Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

NOTIFICATION TO ATTEND MEETING OF THE CLIMATE ACTION, ENVIRONMENT AND ENERGY SPC

TO BE HELD IN THE BY REMOTE VIDEO CONFERENCE VIA - MICROSOFT TEAMS

ON WEDNESDAY 22 FEBRUARY 2023 AT 3.00 PM

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AGENDA

WEDNESDAY 22 FEBRUARY 2023

	i	Minutes of the meeting held on 13th October 2022	**83 - 85**
	ii	IPA Research Report	**86 - 105**
7	Climate Action - Sabrina Dekker, Climate Action Co-Ordinator		
	i	Climate Action Update Presentation	**106 - 115**
	ii	Climate Neutral Dublin 2030	**116 - 119**

8 Motion in the name of Councillor Sophie Nicoullaud

"That this committee acknowledge and notes the latest ESRI and the EPA study on Carbon emission here attached. The working paper No. 740 *The Global Emissions Impact of Irish Consumption* was published in November 2022. This motion asks also for this motion along with the ESRI/EPA working paper be sent to all area committees for them to not it and be sent to all staff at management level and above in DCC. That this motion if passed be circulated to all councils in the country.

What comes out of their study is that carbon emissions attribution to Ireland is greater than what is attributed now. It shows that Irish emissions in 2019 were 74% higher when calculated using this 'consumption-based' approach than with the conventional approach. Countries like Ireland had effectively 'out-sourced' a big chunk of our greenhouse gas emissions.The values given for countries' greenhouse gas emissions are almost always defined as weight of relevant gases produced within that country – they are the values used in all the climate negotiations, . But a truer picture of the emissions due to a country would consider the emissions, wherever in the world they happen, due to consumption within a country. Because we import so many products from poorer countries, many of the greenhouse gases due to the goods and services that we in the rich countries consume are actually produced elsewhere on the planet."

9 A.O.B

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

MINUTES OF THE CLIMATE ACTION, ENVIRONMENT AND ENERGY STRATEGIC POLICY COMMITTEE MEETING HELD ON 30th November 2022.

1. Minutes of the meeting held on 12th October 2022

   Order: Agreed

2. Matters Arising

   None.

3. Correspondence – CNFE

   Order: Noted

4. Chairpersons Business

   The Chair advised the Group that Codling Windfarm, a project off the coast at Greystones have been in contact with a view to presenting to the SPC as it is anticipated that the generated electricity will be landed at or near the Poolbeg SDZ

   Order: It was agreed to invite Codling Windfarm to present a future meeting of the SPC

5. Meeting Dates 2022

   Order: Noted

6. Posters Protocol (Protocol Attached)

   The Chair informed the Committee that the Protocol was referred back from the City Council seeking additional changes / information

   (i) Number of posters permitted to be increased to 250
   (ii) The requirement to supply specific streets where posters can be erected to be changed to general area, i.e. Raheny, Inchicore, etc.
   (iii) The issue around insurance to be clarified

   Order: (i) and (ii) agreed
   Law Agent to advise in writing on the insurance requirement and specifically address the issue of insurance and liability

7. Climate Action Update, Liam Bergin, Executive Manager & Sabrina Dekker, Climate Action Co-Ordinator

   Members thanked Sabrina for the report and raised the following questions issues

   - Where are the main challenges for the Council to achieve carbon neutrality
   - Is there further information on the collaboration with Belfast City Council
   - What is the position in relation to retrofitting social housing flat complexes
   - Did the City Council have representation at Sharm el Sheikh (COP27)
   - Has COP27 made a difference to this report
   - What linkage is there with this SPC and the Dublin / Belfast Economic Corridor
   - Is it possible to have a presentation from an attendee at the COP27 conference
   - Can a distinction on the "ongoing" status of the actions be made, i.e. where exactly the actions are at?
   - What is the position on the 100 Climate Neutral Cities

   Sabrina Dekker / Liam Bergin responded

   - The main challenges lie in the transport area.
   - Ireland will be signing up to the Integrated Carbon Inventory System which will ensure carbon monitoring
   - The Departmental guidelines on retrofitting are being followed
   - A block of social housing flats has been identified for retrofitting it is likely to be a year before work commences
   - The purpose of the Belfast collaboration is to promote circular economy initiatives
   - The City Council was not represented at COP27
   - The City Council expression of interest for 100 Climate Neutral Cities was accepted.
   - Should have more detail on 100 Climate Neutral Cities early next year.
   - To achieve a circular economy it is necessary to link in with the Dublin / Belfast Economic Corridor Group
   - Not sure in COP 27 added additional urgency
   - Frank McGovern from the IPA attended COP27 and can be asked to present to the Committee

   Order: Noted

8. Bulky Household Waste Collection Service – Richard Whelan, Administrative Officer

   Order: Item Deferred

9. Litter Bin Sensor Project Trial - Barry Woods, Senior Engineer

   Members thanked Barry for his presentaion and raised the following question / issues

- Will the changes in work practices be problematic
- Where will the trial take place
- The routes identified, are they high footfall or suburban
- Will bins in parks be included
- What is the project timeline
- Could a map be provide on the Citizen Hub where members of the public can report full / overflowing bins

Berry Woods responded

- Discussions are ongoing with work representatives / unions which are progressing well so far.
- Two routes are being trialled 1 on the Northside and 1 on the Southside
- Will revert to members with streets involved
- Where there is high footfall bins are emptied daily, the trial will cover areas where emptying is not required on a daily basis.
- We hope to commence the trial before Christmas
- The sensors are being fitted next week
- Every litter bin has a QR code which when scanned can be reported as needing attention

Order: Report Noted

10. Seagulls litter nuisance – Barry Woods Senior Engineer

Members thanked Barry for his report and raised the following questions / issues

- Happy that an attempt is being made to address this issue
- Not sure the bag option will work
- Has underground waste collection infrastructure been considered
- Could the trial also include domestic customers
- Will the new system provide for waste segregation
- What happened to the collapsible bin proposal
- Can Talbot Street be included in the pilot area.
- It is important the domestic customers are included in the trial
- Concerned that the bag concept will be a cause of litter rather than a solution
- Underground waste infrastructure is very successful in other European Cities
- There should be consultation with disability groups
- Who will provide the gull bags.
- Any communication should not blame the problem on wilklife

Barry Woods responded

- It is difficult to put waste collection infrastructure underground owing to the amount of services already in situ
- We will look at bags / caddies for dry recyclables / food waste
- We will examine the inclusion of domestic customers
- The trial is being run in conjunction with waste operators

- There will be communication from DCC and the Waste Operators
- Caple street has been picked for the trial
- We will look at Talbot Street
- The Waste Collectors logo will be on the gull bags

11. A.O.B.

Cllr. Flynn referred to the windfall tax being levied on energy companies and queried in the Waste to Energy Plant is liable for this tax

Order: Noted, report to issue to Cllr. Flynn

In attendance

Members

Paul Boylan, Dublin Chamber of Commerce
Trevor Clowry, Public Participation Network
Councillor Joe Costello
Councillor Mannix Flynn
Sally Starbuck, Royal Institute of Architects of Ireland
Bernie Guinan, Association of Consulting Engineers of Ireland
Councillor John Lyons
Councillor Naoise Ó Muirí
Councillor Claire O'Connor
Councillor Michael Pidgeon (Chair)
Councillor Catherine Stocker

Apologies
Councillor Claire Byrne
Robert Moss, Public Participation Network

Absent
Councillor Janice Boylan
Councillor Michael Watters

Officials

John Flanagan, Assistant Chief executive
Liam Bergin, Executive Manager
Barry Woods, Senior Engineer
Sabrina Dekker, Climate Action Co-Ordinator
Richard Whelan, Administrative Officer
Chris Carroll, Administrative Officer
Ciarán McGoldrick, Senior Staff Officer
Bernie Lillis, Litter Prevention Officer

Cllr Michael Pidgeon
Chair, Climate Action
Environment and Energy
Strategic Policy Committee
1st December 2022

Ciaran McGoldrick

To: Chief Executive
Subject: RE: CNFE Mail: CNFE calls for Russia sanctions to include nuclear.

From: CNFE Secretariat JD <office@cnfe.eu>
Sent: Wednesday 15 February 2023 09:31
To: office@cnfe.eu
Subject: CNFE Mail: CNFE calls for Russia sanctions to include nuclear.

Dear Mayor, dear Councillor, dear Colleague,

CNFE urges European Union (EU) leaders to extend the sanctions, introduced because of the war with Ukraine, to include nuclear energy.

Vienna's Executive City Councillor Jürgen Czernohorszky, Chairman of Cities for Nuclear Free Europe, has made this appeal to the European Commission in a letter he has sent this week. We attach his letter for your information.

A recently updated study "Russian Grip on EU Nuclear Power", commissioned by the Vienna Ombudsoffice for Environmental Protection, clearly shows the dependency of Europe on Russian nuclear fuel as well as on nuclear knowledge and services. The study is also attached to this mail for your information.

Almost a year after the invasion of Russia in the Ukraine, and after eight EU sanction packages, nuclear business with Russia is still kept out of the restrictions. CNFE urges the Commission to include nuclear energy in the ban, not only nuclear fuel but also nuclear services.

The Russian Rosatom is the leader of the USD 500 billion global nuclear energy market, building 37% of all new reactors in the world. Rosatom/TVEL is also the supplier of nuclear fuel for the VVER reactor series, thus creating severe dependency for those countries still operating the nuclear power plants they built in communist times.

Poland and the Baltic States have come forward with their proposals to include a ban on cooperation with Russia in the field of nuclear energy and fuels. Finland has cancelled the NPP construction contract with Rosatom. Other countries (Ukraine, Bulgaria, Czech Republic) already started switching to Western suppliers, showing that a ban on uranium from Russia is possible.

Furthermore, the ownership of European companies in the nuclear field, which were in possession of Russian entities, was changed due to political pressure (e.g. Škoda Js in Czech Republic).

Other countries in the EU state that a ban on Russian fuels and nuclear services is not possible. They say that nuclear energy in Europe is not feasible without supply and services from Russia. If this is true, large parts of Europe would be dependent on Russian supplies and thus subject to blackmail.

EU sanctions must be approved unanimously by its member countries, and Hungary's Prime Minister Viktor Orban has said that his country will veto any plan by the 27-member union for sanctions which affect nuclear energy. Hungary has plans for two new Russian reactors at its existing Paks nuclear power plant, which gets its nuclear fuel from Russia.

CNFE states that nuclear energy should have no place in the European Energy Policy, and certainly cannot play a role under the umbrella of the European Green Deal, and that the European Union seriously should consider a ban on nuclear supply and services from Russia.

If a total ban is (politically) not possible for all European countries, then at least those countries willing to reduce Russian dependencies should be supported in their efforts by coordinative assistance.

In general, to reduce dependency for a sustainable energy supply, the EC should thrive towards a nuclear free Europe, and consequently exclude nuclear energy from any European financing or supporting instruments.

A letter with these demands was sent to the President of the European Commission, Ursula von der Leyen, to the Vice President of the European Commission, Frans Timmermans, and to the Commissioner for Energy of the European Commission, Kadri Simson.

Please do not hesitate to contact us, if you have any questions or remarks.

Jan Dictus

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CNFE
Cities for a Nuclear Free Europe

President of the European Commission
Ursula von der Leyen

Vice President of the European Commission
Frans Timmermans

Commissioner for Energy of the European Commission
Kadri Simson

Rue de la Loi / Wetstraat 200
1049 Brussels
Belgium

Date: 14 February 2023

Subject: Russian Grip on EU Nuclear Power

Dear Ms. President Von der Leyen!
Dear Mr. Vice-President Timmermans!
Dear Ms. Commissioner Simson!

I am writing to you as the chairman of Cities for Nuclear Free Europe (CNFE). CNFE is a network of cities – some of them are capitals or regional capitals – and big local authorities in Europe, who are committed to a new fossil-free, nuclear-free future. With 33 member cities, we are representing a total number of more than 14 million inhabitants.

Almost a year after the invasion of Russia in the Ukraine, and after eight EU sanction packages, nuclear business with Russia is still kept out of the restrictions. CNFE urges you to include nuclear energy in the ban, not only nuclear fuel but also nuclear services.

The Russian Rosatom is the leader of the USD 500 billion global nuclear energy market, building 37 % of all new reactors in the world. Rosatom/TVEL is also the supplier of nuclear fuel for the VVER reactor series, thus creating severe dependency for those countries still operating the nuclear power plants they built in Communist times.

Poland and the Baltic States have come forward with their proposals to include a ban on cooperation with Russia in the field of nuclear energy and fuels. Finland was about to build a large-scale nuclear power plant (VVER-1200 at Hanhikivi) by Rosatom, but completely cancelled the project due to the Russian aggression. Other countries (Ukraine, Bulgaria, Czech Republic) already started switching to Western suppliers (mainly Westinghouse), showing that a ban on nuclear fuel from Russia is possible.

Furthermore, the ownership of European companies in the nuclear field, which were in possession of Russian entities, was changed due to political pressure (e.g., Škoda Js in Czech Republic).

Other countries in the EU state that a ban on Russian fuels and nuclear services is not possible. They say that nuclear energy in Europe is not possible without supply and services from Russia. If this is true, large parts of Europe would be dependent on Russian supplies and thus subject to blackmail.
This only supports the fact that nuclear energy should have no place in the European Energy Policy, and certainly cannot play a role under the umbrella of the European Green Deal.

We base our demands on a comprehensive study on European dependency for its nuclear energy, see attachment.

Based on these facts, CNFE asks that…

1. …the European Union seriously consider a ban on nuclear supply and services from Russia.
2. …the countries that are willing to ban should be supported in their efforts.
3. …the European Commission will thrive towards a nuclear free Europe, and consequently exclude nuclear energy from any European financing or supporting instruments, also to reduce dependency for a sustainable energy supply.

Yours sincerely,

Jürgen Czernohorszky,
Chairman Cities for Nuclear Free Europe
Executive City Councillor for Climate, Environment,
Democracy and Personnel of Vienna

www.cnfe.eu

Please send your reply to:

Mr. Jürgen Czernohorszky
Executive City Councillor for Climate,
Environment, Democracy and Personnel
Cities for Nuclear Free Europe
Rathaus
1010 Vienna
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Russian Grip on EU Nuclear Power

Report by Patricia Lorenz

May 4, 2022

Updated in November 2022

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About the author:

Patricia Lorenz has been working as an antinuclear campaigner and expert for GLOBAL 2000, Friends of the Earth Europe, The Joint Project - Nuclear Risk and Public Control and published papers on a multitude of nuclear issues, including Euratom, EU Taxonomy and Stress Tests since 1992.

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Annika Lorenz

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The author wishes to thank the **Vienna Ombudsoffice for Environmental Protection (Wiener Umweltanwaltschaft - WUA)** for funding this report.

Special thanks go to Vladimir **Slivyak**, Co-chairman of the Russian environmental group Ecodefense, the Right Livelihood Award 2021 laureate and co- founder of the Defuel Russia's war machine (www.defuel-russias-war.org) for his input and feedback.

Foreword

The Vienna Ombudsoffice for Environmental Protection (Wiener Umweltanwaltschaft - WUA) is very proud to present this report. The current events lead the WUA to commission this report on the severe dependence of nuclear industry from fuel and service provided by the Russian State atomic energy corporation Rosatom, which has been founded in 2007 by President Putin and is under direct control of the Kremlin.

This proves the idea of achieving energy supply security with nuclear energy a fatal mistake, because some type of nuclear fuel and maintenance for VVER reactors are irreplaceable. The ethical consequences of continued cooperation are undeterminable. The report also analysed options for ordering fuel, services and new reactors from non-Russian companies as replacements, however, short-term solutions proved to be impossible, even the long-term prospect is burdened with a high number of insecurities.

Phasing-out this high-risk energy production is the only reasonable action to take.

David Reinberger

Vienna Ombudsoffice for Environmental Protection (Wiener Umweltanwaltschaft)

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Executive Summary

This report maps out the situation the nuclear industry finds itself in since Russia invaded Ukraine. When compared to gas and oil from Russia, where discussions on sanctions, boycotts, terms of payment started right away, nuclear power has managed somewhat to stay out of the limelight.

While the volume compared to gas and oil is certainly smaller, the Russian nuclear export business is a factor in its foreign policy and part of the Russian war machine; the heavy reliance on uranium and nuclear fuel made this possible.

However, with the war continuing and war crimes a fact, on April 7 the European Parliament agreed on another resolution, demanding a full embargo on imports of oil, coal, nuclear fuel and gas from Russia, believing that the Russian industry and experts, namely Rosatom, can be replaced by Western ones.

However, this might not be the case, as this report shows:

Rosatom became the leader of the USD 500 billion global nuclear energy market, building 37% of all new reactors in the world, eclipsing the United States' meagre 7% share. However, claims about the status and progress of the new nuclear power plant project should be taken with a grain of salt, as an analysis by an independent Russian expert has shown.

Rosatom/TVEL is the supplier of nuclear fuel for the VVER reactor series. They use different fuel to that of Western design nuclear power plants, thus creating severe dependency for those countries still operating the nuclear power plants they built in Communist times. The situation for VVER-440 units is different from the larger and newer VVER-1000 series, because no Western supplier can provide fuel for the smaller plants. For countries operating only VVER-440 plants, Slovakia and Hungary, about half of their domestic power generation is at risk.

Some countries (Ukraine, Bulgaria, Czech Republic) already started switching to Western suppliers, but Westinghouse is the only one already supplying VVER-1000 fuel assemblies. On top of likely technical problems with the replacement fuel which have occurred in the past decades it is clear, that Westinghouse will not be able to handle the large number of new customers asking for fuel – Westinghouse will first need to create new production capacities. Short-term solutions are not likely while some EU leaders started calling for an embargo also on nuclear fuel from Russian state companies.

Less known but of key importance are the many companies active in nuclear services. Among them is Škoda JS, a former Czech nuclear company, which in 2004 was bought by OMZ, the Russian heavy machinery manufacturer, itself owned by Gazprombank, a private bank owned by Russian gas monopoly Gazprom. Škoda JS is indispensable for keep the nuclear power plants Temelin, Dukovany, Mochovce, Bohunice, Paks and Kozloduj operating. The Czech government and the Czech utility ČEZ are desperately trying to find a solution, including nationalization, also connections to FSB were reported. At the end of 2022, ČEZ managed to buy Škoda JS back. (See Update p. 8, for more information.)

The report also gives an overview of the possible alternative vendors for new reactors, which are very limited. On top of the usual construction time and costs overruns, both the French EPR and the US AP-1000 have encountered several design failures. The South

Korean APR-1400 is not recognized as a Gen III+ reactor in Europe, Chinese reactors are already excluded for security reasons in UK and the Czech Republic.

Update

of study "Russian Grip on EU Nuclear Industry", November 2022

Key findings are:

1. **EU sanctions against nuclear business have not been agreed upon** because untangling from dependency is slow or impossible.
2. **Unclear status of Framatome** as a "Western" supplier, the French state company which continues its dependence and business with Rosatom
3. **Impacts on Rosatom**: Only Finland has cancelled the NPP construction contract with Rosatom. The Paks II nuclear power construction project was not halted by Hungarian government, but the government is worried about deliveries of Framatome I&C from Germany.
4. **Progress towards fuel replacements:** tenders and preparations in all countries ongoing

1. EU sanctions against nuclear business have not been agreed upon.

Eight EU sanction packages later, nuclear business with Russia is still kept out of the restrictions. In the current run-up for the nineth sanction package, it was rumoured that another attempt was made to include nuclear energy in the ban. Poland and the Baltic States have come forward with their proposals to include a ban on cooperation with Russia in the field of nuclear energy and fuels. However, Hungary already insisted that nuclear business with Russia will not be included in this forthcoming package.

In August, after the NPP Zaporizhia shelling, the Ukrainian president Volodimir Selenskiy tweeted that he "talked with @eucopresident Charles Michel, told about the situation on the battlefield, in particular at the Zaporizhia NPP. Russian nuclear terror requires a stronger response from the international community – sanctions on the Russian nuclear industry and nuclear fuel. "[1]

Still, even the next attempts to stop financing Putin's war with European money for nuclear services which were undertaken by the Baltic states Poland, Ireland, Germany and Austria encountered fierce resistance, mostly by Slovakia, Bulgaria, Hungary and of course France. Finland seems not to exclude this option altogether, though fuel supply for Lovissa NPP is coming from Russia.

European Commission's view on sanctioning Russian nuclear business

European Commission's responsible Commissioner for Energy, Kadri Simson, addressed this issue whilst accepting that nothing will change by saying at the pro-nuclear ENEF event on November 10, 2022: "We still find ourselves in a situation where we have a critical dependence on Russia for nuclear fuel supply to Russian designed reactors

[1] August 7, 2022, on Володимир Зеленський (@ZelenskyyUa) / Twitter.

operated in five of our member States. And many other member States rely on Russia for services – conversion and enrichment.

This needs to change, because, as it is with gas, we cannot be fully secure of our energy supply if we are dependent on an unreliable source. For the past few months, the five countries with active Russian designed reactors have been in discussions on what can be done to licence alternative fuels that don't compromise on energy security. Nuclear energy can offer useful solutions in the current crisis and at the same time presents to us important security of supply challenges of its own."[2]

Other voices also were reported from the European Commission: "There is no reason that they [Russia] are closing our gas supplies and keeping open our nuclear fuel supplies.", Massimo Garribba, deputy director general of the European Commission's Energy Directorate was quoted as having said. "This is a risk we must tackle...urgently."

It is not only about fuel, but also about services. In the **Czech Republic,** the power utility ČEZ succeeded in the acquistion of Škoda JS, the nuclear service company which was in Russian hands.

According to their November 15, 2022, press release "the ČEZ Energy Group became the 100% owner of ŠKODA JS, a traditional Czech company operating in the field of nuclear energy. With the purchase, ČEZ solved the problem of its major supplier, which several years ago became part of the Russian engineering group OMZ, controlled by Gazprombank. This put the company at risk of sanctions, which had a potential impact on securing key supplies for the ČEZ Group's nuclear power plants. "What cannot be perceived as progress for independence of the Czech nuclear TSO ÚJV Řež is the fact that ČEZ will also acquire further shares in the scientific research facility ÚJV Řež, which Škoda JS currently owns. The ČEZ Group's ÚJV Řež shareholding will therefore increase from 52.46% to 69.85%."[3]

Bulgaria is grappling with the dependence on Russian institutions both for fuel diversication and the Kozloduj annual overhaul. For the fuel deliveries a very political decision was taken in December 2022. For the 6th unit of the nuclear power plant, Framatome will start supplying the nuclear fuel. For the 5th unit's fresh fuel however, Westinghouse signed a contract in late December 2022.

2. **Unclear status of Framatome** as a "Western" supplier, the French state company which continues its dependence and business with Rosatom

In late 2021, France's Framatome and Russian state nuclear corporation Rosatom signed a new strategic cooperation agreement further expanding the companies' efforts to develop fuel fabrication and instrumentation and control (I&C) technologies.[4]

[2] https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_22_6804.
[3] ČEZ, Press Release, November 15, 2022.
[4] WNN, Dec 2,2021: Framatome and Rosatom expand cooperation : Corporate - World Nuclear News (world-nuclear-news.org).

The French state-owned company Framatome continues the import of enriched uranium from Russia to its fuel element production facility in Lingen/Germany, which is supplying French nuclear power plants and many other plants in Europe. The French government made clear that the uranium supply will not be allowed to fall under the EU sanctions against Russia. Bulgaria announced its switch away from TVEL/Rosatom fuel, but one might raise the question whether the Framatome joint venture with TVEL, which produces nuclear fuel assemblies that are a complete analogue of those used at Kozloduycan can be seen as an alternative.[5]

3. Impact of sanctions on Rosatom

Finland has cancelled the NPP construction contract with Rosatom. The NPP Paks II construction was not cancelled by the Hungarian government; instead, the Hungarian government made its worries about deliveries of the necessary Framatome I&C public. While France already cleared the export of the equipment, Germany has not done so.

