



# AFIR: providing infrastructure to make transport *fit for 55*

November 2021

## Summary: Building on a strong Commission proposal

The European Commission has presented a solid proposal on the Alternative Fuels Infrastructure Regulation (AFIR) that will ensure there is sufficient public charging infrastructure to follow the deployment of zero emission cars. Turning the former directive into a regulation is an important signal, showing the Commission has understood that a timely and harmonised deployment of zero emission infrastructure for all transport modes is key.

For cars, the shift towards e-mobility has gained traction in recent years and months and it will not take too much time before the market will provide the necessary infrastructure without regulatory intervention. Still, for the time being minimum targets and harmonised requirements are important to ensure a sufficient and comprehensive charging network throughout the continent - avoiding a two speed Europe.

The zero-emission revolution of the road freight sector is imminent and will need to happen at a much higher pace compared to light duty vehicles. Serial production of zero emission trucks is starting with many OEMs having announced a sale-share of around 10% for 2025. AFIR must ensure charging and refueling infrastructure will help to facilitate this massive market uptake.

If shipping wants to fully decarbonise by 2050, the use of green e-fuels must kick-start before 2030. One thing is clear: LNG does not serve this purpose but hinders it. First large zero-emission vessels are expected in the next few years, and will thus need adequate green refuelling infrastructure to be deployed on European seas. In parallel, strong and harmonised requirements on both ports and ships are key to make the use of shore-side electricity the default option in all European ports.

### Building on a strong Commission proposal T&E recommends for:

#### Light duty vehicles (LDVs) to

1. **Improve the fleet-based charging infrastructure targets** (*Article 3*) by linking them to the EV-share in a country's fleet and ensure an absolute minimum target. This ensures member

states with a relatively low EV-share in their total vehicles fleet are obliged to provide sufficient infrastructure.

- **Minimum power output per BEV.** If EV fleet share is < 1% → **3 kW**; <1 - 2.5% → **2.5 kW**; < 2 - 5% → **2 kW**; < 5 - 7.5% → **1.5 kW**; above **7.5%** → **1 kW**.
  - **Safeguard mechanism** minimum charging infrastructure in every member state for at least 2% EV-share in 2025, 5% in 2027 and 10% in 2030.
2. **Ensure that Europeans can drive an EV throughout the EU by 2025** (*Article 3*) by making LDV-targets for the TEN-T comprehensive network mandatory by 2025 to finally eliminate any fear of range and charging anxiety.
  3. **Enable cars to charge where they park** (*Article 3*) and enable especially people in urban areas without any access to private charging to charge their EV by making it mandatory for medium and large commercial properties to equip 15% of their parking spaces with public accessible chargers.
  4. **Make charging hassle free** by **making card payment possible** for all charging stations >10 kW (*Article 5*) and by requiring (*Article 2*) public accessible charging infrastructure to be available at **least 8 hours a day** (6 days a week) with a minimum **uptime requirement of 98%**.
  5. **Indicative targets for private charging** of 6-8 kW/BEV since charging at home or at the workplace will likely remain the dominant mode of EV-charging.

#### Heavy Duty Vehicles (HDVs) to

6. **Increase the ambition for HDV-charging infrastructure** (*Article 6*) for
  - The **TEN-T core network** to **2,000 kW** (2025) and **5,000 kW** (2030)
  - The **TEN-T comprehensive network** to **2,000 kW** (2030) and **5,000 kW** (2035)
  - **Urban nodes** to **1,200 kW** (2025) and **3,500 kW** (2030)
  - Each Safe and Secure Parking area to have at least **two 100 kW** chargers by 2025 and at least **five** by 2030.
  - For **logistic centers and depots** at least one (semi-) public charger of at least 350 kW.
7. **Given the uncertainties around the technology, limit the deployment of Hydrogen Refueling Stations (HRS) to no-regret locations** (*Article 7*) such as ports and industrial clusters and keep the targets indicative at least until the revision of the regulation in 2026.
8. **Prevent any more investment in LNG truck refueling infrastructure** by removing LNG from the **scope of the regulation** (*Article 2*) and stop by **deleting** any further **obligation to deploy such infrastructure** (*Article 8*).
9. **Strengthening of National Policy Frameworks** (NPF) (*Article 13*) by amending minimum requirements on
  - **Planning permitting and procuring** of charging infrastructure which should take **no longer than 6 months from the date of the initial application**
  - **Improving coordination** between European, national and local authorities
  - **Mapping** available sites, charging demand and grid capacity

- Making the **grid connection future-proof**

### **Ships to**

#### **10. Require all European ports to provide shore-side electricity (SSE) to ships at berth:**

- From 2025 at all passenger terminals;
- From 2030 at all terminals for containerships, tankers and refrigerated-bulk carriers;
- From 2035 at all remaining terminals.

#### **11. Discontinue the mandate on maritime ports to install LNG infrastructure,** to avoid stranded assets in fossil fuels.

#### **12. Introduce targets for the installation of hydrogen and ammonia refuelling infrastructure** in ports, to enable ships to use green e-fuels.

Zero emission alternatives are gaining track across all modes of transport, therefore an ambitious agreement on the AFIR is instrumental to decarbonise the European transport sector in line with the EU's Green Deal.

## **1. Strong proposal with a few shortcomings**

As the EU is striving to transform its transport sector towards zero emission, the need for a comprehensive, sufficient and European-wide network of zero emission infrastructure becomes crucial. It is one crucial variable to accelerate the market uptake of zero emission vehicles across all modes of transport. This is true for light-duty vehicles (LDVs), but is equally important for heavy-duty vehicles (HDVs) and shipping - where the shift towards zero emission technology needs to happen at a much higher pace. This is why T&E has repeatedly called on the European Commission to take measures to ensure the roll-out of a comprehensive network of zero emission infrastructure for cars, vans, trucks and buses<sup>1</sup> and ships and to turn the directive into a regulation.

