housing and Infrastructure: Fixing Ireland's Broken System **2018**
146. Moving from Welfare to Work: Low Work Intensity Households and the Quality of Supportive Services **2018**

NESC Research Series

1. Cluster in Ireland: The Irish Dairy Processing Industry: An Application of Porter's Cluster Analysis **1997**
2. Cluster in Ireland: The Irish Popular Music Industry; An Application of Porter's Cluster Analysis **1997**
3. Cluster in Ireland: The Irish Indigenous Software Industry; An Application of Porter's Cluster Analysis **1997**
4. Profit Sharing Employee Share, Ownership and Gainsharing; What can they Achieve? **2000**
5. Sustaining Competitive Advantage: Proceedings of NESC Seminar **1998**
6. Ireland's Child Income Supports: The Case for a New Form of Targeting **2008**
7. State of Play Review of Environmental Policy Integration Literature **2015**

8. Socially Integrated Housing and Sustainable Urban Communities: Case Studies from Dublin **2015**
9. The Burren Life Programme: An Overview **2016**
10. Nature's Values: From Intrinsic to Instrumental **2017**
11. Valuing Nature: Perspectives and Issues **2017**
12. Low Work Intensity Households and the Quality of Supportive Services: Detailed Research Report **2018**
13. Advancing the Low-Carbon Transition in Irish Transport **2019**

NESC Secretariat Papers

1. Ireland's Economic Recovery: An Analysis and Exploration **2011**
2. Understanding PISA and What it Tells us About Educational Standards in Ireland **2012**
3. Towards a New Climate Change Policy **2012**
4. Ireland and the Climate Change Challenge: Connecting 'How Much' with 'How To'. Final Report of the NESC Secretariat **2012**
5. Review of Developments in Banking and Finance **2013**
6. Employment and Enterprise Policy **2013**
7. Greening the Economy: Challenges and Possibilities

- | | | |
|-----|--|-------------|
| | for Integrating Sustainability
into Core Government Policy | 2013 |
| 8. | Activation Policy | 2012 |
| 9. | Consumer Prices | 2012 |
| 10. | Review of Irish Social and
Affordable Housing | 2014 |
| 11. | Financing of Social Housing
in Selected European
Countries | 2014 |
| 12. | Reflections on Infrastructure Policy
and Institutional Developments in
the UK | 2017 |
| 13. | Land Value Capture and Urban
Public Transport | 2018 |
| 14. | International Approaches to Land
Use, Housing and Urban
Development | 2018 |
| 15. | Cost-Benefit Analysis,
Environment and Climate
Change | 2018 |
| 16. | Multistakeholder Agreements
in Climate Governance and
Energy Transition: The
Dutch Energy Agreement | 2018 |
| 17. | The Framing of Climate
Action in Ireland: Strategic
Considerations | 2019 |