The reduction of fuel sales in the future is an obvious consequence. Of a more strategic impact could be the fact that the brain of a nuclear power plant, the Instrumentation & Control System (I&C) for VVER-1000 and VVER-1200 are not produced by Rosatom but are a unique product produced and delivered by the French state company Framatome's subsidiary in Germany. The situation concerning the export permit is unclear. According to media reports, the French already issued the permit, the German government has not said anything. According to the German Nuclear Bill, art.3 on export, a permit is required only for fission material, not technology. One might speculate that the I&C might fall under the EU sanctions for high-tech goods to Russia.

A full ban on the I&C would impact the entire newbuild program, which Russia is trying to keep. On top of keeping some of its nuclear export business, Rosatom is trying to make new acquisitions. Attempts to enter the African markets continue, in particular with Burundi, Zambia, Nigeria and further down the road Ghana, Tanzania and Ethiopia during the International Forum Atomexpo-2022 which was held in Sochi (Russia) on November 21-22.[6] Also, Nicaragua, Myanmar, Uzbekistan, Kyrgyzstan confirmed their interest in nuclear cooperation with Russia. An agreement was signed between the Russian government and the Belarusian government on cooperation in the field of used nuclear fuel management.

Existing contracts have not been cancelled e.g., in **Egypt**, where in October 2022 the first concrete was poured for the El-Dabaa NPP which will comprise four units with generation III+ VVER-1200 pressurised water reactors.[7] Also, Hungary refuses to even discuss the option of cancelling business with Russian companies and the construction of Paks II is ongoing.

[5] Nucleonics Week, Nov. 1, 2022.
[6] https://www.neimagazine.com/news/newsatomexpo-attracts-65-countries-10381392/.
[7] https://www.neimagazine.com/news/newsfirst-concrete-poured-for-unit-2-of-egypts-el-dabaa-npp-10376585/.

Hungary continues the preparation of the already much delayed Paks 2 construction and remains blocking EU sanctions from including nuclear business. While the contract was signed in 2014, the planned VVER-1200 units have not even received all necessary licenses to start construction works due to Rosatom's inability to deliver necessary documentation and other preparatory work.

4. **Progress towards fuel replacements:** tenders and preparations in all countries

In **Finland**, the NPP operator Fortum asked Westinghouse to deliver fuel for the NPP Loviisa; however, Fortum confirmed that the company will continue buying nuclear fuel from TVEL (Rosatom) until 2027 and 2030 – and continue its dependency on Rosatom.

Hungary made clear several times that there is no intention to diversify from TVEL/Rosatom and find an alternative nuclear supplier for the four VVER-440/213 units operating at the Paks site. Rather the contrary: The fuel supply contracts for the Paks 2 units have already been signed with TVEL.[8] However, they seem to be participating in the VVER-440 group of countries which are working on alternatives.

Czech utility ČEZ announced the switch to Western fuel suppliers already in April 2022; contracts with both Westinghouse and Framatome were signed in June 2022 and deliveries are to start in 2024 for ten years.[9]

At first, **Slovakia** tried to avoid the discussion altogether, but seems to have accepted the need to diversify or rather replace Russian fuel and intends to contract Westinghouse fuel. In an interview on September 9, 2022, Branislav Strýček, the Slovak utility SE CEO mentioned that one month earlier a tender for a new fuel supplier had been announced. He commented on the situation which has improved compared to 6-7 months ago, also due to intensive cooperation with the group of other countries with VVER-440 reactors (Czech Republic, Hungary, Finland) and said that he believed in Framatome's and Westinghouse's ability to deliver this type of fuel.[10]

Bulgaria seems to be in the most complicated and unclear situation. TVEL will supply VVER fuel to Kozloduy -5 and -6 until the end of 2025. The Bulgarian government had to accept the fact that a full ban of Russian nuclear services is impossible and issued derogations from the ban on trade with Russia. The fuel diversification may require a certain level of cooperation with the Russian Kurchatov Institute, based on an existing bilateral contract.[11] Some services for the Kozloduj reactors can only be obtained from Russia: "The derogation will allow the continuation of contracts with "Rusatom Service AD - Bulgaria branch", which is the only participant in the procedure for measuring the actual geometry of the active zone limiter of VVER-1000 reactors. The same company is also the contractor for the modernisation of the neutron flow control equipment, the

[8] IEA 2022, International Energy Agency, Hungary 2022 Energy Policy Review.
[9] https://www.cez.cz/cs/pro-media/tiskove-zpravy/posilujeme-energetickou-bezpecnost-cr-uzavreli-jsme-smlouvy-na-dodavky-palivovych-souboru-se-spolecnostmi-westinghouse-a-framatome-160155.
[10] https://www.youtube.com/watch?v=UgyNe9JhMjI.
[11] Nucleonics Week, Nov. 1, 2022.

repair and operation of the turbogenerators, which will also be continued".[12] Also the core-reactor-management-system is of Russian design, scientific support by Kurchatov institute, therefore for Westinghouse there will be a need to cooperate with the Kurchatov Institute. The Annex to the September 24, 2022, government decision on Kozloduj contains many items, which will be ordered from Russian companies, e.g., OKB Gidropress, Elsib.

The government has given permission to continue work on five more contracts, including the one for the advanced nuclear fuel cycle of units five and six. The long-term idea is to move to diversifying fuel supplies, and in late December 2022 new contracts were signed: On December 29, 2022, a contract was signed for the 6th unit of the nuclear power plant with Framatome. The company will start supplying the nuclear fuel in 2025. For the 5th unit's fresh fuel delivery however, Westinghouse signed a contract in late December 2022. This rather unusual approach was obviously taken in response to political reality.

Regarding nuclear fuel elements for the smaller VVER series, the **VVER 440/213,** both Westinghouse and Framatome made some announcements, however, they have not confirmed that this type will be available and when.

Future of nuclear programs

Many comments from pro-nuclear agencies try to sell nuclear power as an element of energy security. Keeping aside the economic and technical considerations connected to reactors both large and smaller (SMR), countries such as Poland and Estonia which are currently discussing the nuclear option would need to take a very close look at the security angle of nuclear installations in countries bordering with Russia and following an openly anti-Russian policy. Both countries being NATO-states they can rely on NATO protection, however, smaller attacks by terrorist groups or mercenaries or "men in green uniforms" cannot be excluded and would put the entire country at risk.

[12] Email from Todor Todorov, Zazemiata, Bulgaria, dated September 26, 2022.

Introduction

This report maps out the situation the nuclear industry finds itself in since Russia invaded Ukraine. When compared to gas and oil from Russia, where discussions on sanctions, boycotts, terms of payment started right away, nuclear power has managed somewhat to stay out of the limelight.

Regarding the gas supply, Germany and Austria in particular, and to a lesser extent Italy, were quickly blamed by other EU member states for their refusal to cancel their gas delivery contracts. Reluctantly, the most dependent countries made clear that they are not going to sanction Russian gas. Currently the oil embargo is on the agenda and nuclear fuel might be next. The economic difficulties might become even worse. According to Gabriel Felbermayr, Director of the Austrian Institute of Economic Research (WIFO) in Vienna, a new Iron Curtain may fall between Russia and the rest of Europe; the resulting "ice age" could last ten years, at least."[13]

Nuclear power so far managed to avoid Western embargoes for manifold reasons. Among those many reasons is certainly the heavy reliance on uranium and nuclear fuel. Scientists from the Colorado School of Mines pointed out: "As Western nations look for ways to reduce their reliance on Russian oil and gas, another aspect of the Ukraine crisis has received less attention: Most of the 32 countries that use nuclear power rely on Russia for some part of their nuclear fuel supply chain."[14]

While the volume compared to gas and oil is certainly smaller, the Russian nuclear export business is a factor in its foreign policy and part of the Russian war machine. In an open letter[15], a coalition of Ukrainian NGOs called upon the US and EU leaders: "Russia is using its nuclear company as one of the tools in the ongoing war. At this very moment it is important to impose tough sanctions against Russia, which will halt its ability to continue waging a brutal war on Ukraine and threaten international security."

However, when the European Commission came out with its REPowerEU strategy for weaning the EU off Russian gas on 8 March, nuclear was strangely absent. The IAEA Director General also seemed surprised: "We are disappointed that very little is said about nuclear in the communication, given that it consistently produces around one quarter of electricity in the EU," said Grossi. "Ignoring the EU's main source of highly dispatchable, low-carbon and non-weather dependent energy raises questions about whether the proposed measures are realistic."[16] Thanks to this misleading policy some countries will have to face very tough decision soon, as this report shows.

However, with the war continuing and war crimes a fact, on April 7 the European Parliament agreed on another resolution, demanding a full embargo on imports of oil, coal, nuclear fuel and gas from Russia, believing that the Russian industry and experts, namely Rosatom, can be replaced by Western ones:

> 17. Calls for an immediate full embargo on Russian imports of oil, coal, nuclear fuel, and gas, for Nordstream 1 and 2 to

[13] Kleine Zeitung, April 22, 2022.
[14] https://theconversation.com/russias-energy-clout-doesnt-just-come-from-oil-and-gas-its-also-a-key-nuclear-supplier-179444 (Accessed April 14, 2022).
[15] https://en.ecoaction.org.ua/on-russian-nuclear-industry.html.
[16] Energy Monitor, 24 March 2022: https://www.energymonitor.ai/sectors/power/will-the-ukraine-war-change-europes-thinking-on-nuclear (Accessed April 3, 2022).

> be completely abandoned, and for a plan to continue ensuring the EU's security of energy supply in the short-term to be presented; […]
>
> 19. Urges the Member States to terminate collaboration with Russian companies on existing and new nuclear projects, including in Finland, Hungary and Bulgaria, where Russian experts can be replaced by Western ones, and to phase out the use of Rosatom services; calls for an end to scientific cooperation with Russian energy companies, such as Rosatom, and other relevant Russian scientific entities; demands that sanctions on Belarus mirror those introduced against Russia in order to close any loopholes allowing Putin to use Lukashenka's aid to circumvent sanctions;

The task of this report is to provide a first assessment of whether it is possible to replace Russian nuclear services in the near-term. This report is probably the first to gather a comprehensive picture of the Russian nuclear industry's deliveries, supplies and services for the European nuclear industry, and provides one example of a mutual dependency.

Can the manufacturer Rosatom and its subsidiary TVEL be easily replaced? What about the rest of the Russian *matryoshka* unveiling Rosatom's numerous subsidiaries in Russia as well as less visible ones, such as the "Czech" but actually Russian-owned Škoda JS which itself partly owns the Nuclear Research Institute Řež?

The first step is the manufacturing and construction of new reactors. This might be the clearest phase: Business of this size and importance cannot take place any longer, therefore Rosatom will not construct any of its VVER in Europe for years, or rather decades, to come. Some countries had already taken the decision to ban Russian (and Chinese) reactors construction, notably the Czech Republic, with Finland following weeks after the invasion. Only Hungary has tried to hold on to its order. In theory, of course, reactors can be ordered from other countries, although Rosatom was seen as the market leader in this field.

What is much clearer is the dependence on Rosatom's nuclear fuel manufacturer TVEL, which, after switching back and forth to other fuel suppliers, still supplies most countries operating VVER. Those with VVER-440 reactors are fully dependent on Russian fuel.

Less well-known is that not only nuclear fuel, but also reactor maintenance is in Russian hands. The report also devotes a large chapter to services and maintenance in the field. At first glance the VVER market leader is the well-known Czech company Škoda JS, but it is actually Russian-owned, and hardly replaceable for Czech Republic, Slovakia, Bulgaria and Hungary. Unsurprisingly, Hinkley Point C and other European Pressurised Reactor (EPR) projects might also be affected.

In combination with the shocking picture of Russian troops shelling and threatening Ukrainian nuclear power plants and the fact that most Soviet-built nuclear power plants in CEE countries have already reached the end of their original life-time, a well-prepared phase out of nuclear power would be the economically and politically most sustainable answer.

1. Russian Nuclear Companies

The nuclear sector is exposed to high risks all over the world because the industry is heavily dependent on Russian-mined uranium, VVER-fuel supplies, servicing and maintenance of nuclear power plants and new-build plans.

The EU's latest sanctions on Russia do not (yet) include the nuclear sector, but new-build projects, pushed back for years and relatively advanced in the planning or preparation stages, have already been, or may be cancelled, while sooner or later others could turn out to be very problematic, in one way or another.

At the centre of this is Rosatom and, of great importance for CEE countries, the former Czech company Škoda JS and the technical support organisation (TSO) Řež ÚJV.

1.1 Rosatom – The nuclear giant

Rosatom Holding, with around 300 companies, was created by Vladimir Putin in 2007. It is an economic as well as political power to reckon with. As the Czech nuclear regulator SUJB's chairwoman Dana Drábová said in 2021: "Rosatom is a company under Kreml control."[17]

This is also confirmed by Rosatom's development programme, which had to be approved by the Russian President. Putin approved a rise in funding under the programme, known as the Development of Equipment, Technologies and Scientific Research in the Nuclear Industry, from Rb 349.5 billion (USD 4.77 billion) to Rb 552.7 billion, of which Rb 119 billion are expected to be allocated from the Russian federal budget.[18]

According to Rosatom's website, the corporation includes about 300 enterprises and organisations employing a total workforce of more than 290,000.[19]

The Rosatom 2020 Annual Report on market shares:

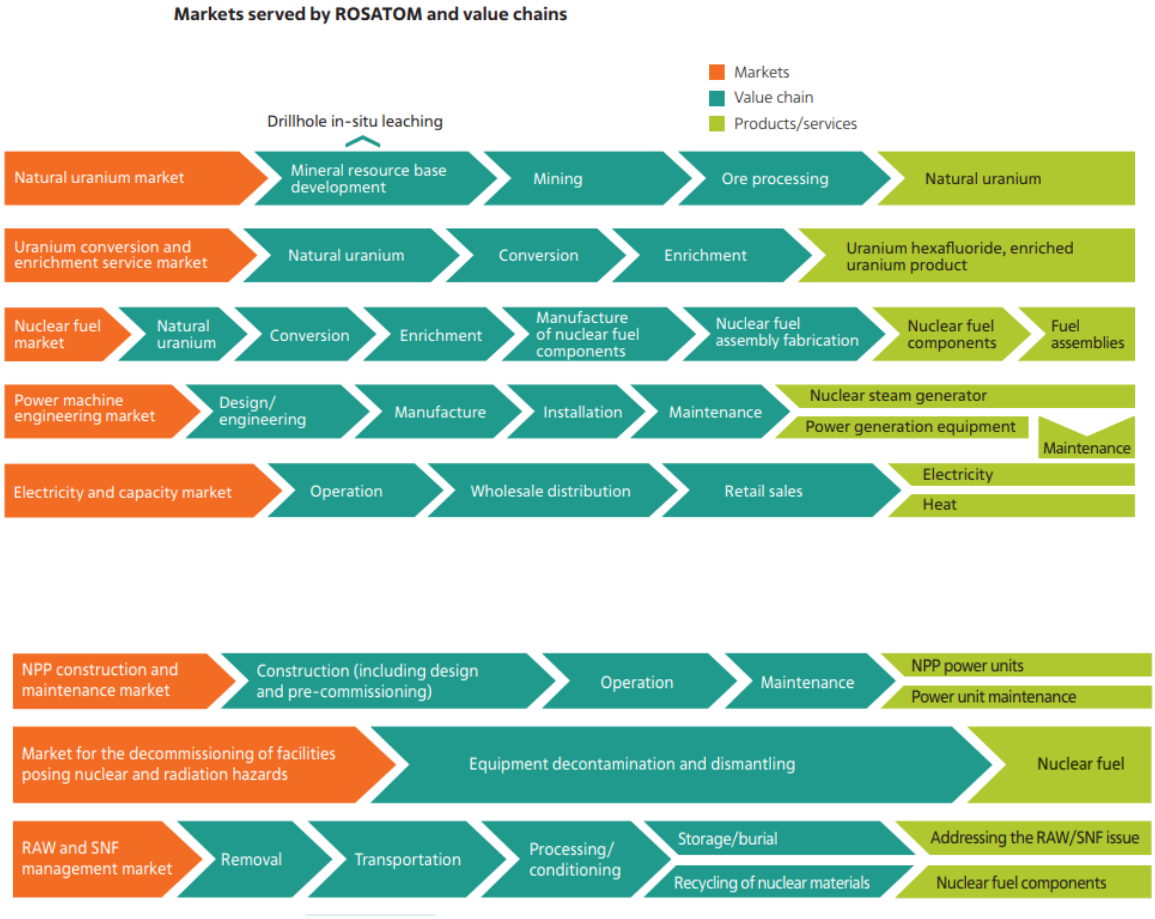
In 2020, ROSATOM ranked:

- First in the world in terms of the number of NPP power units in the portfolio of foreign projects (36 power units, including power unit No. 1 of the Belarusian NPP);
- First on the global uranium enrichment market (36%);
- Second in the world in terms of uranium production (15% of the market);
- Third on the global nuclear fuel market (17%).

The following scheme shows that through its subsidiaries Rosatom covers the complete "nuclear fuel cycle" of the nuclear industry, from mining to burial:

[17] iDNES.cz podcast, April 27, 2021.
[18] Platts Nucleonics Week August 19, 2021.
[19] https://rosatom.ru/en/about-us/.

Figure 1: Markets served by ROSATOM and value chains[20]



Its political importance can be easily demonstrated by the following "staffing decisions": In 2016, Russian President Vladimir Putin appointed Rosatom Director General Sergey Kirienko as the First Deputy Head of the Presidential Administration with immediate effect. Before becoming the head of Rosatom, Kirienko led the Russian Federal Atomic Energy Agency for two years.[21] Currently, he is the Chairman of the Supervisory Board of Rosatom.

Rosatom became the leader of the USD 500 billion global nuclear energy market, building 37% of all new reactors in the world, eclipsing the United States' meagre 7% share.[22] However, claims about the status and progress of the new nuclear power plant

[20] Rosatom 2020 Annual Report.
[21] WNA, https://www.world-nuclear-news.org/Articles/Kirienko-leaves-Rosatom-to-join-Presidential-Admin#:~:text=Russian%20President%20Vladimir%20Putin%20has%20appointed%20Rosatom%20director-general,minister%20of%20economic%20development%20and%20trade%20since%202010. (Accessed April 17, 2022).
[22] https://thebulletin.org/2015/10/russian-nuclear-power-convenience-at-what-cost/ (Accessed April 2, 2022).

project should be taken with a grain of salt, as an analysis by an independent Russian expert has shown.[23]

At the time, the Russian side also offered interesting incentives. One was financing in the form of loans, as applied for the Hungarian nuclear power plant Paks II, where Russia covered 80% of the (assumed) construction costs with a loan. To enter the market even more convincingly, Rosatom offered Turkey the BOO (build-own-operate) option: providing uranium fuel, running the reactors, and taking back the generated nuclear waste to Russia. However, similar offers were not made for projects such as Dukovany in 2020, with the funding having dried up.

BOO Akkuyu

Turkey, a country with no nuclear power plants and no nuclear experience, ordered four units from Russia. Turkey had no nuclear safety regulator, nor any nuclear legislation. There the BOO model seemed to make sense; however, the drawback is complete dependence on Russia during construction and operation. The project is progressing only slowly.

1.2 Nuclear industry key companies owned by Rosatom

A full list is available on Rosatom's website: https://rosatom.ru/en/all-enterprises. Most of the information listed in the following interview stems from the Rosatom website but was confirmed by other sources; only key companies are included.

Atomenergomash (AEM)

AEM delivers reactor islands, turbine islands and owns the well-know OKB Gidropress. AEM is involved in constructing reactors at the following sites in Russia: Kurskaya NPP, Leningradskaya NPP, Novovoronezhkaya NPP. Abroad, AEM is involved in new construction and modernisation: Astravets / Belarussia, Akkuyu / Turkey, Kudankulam / India, Tianwan / China, Hanhikivi / Finland, Temelín NPP, Paks II / Hungary, Kozloduy / Bulgaria, Bushehr / Iran, Mochovce /Slovakia and Metsamor / Armenia.

JSC Atomenergoprom (AEP)

The group comprises around 50 nuclear industry enterprises. Atomenergoprom (AEP) provides the full production cycle of nuclear power engineering — from uranium production to nuclear power plant construction and energy generation. AEP companies already includes large enterprises such as Rosenergoatom Concern (#2 in the world by nuclear electricity generation), TVEL (17% of the world nuclear fuel market), and TENEX.

Atomstroyexport (ASE, Engineering Division of Rosatom), JSC

Atomstroyexport (Engineering Division of Rosatom) unites the leading companies of the nuclear industry, namely: JSC Atomstroyexport. ASE is involved in the following NPP projects:

[23] Ecodefense, Vladimir Slivyak, Dreams and Reality of Russian Reactor Export. https://ecdru.files.wordpress.com/2019/03/rosatom-report2019.pdf.

Astravets/ Belarus, Hanhikivi/ Finland, Akkuyu/ Turkey, Paks II/ Hungary, El-Dabaa/ Egypt/, Kudankulam/ India, Rooppur/ Bangladesh, Tianwan/ China, Xudapu / China and Kursk in Russia.

Mayak Production Association

Mayak in Ozersk, in the Chelyabinsk Region, is infamous. Mayak produced plutonium as early as the 1940s and later became known worldwide for several accidents and radioactive contaminations. Spent fuel reprocessing is a service offered at the Mayak facilities, also to Western countries' utilities.

Nukem

The well-known market leader in storage and transport containers for the nuclear industry, the German company Nukem Technologies GmbH, has only one shareholder: ASE Group ('Atomstroyexport'). In October 2019, Nukem was integrated into TVEL/Rosatom[24]. It provides services related to the management of radioactive waste and spent nuclear fuel (SNF), as well as the decommissioning of hazardous nuclear and radiological facilities. AEA is handling projects such as three projects in Bulgaria: Construction of Dry Storage Facility for Spent Fuel at Kozloduy Nuclear Power Plant, Construction of a Near-Surface Repository for Low Level and Short-Lived Intermediate Level Waste in Bulgaria, Design for Dismantling of Equipment in the Controlled Areas of Kozloduy Nuclear Power Plant Units 1 to 4. In Austria, Nukem has three projects with the Nuclear Engineering Seibersdorf GmbH, and a total of 22 countries have contracts for Nukem's casks and services. At the Ignalina NPP site, it is responsible for the RBMK-1500 SNF storage facility and conditioning and storage facilities. Nukem is constructing the conditioning centre at the Bohunice site in Slovakia, and at Chernobyl. In France, Nukem is decommissioning Brennilis NPP, and NPP Philippsburg 1 in Germany.[25] More information on the projects can easily be found on the company's website.[26]

OKB Gidropress

OKB Gidropress is the designer of the VVER reactors, of which 21 NPP were built in a number of countries (Russia, Ukraine, Armenia, Finland, Bulgaria, Hungary, Czech Republic, Slovakia, China and India), and 22 WWER-440 units. As the plant designer, Gidropress plays a key role in modernisations and life-time extensions.

Project Centre ITER

Russia is involved in the international ITER project.

TENEX

Uranium products, including conversion and enrichment of uranium, also for Western PWR (Pressurised Water Reactors).

TITAN-2

The TITAN-2 Holding represents a group of Russian companies involved in constructing nuclear power facilities. Organisations within the Holding perform the whole cycle of

[24] https://www.nukemtechnologies.de/news/nukem-wird-teil-des-back-end-bereichs-von-rosatom (Accessed April 29,2022).
[25] https://rosatom.ru/en/rosatom-group/back-end/nukem-technologies-gmbh/.
[26] https://www.nukemtechnologies.de/en/projects.

works, from development of basic design documentation to facility commissioning. It is the General Contractor responsible for construction of new units at the Leningrad NPP/Russia, as well as the Main Contractor for Hanhikivi-1 NPP in Finland and Akkuyu NPP in Turkey.