In the context of the Fit For 55 Package, the Commission published its proposal<sup>2</sup> turning the existing Alternative Fuel Infrastructure Directive into a Regulation. T&E's assessment of the proposal is, while some shortcomings have been identified, overall very positive for LDVs and HDVs. However the picture for shipping is different: much remains to be improved to deploy green infrastructure for ports. Key provisions include:

---

<sup>1</sup> T&E, ACEA (2021). Making AFID fit for zero-emission heavy-duty vehicles. Retrieved from [https://www.transportenvironment.org/wp-content/uploads/2021/07/2021\\_04\\_letter\\_TE\\_ACEA\\_trucks\\_AFID\\_FINAL.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/2021_04_letter_TE_ACEA_trucks_AFID_FINAL.pdf) and T&E, BEUC, ACEA (2021). Making the AFID fit for the EU Green Deal - joint letter. Retrieved from <https://www.transportenvironment.org/wp-content/uploads/2021/07/Joint%20letter%20T&E.%20ACEA.%20BEUC.pdf>

<sup>2</sup> European Commission (2021). Proposal for a Regulation of the European Parliament and of the Council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0559>

- Turning the **Directive into a Regulation** will significantly speed up the deployment, harmonize European minimum requirements and ensure that provisions are directly applicable not only to member states but to all key market players.
- The **fleet-based target for LDVs** (*Article 3*) is a game changer as it ensures that the required minimum deployment of charging infrastructure for LDVs is always in sync with the number of registered EVs in every country.
- **Charging infrastructure for HDVs** (*Article 4*): For the first time ever the Commission is setting out requirements for charging infrastructure for battery electric trucks (BETs). By setting the first targets already for 2025, the Commission signals that it has understood that electric trucks are coming to the market first and represent the most viable technology to get road freight to zero emission.
- All **targets are binding** (*Article 3, 4 and 6*) and cover a broad spectrum of use cases: fleet-based, distance-based and urban nodes.
- **Timeframe**: for both LDVs and HDVs the Regulation foresees binding targets as early as **2025**.
- **Harmonized minimum requirements** (*Article 5 and 7*) for the deployed infrastructure that also works retroactively from 2027 onwards and includes payment card requirements, price transparency and comparability and ensure non-discrimination across all market participants.
- By requiring ports to make available **onshore power supply (OPS)** to passenger ships and containerships - the most polluting ships - the proposed review promises to address the chicken and egg problem of the 2014 Directive, that left it to member states to decide based on availability of demand and cost-benefit analysis.
- However, **instead of encouraging the use of green e-fuels** with much-needed infrastructure, the proposal mandates the deployment of fossil LNG infrastructure at core European ports by 2025, in contradiction with the EU Green Deal's objectives to drive all sectors to full decarbonisation by mid-century.

## 2. Light-duty vehicles: range anxiety will be a thing of the past

The uptake of battery electric cars (BEVs) in the EU has gained momentum, reaching 10.5% of new sales last year<sup>3</sup> and 16% in the first three quarters of 2021<sup>4</sup>. The EU has furthermore committed to become climate neutral at the latest by 2050 and in its Sustainable and Smart Mobility Strategy<sup>5</sup> the Commission has acknowledged “that nearly all cars, vans, buses as well as new HDVs will be zero-emission” in 2050. In order to reach this goal, it is necessary to phase out internal combustion engines by 2035 at the latest. The latest Commission proposal to revise the CO2 standards for cars and vans<sup>6</sup> is aiming for exactly that. While BEVs are currently becoming a mass phenomenon, some car owners still hesitate to shift away from

<sup>3</sup> T&E (2021). CO2 targets propel Europe to 1st place in e-mobility race. Retrieved from:

<https://www.transportenvironment.org/wp-content/uploads/2021/07/2020%20EV%20sales%20briefing.pdf>

<sup>4</sup> T&E (2021). Plugged-in: T&E's EV market watch. Retrieved from <https://infogram.com/1pd21nkxzz7vnxcmv9z7xjv5llfk75zdzig>

<sup>5</sup> European Commission (2020). Sustainable and Smart Mobility Strategy. Retrieved from

[https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12438-Sustainable-and-Smart-Mobility-Strategy\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12438-Sustainable-and-Smart-Mobility-Strategy_en).

<sup>6</sup> European Commission (2021). Proposal: CO2 emission performance standards for new passenger cars and vans. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0556>

combustion cars to electro-mobility because of range or charging anxiety. The AFIR therefore needs to put in place a framework that would:

1. Enable sufficient public infrastructure coverage to make it possible for every actual and potential **EV-user to go anywhere within the European Union and that as early as 2025**. Fleet and distance based targets help achieve that.
2. Steer the private investment efficiently where it is most needed as much charging will be private such as at home or work. T&E would like to strengthen the Commission proposals here with requirements on various facilities where people park in their daily lives.
3. Create a **seamless user experience across Europe**. Standards and provisions around easy payment, information sharing, hassle-free usage and regular maintenance of public charge points will all help here.

The Commission's proposal is a solid basis for that. It should however be strengthened. One thing to remember - the AFIR is setting minimum targets for public charging infrastructure - some member states might strive for higher deployment targets and in the long run demand will help the market to provide sufficient infrastructure where needed.

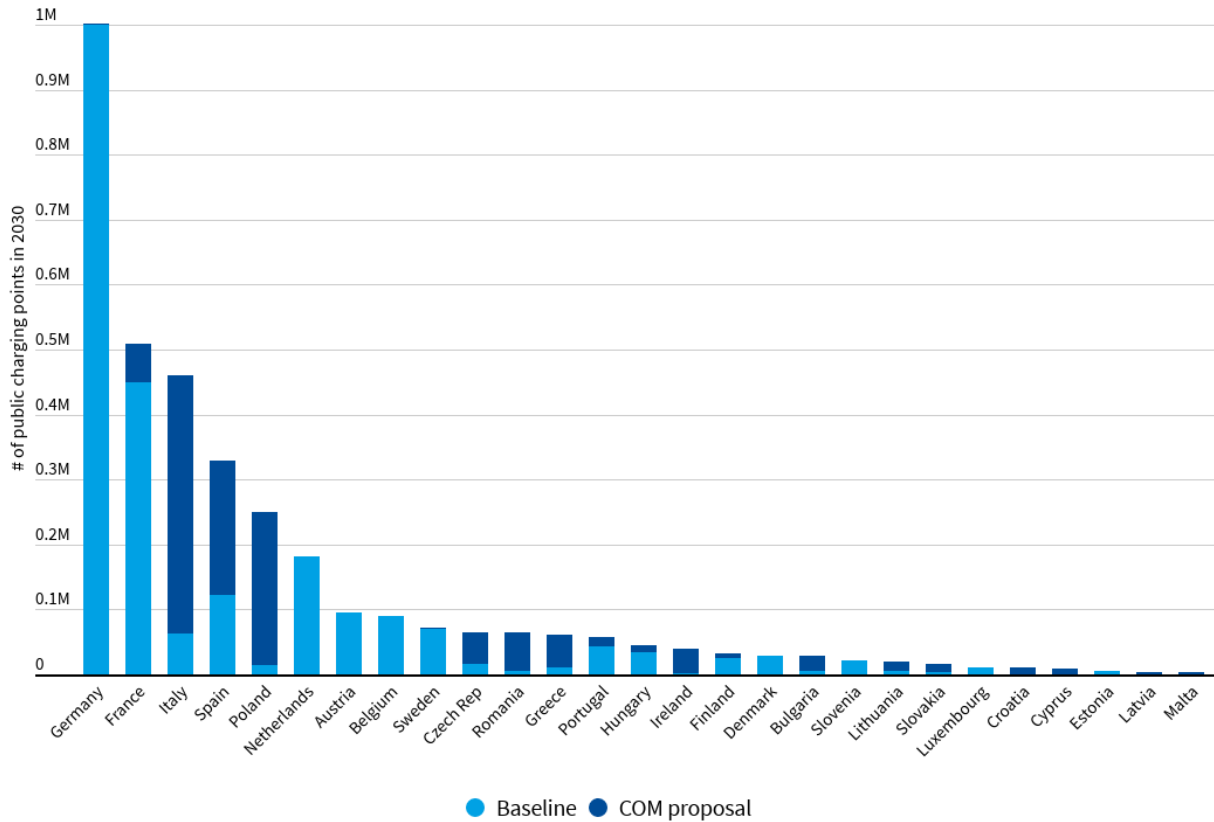
## **2.1. Fleet-based targets - more EVs more charging infrastructure**