TVEL Fuel Company of ROSATOM

The TVEL Fuel Company of Rosatom incorporates enterprises for the fabrication of nuclear fuel, conversion and enrichment of uranium, production of gas centrifuges, as well as research and design organisations. More information on fuel production can be found in the chapter on Nuclear Fuel and TVEL´s website: http://www.tvel.ru/en/.

1.2.1 TVEL´s four enrichment and conversion companies

1. Angarsk Electrolysis Chemical Complex

Angarsk, Irkutsk Region

Uranium enrichment since 1957; a host facility for the International Uranium Enrichment Centre (IUEC) operating under the auspices of the IAEA.

2. Siberian Chemical Combine

Seversk, Tomsk region

The facility supplies Russia's low-enriched uranium fuel and enriches reprocessed uranium for foreign customers. It is one of the largest sites that stores low and intermediate level nuclear waste from reprocessing, with more than 30 million cubic metres.[27]

3. Production Association Electrochemical Plant

JSC PA ECP, Zelenogorsk, Krasnoyarsk territory

The company produces low-enriched uranium.

4. Urals Electrochemical Integrated Plant

JSC UEIP, Novouralsk, Sverdlovsk region

The company provides uranium enrichment.

1.3 Gazprom and OMZ – owner of Škoda JS and Řež ÚJV

Less well-known are the many companies active in nuclear services. Among them is Škoda JS, a former Czech nuclear company, which in 2004 was bought by OMZ, the Russian heavy machinery manufacturer, itself owned by Gazprombank, a private bank owned by Russian gas monopoly Gazprom. A look at the board of directors[28] shows many Russian names with some also on the Škoda JS board of directors[29] and thus under direct control of Russian capital. OMZ is also linked to Gazprombank (managing fonds)

[27] https://www.world-nuclear.org/information-library/country-profiles/countries-o-s/russia-nuclear-fuel-cycle.aspx (Accessed, April 29, 2022).
[28] http://www.omz.ru/en/company/direction/.
[29] https://www.koda-js.cz/struktura-spolecnosti/.

and has already been placed under sanctions.[30] At the same time, Škoda JS owns 17.39% of the Research institute and TSO ÚJV Řež.

The amount of highly specialised and unique information and data gained over decades working in all fields of nuclear infrastructure is enormous, as the following overview shows.

Škoda JS is currently responsible for maintenance of both NPPs (units at Bohunice, and Mochovce-1 and 2), and the construction of Mochovce-3 and 4 where it serves as the main contractor Škoda JS is also contracted for maintenance of the two Czech NPPs Dukovany and Temelín. Škoda JS is already responsible for Paks 1-4 (maintenance and modernisation, including inspections of the reactor pressure vessel at units 2, 3 and 4) and has signed contracts with MVM ERBE within a framework contract for the Paks 2 units for document evaluations, and inspections of the primary circuits.

On top of this, through Škoda JS the Russian nuclear giant owns about 20% of the nuclear research institution ÚJV Řež which is also a TSO. That means they enjoy access to sensitive safety documentation on reactors in both countries.

Russian hand in EPR (European Pressurised Reactor) - NPP Hinkley Point C / UK

Since July 2018, Škoda JS has had a contract with France's Framatome to manufacture two sets of EPR reactor pressure vessel internals (core basket, heavy reflector and the upper internals) for the two units currently under construction at Hinkley Point C, as well as for the two other EPR reactors in the EU: for the one recently completed in Olkiluoto (Finland) and for the still much delayed Flamanville-3 (France).

2. Nuclear fuel by Rosatom / TVEL

Created by Putin in 2007, state company Rosatom now produces nearly 20 percent of the world's nuclear fuel — providing an important revenue stream for Moscow, just like fossil fuels. According to its 2020 Annual Report, Rosatom produced over 1,000 tons of heavy metal (tHM) of nuclear fuel and 7,100 tons of uranium.[31]

TVEL is the supplier of nuclear fuel for the VVER reactor series. They use different fuel to that of Western design nuclear power plants, thus creating severe dependency for those countries still operating the nuclear power plants they built in Communist times. The situation for VVER-440 units is different from the larger and newer VVER-1000 series, because no Western supplier can provide fuel for the smaller plants.

The EURATOM Supply Agency (ESA) in its 2019 and 2020 Annual reports already warned against the continued dependence of VVER reactors operators on a single foreign supplier for nuclear fuel. This remains a matter of concern and is considered a significant vulnerability, in stark contrast with the situation elsewhere."[32]

Table 1: VVER units in the EU and Ukraine

Country	Nuclear power plant	Type of unit
Bulgaria	Kozloduj 5 & 6	VVER-1000

[30] https://www.reuters.com/article/ukraine-crisis-russia-usa-sanctions-corr-idUSL8N1BD4CB.
[31] Rosatom Annual Report 2020.
[32] ESA 2019, https://euratom-supply.ec.europa.eu/publications/esa-annual-reports_en.

Czech Republic	Dukovany 1-4	VVER-440
	Temelín 1 & 2	VVER-1000
Finland	Loviisa 1 & 2	VVER-440
	Hanhikivi 1 (under construction)	VVER – 1200
Hungary	Paks 1 – 4	VVER – 440
	Paks 5&6 (under construction)	VVER – 1200
Slovakia	Bohunice 3&4	VVER-440
	Mochovce 1&2	VVER- 440
	Mochovce 3&4 (under construction)	VVER-440
Ukraine	Khmelnitsky 1&2	VVER-1000
	Rivne 1&2	VVER-440
	Rivne 3&4	VVER-1000
	South Ukraine 1-3	VVER-1000
	Zaporishskaja 1-6	VVER-1000

2.1 VVER 1000 fuel

The issue of Russia being the sole nuclear fuel supplier for the VVER reactors, also in EU countries, has been a topic for decades, and in particular the issue of whether the TVEL fuel can be replaced with fuel made by Western companies; information on why fuel deliveries were substituted by other suppliers cannot always be fully verified. In addition to technical issues, economic, political, and geostrategic interests may have played a role.

Westinghouse was also only delivering fuel for VVER-1000, not for VVER-440, although with one exception, when from 2001-2004 fuel for delivered for Loviisa reactors in Finland.

One interesting result thrown up by research for this report is that TVEL is not only continuously improving the fuel assemblies for its VVER series but is also designing specific fuels for individual plants which could later be used by other plants; for Paks in Hungary, fuel with characteristics other than those for Loviisa (enrichment level) was recently loaded in the core. In 2019, Dukovany started operating on modified RK3 Plus VVER fuel.[33] This constitutes an additional problem when it comes to non-Russian companies supplying VVER reactors with assemblies.

It was reported in 2016 that TVEL intends to standardise the construction of its VVER-1000 fuels for use in all VVER plants.[34]

[33] Nuclear Fuels, August 12, 2019.
[34] https://oenergetice.cz/elektrarny-cr/cez-nakoupi-pro-temelin-opet-americke-jaderne-palivo (Accessed April 29, 2022).

2.2 First Westinghouse fuel for VVER-1000 in 2000

Czech Republic

An attempt to rid power generation from its dependence on fuel deliveries from Moscow has already been made. When, following the Velvet Revolution in the Czech Republic, the decision was taken to complete the VVER-1000 Temelín reactors, the intention was to achieve a Western safety standard and Western fuel supply. Therefore, the US company Westinghouse helped to finish the plants and promised to develop the necessary fuel. When Temelín unit 1 went into operation in 2000, Westinghouse had developed nuclear fuel for this special East-West engineering cooperation, Temelín 1 & 2. Later this fuel turned out to be inadequate.

Ukraine

With its fleet of 13 VVER-1000 units, Ukraine has consistently led the way in trying to diversify its TVEL fuel and demonstrates the realistic options available.

Development of the first Westinghouse VVER-1000 fuel for delivery to Ukraine started in 2001. Westinghouse had earlier designed and delivered VVER fuel to the Temelín nuclear power station in the Czech Republic, but without having considered the mixed core conditions. Developing VVER-1000 fuel for mixed cores presented an additional challenge, especially since compatibility data on the resident fuel was not easily accessible to Westinghouse. Westinghouse shipped the fuel in 2005 and it was loaded in South Ukraine 3 the same year.[4] Later it turned out that the US nuclear fuel assemblies did not fulfil the requirements and revealed mechanical scratches and rub marks, grid damage, and that the fuel rods were not sufficiently stable. Bent fuel rods pose a safety risk if they cannot be moved properly in and out of the reactor core. The State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) did not approve loading of any subsequent Westinghouse fuel assemblies of this design. Both the Czech Republic and Ukraine reverted to TVEL fuel deliveries, but after the 2014 annexation of Crimea, Ukraine re-started its fuel diversification. A constant issue is the difficulty of accessing the required technical data and information which are owned by TVEL, Rosatom and Škoda. Meanwhile, Westinghouse has been able to deliver an improved design – the Robust Westinghouse Fuel Assembly (RWFA). The first reload batch of this design was inserted in NPP South Ukraine 3 in March 2015. In 2014, Energoatom, the operator of all Ukrainian NPPs, extended the fuel contract to also include assemblies for the Zaporishskaja plant. When the Russian army occupied the NPP Zaporishskaja in March 2022, observers claimed they had taken with them fuel samples both fresh and spent.

As hinted earlier, another issue is political influence and the fact that the Russian fuel assemblies are cheaper. This might have played a role in a surprising U-turn in Ukraine, when it was reported that the Russian state-owned nuclear fuel company TVEL will supply fuel to eight out of 15 Ukrainian reactors between 2021 and 2025, as announced by the Ukrainian state-owned nuclear power generator Energoatom on January 10. TVEL supplies fuel to nine reactors, while the remaining six use Westinghouse fuel. Energoatom disclosed the plans after revelations that the company, without a public announcement, had signed an agreement with TVEL in September 2018 to extend Russian fuel supplies for five years through 2025. Foreign Minister Pavlo Klimkin, who said he was not aware of the agreement, has urged Energoatom to explain the continued dependence on the Russian supplier. "I believe those who were involved in this decision-making at least owe an exhaustive explanation to Ukrainian society," Klimkin wrote on

his Facebook page December 21. Ukraine accuses Russia of waging a war against the country following annexation of the Black Sea peninsula of Crimea in March 2014 and continued military support for separatists in parts of the Donetsk and Luhansk regions in eastern Ukraine.[35] A 2021 report said that the Rivne nuclear power plant received its first-ever shipment of fuel assemblies from Westinghouse on July 21.[36] On February 23, 2022, Rosatom completed a fuel delivery for NPP Rivne.[37] Rivne-3 will begin loading Westinghouse assemblies in early 2022 after inspecting the shipment, and it is expected to take four years to completely phase out TVEL fuel for the unit; in 2025 Rivne-3 will operate entirely on American nuclear fuel.

Table 2: TVEL fuel in Ukraine as of April 2022

Ukraine	Khmelnitsky 1&2	VVER-1000 *TVEL*
	Rivne 1&2	VVER-440 *TVEL*
	Rivne 3&4	VVER-1000 WEC unit 3, TVEL unit 4
	South Ukraine 1-3	VVER-1000 1 TVEL, 2 & 3 units WEC
	Zaporishskaja 1-6	VVER-1000 4 WEC, 2 units TVEL

However, Ukraine also intends to receive VVER 440-fuel from the US company. In 2021, a contract was signed between Energoatom and Westinghouse for the development and delivery of licensing documentation for fuel assemblies fitting VVER-440 reactors. The first reload of Westinghouse fuel in a Ukrainian VVER-440 nuclear fuel is expected at Rovno-2 in 2024, according to Energoatom. However, it was already expected for 2022.

On top of likely technical problems, it is clear that Westinghouse will not be able to handle the large number of new customers asking for fuel – Westinghouse will first need to create new production capacities.

Bulgaria switching to Westinghouse fuel

Bulgaria has two VVER-1000 units operating at the Kozloduj sites. Bulgaria started preparing for the switch three years ago.

According to experts in Bulgaria, the new supply by Westinghouse will come through, but the necessary tests took 2-3 years and the new fuel still needs a permit for commissioning. In early 2021 a contract was signed between the Bulgarian government and Westinghouse for a safety assessment of Westinghouse nuclear fuel as a supplement to Russian-sourced fuel for the 1,000-MW Kozloduy-5.[38] However, TVEL is contracted to supply Kozloduy-5 and -6 until 2025.[8] (See Update p. 10, for more information.)

[35] Nuclear Fuels January 28, 2019.
[36] Nuclear Fuels July 26, 2021.
[37] NIW, March 25, 2022.
[38] Nuclear Fuels February 8, 2021.

2.3 VVER-440 fuel

There is currently no alternative fuel supplier on the market. Although a well-known fact, the respective countries have chosen to ignore this problem, even claiming that nuclear energy is a domestic energy source ensuring a reliable energy supply. [39] The EC, namely the ESA even financed a project: "EURATOM has allocated funding to support diversification of the nuclear fuel supply for the VVER units operating within the EU. Earlier this year, a consortium of Westinghouse and eight European partners was awarded more than €2 million ($2.2 million as of 14 July 2015) by EURATOM for a programme to qualify a second supplier."[40]

Westinghouse has already been delivering fuel to the Loviisa NPP 440 units, however, not even Finland intends to resume the Westinghouse fuel supply. Technical issues include not only the fact that Westinghouse does not produce this fuel, but that there is no one type of VVER-440 fuel which could be used to supply all the reactors of this type (all 4 Slovak reactors, all 4 reactors in Hungary), and the Russian Rosatom company TVEL has developed specialised fuel for the individual reactors. The fuel and the core configuration and other key tasks are in the hands of TVEL, Škoda JS and Řež.

Countries operating VVER-440 units in the EU and Ukraine have also announced a growing interest in qualifying a second supplier. Back in 1998, BNFL (British Nuclear Fuel Limited) delivered lead test assemblies to unit 2 at Finland's Loviisa plant. The assemblies were manufactured in the fuel facility in Springfields, UK, and the purpose of the programme was to qualify a second supplier for Loviisa, as well as for Paks in Hungary. After successful completion of the operation of the LTAs, in December 1999 BNFL was awarded a contract to supply reload deliveries to Loviisa and a total of seven reload batches were delivered between 2001 and 2007. Shortly before the contract award, Springfields was incorporated into Westinghouse fuel operations after BNFL was acquired by Westinghouse. Westinghouse decided that the reload fuel would be assembled by ENUSA in Spain instead of at Springfields. Following some unsuccessful fuel tenders in 2006 and 2007, Westinghouse decided to exit the VVER-440 business. Lately, the increased importance of diversified fuel supply has resulted in discussions with different utilities about re-entering the market with an upgraded Westinghouse fuel design, including more advanced materials, as well as improved mechanical features. The EURATOM programme has allocated funding to support diversification of the nuclear fuel supply for the VVER units operating within the EU. Earlier this year, a consortium of Westinghouse and eight European partners was awarded more than €2 million ($2.2 million as of 14 July 2015) by EURATOM for a programme to qualify a second supplier. The programme will mainly focus on establishing the methods and methodology required to licence a VVER-440 fuel design. The consortium includes partners with expertise in different technical disciplines and the countries operating VVER440 within the EU are represented (see box). As part of the programme, steps will be taken to update the design previously delivered to Loviisa, and to create a state-of-the-art design.[41]

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[39] MPO, Ministry of Trade and Industry: Czech State Energy Concept 2015. https://www.mpo.cz/assets/dokumenty/52841/60959/636207/priloha006.pdf. p. 44, where nuclear fuel is categorized as primary domestic source.

[40] Nuclear Engineering International NEI, September 2015.

[41] Ibid.

Both Paks and Loviisa are being supplied by TVEL with a newly modified second-generation VVER-440 fuel, although these fuels are not identical. The fuel for Paks enables an increase in the coolant volume inside the reactor core and optimisation of the hydro-uranium ratio. TVEL also decreased the amount of fuel bundles loaded in the reactor core. Loviisa has the same number of fuel assemblies, but a lower uranium enrichment level was developed.[42] In late 2020, TVEL loaded 18 fuel bundles of a modified design of VVER-440 fuel into the 500-MW Paks-3 in Hungary during last month's recent refuelling outage at the unit.[43]

TVEL confirmed this being the company's strategy in December 2020: "We are actively engaged in the development of new models and modifications of VVER-440 fuel for power plants in Europe. The projects of the new fuels for the Loviisa plant in Finland, Dukovany plant in the Czech Republic, [and] Mochovce and Bohunice plants in Slovakia are currently at various stages of implementation. Despite the same reactor model, these projects are quite different technically and conceptually."[44] Two more VVER-440 units are also depending on TVEL supply, Metsamor in Armenia.

Westinghouse may develop VVER-440 fuel

In 2021, a contract was signed between Energoatom and Westinghouse for the development and delivery of licensing documentation for fuel assemblies fitting VVER-440 reactors. The first reload of Westinghouse fuel in a Ukrainian VVER-440 nuclear fuel is expected at Rovno-2 in 2024, according to Energoatom. This, of course, may change due to the current war situation; with respect to other VVER-440 operators, it the question of whether it is commercially viable for Westinghouse to produce fuel for a few VVER-440 reactors needing fuel with different characteristics.

Czech Republic

Since the beginning of the war in Ukraine, for the third time Czech Republic a nuclear fuel delivery has been flown into the Czech Republic. This was so urgent that, in the midst of the war in Ukraine, an exemption to the ban on flights for Russian aircraft into the airspace of the European Union had to be granted. ČEZ, the operator of both Temelín and Dukovany NPP explained that this was the last of the planned deliveries.[45] ČEZ also informed the public that Temelín currently has sufficient fuel stored for two years and Dukovany for three.

The nuclear fuel supplier for both NPPs is TVEL which belongs to the Russian state holding Rosatom. For Temelín, this contract expires in two years' time and ČEZ announced it will try to avoid renewing the contract with TVEL. For the construction of the new reactor, Rosatom has already been excluded for security reasons.[46]

TVEL has announced the start of tests of its 3rd generation fuel intended for VVER-440 reactors. The new fuel, which will be loaded in Dukovany in reload batch quantity in 2023, allows the reactor to operate with increased thermal capacity and to extend the

[42] World-nuclear-news.org, May 24, 2021.
[43] Nuclear Fuels December 28, 2020.
[44] Ibid.
[45] https://www.idnes.cz/ekonomika/domaci/rusko-jaderne-palivo-temelin-dukovany-dodavka-letadlo-zasoby-jaderne-elektrarny-cez.A220401_192525_ekonomika_hend.
[46] https://www.idnes.cz/ekonomika/domaci/rusko-jaderne-palivo-temelin-dukovany-dodavka-letadlo-zasoby-jaderne-elektrarny-cez.A220401_192525_ekonomika_hend.

fuel cycle at the plant, leading to better economic efficiency.[47] Nuclear Fuels reported in more detail: "The modification includes a higher uranium load and will enhance the efficiency of fuel usage (…). Increasing the mass of uranium in one fuel rod will allow a lower uranium enrichment level without reduction of thermal power generation in the reactor," the company said. It did not say how much uranium is contained in a rod of either the new or current design. Lower enrichment will also reduce the cost of the nuclear fuel production chain and facilitate handling of irradiated fuel, Rosatom said. (…) the company had developed different VVER-440 fuel cycle strategies for its customers in Hungary and Finland."[48]

This might already be reflected by Finland's NPP operator Fortum saying on March 25 at the Fortum AGM[49] that they intend to stay with TVEL (Rosatom company) as foreseen in the contracts until 2027 and 2030.

Finland

In March 2022, Fortum announced that although there are potential alternative suppliers of fuel for the NPP Loviisa they intend to continue with TVEL fuel for the two units as foreseen in the current contract until 2027 and 2030 respectively. According to TVEL, modified VVER-440 fuel for the Loviisa plant served to enhance the efficiency of fuel usage. It consisted of a higher uranium load in each fuel road, and a reduced level of uranium enrichment without a reduction of thermal power generation in the reactor.[50]

The company noted the project has involved the participation of a number of Russian nuclear industry enterprises, such as OKB Gidropress (part of Rosatom's machine-building division Atomenergomash), Bochvar Institute (TVEL's material science research facility), the Elemash Machine-building plant and the Kurchatov Institute national research centre. The new fuel passed a range of hydraulic, longevity and vibration tests at the site of OKB Gidropress research and experiment facility.

Finnish utility Fortum signed a contract with TVEL in March 2018 for the supply of the modified fuel for use at its twin VVER-440 Loviisa plant. It followed the signing in November 2017 of a similar contract between TVEL and MVM Paks for development of the new VVER-440 fuel for use in the Paks plant in Hungary.

Slovakia

Slovakia is a good example of total dependence. Currently, Slovakia's utility Slovenské elektrárne is the operator of four units of VVER-440 reactors, delivering over 50 % of Slovak power. This reactor type is operated with fuel which only the Russian company TVEL can deliver. Slovakia ignored the warning from EU institutions which kept enforcing alternative fuel suppliers. Instead, Slovakia continued with the construction of two additional VVER-440 units (Mochovce 3 & 4).

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[47] IAEA/NEA: Uranium 2020, Resources, Production and Demand, p. 9. https://oecd-nea.org/upload/docs/application/pdf/2020-12/7555_uranium_-_resources_production_and_demand_2020__web.pdf, p. 59.
[48] Nuclear Fuels May 31, 2021.
[49] https://www.fortum.com/files/answers-shareholders-questions-fortum-agm-2022/download?attachment.
[50] World-nuclear-news.org, May 24, 2021.

Therefore, three flights operated by the Volga Dnepr airlines, with special exceptions from the ban of Russian airspace, delivered fuel to Bratislava in the first days of the war on Ukraine. However, these batches may last only for another year. Compared to other countries, Slovakia is very silent when it comes to efforts to find other suppliers of nuclear fuel. The reasons might be that no alternative suppliers exist for those VVER 440 units, and the existing infrastructure for licensing new fuel – Nuclear Regulator and TSO – is not very capable. Consequently, it might prolong the time needed in order to use new fuel up to ten years. It is fair to assume that Slovakia is most likely lobbying the other member states and the EU Commission hard to keep fuel from Russia coming in, despite the ongoing war, war crimes and the crimes against humanity committed by the Russian army in Ukraine. This could turn Russia into a pariah state for years to come and lead to charges in the Hague – and result in a very difficult political situation for Slovakia. (See Update p. 10, for more information.)

TVEL is developing accident-tolerant fuel (ATF)

TVEL invested into developing accident-tolerant fuel (ATF). This type of fuel is a response to the Fukushima catastrophe, and it should, among other factors, lower the impact of accidents by modifying certain fuel compositions. The goal is to produce nuclear fuel without zirconium content because this leads to hydrogen development under accident conditions. It was this that led to explosions at the Fukushima unit 1 when the hydrogen that was being created rose to the ceiling of Unit 1, leading to a spark that led to the reactor exploding. In 2019, TVEL was reported as testing fuel with up to 7% U-235. TVEL also tried to enter the US market with TVS-Kvadrat for Western PWRs.[51]

This ATF is required in order to allow include nuclear generated power under the currently prepared EU taxonomy (draft CDA).[52]

High-assay low-enriched uranium (HALEU) for SMR

Currently some politicians and lobbyists claim that the answer to the energy crisis will be to deploy so-called next-generation or advanced nuclear reactors, many of them Small modular reactors. Many of these reactors need HALEU – which is higher enriched than the approx. 5% enriched fuel for Light Water Reactors (LWR) currently used, as the following overview shows:

- Small modular reactors, LWR-based → mostly use UO2 with enrichment < 5%
- Small modular reactors, HTR-based → mostly use HALEU
- Small modular reactors, MSR-based → mostly use HALEU
- Small modular reactors, sodium- or lead-cooled → mostly use HALEU or mixed oxides (MOX)
- Advanced reactors > 300 Mwe.[53]

These are mostly fast reactors, sodium or lead-cooled, and use MOX fuel or, in some cases, HALEU.