T&E, together with ACEA and BEUC, has called for the deployment of one million public charging points by 2024 and three million by 2029. While setting an objective in an absolute number of charging points makes sense to ensure a minimum coverage throughout the Union, it also has its flaws. Predicting the market uptake of EVs is never free of uncertainties and it might very well be possible that the actual number of BEVs on the EU's roads will be significantly higher in the future than what we can anticipate today. Furthermore, since the proposal for CO<sub>2</sub> standards for cars and vans and the AFIR proposal are negotiated independently from each other, absolute numbers would not necessarily directly correspond to the CO<sub>2</sub> reduction ambition.

Therefore, it is very welcome to see that the AFIR proposal contains a newly developed approach to avoid these pitfalls. According to the proposed methodology, the infrastructure requirements for public charging points for LDVs is set to grow in line with the actual number of BEVs on the road. The proposal requires every member state to provide at least 1 kW of installed charging power per registered BEV and 0.66 kW per PHEV registered within their territory. According to the Commission's estimates, the AFIR targets would amount to around 3.5 million charging points within the EU by 2030, see figure 1 below for the distribution per member state.



## Number of chargers per member state in 2030



Source: European Commission (2021). Impact Assessment accompanying the Proposal for a Regulation on the deployment of alternative fuels infrastructure.



Figure 1: Number of public chargers per member state in 2030

T&E’s assessment confirms that this fleet-based 1 kW-target per BEV will be sufficient to provide the whole EU with a comprehensive charging network in the long run.<sup>7</sup> Thus, the public charging network will be aligned with the electric vehicle market growth across Europe in the future.

The shortcoming T&E has identified is that the required power output per EV will likely be insufficient in the short and medium term. There are two reasons for that: the low total EV share in a country's vehicle fleet and the utilization rate per charger. If the EV share in a country's vehicle fleet is low, the mandatory minimum number of chargers in that country is low as well and could be too low to achieve a basic comprehensive coverage in the entire country (and disincentivise potential EV users). With increasing maturity of the EV market, the networks will be optimised and the utilization rate per charger will increase as the number of vehicles increases. In other words: a relatively small EV-fleet still needs a minimum

<sup>7</sup> **Modelling of the target (2030):** Assumptions: 15k km per year, 0.17 kWh/km, average fast charger 130 kW, 80% DC charging efficiency, 3h/day, normal charger 7.7 kW, 1.8 h/day. Total energy split: 15% fast public, 15% normal public. ⇒ 1kW/BEV

**Modelling of the target (2025):** Assumptions: same but 11% fast charging and 17% normal charging, utilisation rates are reduced (from halved to divided by 1.3-1.8 for normal/fast) ⇒ between 1.5 and 2 kW per BEV.

infrastructure coverage that enables those vehicles to charge wherever they are driven, (the very same infrastructure coverage is however able to support a higher number of EVs).

Hence, T&E's recommendation is to strengthen the existing provision by linking the power output per EV to the actual EV share in the country's total fleet. In order to roll out charging infrastructure across the whole territory of a country, member states with a low EV penetration rate would need to install more charging power (kW) per EV than countries with a higher EV penetration. Once a country reaches a certain EV share in its total vehicle fleet, the fleet based target will automatically be reduced back to the number proposed by the Commission. Based on assessments from ChargeUpEurope, T&E therefore recommends, a decreasing minimum amount of charging power per BEV for the following EV-shares:

- < 1% → 3 kW
- <1 - 2.5% → 2.5 kW
- < 2 - 5% → 2 kW
- < 5 - 7.5% → 1.5 kW
- Above 7.5 % → 1 kW

## **Avoid a two speed Europe: introduce absolute minimum targets**

Although the fleet-based target ensures that the number of available charging points is increasing proportionally to the registration numbers of EVs, the regulation should avoid a two speed Europe. This is in particular an issue in some Eastern European countries where more has to be done to ensure a sufficient and comprehensive charging network.

T&E recommends to amend the **AFIR proposal with a safeguard mechanism that will ensure a minimum charging infrastructure network in all 27 member states**. This mechanism would require member states to provide a charging infrastructure that is sufficient for a certain percentage of EVs in their national fleet - regardless of whether this share is already achieved or not. This target should start with **2% in 2025** (even if the EV share in the entire fleet is lower than that) and grow to **5% in 2027 and 10% in 2030**. The European Commission has explored this idea in its impact assessment accompanying the AFIR proposal, but unfortunately did not include it into the final text. In practice, this target only applies to member states whose EV share is below that level.