[51] NIW July 5, 2019.
[52] https://www.euractiv.com/wp-content/uploads/sites/2/2022/01/draft-CDA-31-12-2021.pdf.
[53] ESA 2019, Securing the European Supply of 19.75% enriched Uranium Fuel.

So-called next-generation nuclear reactors generally require fuel enriched with up to 20 percent U-235, called HALEU. Higher enrichment allows nuclear power plants to operate longer before refuelling. The more energy-dense fuel also allows for smaller reactor designs. But the only major supplier of HALEU is in Russia. With the Russian invasion of Ukraine, this type of fuel will also be out of reach. The US Administration which is supporting SMR development has acknowledged this problem. Two Department of Energy-funded demonstration projects for advanced reactors will need HALEU by the end of 2024. Until then, a production facility must be established in the US; this will take at least 4-5 years. President Biden's budget proposal for 2023 includes a funding boost for the DOE that includes money to help "secure the availability" of HALEU.[54]

After having banned the import of oil, gas and coal from Russia, US uranium imports from Russia remain an open issue. The obvious alternative to uranium imports from Russia would be to re-open US mines. The obvious problem would also be re-opened: environmental pollution on a vast scale, and often close to sacred Native American sites.[55]

3. From Uranium Mines to Nuclear Fuel Assemblies

Several steps outlined in the following chapter are needed to produce nuclear fuel assemblies which are then used in NPP. They are very specialised and only available in some countries for several reasons. To understand why Russia's nuclear fuel deliveries to European countries cannot be simply replaced by importing Australian uranium, for example, it is necessary to understand that fuel is specific for reactor types and the different production phases are available only on a limited scale in certain countries, and there can be bottlenecks. In addition, some data are not available, e.g., for decades Germany managed to keep the origin of the uranium it used a secret, and until today the uranium deployed in French reactors is mostly labelled "French", in spite of being imported from Niger, because the initial processing is undertaken in France.

Mining of uranium

Uranium mining is a very hazardous and environmentally damaging activity. The next step is milling and processing the uranium ore, where the goal is to isolate uranium oxide (U3O8), the so-called yellowcake which, after conversion, is then sold to companies for further enrichment. Enrichment of uranium is seen as a safeguarding risk and therefore the IAEA non-proliferation policy bans this technology from being exported to countries which do not yet have enrichment capacities. Increasing the share of uranium's most fissile isotope, U-235 is called enrichment. Low-enriched uranium, which typically has a 3-6% concentration of U-235, is used for fuelling NPP. The fuel loaded into EU reactors has an average enrichment assay of 3.94%, with 85% falling between 3.43% and 4.52%.[56] Highly enriched uranium, or HALEU, is 20% enriched or more, while weapons-grade uranium for nuclear bombs is 90% enriched or more. The

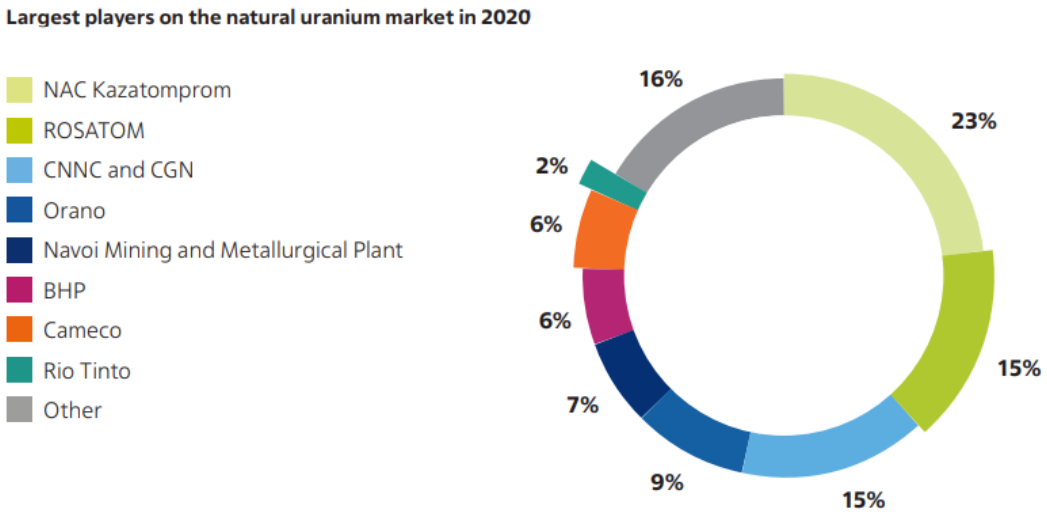
[54] https://www.theverge.com/2022/3/31/23003494/war-ukraine-nuclear-energy-uranium-russia-supply-chain (Accessed April 2, 2022).
[55] https://www.theguardian.com/us-news/2022/mar/28/native-americans-ban-russian-uranium (Accessed April 5, 2022).
[56] ESA European Supply Agency— ANNUAL REPORT 2020, p. 21.

very same plant can be used to enrich all the way through to bomb-grade material, making it a safeguarding risk.

Uranium mining capacities

About 40% of uranium imported in the EU stem from Rosatom's mine or from Kazakhstan, which is politically considered an ally of Russia. Some of the mines in Kazakhstan are owned or co-owned by Russian companies.

Figure 2: Largest players on the natural uranium market in 2020[57]



Europe has no uranium production

Europe's last uranium mine in Rožná in the Czech Republic closed in 2017. However, the government reserved the option of reopening other mines, such as Brzkov open. Brzkov is said to contain 3000-4000 tU around 300 m deep; state company Diamo said it would take six to seven years to commission the mine; local resistance it high. In Spain, the Salamanca project was under preparation and could produce 4.4 million pounds (Mlbs) of uranium concentrate annually for 14 years. But this was also recently cancelled. Similarly, the Kvanefjeld mining project didn't start after the Greenland Parliament approved a bill prohibiting uranium exploration and mining in 2021.

Uranium prices and increasing production

Uranium does not trade on an open market like other commodities. Buyers and sellers negotiate contracts privately. Uranium spot prices have surged more than 30% since Russia's invasion of Ukraine to trade at about $58/lb, the highest level since before the 2011 Fukushima-Daiichi disaster. The Wall Street Journal reported fears of disruption to uranium supplies due to sanctions on Russia. (…).[58] In the current situation, uranium

[57] UxC, Company reports.
[58] NucNet's Weekly News Review, April 1, 2022.

producers remain cautious before increasing production, which takes several months, in some cases years, and are waiting for long-term contracts before making risky investments.[59]

An IAEA/NEA report summarised this in saying that "significant investment and technical expertise will be required to bring these resources to the market. Producers will have to overcome a number of significant and, at times, unpredictable issues in bringing new production facilities on stream, including geopolitical and local factors, technical challenges and legal and regulatory frameworks. To do so, strong market conditions will be critical for achieving the required industry investment".[60]

When evaluating the issue of replacing dependency on Russian and/or Kazakh uranium, costs are important. Uranium price plays a minor role for the operator of a nuclear power plant, but it is decisive when opening or enlarging a uranium mine. An example here is the US, where the dramatic decline in uranium production from 2016 to 2018 was due to low market prices. At the same time, US utilities started importing cheaper uranium from Rosatom; by March 2022 the dependency was so high that they lobbied hard to prevent the White House from banning the import; this may well be overturned.

The IAEA/NEA reported on global supplies: "Globally, Australia continues to lead with 28% of the world's identified resources in the category <USD 130/kgU (equivalent to USD 50/lb U3O8), with over 64% of Australia's national total endowment related to a single site, the world class Olympic Dam deposit. In terms of lower cost resources <USD 80/kgU and <USD 40/kgU, equivalent to USD 30/lb U3O8 and USD 15/lb U3O8), Kazakhstan leads with 49% and 36% of the world total, respectively."[61] Uranium mine development takes long preparatory times, so no sudden new players can emerge. Also here Kazakhstan is leading. Only six countries announced development drilling in 2020: Canada, Iran, Kazakhstan, Namibia, Russia and Ukraine, with Kazakhstan accounting for half of the total global development drilling.[62]

On top of industrial considerations, ecological limitations will play a role and might in the end block efforts to increase uranium mining.

An embargo of Russian uranium cannot be excluded and has already started worrying the Kazakh state-owned uranium miner Kazatomprom. However, Kazakhstan is considered an ally of Russia and most likely would be become a target, even though Kazatomprom was responsible for a quarter of the world's primary uranium production in 2021, according to company data.

Conversion and enrichment

Western uranium converters and enrichers are facing an explosion in demand from nuclear fuel buyers preparing for a possible cutoff from Russian nuclear fuel. However, new additional capacities are needed and those are a long-term project. Some observers pointed out at the beginning of April 2022 that for many companies uncertainties remain, because if the war ends suddenly and Russian nuclear fuel never stopped

[59] NIW, March 25, 2022.
[60] IAEA, NEA: Uranium 2020, Resources, Production and Demand. https://oecd-nea.org/upload/docs/application/pdf/2020-12/7555_uranium_ _resources_production_and_demand_2020__web.pdf.
[61] Ibid., p. 9.
[62] Ibid., p. 45.

entering the EU or the US, the newly build-up capacities for mining, converting and enriching would have been in vain.

Today there are five major global suppliers of uranium conversion services, Orano/Comurhex (France), Cameco (Canada), Converdyn (USA), Rosatom/TVEL (Russia) and CNNC (China).

Table 3: Estimated world primary conversion capacity 2020[63]

Conversion plants are operating commercially in Canada, France, Russia and China. China's capacity is expected to grow considerably through to 2025 and beyond to keep pace with domestic requirements.

Estimated world primary conversion capacity 2020

Company	Country	Location	Nameplate capacity (tU)	Capacity utilization (%)	Capacity utilization (tU)
Orano*	France	Pierrelatte & Malvési	15,000	17%	2600
CNNC†	China	Lanzhou & Hengyang	15,000	53%	8000
Cameco	Canada	Port Hope	12,500	72%	9000
Rosatom	Russia	Seversk	12,500	96%	12,000
ConverDyn‡	USA	Metropolis	7000	0%	0
Total			**62,000**	**51%**	**31,600**

World Nuclear Association *Nuclear Fuel Report* (2021 edition)

* Orano's new conversion facility is still in the process of production ramp-up, which is expected to be finalized by 2023.

† Estimated capacity according to the assumption that China will develop its conversion capacity to supply the needs of the domestic reactor fleet.

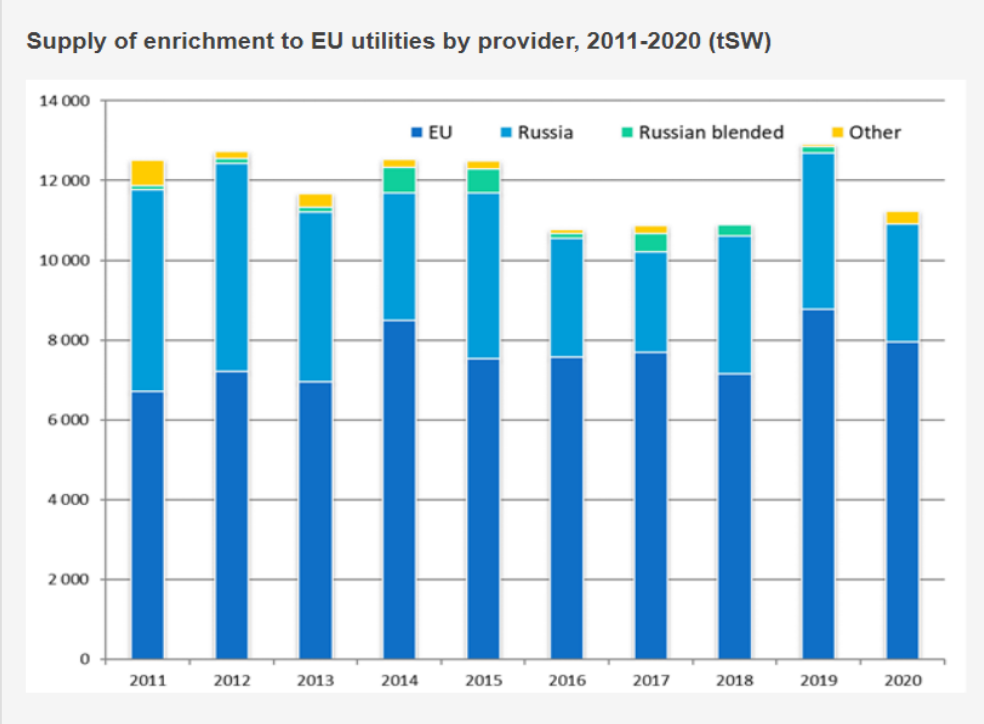
‡ ConverDyn reduced capacity of its Metropolis plant in 2016 then closed it down pending market improvement in 2017. In January 2021 it announced that it plans to restart the plant after refurbishment in 2023.

Enrichment capacities

According to European Supply Agency's data[64], Europe covers its enrichment demand by 60-70 % itself, the remaining amount needs to be imported from Rosatom's enrichment facilities:

[63] https://world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/conversion-and-deconversion.aspx (Accessed April 4, 2022).
[64] ESA 2020. https://euratom-supply.ec.europa.eu/activities/market-observatory_en.

Table 4: Supply of enrichment to EU utilities by provider, 2011 - 2020 (tSW)



4. Outlook on Alternatives for New Reactors

A few days after the Russian invasion of Ukraine, discussions started on the fate of ongoing Rosatom projects in EU countries. This chapter explores the current new-build projects and gives an overview of the reactor types and reactor vendors available to replace the Russian supplier Rosatom Holding and its companies.

Russia's Rosatom with its many subsidiaries was the market leader in the nuclear industry. Russia was not only constructing nuclear power plants at home, but also successfully completed its NPP projects (Astravets-1/Belarussia) abroad, certainly with fewer delays and cost overruns compared to its competitors. Russia has dominated the nuclear export market since 2009 and was preparing new contracts in many countries. Following its attack on Ukraine and resultant sanctions, many of Russia's contracts, including those in Finland and in Hungary, are likely to be cancelled. Russia's ability to even complete the remaining contracts is also in question.[65]

EPR/France

The French nuclear industry, usually understood as a powerful branch, is vastly overrated. The issue here is the potential of French nuclear industry to replace the new reactors which were previously, or might have been, delivered by Rosatom in Russia.

The only European reactor on the market is the EPR-1600 MW, which 20 years ago was called the flagship of nuclear renaissance. This Generation III+ reactor, however, is infamously troubled, notorious for its cost overruns and delays: even the domestic

[65] M.V. Ramana, University of Colorado: https://www.colorado.edu/cas/2022/04/12/even-china-cannot-rescue-nuclear-power-its-woes (Accessed April 17, 2022).

project Framatome 3, and Olkiluoto-3 in Finland, are not scheduled to reach full capacity until September 2022 – is a delay of 13 years, following a total construction time of 18 years.

Table 5: EPR reactors – 1600 MWe net

Country and NPP unit	Construction start	Commercial operation
China, Taishan 1	Dec 2009	Dec 2018
China, Taishan 2	April 2010	September 2019
Finland, Olkiluoto 3	Aug 2005	Planned July 2022
France, Flamanville 3	2007	Planned end of 2022
UK Hinkley Point C 1	2018	Planned 2026
UK Hinkley Point C 2	2019	Planned 2027

Two key problems stand in the way of an export offensive: manufacturing capacity and the EPR's design deficiencies which became evident once the first EPR started operating in China. The Taishan NPP unit 1 was taken offline for inspection on July 30, 2021, and it was still shut in April 2022. The immediate cause was fuel rod leakage, however, later it turned out that the problem might be a design failure in the reactor pressure vessel for which EDF is required to present a design solution to the French nuclear regulator ASN. EDF needs to submit a plan for reinforcement of metal grids at the EPR in France. The plan has not yet been submitted and is delayed.[66] This might be a major design failure which affects all EPR reactors.

Czech Republic

The Czech Republic is of particular interest for the discussion for two reasons. It is the only country which has opened a tender procedure, and, after a severe political struggle, decided even before the war in Ukraine to exclude Russia and China from the construction of the fifth unit at the NPP Dukovany site in 2021 after GRU (Russian military intelligence service) involvement in the 2014 explosion of an ammunition depot in Vrbětice was confirmed.

The path chosen by the government and parliament in Prague when it comes to ordering a nuclear reactor can be understood as a path others also need to take. What remains unclear at the this point in time – May 2022 – is the issue of other suppliers such as Škoda JS. One key point applicable to all future NPP financing schemes is the 100% state funding, loan and guarantees provided. The government announced that they will not only keep an eye on the main supplier, but also their sub-suppliers. The following steps must be clear before any contracts are signed.

4.1 Status of Dukovany financing and tendering process

The notification of the project at the European Commission is ongoing. The past cases of state aid notifications for financing packages for new NPP (Hinkley Point C and Paks II) were granted, but the Czech Republic seems to fear problems on some points, namely the relationship between investor (ČEZ) and the state (70% shareholder is the state) and the minority shareholders, and exceptions from public tendering: in a letter to the

[66] https://www.montelnews.com/news/1313051/crucial-french-epr-report-4-months-late--regulator (Accessed April 18, 2022).

government[67] Transparency International Czech Republic criticising the unclear financing structure and unrealistic costs estimates[68] or rather the lack of a limit to the public funding assumed for the NPP and the possible loss of billions of taxpayers' money. The authors of the letter also reminded the Minister of Finance that the Czech Office for the Protection of Competition has informed the government that the NPP tender would not be exempted from public procurement law; moreover, this exemption might also stand in violation of EU law.

According to the timeline of NPP Dukovany, according to information provided by MPO, the Czech Ministry of Trade and Economy, the March 2022 start of tendering will end with a November 2022 deadline for the offers coming in from vendors, which will then be evaluated for approx. 2 years.[69] The tendering procedure should be completed by the end of 2023/beginning 2024, followed by 2029 construction start and 2036 start-up of the new reactor.

According to the French President, the new plants would be built and operated by state-controlled energy company EDF and tens of billions of euros in public financing would be mobilised to finance the projects and safeguard EDF's finances. The first new reactor, an evolution of the EPR known as the EPR2, would come online by 2035, Mr Macron said. Studies for a further eight reactors in addition to the initial half-dozen new plants would be launched.

EDF has submitted a preliminary, non-binding offer to the Polish government for the construction of four to six EPR nuclear power plants in Poland at two or three different locations. It is also hoping to build six EPRs at the Jaitapur site in Maharashtra state, Western India.

Poland has been planning the construction of four to six EPR for over a decade; India also intends to order six EPR. At the same time, half of the NPP fleet in France (as of May 2, 2022) is out of operation and in need of repairs, thus adding pressure on the existing lack of skilled workforce and other nuclear industry infrastructure. It is safe to doubt the ability of France to go from managing the construction of four EPR in the past 15 years to a significantly larger number. On top of the already envisaged orders of 12 for export and eight for France, and 2 ongoing reactors in UK (HPC), EDF might have a hard time demonstrating its capacities to manage over 22 reactors in the next years.

Rosatom has also been plagued by the inability to deliver new nuclear power plants. NPP Paks II in Hungary was scheduled for start-up in 2025, and Hanhikivi in Finland in 2024.

Concerning the ongoing tender in the Czech Republic for a max. 1200 MW reactor, the experts' opinion on the rumoured intent of EDF to offer a downscaled EPR remains split: some say no problem, other exclude this possibility on technical grounds; the deadline for offers is scheduled for November 2022.

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[67] https://www.transparency.cz/wp-content/uploads/2022/03/TI-MPO-JEDU-17.3.22.pdf.
[68] https://english.radio.cz/tender-new-nuclear-unit-dukovany-launched-after-years-delays-8745211 (Accessed April 4, 2022).
[69] https://www.mpo.cz/cz/rozcestnik/pro-media/tiskove-zpravy/stat-dal-souhlas-se-zahajenim-vyberoveho-rizeni-na-dodavatele-noveho-jaderneho-zdroje-v-dukovanech--266463/.

US / AP 1000

Another option is the US company's reactor, the AP 1000. Westinghouse is advertising its new reactor type with passive safety features: The AP1000 features a compact nuclear island per kWe produced (i.e., lower amount of concrete and steel per kWe) with fewer number of nuclear safety grade components relative to other GENIII/III+ reactors including the EPR and APR1400. This is due to AP1000 reliance on passive safety. AP1000's robust station black out scenario response without any need for offsite support already provides effective protection against Fukushima-type events.

This, however, could lead to a time-consuming licensing process, because many regulators lack experience and legal provision for this reactor type with more passive safety features replacing e. g. pumps. Switching from VVER-type reactors to the reactor from the US might need some time for the regulators, including finding staff with sufficient language skills to work with Westinghouse when it comes to constructing an AP1000 reactor to replace the planned VVER-1200 reactors in Kozloduj or Belene in Bulgaria.

In general, the costs of NPP are always hugely uncertain, consistently turning out to be extremely over budget and the most expensive method of generating power. Lazard projects the capital cost of a nuclear power plant at $6,900 – $12,200/kW, while OECD Nuclear Energy Agency projects the capital cost between $2,157-$6,920/kW.

The newly published MIT study on the AP1000[70] tries to argue several specific cost-driving factors which have led to the ongoing AP1000 Vogtle project's current cost overruns since its start of construction in 2012. Modular construction is currently promoted as the answer to the well-known delays and subsequent cost overruns. Westinghouse promised to beat this trend because of their expectation that "plant costs and construction schedules benefit directly from the great simplifications provided by the design" and because of the adoption of "modular construction techniques". Based on these, Westinghouse estimated a "cost per kWh of about 3.0 to 3.5¢/kWh for a twin unit plant". Westinghouse projected that the AP1000 reactor would have "an accelerated construction time period of approximately 36 months, from the pouring of first concrete to the loading of fuel". All of these projections have gone spectacularly wrong in both China, with the Sanmen and Haiyang projects, and especially with projects in the United States. The modular construction methods only had the effect of shifting some of the problems from the building site to the factory, found the World Nuclear Report in 2017. Among those technical problems was the unfinished design, pumps which had to be called back, shielding material which expanded in volume – a possibility the company had not considered as it had to admit in its report to the US nuclear regulator, the NRC. China publicly voiced criticism with Westinghouse handling construction of the reactor in China and it was the last order China placed with the US company. The AP1000 disasters in terms of cost overruns and delays with the reactor constructions at V.C. Summer and Vogtle are well-known and ongoing.

On top of technical issues, many observers doubt Westinghouse's abilities as a reactor supplier. Westinghouse filed for bankruptcy reorganisation in 2017, driven by liabilities related to the two US projects, and new owner Brookfield Business Partners has said the

[70] MIT-ANP-TR-193 March 2022, Koroush Shirvan: Overnight Capital Cost of the Next AP1000 Advanced Nuclear Power Program.

company wanted to remain a reactor supplier but not get involved in being the construction contractor on nuclear plant projects.