## **2.2. Distance-based targets**

Besides the fleet-based targets, the AFIR proposal also includes requirements for distance-based targets. Article 3(2) is requiring member states to deploy charging infrastructure along the EU's Transeuropean Transport network (TEN-T)<sup>8</sup>, Europe's busiest highways: For the TEN-T core (the EU's main highways):

---

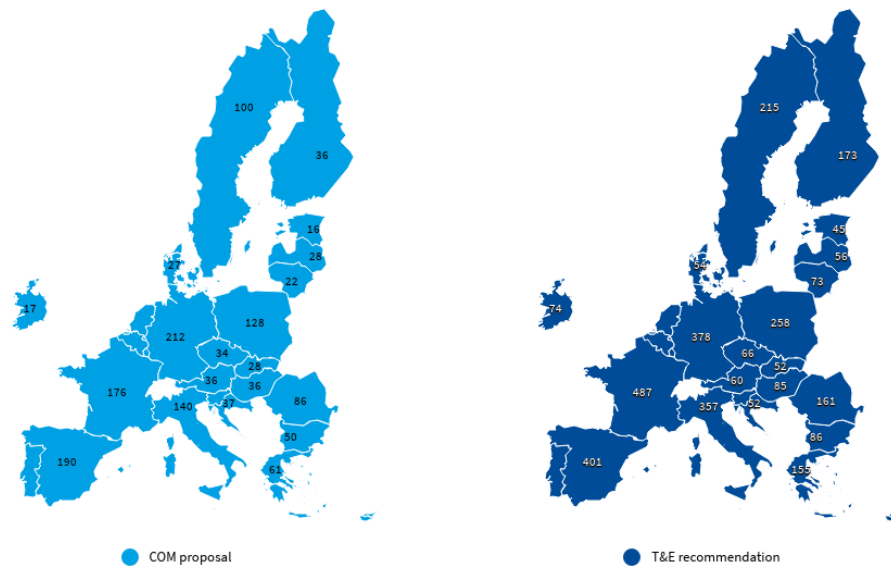
<sup>8</sup> European Commission (2019) TEN-T map. Retrieved from [https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/site/maps\\_upload/tent\\_modes/EU\\_A0Landscape2019\\_roads.png](https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/site/maps_upload/tent_modes/EU_A0Landscape2019_roads.png)

- By 2025 one charging pool of at least 300 kW of charging power every 60 km while at least one charger needs to have a minimum power output of 150 kW.
- By 2030 the total minimum power output of the charging pool is required to rise to 600 kW.

The same targets apply also for the slightly longer TEN-T comprehensive network - Europe's secondary highways - regrettably only from 2030 onwards. In total this would amount to a minimum of 3552 charging pools with at least the same number of fast chargers (>150kW) along Europe's most frequented roads by 2030.

While the fleet-based targets are an effective mechanism to guarantee a basic charging network coverage, the distance-based targets proposed are the key tool to enable long-distance trips across Europe. This is why these targets are not only important regarding the actual numbers they provide but also as a psychological factor. EV-drivers will have the assurance to be able to travel throughout Europe without the fear of range or charging anxiety. This is the reason why T&E calls on co-legislators to **bring the targets for the TEN-T comprehensive<sup>9</sup> network forward to 2025** instead of from 2030 onwards. The signal of this legislation must be that **from 2025, every European citizen can reach any destination within the EU with an EV.**

## Minimum number of LDV charging stations along the TEN-T network in 2025



Sources: T&E analysis of the European Commission's AFIR proposal.

Figure 2: Minimum number of LDV charging stations along the TEN-T network in 2025

<sup>9</sup> E.g. Paris to Strasbourg is fully connected by the core network. Paris - Nevres is mostly part of the comprehensive network



## 2.3. Targets for commercial properties: enable cars to charge where they park

The fleet-based target ensures that the infrastructure is always in line with the numbers of EVs on European roads, while the distance-based targets ensure a Trans-European charging network. However, what both provisions do not address is the actual distribution of chargers within each member state. While it is reasonable that member states decide the location where to deploy chargers, this may risk creating some gaps within the charging network. The lack of further requirements could lead to an oversupply of chargers in certain locations while it might result in a shortage of chargers in others. Especially in densely populated areas, where many people might not have the possibility to install a private charge point at their home, this problem needs to be addressed. Parking spaces at commercial properties like shopping malls, grocery stores, cultural and sport facilities are locations where many people spend a significant amount of time per week - typically enough to top up or even fully recharge the depleted power of the battery<sup>10</sup> - are a perfect location. T&E thus recommends requiring medium and large commercial properties to **equip at least 15% of their parking spaces with public accessible chargers from 2025**.

## 2.4. Targets for private charging

While the AFIR proposal is focusing on publicly accessible infrastructure the majority of charging takes place at private locations, especially at home and at workplaces. Although it is difficult to project it is reasonable to assume that private charging will remain the dominant charging mode<sup>11</sup>. Private charging is typically slow charging, hence it is more affordable, better for the battery life and better for the grid stability. While private charging has been addressed in European legislations primarily in the Energy Performance of Buildings Directive<sup>12</sup> - this approach has shown serious shortcomings. Strengthening the e-mobility provision in the upcoming revision of the EPBD is therefore key.

T&E nevertheless thinks it is important to address private charging in the AFIR as well, as it is the main EU legislation focusing on charging. Member states should ensure a 'right to plug'. Within their National Policy Frameworks (NPF), they should come up with measures that ensure this 'right to plug' for every EV driver. This means that citizens living in a private or multi dwelling residential building, with parking spaces, should have the right to install a charging point but also for people having no access to a private parking space to have access to a nearby charger. Furthermore, member states, in the context of the NPFs,

---

<sup>10</sup> As an example: the median usage of cars in Germany is 30 km/day. In bigger cities the median usage is as low as 14km/day or 98km/week. With an average normal charger (7.7 kW) it would take slightly more than 2 h to recharge a typical EV. Bundesministerium für Verkehr und Digitale Infrastruktur (2019). Retrieved from [http://www.mobilitaet-in-deutschland.de/pdf/MiD2017\\_Ergebnisbericht.pdf](http://www.mobilitaet-in-deutschland.de/pdf/MiD2017_Ergebnisbericht.pdf)

<sup>11</sup> The European Commission is expecting that 40% of all charging will take place at public accessible chargers, while T&E assumes this to be around 30%.

<sup>12</sup>European Union (2010). Energy Performance and Buildings Directive. Retrieved from [https://eur-lex.europa.eu/legal-content/EN/ALL/;ELX\\_SESSIONID=FZMjThLLzfxmmMCOGp2Y1s2d3Tjwtd8QS3pgdkhXZbwqGwlgY9KN!2064651424?uri=CELEX:32010L0031](https://eur-lex.europa.eu/legal-content/EN/ALL/;ELX_SESSIONID=FZMjThLLzfxmmMCOGp2Y1s2d3Tjwtd8QS3pgdkhXZbwqGwlgY9KN!2064651424?uri=CELEX:32010L0031)

should come up with plans on how to provide a minimum amount of charging points in residential and non-residential buildings.

Analogous to the targets for public charging, the indicative targets for private charging that member states should reach should be based on the actual fleet-size. Based on an assessment of ChargeUpEurope **6-8 kW / EV would be an ideal indicative target to aim for.**

## **2.5. Infrastructure usage requirements: making charging hassle free**

The AFIR is setting targets to achieve a basic coverage of charging infrastructure across Europe. At the same time it addresses another issue that is at least as important as the targets themselves: the minimum requirements this charging infrastructure has to fulfill. T&E welcomes the requirements for payment card readers, price transparency and comparability, the non-discrimination between end users and mobility service providers and that it must be easy to compare information based on a standardised fuel price measured in €/100km at “all relevant stations”. Furthermore, the sharing requirement for static and dynamic data concerning alternative fuels infrastructure at no cost is another crucial point that will help make the charging network as efficient and user friendly as possible. In particular this will enable consumers to have real time access about the availability of chargers.