China as a vendor of nuclear power plants the Europe

Nuclear power features prominently in China's plans for exports of energy technologies under the Belt and Road Initiative. In February 2022, China National Nuclear Corporation signed an agreement to build a nuclear plant in Argentina. This marks China's first export of a nuclear reactor to a country other than Pakistan (with whom China shares a special relationship that also extends to sharing nuclear weapons and related military technology).[71] Already earlier, however, countries decided to avoid the risk of Chinese interference and possible threat to infrastructure. In summer 2020, in reaction to doubts which arose in the US, several UK politicians started taking a very critical view on the Chinese involvement in the Hinkley Point C project, as reported by the Telegraph 26th July 2020[72]:

"Another senior Tory MP has called for an inquiry over Chinese involvement in Britain's nuclear power stations amid rising concerns over the Hinkley Point C mega-project. Neil O'Brien said that urgent questions must be answered following conflicting reports about work by state-owned contractor China General Nuclear (CGN) on the £22.5bn scheme. The firm's role was originally thought to be limited to financial investment (…) Mr O'Brien said that US regulators were already taking aim at CGN and another business, China National Nuclear Corporation, after its department of defence accused them of having ties to Beijing's military forces. He said: "Both CGN and China National Nuclear Corporation have a kind of regulatory sword of Damocles hanging over their heads. Chinese reactors will be built even less, even if the design might be accepted, as the Economist reported in early 2022: "Hualong One…has a more straightforward design than other reactors being built in Europe… Publicly, the government says no decision has been taken. Privately, it is clear that Chinese involvement in British nuclear-power plants is at an end."[73]

The Czech Republic had already banned Chinese participation in this new reactor project in 2021 with its so-called Lex Dukovany which took effect on January 1, 2022.

Korea Hydro and Nuclear Power (KHNP)

South Korean energy company Korea Hydro and Nuclear Power (KHNP) has confirmed it intends to take part in the Czech Republic's tender process. Its flagship export technology is the 1,345 MW APR-1400 pressurised water reactor design, so far deployed overseas only at the United Arab Emirates' Barakah nuclear power station. Domestically, KHNP operates the APR-1400 at Shin-Kori-3 and 4 and is building more units at Shin-Hanul-1 and 2 and Shin-Kori-5 and 6.[74] However, since 2009, when South Korea won this contract thus beating France, South Korea has not won a single reactor export contract.

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[71] M.V. Ramana, University of Colorado: https://www.colorado.edu/cas/2022/04/12/even-china-cannot-rescue-nuclear-power-its-woes (Accessed April 17, 2022).
[72] Telegraph on 26th July 2020 at https://www.no2nuclearpower.org.uk/news/hinkley-chinese-involvement-28-7-20/ (Accessed April 17, 2022).
[73] https://www.economist.com/britain/2022/02/12/british-regulators-have-approved-a-chinese-reactor-design (Accessed 17 April 2022).
[74] NucNet Nuclear News Daily/1 April 2022.

4.2 Difficult future of Rosatom reactor exports

VVER reactor producer dependent on Western I&C

Rosatom Holding, the market leader in the past decades, also might run into difficulties because it relied on Framatome's Instrumentation & Control systems in its reactors, as well as receiving support for licensing in Western countries. In many cases it is a Framatome-Siemens consortium providing this service to Rosatom.

The possibly politically or economically forced end to this field of cooperation could pose a serious problem both for Rosatom's new-build and modernisation business, because Framatome has been delivering the I&C systems for VVER reactors. It is almost impossible to replace the supplier of Instrumentation & Control systems which are the brain of a nuclear power plant: only very few companies are able to produce them. It may be that only Framatome can deliver the I&C for Rosatom's VVER reactors, both old and new, as it has many times in the recent past: In 2009, Framatome completed the Dukovany plant (Czech Republic) I&C refurbishment, a nine-year project considered one of the most significant I&C modernisation projects, and was used in 2018 to modernise key parts of the two Loviisa (Finland) VVER plants.[75] Framatome also delivered the I&C for Russian and Chinese plants.

Back in 2020, the I&C Business Unit at Framatome announced: "We are delighted to provide our I&C expertise and partner with RASU JSC to support the construction of the Hanhikivi-1 Nuclear Power Plant," and continued by saying that this contract "demonstrates our unique capabilities to support Russian reactor designs in the field of I&C."[76] The Rusatom/Framatome/Siemens cooperation for another planned NPP in an EU country was already signed in 2019: Paks-2 in Hungary.[77]

WNN also reported that in 2018, Framatome and Rosatom subsidiary JSC Rusatom Automated Control Systems (RASU) signed an MoU to enhance their cooperation in the field of I&C, including cooperation in the fields of maintenance and modernisation, training, development of nuclear infrastructure, and support for the certification of Russian equipment to ensure compliance with European and international norms and standards.

In 2021 Framatome and RASU signed a contract to provide technical support in design and integration of the I&C system for Fennovoima's Hanhikivi-1 nuclear power plant project in Finland. Under the terms of the contract, Framatome was to provide consulting support for I&C system integration and design in the plant construction

[75] https://www.framatome.com/solutions-portfolio/docs/default-source/default-document-library/product-sheets/a3038-b-fr-g-en-0422-spinlinefinal.pdf?Status=Master&sfvrsn=c378d37e_2 (Accessed April 25, 2022).
[76] https://rosatom.ru/en/press-centre/news/rosatom-and-framatome-sign-instrumentation-and-control-design-support-contract-for-hanhikivi-1-npp-f/?sphrase_id=2953088 (Accessed April 26, 2022).
[77] https://emerging-europe.com/business/rusatom-and-framatome-siemens-to-deliver-control-systems-for-hungarys-paks-npp/ (Accessed April 26, 2022).

project based on a VVER-1200 reactor. The role of RASU is to review design documentation and to be I&C technical leader and integrator for the Hanhikivi-1 plant.[78]

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[78] www.world-nuclear-news.org/Articles/Framatome-and-Rosatom-expand-cooperation (Accessed April 26, 2022).

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Dublin City Council

Strategic Noise Mapping and Noise Action Plans for the Agglomerations of Dublin, Cork and Limerick for Round 4 of the Environmental Noise Regulations 2018

Report to the
Climate Action, Environment & Energy
Strategic Policy Committee

By

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Executive Summary

A project to implement Round 4 of the Strategic Noise Mapping and Noise Action Plan for Dublin City commenced in May 2021 and is due for completion by September 2024. In addition to delivering Dublin City Council's obligations in respect of preparing Strategic Noise Maps and a Noise Action Plan for the Dublin City administrative area, a project management team from Dublin City Council is managing the delivery of the Round 4 project at a national level for all the agglomerations in Ireland.

Legislation and Requirements

EU Directive 2002/49/EC, which was transposed into Irish law through the European Communities (Environmental Noise) Regulations 2018 to 2021, requires Nosie Mapping Bodies and Action Planning Authorities to prepare Strategic Noise Maps and Noise Action Plans every 5 years. These shall apply to environmental noise created by human activities and particularly to noise emitted by road traffic, rail traffic, air traffic and from sites of industrial activity. The following two indicators must be applied in the assessment and management of noise;

- L_{den} is the annual average noise level for the day, evening and night period and is designed to measure 'annoyance'. It has a defined threshold of **55dB**.
- L_{night} is the annual average noise level for night-time periods and is designed to assess sleep disturbance. It has a defined threshold of **50dB**.

Member states must report the numbers of people who are exposed to noise levels above both these thresholds for the range of noise sources mentioned above.

Strategic Noise Maps, and Noise Action Plans, must be prepared for each of the following areas;

- Agglomerations (>100,000 persons)
- Major roads (>3,000,000 vehicle passages per year)
- Major rail (>30,000 train passages per year)
- Major airport (>50,000 movements per year).

The Noise Action Plans shall include actions and measures to address priorities which may be identified by the exceedance of the main indicators thresholds set out above.

Agglomerations Project – Progress & Next Steps

The project being delivered by Dublin City Council at a national level deals with agglomerations only and includes the Dublin, Cork and Limerick agglomerations. The project is being delivered in the following two phases;

- Phase 1 – Noise Modelling & Strategic Noise Mapping (June 2022 – May 2023)
- Phase 2 – Noise Action Plans (June 2023 – September 2024).

At present the project team has successfully completed the noise modelling work and has delivered the digital strategic noise mapping results to the EPA in line with the statutory deadlines set by the European Commission. The project team is currently preparing the graphical Strategic Noise Maps which will be made available to the public on each Local Authority website in late February 2023.

The Noise Action Plan phase of the project is scheduled to commence at the end of Q2 2023 and it is expected that draft Noise Action Plans will be available before the end of 2023. This will be followed by a period of public and stakeholder consultation in Q4 2023 / Q1 2024 before the Plans are finalised.

1 Introduction

A project to implement Round 4 of the Strategic Noise Mapping and Noise Action Plan for Dublin City commenced in May 2021 and is due for completion by September 2024. This report provides an update on the statutory basis and requirements for the project, progress to date and the work that will be completed over the next two years.

As well as ensuring the delivery of Dublin City Council's obligations in respect of preparing strategic noise maps and a noise action plan for the Dublin Administrative area, a project management team from Dublin City Council is managing the delivery of the Round 4 project at a national level for all the agglomerations in Ireland that are obliged to comply with the relevant legislation. Further details are set out in Section 2.

1.1 Legislative Background

EU Directive 2002/49/EC relates to the assessment and management of environmental noise and is more commonly known as the Environmental Noise Directive (END). The directive was implemented on foot of an EU green paper on 'Future Noise Policy' which highlighted the need for a high level of health and environmental protection against noise. In the green paper, noise in the environment was addressed as one of the main environmental problems in Europe.

The Directive was transported into Irish law through the following Regulations;

- Environmental Noise Regulations 2006 (S.I. No. 140 of 2006) (Now revoked)
- European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549 of 2018)
- European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. No. 663 of 2021).

Round's 1 to 3 were completed under the now revoked 2006 Regulations.

The 2018 Regulations were introduced to bring into effect a new European common assessment method which was set out in Commission Directive (EU) 2015/996. This common assessment method, known as CNOSSOS-EU, ensures that Ireland and all Member States are applying a common approach to modelling and assessing the impact of environmental noise and the avoidance, prevention and reduction of harmful effects as a result of exposure to it.

The 2021 Amendment was introduced to bring into effect amendments to the agglomeration boundaries to be covered by Round 4. This included adjustments to the Dublin and Cork agglomeration boundaries as well as the introduction of the Limerick agglomeration for the first time. The Amendment also gave effect to a one year extension granted by the EU for the completion of the Round 4 Noise Action Plans from 2023 to 2024.

The 2018 Regulations make the Environmental Protection Agency (EPA) the national competent Authority for the purpose of overseeing implementation of the Regulations and for providing guidance.

1.2 Scope and Requirements

1.2.1 Environmental Noise Sources and Metrics

The END and the 2018 Regulations apply to environmental noise, created by human activities, which people are exposed to in built-up areas, in public parks or quiet areas, near schools and hospitals and other noise sensitive buildings and areas. The definition of "environmental noise" contained within the 2018 Regulations includes "unwanted or harmful outdoor sound crated by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity". The 2018 Regulations do not apply to noise from domestic activities or noise created by neighbours or natural environmental noise such as wind, waves and nature. As such the Regulations do not cover many of the noise compliant subjects which Dublin City Council Air Quality and Noise Control Unit would receive on an annual basis.

The END and the 2018 Regulations requires two main indicators to be applied in the assessment and management of noise as follows;

- $\mathbf{L_{den}}$ is the annual average noise level for the day, evening and night period and is designed to measure 'annoyance'. It has a defined threshold of **55dB**.
- $\mathbf{L_{night}}$ is the annual average noise level for night-time periods and is designed to assess sleep disturbance. It has a defined threshold of **50dB**.

Member states must report the numbers of people who are exposed to noise levels above both these thresholds for the range of noise sources mentioned above.

1.2.2 Strategic Noise Maps

The END and the 2018 Regulations require Noise Mapping Bodies (NMBs) to prepare or review Strategic Noise Maps every 5 years for each of the following areas;

- Agglomerations (>100,000 persons)
- Major roads (>3,000,000 vehicle passages per year)
- Major rail (>30,000 train passages per year)
- Major airport (>50,000 movements per year).

For the agglomerations, there is a requirement to place special emphasis on noise emitted by road traffic, rail traffic, airports and industry activity sites including ports.

For the purpose of the 2021 (Amendment) Regulations, NMBs are defined as follows;

- Agglomeration of Dublin – Dublin City Council and the County Councils of Dun Laoghaire Rathdown, Fingal, South Dublin, Wicklow and Kildare.
- Agglomeration of Cork – Cork City Council and Cork County Council.
- Agglomeration of Limerick – Limerick City and County Council and Clare County Council.
- Major Roads;
  - National Roads – Transport Infrastructure Ireland (TII)
  - Non-National Roads – relevant Local Authority
- Major Rail;
  - Heavy Rail – Iarnród Éireann
  - Luas/Light Rail – TII
- Major Airports - relevant Airport Authority.

The purpose of the Strategic Noise Maps are to;

- Provide relevant data to the European Commission in accordance with the requirements of the END,
- Provide a source of information for the general public
- Provide the basis for developing Noise Action Plans to identify noise hots spots and quiet areas and propose relevant mitigation measures to mitigate the harmful effects of these noise sources.

The Statutory deadline for reporting the results of the Strategic Noise Mapping to the European Commission was the 31st December 2022.

1.2.3 Noise Action Plans

The END and the 2018 Regulations require Action Planning Authorities (APAs) to make or review Noise Action Plans every 5 years for each agglomeration and also places that may be affected by noise from major roads, major rail and major airports, each as defined above.

Action Planning Authorities as defined by the 2018 Regulations are as follows;

- Agglomeration - the Local Authorities that make up each agglomeration as defined above.
- Major Roads – the relevant Local Authority within whose functional area the major road is located
- Major Railways – the relevant Local Authority within whose functional area the major railway is located
- Major Airports – the relevant Local Authority within whose functional area the major airport is located.

The Noise Action Plans shall include actions and measures to address priorities which may be identified by the exceedance of one of the two main indicators set out above or as a result of other criteria chosen by the National Competent Authority, the EPA. They should address the most important areas as established by the Strategic Noise Maps and the exposure assessment resulting from the modelling and mapping process.

Action Planning Authorities may also use the Strategic Noise Maps to assess the impact on designated Quiet Areas and/or to identify Quiet Areas and identify actions and measures to protect and enhance existing or proposed Quiet Areas.

The Statutory deadline for reporting the Noise Action Plans to the European Commission is the 18th January 2025.

1.2.4 Public Information and Consultation

In accordance with the 2018 Regulations and the European Communities Act 1972 (Access to Information on the Environment) Regulations 2007 (as amended), the Noise Mapping Bodies and Action Planning Authorities are required to make the Strategic Noise Maps (new or revised) and the Noise Action Plans (new or revised) available to the public and disseminate them by any appropriate means, including through the use of available information technologies.

Furthermore as part of the preparation of the new or revised Noise Action Plans, the Action Planning Authorities are required to consult with the public and take into account the results of this consultation when finalising the Noise Action Plans.

For the purpose of this agglomerations project Strategic Noise Maps will be made available to the public on each Noise Mapping Bodies web site in February 2023. Furthermore a period of formal public and stakeholder consultation will be completed in late 2023 or early 2024 when draft Noise Action Plans are prepared. Final Noise Action Plans will be made available on each Action Planning Authorities web site on completion.

2 National Approach to Round 4

The implementation of the END through the completion of Round's 1 to 3 involved each Noise Mapping Body and Action Planning Authority preparing their own Strategic Noise Maps and Noise Action Plans. Notwithstanding this, consultation and co-ordination was undertaken through the EPA and between adjoining Authorities. Furthermore, the EPA provided a series of Guidance Documents to help the Noise Mapping Bodies and Action Planning Authorities with the process and ensure, where possible, consistency of approach.

For Round 4 a new national approach was adopted as follows;

- Agglomerations of Dublin, Cork and Limerick – a single consultant was appointed to complete the noise modelling and mapping for all agglomerations on behalf of the Noise Mapping Bodies and also to support the Action Planning Authorities with the production of Noise Action Plans.
- Major Roads and Rail outside the agglomerations – TII is completing the noise modelling and mapping on behalf of the Noise Mapping Bodies.
- Major Airports – Dublin Airport Authority (DAA), is completing the noise modelling and mapping as the designated Noise Mapping Body.

For Round 4 the EPA continued to provide an overseeing and co-ordination role and also provided updated Guidance documents relating to the implementation of the new common assessment approach, CNOSSOS – EU.

For the purpose of successfully implementing this new national approach for the agglomerations, it was necessary for one of the Noise Mapping Bodies/Action Planning Authorities to undertake a project management and co-ordination role. Dublin City Council's Technical Support Division (TSD), which is part of the Environment and Transportation Department, is undertaking this project management role for the delivery of this new national approach for each of the three agglomerations. This project management role is in addition to the role that Dublin City Council's Air Quality and Noise Control Unit has, on behalf of Dublin City Council, within the project in relation to their technical expertise within this field.

The project management role for the agglomerations project involved/involves the following;

- Co-ordination of the inputs from 10 Local Authorities, TII, Iarnród Éireann, the Road Management Office (RMO), the National Transport Authority (NTA), DAA.

- Liaison with and reporting to EPA and the Department of Environment, Climate and Communications (DECC).
- Co-ordination of a major data collection exercise across all NMBs (except DAA).
- Procure and appoint a consultant to complete the work in line with statutory deadlines. This included preparation of the tender documents including a detailed technical specification for the project covering both noise modelling, mapping and action plans.
- Ongoing project management across all stakeholders and administration of the noise consultant contract.

For the purpose of delivering the project, the project management team has broken the project into the following two phases;

- Phase 1 – Noise Modelling & Strategic Noise Mapping (June 2022 – May 2023)
- Phase 2 – Noise Action Plans (June 2023 – September 2024).

3 Milestones and Progress to Date

At present the project is currently in Phase 1 and has made significant progress since the project management team was appointed to implement the project. A summary of the key tasks and deadlines that have been achieved to date are set out in Table 3-1.

Table 3-1 - Summary of Progress - Phase 1

Progress Task	Timelines
Completed data register and major data collection exercise	June 2021 - March 2022
Completed tender documents and published contract notice for Consultant	18th February 2022
Appointed project consultant and commenced project - Phase 1 – Noise Mapping	26th May 2022
Weekly co-ordination meetings with TII on modelling of major roads at agglomeration boundaries including modelling of pilot area on M11	August – September 2022
Commenced noise modelling • Limerick • Cork & Dublin	 27th October 2022 28th October 2022
Provided draft model outputs results to Local Authorities • Cork & Limerick - All sources & Exposure Statistics, Dublin – Road only • Dublin - Industry • Dublin – Rail • Dublin Exposure Statistics (all sources)	 25th November 2022 29th November 2022 2nd December 2022 7th December 2022
Prepare model results in line with EPA/EEA reporting requirements and deliver to EPA Note: Issues with uploading reports to EEA ReportNet site have been encountered but this is due to issues with the reporting site and is being dealt with by the EPA.	9 – 16th December 2022

While Phase 1 of the project is ongoing, it should be noted that the project successfully delivered the results to the EPA in-line with the European Environment Agency's (EEA) reporting requirements before the statutory deadline. To date the results for the Cork and Limerick agglomerations have been successfully uploaded by the EPA. However, problems have been encountered when uploading the

Dublin agglomeration data sets due to file size. This is a problem with the EEA's ReportNet site and the EEA are currently working to resolve the issue.

Details of the outstanding tasks to complete Phase 1 are set out in Section 5.

4 Strategic Noise Modelling Results – Dublin

The strategic noise modelling results for the agglomeration of Dublin are presented in Appendix A. The following results are presented;

- Roads $L_{den,}$
- Roads L_{night}
- Rail L_{den}
- Rail L_{night}
- Industry L_{den}
- Industry L_{night}.

It should be noted that all roads within the agglomeration have been models including those which would be classed as Major Roads.

The source data for the modelling work is reflective of a base year of 2021.

For traffic data a traffic model was created using a combination of traffic sources which included;

- TII traffic count data on national roads
- The NTA Regional Modelling System, specifically the Eastern Regional Model for the Dublin agglomeration.
- Local Authority traffic count data, both historic and traffic surveys completed for the purpose of Round 4
- Default traffic data sets for minor roads.

Rail traffic data sets were provided by Iarnród Éireann and TII.

For industry the sites that were included within the modelled included Industrial Emission (IE) sites, as regulated by the EPA under the IPPC Directive 96/61 EC. In addition to this Dublin Port and Port of Cork were included in the industry analysis. Information on each site was provided by the EPA, i.e. Annual Environmental Reports (AERs) or obtained from other publicly available data. Where data was not available on specific noise sources, a default methodology was applied.

5 Next Steps

5.1 Phase 1 – Noise Modelling and Strategic Noise Mapping

While the digital noise contour data was reported to the EPA and the EEA in December 2022, the project team is currently working to produce graphical Strategic Noise Maps which will be made available to the public in line with Regulation requirements.

At present it is proposed to host the maps as pdfs on the Dublin City Council's Air Quality and Noise Control web page showing the results for the full agglomeration of Dublin together with a map showing the Dublin City Council administrative area only. Each other Local Authority will host their own maps.

In addition to this it is proposed to work with the EPA to host the maps on their web site in a Web GIS format which will be provide the public and other stakeholders with a more interactive experience. This will also provide a collective set of maps covering the whole of Ireland including all agglomerations and major roads and rail outside the agglomerations.

A summary of the outstanding tasks/deliverables for the remainder of Phase 1 is set out in Table 5-1.

Table 5-1 - Outstanding Deliverables - Phase 1

Phase 1 Deliverables	Programme Delivery Date
Finalise Graphical Strategic Noise Maps (Limerick, Cork & Dublin)	January /February 2023
Data Review, Evaluation and Model Set-up Reports (Limerick, Cork & Dublin)	January to April 2023
Nosie Model Files (Limerick, Cork & Dublin)	January 2023
Noise Modelling and Exposure Assessment Report (Limerick, Cork & Dublin)	April to May 20223
Maps Available to the Public (Limerick, Cork & Dublin)	February 2023

5.2 Phase 2 – Noise Action Plans

An overview of the key tasks and deliverables for Phase 2 are set out in Table 5-2.

Table 5-2 - Phase 2 Deliverables - Indicative Timelines

Phase 2 Deliverables	Indicative Timeline
Commence Phase 2	June 2023
Draft Noise Action Plans	Q4 2023
SEA / AA	Q4 2023 – Q1 2024
Public Consultation	Q1 2024
Final Noise Action Plans	Q2 2024
Deliver Final Noise Action Plans to EPA	Q3 2024
EEA Deadline	End 2024

Note: SEA – Strategic Environmental Assessment

AA – Appropriate Assessment

Although the timelines set out in the table above are high-level and indicative at this time, they broadly reflect the expected progression of the various tasks required. While Phase 2 is shown as commencing

in June 2023, the project management team will review this, and the overall project programme for Phase 2, with the project consultant in the coming months and it may be possible to commence Phase 2 earlier.

The Elected Members will be keep informed of progress during the remainder of Phase 1 and Phase 2 through updates at relevant SPC meetings and by other consultative means.