Nevertheless, T&E has identified two serious shortcomings. The requirement to equip public accessible charging stations with card readers only applies for charging stations with a power output of 50 kW and more. Charging stations with a lower power output only need to be able to generate a quick response (QR) code to enable payment via a smartphone app etc.

Given the fact that the vast majority of chargers will have a power level below this 50 kW threshold, it means that charging point operators (CPOs) will not have any incentive to add the card reader payment option to the majority of their charging stations. Driving an EV and being able to charge it at any public charger needs to be made as simple as possible. From today's perspective, it seems overly optimistic to assume that all demographic and socio-economic groups will be able and willing to use their smartphones to pay. Hence, T&E recommends making contactless **card readers mandatory for all charging stations with a power output above 10 kW** in order to remove unnecessary obstacles that could delay the shift to electrification. In addition those **requirements should apply from 2025 onwards** also for existing infrastructure.

The second issue is the definition of what qualifies as a public accessible charging station. The proposal's definition in Article 2 is very broad and thus vague. Theoretically, charge points that are accessible to the general public only for a very limited time period per day would fall within the scope of the regulation but would do little to achieve the intended goal of a comprehensive charging network. T&E therefore recommends to amend the definition to ensure that public chargers should be **available at least 8 hours**

**per day** (6 days a week<sup>13</sup>), with at least **half of the chargers available to the general public without any restrictions** (i.e. not limited to customers/clients) while ensuring that the **uptime of each charger is not falling below 98%**.

### 3. Heavy-duty vehicles

GHG emissions from HDVs are responsible for 27%<sup>14</sup> of all road transport emissions and so far comparatively little has been done to reduce these emissions. Just as the European Commission has proposed a 100% CO<sub>2</sub> reduction target for LDVs, its upcoming proposal to revise the CO<sub>2</sub> standards for HDVs in 2022 should set a similar 100% CO<sub>2</sub> reduction target. To enable this, high-power and megawatt charging is key. This is why T&E is welcoming that the Commission is setting the first targets for HDV charging infrastructure as early as 2025 in order to bring electricity to highways in the next years. This will send a key signal to the road freight sector that it can and should transition away from conventional diesel to zero-emission trucks.

Furthermore, T&E has looked in detail into the truck makers announcements of the anticipated zero emission trucks (ZET) share they intend to reach by 2025 and 2030. They are as high as 10% in 2025 (Volvo, Iveco, Renault and Scania) and could reach 60% (Daimler) in 2030. Based on the OEM's market shares in 2019, T&E therefore expects 50,000 - 106,000 ZETs to be on European roads by 2025, and 480,000 - 630,000 by 2030<sup>15</sup>. These estimates exceed the Commission's estimates of 170,000 by 2030 by a factor of 3-4.

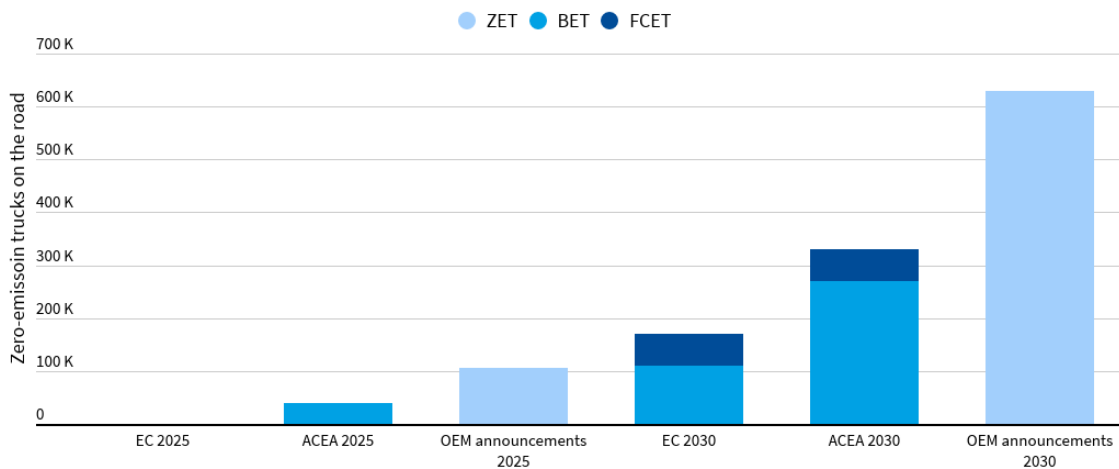
---

<sup>13</sup> Some commercial properties are closed to the public on Sundays and public bank holidays. Hence a 6 days should account for a normal week without bank holidays.

<sup>14</sup> UNFCCC (2021). GHG data from UNFCCC. Retrieved from <https://unfccc.int/process-and-meetings/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc/ghg-data-from-unfccc>

<sup>15</sup> T&E (2021). Easy ride: why truck CO<sub>2</sub> targets are unfit for the 2020s. Retrieved from [https://www.transportenvironment.org/wp-content/uploads/2021/10/202108\\_truck\\_CO2\\_report\\_final.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/10/202108_truck_CO2_report_final.pdf) These numbers account for short- and long haul trucks. While not every OEM announcement makes a distinction some do. MAN for instance predicts that 40% of its long haul truck sales will be zero-emission by 2030.

## The European Commission greatly underestimates the potential for electric trucks



Source:  
T&E (2021), Unlocking Electric Trucking in the EU: long-haul trucks. Numbers are based on truck-makers announcements.  
ACEA( 2021), Heavy-duty vehicles: Charging and refuelling infrastructure requirements  
European Commission (2021), Impact assesement of the AFIR proposal.

**Figure 3: Projected number ZETs in 2025/2030**

To summarize: the industry and not regulators - appear to be the vanguard when it comes to estimating the potential for ramping up the deployment of zero emission trucks.

### 3.1. Charging infrastructure for HDVs

The Commission is proposing distance-based targets along the TEN-T core network by 2025 in both directions:

- TEN-T core network: a charging pool with at least 1,400 kW of charging power every 60 km by 2025, 3,500 kW by 2030; at least one charger with 350 kW power output.
- TEN-T comprehensive network: a charging pool with at least 1,400 kW of charging power every 100 km by 2030, 3,500 kW by 2035; at least one charger with 350 kW power output.
- TEN-T urban nodes: 600 kW power output for each node in 2025 and 1,200 kW in 2030
- Safe and secure parking areas: at least one charging point with a power output of at least 100 kW by 2030.

However, as outlined above the Commission is seriously underestimating the expected market uptake of BETs. It is therefore necessary to significantly raise the level of ambition. This will not only help to decarbonise road freight, but will also prepare the ground for large-scale zero emission trucking and give European manufacturers a head start in this global industrial transition.

For this reason the power output of the TEN-T core and comprehensive network charging pools needs to be increased, as well as the power output of the charging pools located at the urban nodes. T&E therefore recommends to increase the targets to the highest scenario which was assessed in the Commission's impact assessment:

- TEN-T core network: a charging pool with at least **2,000 kW** of charging power every 60 km by 2025, **5,000 kW** by 2030.
- TEN-T comprehensive network: a charging pool with at least **2,000 kW** of charging power every 100 km by 2030, **5,000 kW** by 2035.
- TEN-T urban nodes: **1,200 kW** power output for each node in 2025 and **3,500 kW** in 2030

It is crucial to have ambitious targets already for 2025 because this is when BET long haul trucks will likely be available in series production and be competitive with diesel trucks. The current target level or a postponement of the date would delay the mass adoption of zero emission trucks and make it difficult for the EU to achieve its 2030 climate ambition.

Due to reasons of efficiency and economic viability, the vast majority of charging events will happen during the daily rest periods and overnight. The EU rules on driving times and rest periods foresee maximum daily driving periods of 9 hours (10 hours in exceptional cases) and minimum resting periods of (at least) 9 hours. In addition, mandatory breaks of 45 minutes every four and a half hours are required.<sup>16</sup>

The intention of the Commission and the road haulage sector is that they should be able to do this at safe and secure truck parking areas. Therefore, it is reasonable to equip those **safe and secure parking areas with at least two charging points with at least 100 kW as early as 2025** and **at least five charging points by 2030**. This could create an additional business case, accelerate the creation of safe and secure parking facilities and thereby result in improved social and labour conditions for truck drivers.

Furthermore, a power level of 350 kW per charger is not enough. CharIN, the industry's standardisation initiative, is currently developing the 'Megawatt Charging System' (MCS), a high-power charging standard for commercial vehicles with more than 3 MW whose development is expected to be concluded soon.<sup>17</sup> The Commission should therefore amend the Regulation through implementing powers **as soon as this standard is available and increase the minimum power output per charger to at least 700 - 800 kW**.

Finally, trucks will also need to charge while they are located at **logistic centers and depots** for loading and unloading goods. A significant share of the electric truck charging will happen at the distribution/logistic center while cargo is (un)loaded - this typically takes up to 3 hours. Co-legislators should therefore include **targets for at least one 350 kW (semi-)public charger** at each of these

---

<sup>16</sup> European Union (2019). Regulation (EU) 561/2006 of the European Parliament and of the Council. Retrieved from [https://eur-lex.europa.eu/resource.html?uri=cellar:5cf5ebde-d494-40eb-86a7-2131294ccb9.0005.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:5cf5ebde-d494-40eb-86a7-2131294ccb9.0005.02/DOC_1&format=PDF)

<sup>17</sup> CharIN (2020). The CharIN path to Megawatt Charging (MCS): Successful connector test event at NREL. Retrieved from <https://www.charin.global/technology/mcs/>

locations. This charger should preferably be shared between multiple transport operators and be made accessible in a way so that it can be used publicly.

### 3.2. Hydrogen refueling infrastructure for HDVs

According to industry plans, hydrogen fuel cell electric trucks (FCETs) are expected to enter series production in the second half of the 2020s. These vehicles are zero emission and could be complementary to BETs as we accelerate towards zero emission across the freight sector.

However, according to the industry's estimates, four out of five<sup>18</sup> zero emission trucks in 2030 will be battery electric and production plans focus much more on battery electric for the next decade. Indeed, thanks to better efficiency, BETs are expected to be much more competitive than FCETs. T&E's analysis suggests that FCETs will reach TCO cost parity with diesel trucks not before 2030, whereas BETs reach cost parity already by the mid 2020s (see figure 4 below which highlights key performance differences between BETs and FCETs).

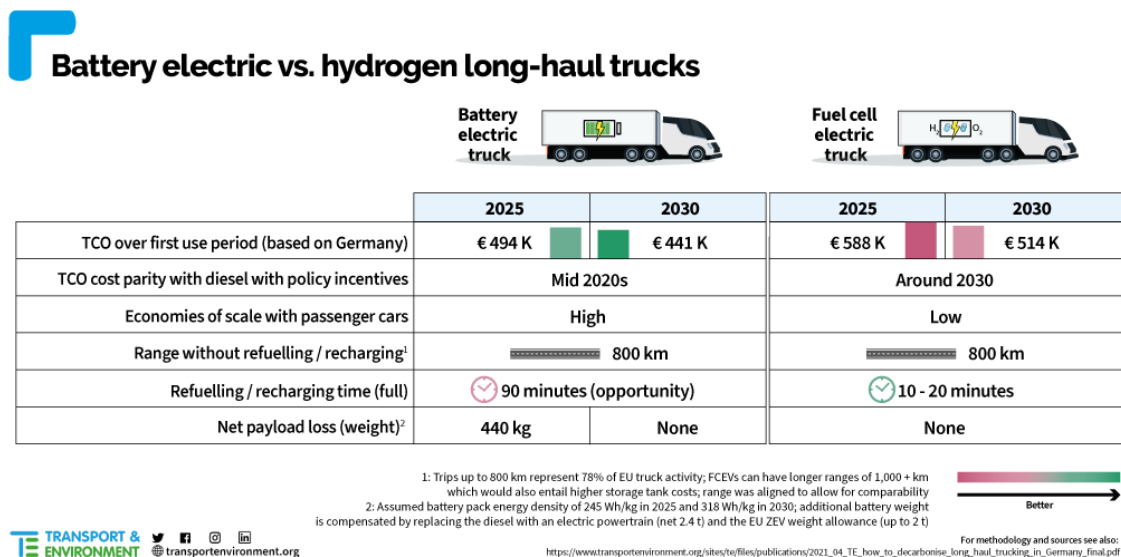


Figure 4: Battery electric vs. hydrogen long-haul trucks

The AFIR proposal would require member states to install almost 2,000 hydrogen refueling stations (HRS) along both the TEN-T core and comprehensive network by 2030, according to the Commission's impact assessment. This is significantly higher than the 1,500 refuelling stations the hydrogen industry itself is calling for.<sup>19</sup> Even based on the scenario of the Commission which expects 60,000 FCETs on the road in 2030, this hydrogen refueling network would be underutilized. T&E has calculated that the utilization rate would be as low as 30%. The Commission proposal would require a hydrogen refuelling station every 150 km for compressed hydrogen along the TEN-T core and comprehensive networks and every 450 km for liquified hydrogen, which is an excessively tightly meshed network for a technology which is touted for its