APPENDIX A – STRATEGIC NOISE MODELLING RESULTS – DUBLIN

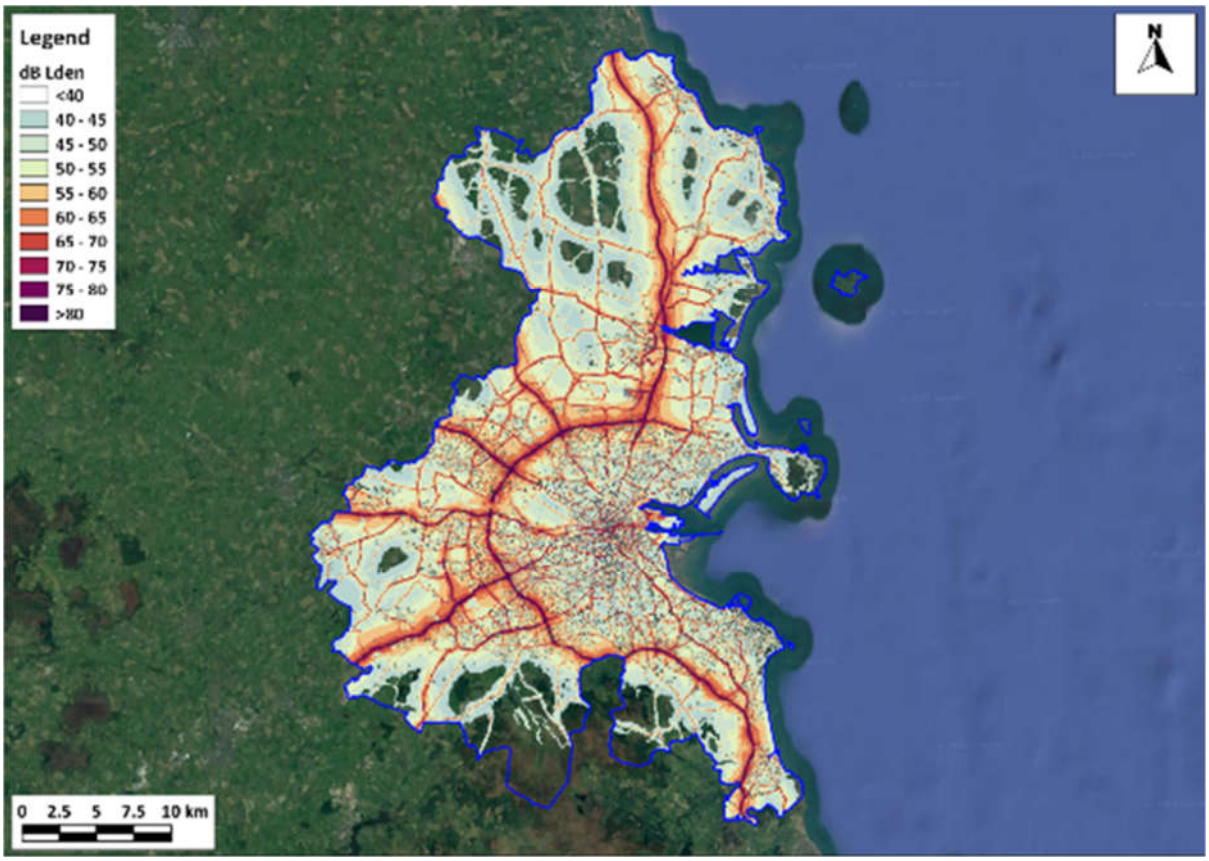


Figure 1 - Roads L_{den}

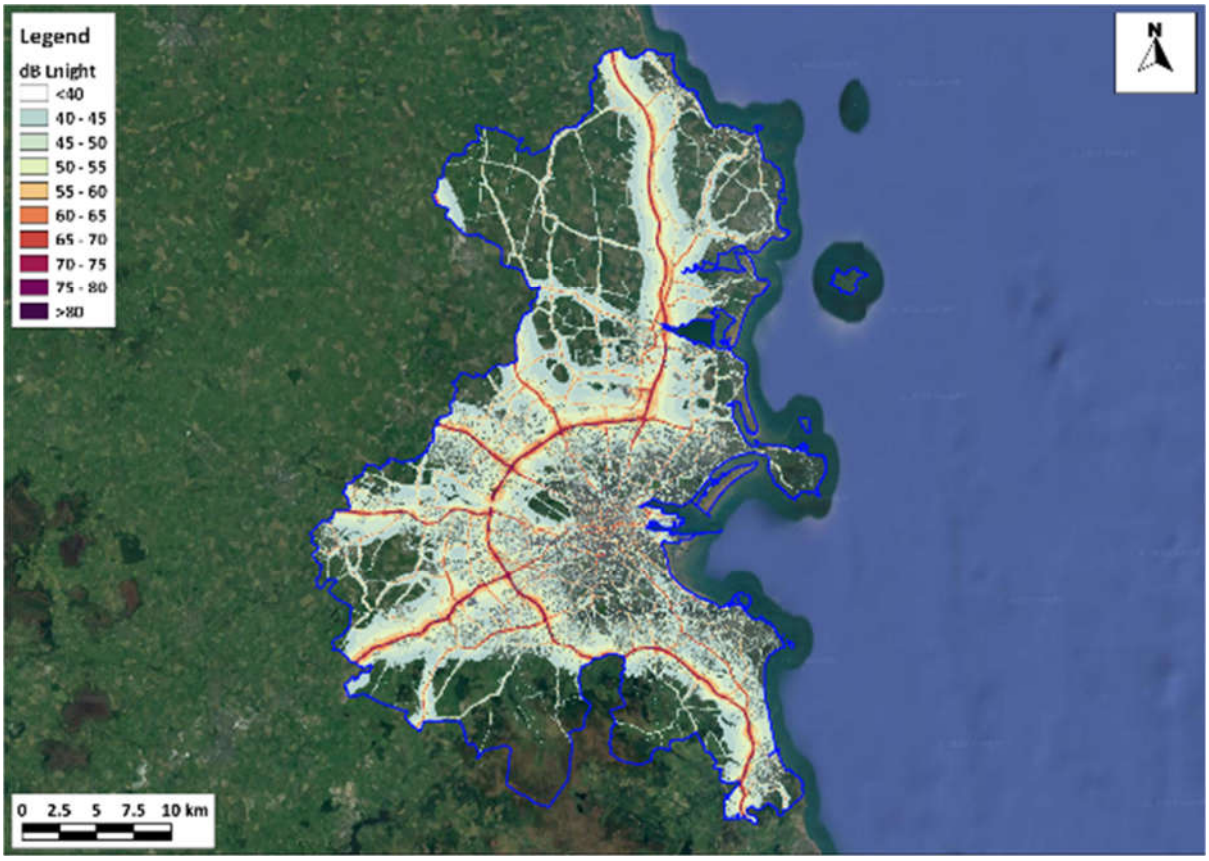


Figure 2 - Roads L_{night}

Figure 3 - Rail L_{den}

Figure 4 - Rail L_{night}

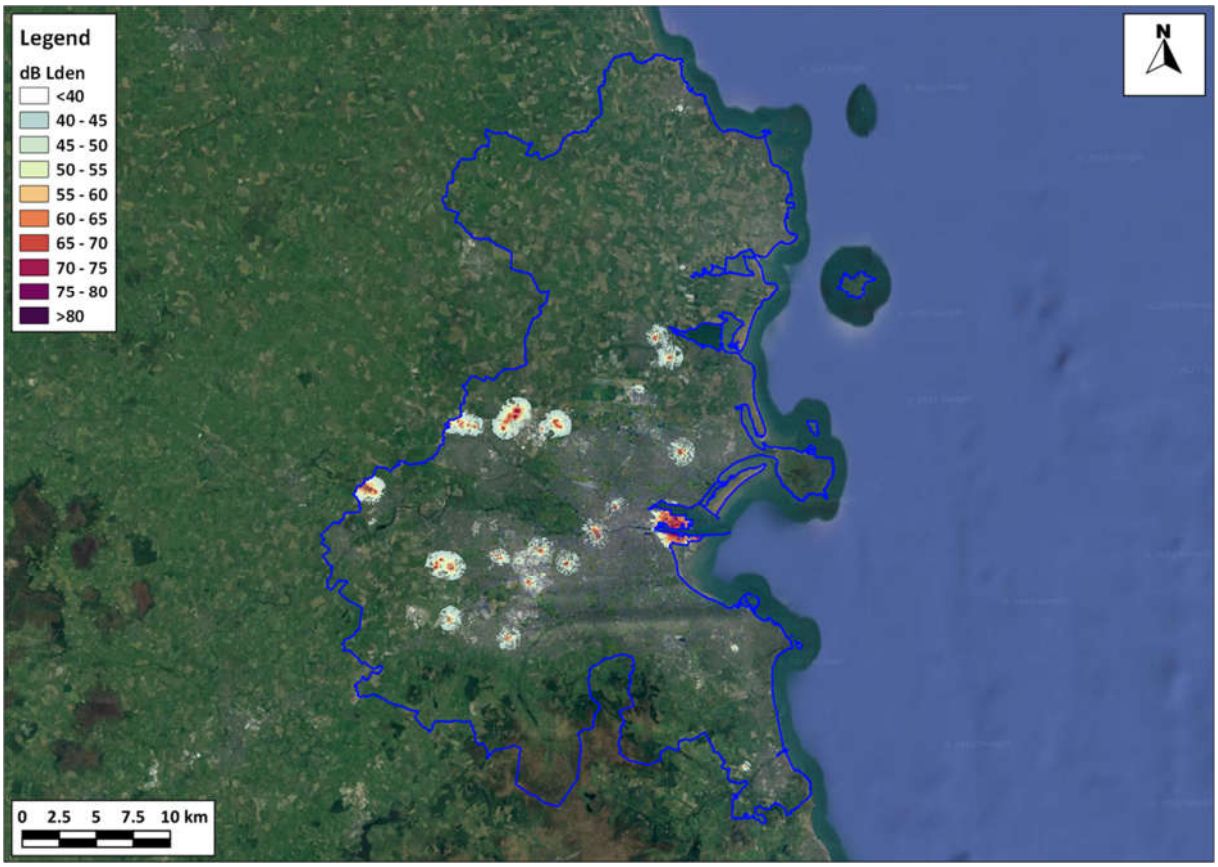


Figure 5 - Industry L_{den}

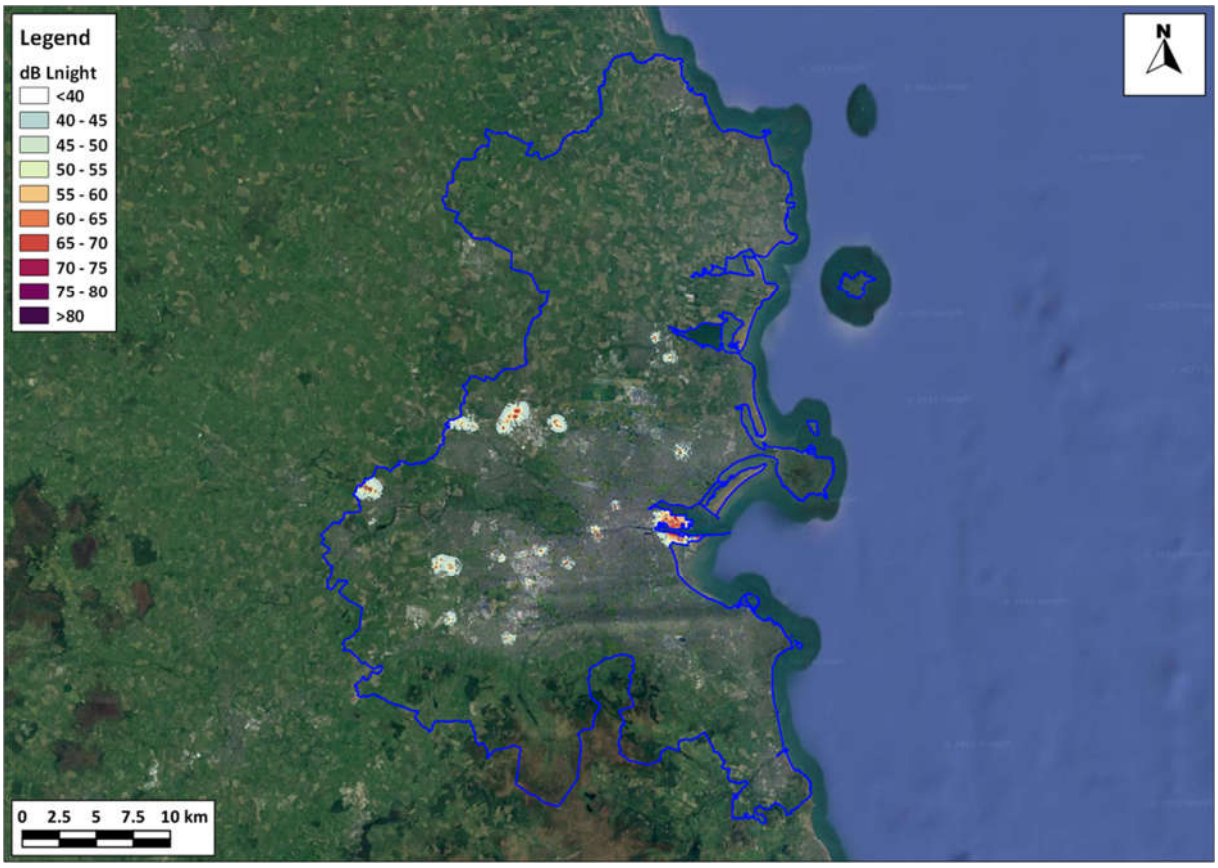


Figure 6 - Industry L_{night}

R4 Strategic Noise Mapping and Noise Action Plans Agglomerations

Climate Action, Environment & Energy Strategic Policy Committee
February 2023

Owen McManus
Technical Support Division - Dublin City Council

Martin Fitzpatrick
Air Quality Monitoring and Noise Control Unit – Dublin City Council

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Agenda

- Round 4 Strategic Noise Mapping and Noise Action Plan Overview
- National Approach to Round 4
- Milestones and Progress to Date
- Strategic Noise Modelling Results – Dublin
- Next Steps
- Questions / Discussion

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Round 4 Strategic Noise Mapping and Noise Action Plan Overview

European Communities (Environmental Noise) Regulations 2018 (S.I. 549/2018)

- The Regulations give effect to the Environmental Noise Directive (END) 2002/49/EC
- Apply to environmental noise, created by human activities, which people are exposed to; in built-up areas, in public parks/quiet areas, near schools & hospitals and other noise-sensitive buildings/areas.
- Provide for the implementation in Ireland of a common approach for Europe to avoid, prevent and reduce the harmful effects due to exposure to environmental noise.
- The Regulations/END requires the following two indicators to be applied in the assessment and management of environmental noise;
    - L_{den} is the annual average noise level for the day, evening and night period and is designed to measure 'annoyance'. It has a defined threshold of 55dB.
    - L_{night} is the annual average noise level for night-time periods and is designed to assess sleep disturbance. It has a defined threshold of 50dB.
- Member States must report on the numbers of people who are exposed to noise levels above these thresholds for a range of noise sources.

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Round 4 Strategic Noise Mapping and Noise Action Plan Overview

European Communities (Environmental Noise) Regulations 2018 (S.I. 549/2018)

- The Regulations make the Environmental Protection Agency (EPA) the national competent authority for the purpose of overseeing implementation and for providing guidance.

- The Regulations require Noise Mapping Bodies (NMBs) to prepare or review **Strategic Noise Maps** every 5 years for each of the following areas;
    - Agglomerations (>100,000 persons) (road, rail, airports & industry)
    - Major roads (>3,000,000 vehicle passages per year)
    - Major rail (>30,000 train passages per year)
    - Major airport (>50,000 movements per year)

- The Regulations require Action Planning Authorities (APAs) to make or review **Noise Action Plans** every 5 years for each of the areas covered by the Strategic Noise Maps.

- Statutory Deadlines for reporting to the EU;
    - Maps - End 2022
    - Noise Action Plans – End 2024

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

National Approach to Round 4

- Rounds 1 to 3 – approach involved each NMB / APA completing their own maps and Action Plan
- Round 4 – new National approach was adopted as follows;
    - Agglomerations of Dublin, Cork and Limerick – appoint single consultant to complete the noise modelling and mapping.
    - Major Roads and Rail outside agglomerations – Transport Infrastructure Ireland (TII) would complete the noise modelling and mapping.
    - Major Airports – Relevant airport authority, Dublin Airport Authority (DAA), complete the noise modelling and mapping.
- Dublin City Council's Technical Support Division (TSD) undertook the role of project managing the delivery of the new National approach for the agglomerations which included;
    - Co-ordination of inputs from 10 Local Authorities, TII, Irish Rail, Road Management Office (RMO), National Transport Authority (NTA), DAA and reporting to EPA.
    - Co-ordinate major data collection exercise
    - Procure and appoint a consultant to complete the work in line with statutory deadlines
    - Ongoing management and administration of the project;
        - Phase 1 – Noise Modelling & Mapping (June 2022 – May 2023)
        - Phase 2 – Noise Action Plans (June 2023 – September 2024)

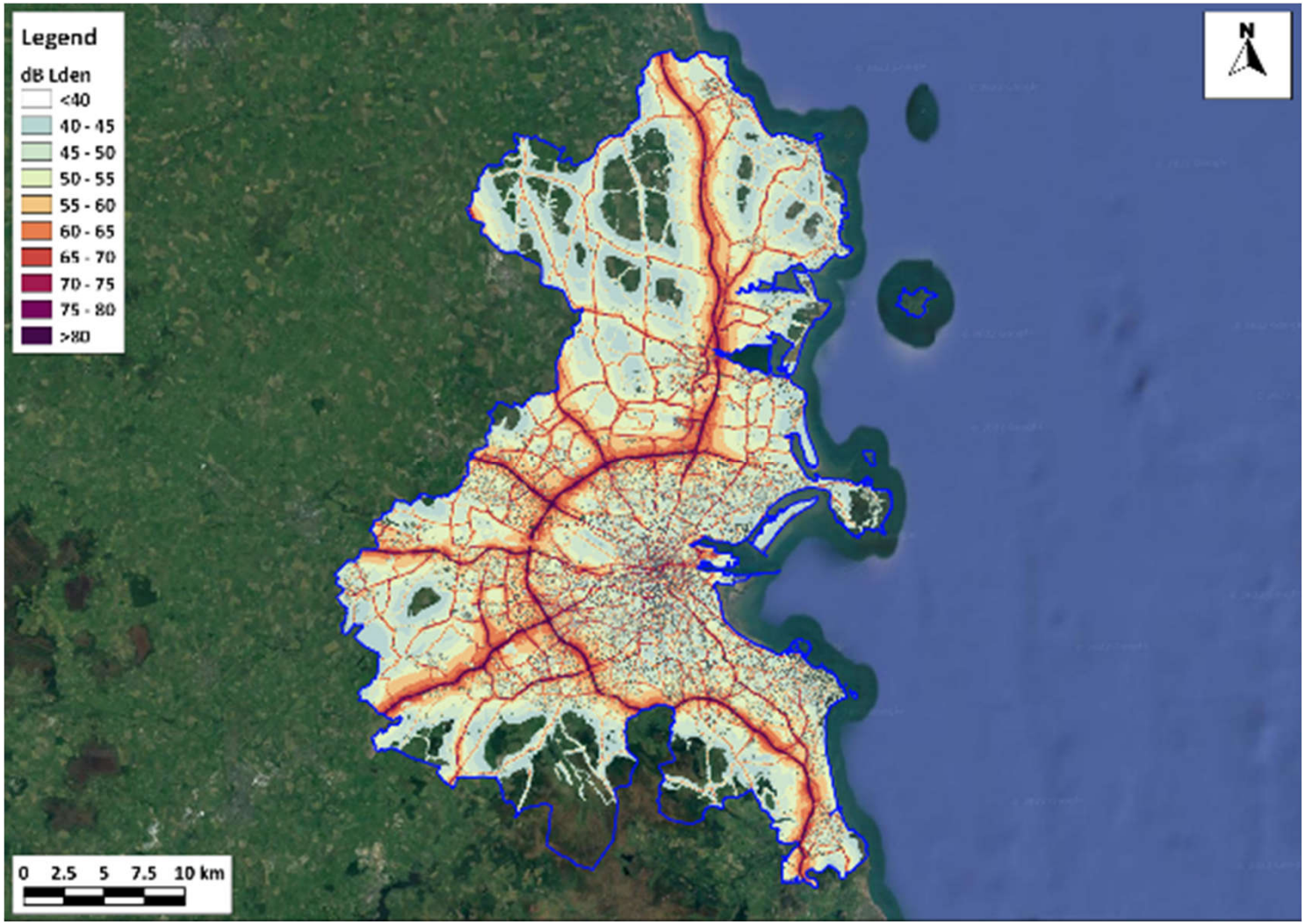
Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Milestones and Progress to Date

Progress Task	Timelines
Completed data register and major data collection exercise	June 2021 - March 2022
Completed tender documents and published contract notice for Consultant	18th February 2022
Appointed project consultant and commenced project - Phase 1 – Noise Mapping	26th May 2022
Weekly co-ordination meetings with TII on modelling of major roads at agglomeration boundaries including modelling of pilot area on M11	August – September 2022
Commenced noise modelling • Limerick • Cork & Dublin	 27th October 2022 28th October 2022
Provided draft model outputs results to Local Authorities • Cork & Limerick - All sources & Exposure Statistics, Dublin – Road only • Dublin - Industry • Dublin – Rail • Dublin Exposure Statistics (all sources)	 25th November 2022 29th November 2022 2nd December 2022 7th December 2022
Prepare model results in line with EPA/EEA reporting requirements and deliver to EPA Note: Issues with uploading reports to EEA ReportNet site have been encountered but this is due to issues with the reporting site and is being dealt with by the EPA.	9 – 16th December 2022

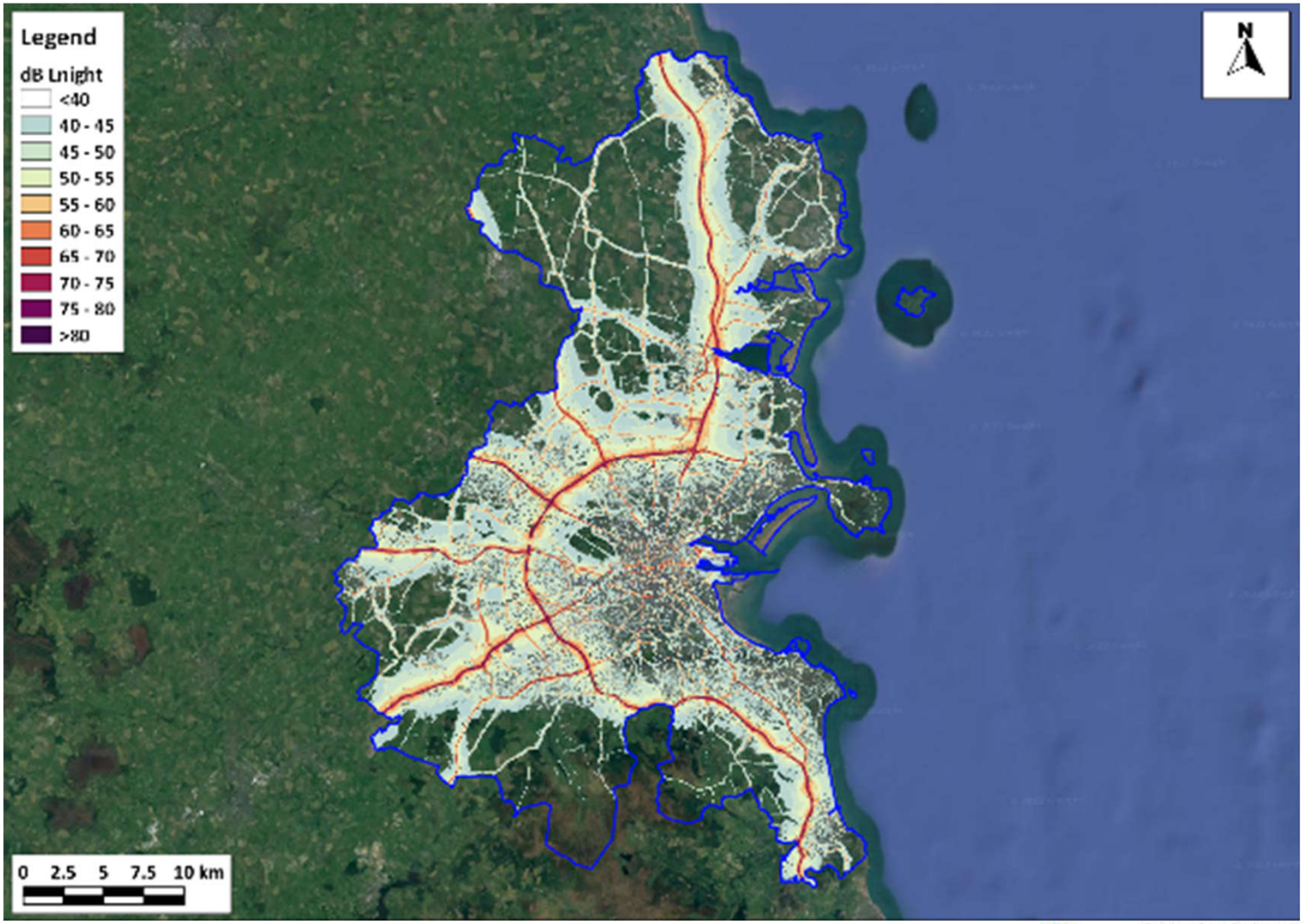
Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin Strategic Noise Modelling Results – Roads L_{den}



Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin Strategic Noise Modelling Results – Roads L_{night}



Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin Strategic Noise Modelling Results – Rail L_{den}

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Dublin City Council

Dublin Strategic Noise Modelling Results – Rail L_{night}

Comhairle Cathrach Bhaile Átha Cliath
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Dublin Strategic Noise Modelling Results – Industry L_{den}

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Dublin Strategic Noise Modelling Results – Industry L_{night}

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Dublin City Council

Next Steps

Complete Project Reports & Deliverables (Phase 1 – Strategic Noise Maps)

Phase 1 Deliverable	Programme Delivery Date
Finalise Graphical Strategic Noise Maps (Limerick, Cork & Dublin)	January /February 2023
Data Review, Evaluation and Model Set-up Reports (Limerick, Cork & Dublin)	January to April 2023
Nosie Model Files (Limerick, Cork & Dublin)	January 2023
Noise Modelling and Exposure Assessment Report (Limerick, Cork & Dublin)	April to May 20223
Maps Available to the Public (Limerick, Cork & Dublin)	February 2023

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Next Steps

Commence Phase 2 – Noise Action Plans (Programme to be reviewed)

Phase 2 Deliverable	Indicative Timeline
Commence Phase 2	June 2023
Draft Noise Action Plans	Q4 2023
SEA / AA	Q4 2023 – Q1 2024
Public Consultation	Q1 2024
Final Noise Action Plans	Q2 2024
Deliver Final Noise Action Plans to EPA	Q3 2024
EEA Deadline	End 2024

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Thank You

Questions / Discussion?