<sup>18</sup> ACEA. Heavy-duty vehicles: Charging and refuelling infrastructure requirements. Retrieved from: [https://www.acea.auto/uploads/publications/ACEA\\_Position\\_Paper-Heavy-duty\\_vehicles-Charging\\_and\\_refuelling\\_infrastructure.pdf](https://www.acea.auto/uploads/publications/ACEA_Position_Paper-Heavy-duty_vehicles-Charging_and_refuelling_infrastructure.pdf)

<sup>19</sup>Hydrogen Europe. Position Paper on the AFID. Retrieved from <https://www.hydrogeneurope.eu/wp-content/uploads/2021/07/Hydrogen-Europes-position-paper-on-the-AFID.pdf>

longer range. Furthermore, truck makers currently developing FCETs are divided on the question whether compressed or liquid hydrogen will be the more promising refuelling option.

Consequently, this high ambition leads to high investment costs. The Commission's impact assessment is expecting annual total investment costs for HRS of almost 800 million euros. For BETs it is only estimating around 300 million euros per year (for a number of vehicles on the road which is around two times higher). (See section 3.4 for a more detailed investment comparison).

Given the lack of market readiness and the uncertainties around the future size of the FCET fleet, the EU should start by targeting the deployment of refuelling stations at key hydrogen ecosystem locations instead of overbuilding a dense and expensive network across Europe. Therefore, member states and Parliament should **limit the deployment of HRS to no-regret locations**, namely **ports and industrial clusters** as hydrogen will play a major role in shipping and is needed to decarbonise heavy industry. Ports recognized by the TEN-T regulation are viable locations. While there are some definitions for industrial clusters<sup>20</sup>, none of them are suitable for the purpose of the regulation. Hence, the Commission should assess **which industrial clusters are suitable for the deployment of refuelling stations**. Given the uncertainties, **targets should also remain indicative** for the time being. Member states should report their HRS-deployment plans within their National Policy Frameworks which they have to provide to the Commission by 2024. Once there is sufficient certainty in terms of the expected market uptake, the **Commission should reassess the targets** and if necessary adjust them as part of the foreseen AFIR revision in 2026.

### 3.3. LNG refuelling infrastructure for HDVs

Some truckmakers and fuel suppliers continue to claim that LNG trucks running on either fossil-derived or renewable methane would deliver meaningful emission reductions. Contrary to these claims, a recent report has found that LNG trucks are not a viable solution to reduce emissions, let alone decarbonise trucking.<sup>21</sup>

Over a 100-year global warming potential, the tested LNG truck achieved a well-to-wheel GHG reduction of 7.5% compared to the tested diesel truck. When looking at a 20-year GWP time frame, the LNG truck had higher emissions than the diesel truck, resulting in 13.4% higher GHGs. This means that a growing number of LNG trucks on European roads today would actually lead to an increase in global warming over the next few decades compared to the alternatives.

In addition, the report also examined the cost, availability and scalability challenges of sustainably sourced biomethane and renewables-based synthetic methane and found that neither sustainable

---

<sup>20</sup> Seenergies (2021). Industrial Excess Heat Potentials Dataset Map. Retrieved from <https://euf.maps.arcgis.com/apps/webappviewer/index.html?id=43888b15ffd7409d8e544ad83b3a59a6>

<sup>21</sup> Transport & Environment (2021). LNG trucks: a dead-end bridge. Retrieved from <https://www.transportenvironment.org/discover/lng-trucks-a-dead-end-bridge/>

biomethane nor synthetic methane produced from renewable electricity will be sufficiently scalable or affordable for the trucking sector.

Continuing the investment in LNG trucks and refuelling infrastructure carries a high risk of stranded assets and would create a fossil fuel lock-in due to the lack of renewable alternatives. As long as some vehicle manufacturers, hauliers and infrastructure operators continue to invest in this technology, they will have a vested interest to protect those investments. Since there will not be enough renewable methane available at competitive costs, even by 2050, the industry would instead need to rely on fossil gas in order to meet increasing fuel demand from gas-powered trucks.

LNG refuelling infrastructure should therefore be removed from the scope of the legislative act by **deleting Article 8**. The definition in Article 2 of what qualifies as an ‘alternative fuel’ should also be modified as it defines which fuels the EU considers to be aligned with the European Green Deal. This definition is also at the heart of many European and national funding programmes, structural and investment funds. Therefore, as long as natural gas is part of the scope of the alternative fuel infrastructure law, it benefits from preferential treatment and funding. For example, support from the CEF Transport Blending Facility and the Alternative Fuels Infrastructure Facility, the main tool to finance alternative fuels infrastructure and vehicles, is based on this definition of what counts as an alternative fuel.

### **3.4. HDV infrastructure costs**

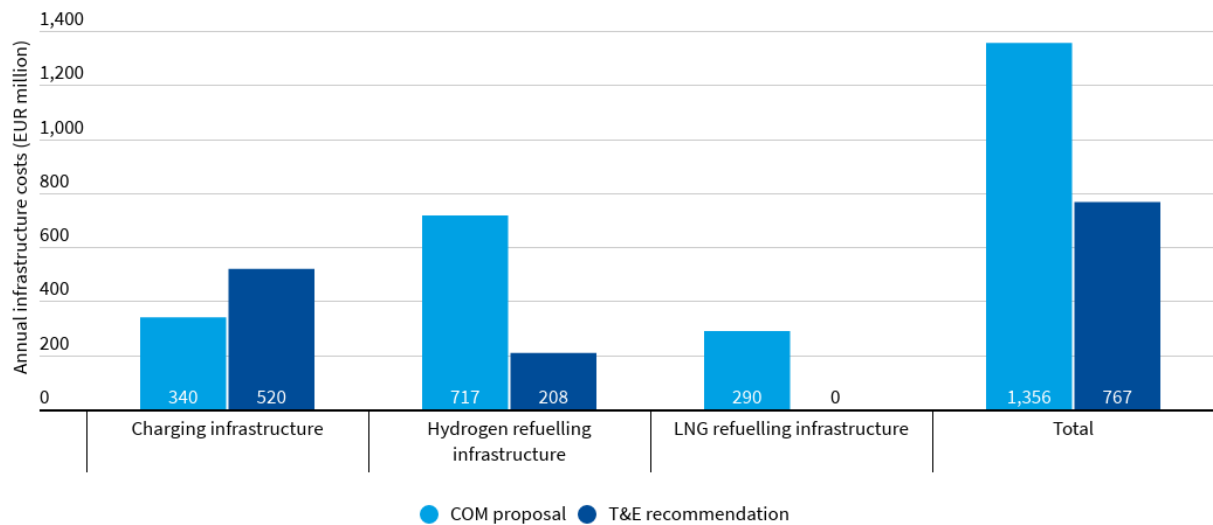
The roll-out of Infrastructure will require significant public and private investment. Co-legislators should therefore be mindful of how to spend limited funding. As the previous section has shown, LNG trucks have no positive impact when it comes to the reduction of GHG emissions nor do they improve air quality. The 290 million euros of annual investment the Commission’s impact assessment has foreseen for LNG refueling stations is a waste of public and private money.