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Minutes of the Re-municipalisation of Waste Collection Service Subcommittee held on 13th October 2022 via MS Teams

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1. Minutes of the meeting held on 28th April 2022

   Order: Agreed.

2. Matters Arising

   The Chair introduced Ritchie Carruthers to the group, Ritchie will be replacing Dessie Robinson as the FORSA representative.

   Ritchie advised the group

   - He is currently the National Secretary for the Local Government and Municipal Division
   - Has been working for the union for in excess of 16 years
   - The work that is being undertaken by the Subcommittee sits well with the "More Power to You Campaign"
   - He hopes to add a new perspective to the deliberations of the Subcommittee

   Order: Noted

3. Chairperson's business

   None

4. Update on the Status of the Next Stage of the Research Report – Institute Of Public Administration

   Joanna O' Riordan updated the Group on the status of the project

   - The purpose of the second phase of the project is to review the benefits and the challenges in respect of remunicpalisation
   - Referenced the legal context of remunicpalisation

- Advised that is Government and EU policy to transition from a linear economy to a circular economy
- A single, 6 year national waste management is currently being developed and should be available early 2023.
- As part of phase 2 of the Waste Legislation and competition law is being reviewed
- Current and emerging waste policy is being reviewed
- It is intended that a draft report will be available in December
- We will have the report before Christmas, hopefully by 22nd December

Members raised the following questions / issues

- The 1st report referenced that pay was be negotiated with unions in Copenhagen, can the new data be provided (SN)
- Can the issue of waste ownership be included in the final report? (SN)

Order: Noted, the report will be available by 22nd December with a view to having a meeting to review the report on 12th January.

5. Next meeting

   12th January 2023

6. A.O.B

   None

In Attendance:
Members:

Cllr Daithí Doolan (Chair) **(D.D.)**
Cllr. Cieran Perry (C.P.)
Cllr. John Lyons
Cllr. Kevin Donoghue
Cllr. Michael Pidgeon
Cllr. Sophie Nicoullaud
Bernie Guinan, A.C.E.I
Dessie Robinson, FORSA (D.R.)
Adrian Kane, SIPTU (A.K.)

Officials:
Chris Carroll, Administrative Officer (C.C)
Ciarán McGoldrick, Senior Staff Officer (CMcG)

IPA:
Joanna O'Riordan
Sean Keating

<u>Councillor Daithí Doolan</u>
Chair, Re-Municipalisation of Waste Collection Services Subcommittee
14th October 2022

IPA
INSTITUTE OF PUBLIC
ADMINISTRATION

Institute of Public Administration

Research in respect of the remunicipalisation of waste services in Dublin City Council

Research on behalf of the Strategic Policy Committee of Dublin City Council (Climate Change, Environment and Energy)

January 2023

Contents

1. Introduction

In July 2019, Dublin City Council (DCC) passed a cross-party composite motion calling for the remunicipalisation of household waste services. A cross-party working group was established by the Council to consider how this might be advanced. The group reported back to the full Council in November 2019. Among the group's recommendations was a suggestion that DCC's Executive would provide funding to conduct research that would support the development of a new roadmap for waste management in the city.

A sub-committee of the Climate Change, Environment and Energy Strategic Policy Committee (SPC) was established in order to commission and oversee this research. The terms of reference drawn-up by the sub-committee indicated that the research would cover two areas:

1) To review the approach to waste collection in Dublin through a comparative analysis with the waste collection approaches pertaining in four other European cities. The cities were selected by the sub-committee on the basis of comparable size to Dublin and because they have progressive approaches to waste management. A number of performance criteria were also specified by the sub-committee including the coverage, cost of service, quality of service, employment terms and conditions and environmental impact.
2) The second phase of the research, to commence only on completion of the first phase, would consider the evidence and findings to emerge in Phase One in the context of waste management arrangements pertaining in both Dublin City and Ireland. This would include a description of the legal and regulatory context and would draw attention to the legislative and other changes that would be required in considering the re-municipalisation of domestic waste collection services in Dublin City Council.

In September 2021, the SPC sub-committee appointed the Research Division of the Institute of Public Administration (IPA) to carry out the research. It was agreed that, as requested by the committee, a first phase of the research would provide information on domestic waste collection services in Dublin and a number of comparable European cities. This would be followed by and would inform a further report analysing the legal considerations involved in any new approach to domestic waste collection services in the DCC administrative area.

2. Context

Environmental protection and sustainable development are central to current government policy, with climate and biodiversity challenges given particular emphasis in the Programme for Government (Government of Ireland, 2020). At a European level, the European Green Deal sets out a roadmap for transition to a new economy where climate and environmental challenges are turned into opportunities. Circularity is central to evolving EU and Irish policy. The concept aims not only to help deliver on environmental commitments but to ensure that resources are kept within the local economy as long as possible.

The approach to household waste collection in Ireland is atypical compared to other European cities. Waste collection is carried out by private companies who contract with individual households and thereafter own the waste in terms of subsequent treatment. Any company who is granted a waste collection permit by the National Waste Collection Permit Office (NWCPO), a local authority shared service run by Offaly County Council, may compete in any waste market and any local authority administrative area authorised in that permit.

The Government's *Waste Action Plan for a Circular Economy* (Department of Communications, Climate Action and Environment, 2020) sets out a range of commitments in respect of the circular economy. The policy identifies a range of measures across different waste streams and puts an emphasis on increased regulation to ensure EU targets in respect of waste are achieved. In order to deliver on these objectives, it is proposed that the National Waste Collection Permit Office (NWCPO) be given increased powers as a waste 'collection market oversight body' (page 21). In addition, the role, capacity and responsibilities of the Waste Enforcement Regional Lead Authorities (WERLAs) will be enhanced to position the local authority sector better to respond to emerging and priority enforcement challenges (page 60).

3. Key findings from Phase One

The objective of Phase One was to identify information and data on waste collection arrangements in both Dublin City and a number of comparable cities in order to inform Phase Two of the research. In general terms it was challenging to identify directly comparable data. Within each jurisdiction there are varying administrative structures. There are also differences in how and why data is collected and in this regard it was difficult to get uniformity across the criteria agreed in respect of the comparative

analysis. There are also important historical, cultural, political and economic reasons why waste management has evolved the way it has in the various jurisdictions.

However, notwithstanding these limitations, Phase One was still able to identify some key research findings and data to inform discussions in respect of identifying a new roadmap for waste collection services in Dublin City Council. These are summarised below:

- The DCC administrative area has a population of 554,554 and 211,591 households. Further information from the 2016 Census shows that 35% of households live in apartments, including flats and bedsits, with 65% living in houses.[1]
- In 2022, eleven companies were registered as having permits to collect waste in the DCC Administrative Area. Four of these companies - Greyhound Household, Key Waste Management Ltd, Pádraig Thornton Waste Disposal Ltd, and Pandagreen Ltd - between them account for almost three-quarters of the market. Of these, one company, Greyhound Household, which along with Pandagreen Ltd is part of the Beauparc Group, collects 55 per cent of domestic bins. Further evidence of the consolidation of the domestic waste collection market is evident in the proposed merger of Thorntons Ltd. with the City Bin Co (Curran, 2022).
- Residual, recyclable and bio (food/garden) waste are the waste components picked up at the kerbside in separate collections, while householders are required to bring other waste fractions (e.g. electrical goods, textiles, garden waste) either to drop off points located throughout the community or to recycling centres in each local authority area. Some households are also provided with a kerbside glass collection service. In the main, waste collectors use a wheelie bin system and users are charged each time a bin is lifted, in addition to an annual administration charge. However, a proportion of houses also use pre-paid bags for residual waste and recyclables.
- Dublin is the only one of the five cities surveyed with a fully privatised system of waste collection. In all other cities there is a strong element of public involvement, with waste either collected by the municipality directly by publicly owned companies, or with publicly owned companies managing the service but tendering among private operators for kerbside waste collection. To the extent that a trend is observable from the four comparator cities and their respective countries the trend appears to be towards greater municipal involvement.

[1] These figures are taken from the 2016 Census. The Census due to take place in 2021 was delayed because of Covid-19 and was held in April 2022. The numbers of households and the proportion living in apartments are likely to have increased in the current census, however, data at local authority level will not be available till later in 2023. www.data.cso.ie - https://data.cso.ie/table/E1005

- The proportion of households living in apartments rather than houses in the comparator cities is very high, as much as 90 per cent of households, compared with 35 per cent (2016 Census) in Dublin City. This has a significant impact on waste collection.
- The NWCPO/EPA (2021) indicate that waste is collected from 82% of households in the Dublin City Council area. This proportion would appear to include households using pre-paid bag tags but not those who share a bin with a relative or friend as the collection companies and the NWCPO would be unaware that this is happening. Data from the CSO Quarterly National Household Survey whereby a sample of households were questioned (CSO, 2021) indicates that for Dublin county as a whole, 92% of residual waste is collected kerbside via wheelie bin collection, bin sharing and pre-paid bag tags. The comparable figure for the other cities in this report is 100%.
- Data from two operators suggests that householders in Dublin City in 2022 paid on average €243 per annum in waste collection costs. In Copenhagen households paid on average €284 per annum, in Oslo €258 per annum and in Salzburg €232. In Stockholm average annual waste costs are significantly lower (€88) though for the 10 per cent of households living in houses, comparable at €205 to the costs applying in other cities.
- Dublin is the only city that in the main applies a pay-by-weight system. In the other cities, costs for residual waste depend on the size of the residual bin (with the cost of collecting and treating recyclable and bio waste factored into this charge).
- The quality of service measured by the frequency of collection would appear to be similar across all cities. In general, in the comparator cities a greater range of waste fractions are collected kerbside, or if citizens are required to dispose of the waste themselves at bring centres the cost is considered to be factored into the annual charge.
- From an environmental perspective transitioning to alternative fuels and low carbon fleets would appear to be an important objective for the comparator cities assessed.
- Illegal dumping, as opposed to littering, is not perceived to be a problem in the comparator cities. Waste is collected from all households or can be brought to civic amenity points. DCC indicate that 3,400 tonnes of illegally dumped waste was collected in Dublin City in 2020.
- Data we obtained from two waste collection companies suggests that salary figures in Dublin for drivers of waste collection vehicles are broadly similar with the other cities. However, operators in Dublin would appear to be on somewhat lower salaries comparatively. Other cities do not appear to distinguish to the same degree between drivers and operators with waste collection personnel appearing to do both tasks, whereas in Dublin drivers do not empty the bins. The cost of living in Stockholm and Dublin is very similar, with Copenhagen somewhat higher and Oslo

about 20 per cent higher. When the cost of housing is factored in, the cost of living in Dublin is above Salzburg and Stockholm, on a par with Copenhagen and much closer to Oslo.

4. Methodology and approach for Phase Two

Building on the work from Phase One, the scope of this second phase of the research is to review the legal and policy implications of the remunicipalisation of Dublin city's waste collection service. DCC is one of 31 local authorities, albeit the largest, and any changes in services need to take into consideration the wider local government sector and also relevant Irish and European policy and legislation. There is no indication that other local authorities want to change their waste collection arrangements.

This report presents a number of possible courses of action in respect of domestic waste collection services in DCC and reviews their respective strengths and constraints and the extent to which they would deliver on the essential objectives of the cross-party motion of 2019 in respect to the remunicipalisation of waste collection services. Three scenarios are analysed in detail:

- DCC recommencing domestic waste collection either on the basis of excluding the private operators or in competition with them
- DCC tendering for waste collection services (i.e. competition for the market)
- Continuing with the status quo but encompassing current government policy, that is, expanding the role of the NWCPO to safeguard the interests of consumers and ensure environmental benefits.

In addition to drawing on the findings of Phase One, the analysis in this report draws on interviews with a small number of stakeholders in the area of waste collection in Ireland. Also very relevant is existing research in respect of the legal implications of any change in domestic waste collection arrangements. We have reviewed and incorporated in this report the findings in a Senior Counsel opinion commissioned by SIPTU in 2020 on the legal issues posed by the potential re-municipalisation of waste collection services in the State, and also, analysis carried out by DCC's own legal division in respect of possible obstacles to its re-entry into the domestic waste collection market in competition with the private operators. SIPTU also commissioned, in 2019, a review by the Centre for Law and the Environment at the School of Law, University College Cork (UCC) on the remunicipalisation of the household waste collection sector in Ireland. This analysis has been further updated in autumn 2022 to inform the particular research questions in this study. The analysis considers competition law, much of which is grounded in the EU Treaty on the Functioning of the European Union, procurement law

and constitutional law. Case law precedent is also deemed to be significant, in particular the judgment in the case of *Nurendale v. Dublin City Council* (2009).

It is important to emphasise that this report is not in any way a definitive legal opinion. It is a research report encompassing a description of the legal and regulatory context in respect of domestic waste collection in Ireland and also summarises the legislative and other changes that would most likely be required in considering the re-municipalisation of domestic waste collection services in Dublin City Council.

5. The evolution of domestic waste collection in Ireland

In parallel with changes in national waste policy, the role of local authorities in the waste market has also evolved. Traditionally, waste management in Ireland was within the remit of local authorities and funded by local and central government. Lack of infrastructure and investment in waste management limited the role to the provision of collection, landfill and some recycling facilities. However, this was no longer tenable under EU legislation. In response, new responsibilities were assigned to local authorities under the Waste Management Act, 1996, to ensure better waste management, planning and regulation, while confirming that 'each local authority shall collect, or arrange for the collection of, household waste within its functional area' (Section 33). Provision of waste services by private enterprise under license was also permitted.

Prior to 1996, local authorities could and in some cases did charge for waste collection services under the Local Government (Financial Provisions) (No. 2) Act, 1983 (Quinn and Feeney, 2020). However, in urban areas, including Dublin, charges for waste collection were only introduced by local authorities in the early 2000s following the Protection of the Environment Act (2003). Consistent with the polluter pays principle prominent in EU policy and legislation, the new legislation allowed local authorities to 'make a charge in respect of the provision of any waste service, by or on behalf of, that authority' (Section 52). However, charges were waived for low-income households and in other cases remained unpaid by some householders who resisted the charge on the basis that it should be paid for out of general taxation.

In line with government policy, private operators began collecting waste alongside local authorities across the country. In many cases they offered lower charges to attract customers. This left local authorities with a range of challenges including, a reduced share of paying customers, high levels of

debt[2], and finding it difficult to compete in respect of charges. In Dublin, the four local authorities came together and through an amendment to the Waste Management Plan for the Dublin Region sought to ensure that waste could only be collected by the councils or contractors appointed by them. Two of the private companies involved took legal action and, in the *Nurendale Ltd. (trading as Panda Waste Services) v Dublin City Council and Others* case,[3] it was determined that the action of the local authorities represented a breach of the dominant position enjoyed by the local authorities in this market and was contrary to the 1996 Waste Management Act and the 2002 Competition Act.

Following on from this decision, local authorities around the country began the process of exiting domestic waste collection entirely, leaving it to operators in the private sector to compete for customers previously serviced by the local authorities. This scenario is described as 'competition in the market' and continues to pertain in Ireland, with State involvement in the waste market at both central and local level mainly focused on waste policy, enforcement, and the regulation of private sector operators.

The roll-out nationally in 2017 of 'pay-by-weight' charges brought about further changes to the market and for customers. Different charges were set according to the type and volume of waste. Incentivised pricing structures are regarded as driving behaviours to protect the environment under the polluter pays principle. However, during the Dáil debates on the proposal to bring in these charges, concerns were expressed that the new approach would lead to increased charges for most households. As a result, a motion was passed in the Dáil calling for research to be commissioned by the Competition and Consumer Protection Commission (CCPC) to review the operation of the waste collection market in Ireland.

This research, commissioned by the then Department of Communications, Climate Action and the Environment was published in 2018 (CCPC, 2018). The report is critical of the manner in which the waste market in Ireland has evolved. In particular it suggests that the current market is not supporting the interests of consumers or Government environmental objectives. The conclusions of the report particularly highlight the point that the market is highly concentrated in places, giving some operators considerable power and that the regulatory regime is 'fragmented and incomplete' and that this is impacting on the achievement of environmental objectives (CCPC, 2018: 59). In response to these

[2] Dublin City Council's unpaid waste charges were estimated to be around €7 million, Irish Times, 22-11-2016 https://www.irishtimes.com/news/environment/over-40-000-people-to-have-bin-charge-debts-wiped-out-1.2875792

[3] [2009] IEHC 588

wide-ranging challenges within the waste market, the CCPC recommended the establishment of an economic regulator to develop over time 'an efficient, sustainable and commercial model of domestic waste collection in Ireland, in a manner that protects the interests of consumers and adheres to the principles of better regulation' (CCPC, 2018: 64). The CCPC further comment (CCPC, 2018: 24/25) that regulation for market failures in household waste collection is typical in Europe and that this is done either by State-run monopolies or through competitive tendering. A benefit of the latter approach is that it 'allows a municipality to stipulate its requirements in relation to many relevant factors, including the level and type of service to be provided to households and the adherence to environmental standards'. The Phase One report of this research project concurs with this finding.

In 2020 the Department of Communications, Climate Action and the Environment published Ireland's updated national waste policy, *A Waste Action Plan for a Circular Economy*. Instead of an economic regulator, the policy indicates that the NWCPO will be asked to take on a broader role that will encompass a number of initiatives to protect the interests of consumers. Given the orientation of government policy in this regard, the research was able to focus on the three scenarios identified. A further commitment made in the Waste Action Plan is to expand the role of the Price Monitoring Group at the Department of Environment, Climate and Communications, to monitor more of the market and to examine pricing. This information would be shared with the NWCPO. Lastly, the plan commits to more robust enforcement of waste regulations by local authorities, with an expanded role, capacity and responsibilities for the Waste Enforcement Regional Lead Authorities (WERLAs).

6. Analysis of scenarios in respect of domestic waste collection in Dublin City Council

As per Section 4, the three scenarios we analyse in respect of domestic waste collection in the Dublin City administrative area are:

- DCC recommencing domestic waste collection either on the basis of excluding the private operators or in competition with them
- DCC tendering for waste collection services (i.e. competition for the market)
- Continuing with the status quo but encompassing current government policy that is, expanding the role of the NWCPO and WERLAs to safeguard the interests of consumers and ensure environmental benefits.

6.1 DCC recommencing waste collection

This section initially reviews the legal implications of a return by DCC to waste collection activities (remunicipalisation) and the exclusion from the market of the private operators. A key consideration in analysing the possibility of DCC re-entering waste collection and excluding the private operators is the extent to which the Council would be deemed to be an 'undertaking' for the purposes of competition law in engaging in waste collection. This issue was tested in the case taken by *Nurendale Ltd* against Dublin City Council. The case was taken by two private operators (Panda Waste and Greenstar) in 2009 in response to changes made by the four Dublin local authorities intended to give these authorities exclusive waste collection rights. The judgment in the case concludes that any direct engagement by a local authority in waste collection would amount to engagement in economic activity. This would render the local authority an undertaking and thus subject to the general requirements of competition law,[4] and thereby restricted from taking any action that would hinder competitors' engagement in such economic activity. More specifically, the actions of the Dublin local authorities in amending the Dublin Waste Management Plan contravened Section 4, and Section 5 of the Competition Act which govern agreements between undertakings that seek to restrict competition and/or abuse a dominant position.

The judgement also comments on the potential for a conflict of interests between local government's role in respect of waste regulation and the provision of a waste collection service. In particular, where a local authority might provide a service and exercise administrative regulatory authority over other operators engaged in that service sector, there is a significant risk of the local authority abusing its dominant position in breach of the Competition Act and also the Treaty on the Functioning of the European Union.[5] In the words of the judgment 'were this not the case, the State or other public bodies would be free to engage in all forms of regulatory abuses for commercial gain'.[6]

A further question tested in the *Nurendale* case was the extent to which the implied right to earn a livelihood protected by the Constitution would be breached by any actions to exclude the private waste collectors. While the judgement deems the right to earn a living to be 'a narrow one' and advises that the 'right is not an absolute one…and it may be subject to legitimate legal restraints'[7], full municipalisation of household waste collection services could give rise to some risk of infringement of

[4] Nurendale Ltd t/a Panda Waste Services v Dublin City Council [2013] 3 IR 417, Paragraph 68.
[5] Section 5(1) of the Competition Act, 2022 and Article 102 of the Treaty on the Functioning of the European Union.
[6] Nurendale Ltd, Paragraph 62.
[7] Nurendale, Paragraph 193.

constitutional rights. In particular, the fact that no private operator would be in a position to compete for a share of the household waste collection market would appear to present a risk of a breach of the unenumerated constitutional right to earn a livelihood.

Procurement law would not be relevant in this scenario, unless the local authority was to deliver the waste collection service by means of the award of a contract for such services to a publicly owned company, or in the case of cooperative arrangements between local authorities for local authority delivery of such services.

If DCC were to look to recommence waste collection, to avoid a situation where its activities would be deemed anti-competitive it would be necessary to amend the Waste Management Act 1996 in two key respects:

- introduction of an unqualified mandatory obligation upon local authorities to collect or arrange for the collection of waste within their functional areas; and
- exclusion of other operators from the waste collection market and/or allowing for the possibility of refusing other operators access to the market if this was likely to have an adverse effect on the operation of the public waste collection service.

These changes would need to be made through the Houses of the Oireachtas. Corresponding amendments may also be required to the key statutory instruments relating to waste collection services. However, in re-entering the market DCC would be setting themselves up as an undertaking and the risk of a legal challenge to any legislation that seeks to implement such a change would be very high.

The above analysis relates to a scenario whereby DCC would re-enter domestic waste collection and seek to exclude the already active private collectors. However, much of the analysis would also apply were DCC to re-enter the waste collection market in competition with the private operators. Contravention of competition law would be highly likely, as the conflict of interests arising due to DCC's role as both a regulatory authority and a provider of a commercial service might easily be construed as an abuse of its dominant position in the waste collection market. In addition, the Waste Management Act would require amendment to afford local authorities the certainty they would require to recommence direct involvement with waste collection.

This particular option was also examined by DCC's in-house legal services in late 2019. Their analysis notes that the waste collection service, leading up to DCC's exit from the market in 2012, operated annually at an overall loss in the region of €10 million (including approximately €5 million in waivers to low-income households). The analysis looked at whether, under EU state aid rules, the Council could legally operate a service with considerable losses (even if waivers were not provided) given that financial shortfalls would have to be made up from national funding. It concluded that the provision of a household waste collection service through State resources may constitute State aid, thereby requiring approval from the EU Commission which may not be forthcoming on account of the potential effect on trade. It is therefore considered that there may be grounds – in the state aid area at least - for the private sector operators to challenge any decision by DCC to exercise this option.

A somewhat different variation on this option would be if DCC were to set up a company whole owned by the local authority to compete against private operators in the market for domestic waste collection services. However, it appears that it would still be acting as an undertaking engaged in economic activity for the purposes of competition law, so that the requirements of competition rules would be fully applicable. Furthermore, DCC would be severely restricted in terms of any regulatory action in which it might engage, lest this should amount to 'regulatory abuses for commercial gain'.[8] Thus, DCC might struggle to realise the benefits for which it might decide to re-enter the waste collection market. In addition, there might be issues of state aid to be clarified in respect of the funding process involved in establishing the local authority company.

6.2 Exclusive tendering of waste collection services

Under this scenario, DCC would select the optimal bidder from one or more procurement (tendering) processes awarding them a concession contract to collect domestic waste, a scenario typically described as 'competition for the market'. As our Phase One research shows this scenario is typical in European cities. In Stockholm, for example, the municipality is divided into 11 sanitation districts which are procured separately, thereby facilitating smaller operators to compete. Under this scenario as DCC would not themselves be directly collecting waste, it appears that their role would be that of a contracting authority rather than an undertaking. Further conditions regarding adherence to environmental, social and/or labour standards might also be incorporated into the tendering process. While the potential may still exist for legal challenges on the basis of anti-competitive practices, legal precedence in the *Nurendale* judgment, and also subsequent analysis of the judgment, would seem to suggest that a local authority which uses its statutory powers to enter into an agreement to grant

[8] Nurendale Ltd, Paragraph 62.

a waste collection concession to an undertaking is not itself acting as an undertaking and does not, therefore, fall within the scope of the prohibition on anti-competitive agreements set out under EU law. While the contractor appointed would be deemed to be an undertaking, the contractual arrangement under which they are appointed could qualify as a grant of 'special or exclusive rights' and the waste collection service provided could qualify as a 'service of general economic interest'.[9] In the case of a service of general economic interest, such as household waste collection, a restriction in competition may be justified where it is necessary in order to create the appropriate economic conditions for the operator to be able to provide the service at a satisfactory level of performance.

The right to earn a livelihood under the Irish Constitution was raised in the *Nurendale* case, but the court decided that it did not confer an absolute right and that such a right was in any event not 'free from appropriate regulatory interference'. It would appear, therefore, that competitive tendering arrangements for household waste collection services, subject to adherence with relevant contractual practices, would amount to a proportionate regulatory interference justifying any restriction upon operators' constitutional rights.

Regarding procurement law, if a local authority procures household waste collection services by means of a concession arrangement, then the 2014 Concession Directive may apply. The Concession Directive does not affect the freedom of Member States to define, in conformity with Union law, what they consider to be services of general economic interest. Thus, the Concession Directive appears to confirm the consistency with EU law of a competitive tendering process for waste collection services.

On the basis of a detailed examination of broader legal requirements applying to any process of competitive tendering for household waste collection services, and of the Irish legislative framework currently applying, it would appear that any initiative by DCC to re-commence waste collection through a concession type contract will need to be preceded by amendment of the Waste Management Act, 1996 in three key respects:

- introduction of an unqualified obligation on local authorities to provide or arrange for waste-collection services within (and throughout) their functional area;
- inclusion of an express provision that such obligation may be met by the appointment of a waste collection operator for the functional area (or each part thereof); and

[9] Article 106(1) and (2) of the EU Treaty on the Functioning of the European Union.

- where a waste collection operator has been appointed, inclusion of an express prohibition on operators other than the appointed operator(s) from collecting waste in the functional area.

These changes would need to be made through the Houses of the Oireachtas, with corresponding amendments also likely to be required to the key statutory instruments relating to waste collection services. In addition, further consideration would need to be given to a transition period in moving from the current competitive arrangements to an exclusive tendering arrangement and to review in greater detail the implications (legal, commercial, logistical etc.) of this change.

The question arises of whether these amendments to introduce an unqualified obligation on local authorities to provide or arrange for waste collection services, could also permit some local authorities to choose to continue with competition within the market, in other words the current side-by-side, private sector collection. It would appear possible, if carefully worded, that the legislative amendments could allow for three options, local authority collection, exclusive concession or side-by-side competition. However, such a legislative situation might prove confusing. In addition, it might serve to undermine the arguments made for any return to local authority collection or to provide for concession arrangements.

6.3 Maintenance of Current Arrangements with Enhanced Regulation

This scenario allows the current private sector side-by-side competition to continue but with enhanced regulation to overcome some of the limitations that have been identified (CCPC, 2018) with the manner in which the waste market currently operates.

Current national waste policy as set out in *A Waste Action Plan for a Circular Economy* (Government of Ireland, 2020: 20) notes that 'current market structures may have advantages in terms of value for money and flexibility', but emphasises the need to achieve 'a balancing of powers across regulatory bodies …, the waste collection industry and their end-users' and notes that 'other systems may offer greater control for regulators in terms of achieving guaranteed performance levels'. The policy therefore envisages the:

- introduction of recycling targets (for waste collectors) as conditions of waste collection permits;
- greater waste segregation, including for apartments;
- greater extended producer responsibility;
- introduction of a Waste Recovery Levy to encourage recycling (applicable to waste destined for landfill, energy recovery, incineration or export);

- improved standardisation of items acceptable for (dry) recycling;
- prioritisation of enforcement of household waste management requirements;
- greater responsiveness to emerging trends and best practice in waste collection.

Where relevant, the Circular Economy and Miscellaneous Provisions Act of 2022 provides for the introduction of regulations to give effect to the above objectives. Included among the measures planned for enhancement of regulatory supervision are included:

- expansion of the supervisory role of the National Waste Collection Permitting Office (NWCPO) regarding:
  - data analysis on the operation of the market;
  - oversight of charging structures and penalties;
  - oversight of service provision;
  - management of consumer rights and a complaints escalation mechanism; and
  - data protection.
- expansion of the role of the Price Monitoring Group to ensure fair and transparent pricing;
- review of incentivised charging systems with a view to standardisation;
- easier access for householders to information and waste data.

In order to provide a sound statutory basis, such an enhanced regulatory role for the NWCPO would require amendment of current waste legislation regarding the establishment of a formal consumer complaints procedure creating a central role for the NWCPO in investigating individual consumer complaints (*e.g.* in relation to alleged over-charging, *etc*.) Corresponding amendments may also be required to the relevant statutory instruments relating to waste collection services. As of December 2022, the legislative changes to facilitate these initiatives are understood to be in train. It appears that these changes can be implemented through provisions set out under secondary legislation.

7. Conclusions

This research project has encompassed two phases. The first phase, completed in April 2022, analysed domestic waste collection in Dublin city compared with a number of appropriate European, comparator cities. This first phase of our research, summarised in Section Three above, highlights that domestic waste collection arrangements in Ireland differ significantly from those pertaining in the other European cities we reviewed. There are important historical, cultural, political and economic reasons why waste management has evolved in the way it has in each jurisdiction. A detailed analysis

of why this is the case is of course far beyond the scope of this report, however, the reality is that Ireland has a domestic waste collection service that is provided by private operators with state involvement focused on waste policy, regulation and enforcement. This situation is supported by legislation which has, at least in some respects, been tested and upheld by the Courts. Any initiative by DCC to re-enter domestic waste collection is done within the context of these political and legal realities. The purpose of this phase two report is to explore the options that are available to DCC through a review of three scenarios:

- The implications of DCC recommencing domestic waste collection either on the basis of excluding the private operators or in competition with them
- The implications of DCC tendering for waste collection services (i.e. competition for the market)
- The implications of continuing with the status quo but encompassing current government policy, that is, expanding the role of the NWCPO to safeguard the interests of consumers and ensure environmental benefits.

In respect of the first of these scenarios, whereby DCC would recommence waste collection either through an effort to exclude the private operators or in competition with them, our analysis suggests that this would firstly require changes through primary legislation to the Waste Management Act, 1996 in order to, among other things, introduce an unqualified obligation on local authorities to provide or arrange for waste-collection services within their functional area. However, even with this legislative change it is very likely, if tested, that DCC's re-entry into domestic waste collection and the exclusion of private operators would be deemed anti-competitive by the Courts. Even if DCC were to re-enter the market in competition with private operators, it is likely that the Courts could view its dual roles as both regulator and market operator as a conflict of interests and therefore anti-competitive.

The second scenario we analyse is one where DCC would not directly engage with waste collection but would select, on the basis of a concession arrangement, one operator to provide the service. Under this scenario private operators would be prohibited from operating within the area allocated to the concessionaire but would not be excluded outside of that area, where they could continue to compete for the market. It would be possible for DCC to indicate the scope of the procurement opportunity, for example detailing certain environmental or human resource conditions that have to be met by any prospective tenderer. It would appear that such a scenario would not be deemed anti-competitive. However, in order to afford DCC with the necessary certainty, amendment to the Waste

Management Act, 1996, through primary legislation would be required and any such change could potentially apply to all local authorities.

The final scenario presented is an analysis of the evolving current context with respect to domestic waste collection. Deficiencies with the current market approach have been acknowledged by Government and current waste policy seeks to better protect consumers and also ensure more pro-environment outcomes. It would seem that the legislative changes necessary in order to ensure more robust regulation and enforcement of domestic waste collection by existing local authority shared services are under way.

The objective of this research is to not to make recommendations, rather it sets out the pathway that could be followed to achieve the primary objective of the DCC cross-party motion - a return to full municipalisation - and the legal and other challenges in this regard. It also looks at alternative scenarios that could deliver some of the main objectives that the cross-party motion seeks to achieve and outlines their inherent challenges in the context of relevant existing and emerging EU and Irish policy and legislation.

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INSTITUTE OF PUBLIC ADMINISTRATION

CLIMATE CHANGE ACTION PLAN

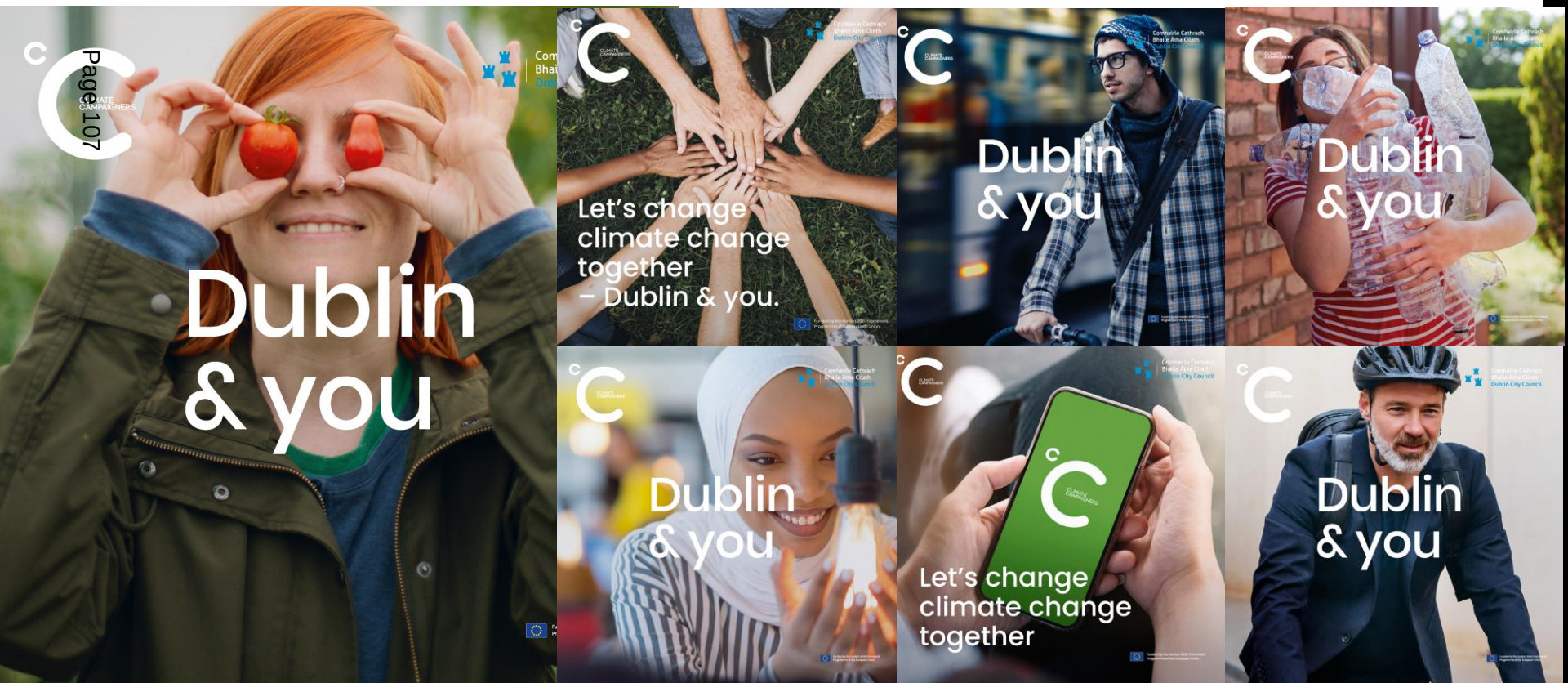
Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

ENGAGEMENT

Climate Campaigners

- **1,000 people signed up across project partners**
- **New year, new engagement**



Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

FUNDING

Public Sector Innovation Fund

- **Climate Ready Housing – Using digital twins to model retrofit options**
- **€30,000**

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

IURC

Seoul to Dublin

- **Three Day Visit**
- **February 6th to 10th**
- **UCAP**
  - MOU between Transport Departments

DCC CREATIVE IRELAND FUND

Pawfficer JoJo – School Zone Safety Booklet

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Dublin City Council

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Dublin City Council

FUNDING

Shared Island Fund

- **A Connected Circular Economy**
- **Tendering for Services via OGP Framework**

EU Funding

- **CULTIVATE**

CULTiVATE

THE FOOD SHARING COMPASS - AN ONLINE PLATFORM FOR MULTIPLE STAKEHOLDERS TO SUPPORT SUSTAINABLE AND RESILIENT FOOD SHARING

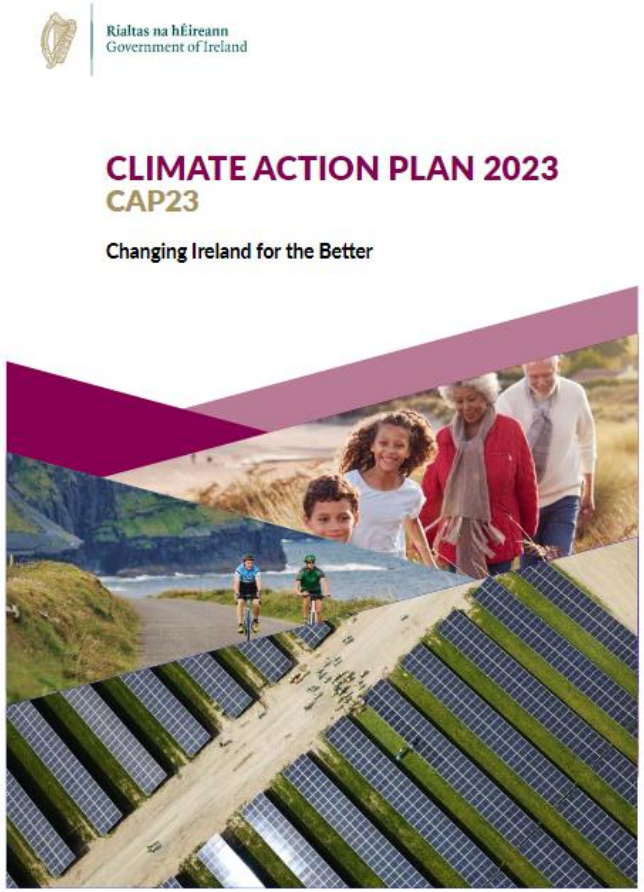
An urgent transition towards more just and sustainable urban and peri-urban food systems is required. Many foodsharing initiatives (FSIs) already provide a positive contribution towards this transition yet their activities are often hampered by complex, fragmented food governance, uncertain finance and insecure tenure.

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

THE CAP 2023

Key Points

- **We need to adapt.**
- **We need to work together**
- **Health and Well-being/ Just transition**
- **EU Missions for Cities and Adaptation will be supported**
- **Action to improve availability of local data**



100 CLIMATE NEUTRAL AND SMART CITIES

Iterative Process led by ICLEI's Net Zero Cities - ONGOING

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

PROCESS AHEAD

Q1/23	Q2/23	Q3/23	Q4/23	Q1/24	Q2/24	Q3/24	Q4/24
Existing CCAP 2019-2024							
Timeframe for Ministerial Request							
	Timeframe for developing “revised” action plan						
						New CCAP 2024-2029	
Climate City Contract, Climate Action Plan & Investment Plan							

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

THANK-YOU!

Dublin: A City with a Mission

Dublin City Council's Corporate Plan puts forth our vision and mission for both the city and Dublin City Council, as an organisation and the principles by which we are guided in all elements of our work on climate action. Our vision and mission in the Corporate Plan for 2020-2024 are:

- Vision: A dynamic, sustainable city, that is future-ready, built on thriving, inclusive neighbourhoods and communities, a strong economy, a vibrant cultural life, and compact, connected growth.
- Mission: To drive the sustainable development of the city through strong civic leadership and delivery of effective services that promote ***the well-being and quality-of-life of citizens and communities***.

It is recommended that this be retained for the revised CAP.

The EU Mission for 100 Climate Neutral and Smart Cities provides us with the opportunity to build capacity, and further deliver on our mission statement. In particular, the Climate City Contract calls for us to build a mandate to innovate and to strengthen our capacity to deliver on our vision and mission and to develop a more ambitious climate action plan, supported by an investment plan to realise our climate commitments and contribute to Ireland's National Climate Objectives and the global challenge.

Critically, given that a principle of the Mission is ***to do no harm***, in other words, that ***our actions today do not adversely affect well-being and quality of life now, or in the future.*** This requires a systems approach to fully evaluate, and to anticipate risk and vulnerabilities stemming from the actions we take.

Our current Climate Change Action Plan (CCAP) does bring life to our mission statement and demonstrates that we can lead, and take initiative. The process for developing the CCAP was collaborative and we will build on this, guided by a steering group at Senior Management Level.

The Process Ahead

Reaching neutrality by 2030 through the Mission will be a challenge. The process will be iterative as the climate action plan will be a living document that responds to science and changes in policy and legislation.

The focus in the next year will be on submitting our Climate City Contract to the European Commission, to be assessed and awarded the Mission Label, while aligning with our statutory obligations under the Act. To achieve this we will establish a senior management steering group to liaise with the National steering group and Cork City, review and revise our current CCAP through workshops with staff and relevant external stakeholders, develop an investment plan, and create a communications plan.

<table>
<tr><td>Q1/23</td><td>Q2/23</td><td>Q3/23</td><td>Q4/23</td><td>Q1/24</td><td>Q2/24</td><td>Q3/24</td><td>Q4/24</td></tr>
<tr><td colspan="6">Existing CCAP 2019-2024</td><td></td><td></td></tr>
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<tr><td colspan="8">Climate City Contract, Climate Action Plan & Investment Plan</td></tr>
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Figure 1 Timelines for National Requirements and Mission

Achieving the ambition of climate neutrality by 2030 will require a review of our existing plan to identify gaps and opportunities.

Actions will need to be developed through workshops and one to one discussions with teams and individuals with current responsibility for actions. The workshops will be an opportunity to ensure the interdisciplinary nature of the actions and that actions have multiple co-benefits.

Workshops

We will be engaging with Cork City and DECC to develop workshops to support the development of our CAP. The overall objectives of these workshops are to:

1. Strengthen climate literacy across the organisation
2. Foster team work for climate action
3. Develop organisational capacity for systems thinking to ensure the impacts of actions on wellbeing and quality of life are fully considered.

Appendix: Current Climate Change Action Plan

Dublin City Council's Climate Change Action Plan 2019-2024 was approved on May 13, 2019 in accordance with the National Adaptation Framework – Planning for a Climate Resilient Ireland 2018 (NAF). The Plan was also completed in accordance with the requirements (at the time) of the Covenant of Mayors (CoM) for Climate & Energy of which Dublin City Council (DCC) is a signatory.

The Plan set out 4 key targets and 219 actions that the Council is undertaking in the interconnected areas of energy & buildings, transport, flood resilience, nature-based solutions and resource management (*Figure 2*). While the plan is a living document it does not fully capture the changes in the City Council's organisation structure (European Office, Active Travel Unit) and new initiatives that contribute to a climate neutral Dublin (SoCircular, A Connected Circular Economy, Academy of the Near Future, Eat the Streets and Edible Dublin, Connecting Communities). The new plan must capture the dynamic nature of the City Council's work and address issues with the current plan.

Figure 2 CCAP Targets and Action Areas

Issues with Current Plan

Mitigation of Emissions

At present we monitor the emissions stemming from our operations and service delivery on a yearly basis and this is reported in our CCAP Annual Reports; based on analysis undertaken by Codema and reported to SEAI's public sector monitoring and reporting system. Our emissions were decreasing and this was attributable to the increasing volume of renewables on the national grid. City-wide emissions are included in the National Inventory and reductions are not in line with targets. Further, the latest EPA projections show that Ireland as a whole is off target.

Further DCC has signed the voluntary EU Covenant of Mayors for Climate and Energy. This commits us to supporting the implementation of the EU 55% greenhouse-gas reduction target by 2030 and the adoption of a joint approach to tackling mitigation and adaptation to climate change. However,

our actions on mitigation need to cover city-wide emissions to align with the CoM. This needs to be addressed in our new plan.

Adapting to Climate Change

Making Dublin resilient to climate change is a target of CCAP, this calls for adapting the city and residents for a future where we live with the impacts of climate change, such as flooding, extreme temperatures, and extreme weather events that are locked in, and are prepared for the unknown impacts.

Uncertainty adds to the challenge of implementing actions that contribute to the city's resilience. Despite this DCC has made progress in the implementation of actions that contribute to our overall resilience, particularly in the use of nature-based solutions to respond to flood risk in the city. However, we have not adequately responded to other known climate risks, such as heat.

Further, the long-term challenge is ensuring that the adaptation actions we implement are just. The implementation of city development plan is vital to making the city and residents resilient to climate change. The decisions we make about land-use and land-use change will determine our adaptive capacity. The location of housing, employment determines our vulnerability and exposure to climate risk.

We need to map our hazards, risks and vulnerability and use this to inform our decisions and investments.

Theory to Practice: Collaborative Systems Change

The process for developing the CCAP was collaborative, though it focused on fostering internal collaboration. This was intentional, as was focusing on what Irish Local authorities are responsible for.

We will need to take internal collaboration further and develop a deeper understanding of the barriers to our leadership in climate action, and identify the changes needed to enable ownership across the organisation.

We will need to realise our vision and mission by actively engaging the residents of the city to achieve systems change that improves quality of life for all.