In terms of hydrogen refuelling stations, investments should be made in a targeted manner until there is sufficient clarity on the future role of FCETs. Investment for the market ready technology, BETs, should be reasonably increased to around 500 million euros in order to match it with the expected number BETs that exceeds the current Commission estimates by a factor of 4-5.

Based on the assumptions in the AFIR’s impact assessment T&E’s recommendation would result in an overall annual investment costs (CAPEX and OPEX) 44% below those predicted by the European Commission (see figure 5 below).



## Annual infrastructure costs for HDVs (2021 - 2030)



**Notes:** Annualised public infrastructure costs including CAPEX and OPEX for the years 2021 - 2030.

**Sources:** T&E calculations based on European Commission (2021).

**Figure 5: Annual infrastructure costs for HDVs (2021-2030)**

## 4. Accelerating infrastructure deployment - National Policy Frameworks

Setting out binding targets is without doubt the most important priority of the AFIR. Nevertheless, to ensure the timely attainment of these targets it is important to create the right market conditions for the deployment of charging infrastructure. The proposal is addressing these issues to a certain extent. However, a few improvements should amend the regulation.

Member states have to provide National Policy Frameworks (NPFs) as part of the AFIR. Within these frameworks they have to develop plans on how they intend to reach the targets and goals set out in AFIR. The current requirements provide a first starting point to identify how member states intend to reduce obstacles but are not sufficient to improve charging infrastructure deployment.

### Planning, permitting and procuring

There are no harmonised requirements across Europe with regards to planning, permitting and procuring of charging infrastructure, although this is largely considered today as a main barrier to fast deployment. The planning, permitting and procurement process to deploy charging stations, medium- and high-voltage substations and power lines can take several years. The complexity of the approval process

and the time it takes to obtain the necessary permits can vary considerably by member state and region, particularly for grid connections in the medium- and high-voltage range.<sup>22</sup> As part of the NPFs, member states have to inform the Commissions about their “measures to remove possible obstacles with regards to planning, permitting and procuring of alternative fuels infrastructure”. However, the planning process has to begin well before the infrastructure needs materialise. Without prejudice to national permitting and planning processes, the AFIR should require member states to ensure that obtaining the final permit/building authorisation for a publicly accessible charger being installed pursuant to the requirements of this Regulation takes **no longer than 6 months from the date of the initial application** submission. Member states should also assess whether their national and local regulations are effective enough to ensure an efficient and swift roll-out of charging infrastructure and member states should further outline in their NPF how they intend to ensure this maximum latency between permitting and actual deployment.

### **Coordination between authorities**

Better coordination between EU, national and local authorities will help shorten charging infrastructure deployment. Public authorities need to steer the deployment of charging infrastructure to ensure both light- and heavy-duty vehicle charging infrastructure is deployed in a coordinated and complementary way. It is important to leverage synergies between transport modes and economic sectors and take into account the future interplay between an electrified road transport sector and a power system based on intermittent renewables. Hence member states should assess how to improve - where necessary - the coordination between EU, national and local authorities.

### **Mapping available sites, charging demand and grid capacity**

Already today, CPOs face difficulties in finding suitable locations for deploying charging stations in some instances. There are however some best practices on how to deal with this issue. For example, Germany's 'StandortTOOL' combines data on the LDV fleet, the existing charging infrastructure as well as driving behaviour and grid capacity.<sup>23</sup> UK Power Networks' 'DG Mapping Tool' shows the approximate locations of the company's medium- and high-voltage lines.<sup>24</sup> T&E recommends that the EU should require member states to map appropriate locations for site development with sufficient grid capacity, model future charging demand, and make this information publicly available.<sup>25</sup>

---

<sup>22</sup> European Commission (2021). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A strategic rollout plan to outline a set of supplementary actions to support the rapid deployment of alternative fuels infrastructure. Retrieved from [https://ec.europa.eu/info/sites/default/files/strategic\\_rollout\\_plan\\_support\\_rapid\\_deployment\\_of\\_alternativ\\_e\\_fuels\\_infrastructure.pdf](https://ec.europa.eu/info/sites/default/files/strategic_rollout_plan_support_rapid_deployment_of_alternativ_e_fuels_infrastructure.pdf)

<sup>23</sup> StandortTOOL (no date). StandortTOOL. Retrieved from <https://www.standorttool.de/strom/>

<sup>24</sup> UK Power Networks (no date). DG Mapping Tool. Retrieved from [https://dgmap.ukpowernetworks.co.uk/site/?q=dgmapping\\_ext\\_open](https://dgmap.ukpowernetworks.co.uk/site/?q=dgmapping_ext_open)

<sup>25</sup> Sustainable Transport Forum (2021). Recommendations for public authorities on: procuring, awarding concessions, licences and/or granting support for electric recharging infrastructure for passenger cars and

## Making the grid connection future-proof

The dimensioning of the grid connection and power capacity should ensure the expendability of charging pools which can be expected in the future following the increasing fleet penetration of EVs. A forward-looking design and sizing can avoid the risk of misplanning and reduce overall grid connection costs. Hence, member states should lay out detailed plans on how to make grid future proof and - where necessary - increase grid capacity in the short term.

## 5. Shipping

### 5.1 Shore side electricity (SSE) at berth

Even though the technology to plug-in ship at berths has existed for over 20 years now, a small number of ships use it at the moment. T&E 2021 shipping decarbonisation study<sup>26</sup> calculated that total EU-related fleet CO<sub>2</sub> emissions could be reduced by 5.8%, if all ship types were plugged at berth. Not only would such measures contribute to reducing shipping's climate impact, but also the SO<sub>x</sub>, NO<sub>x</sub> and PPM emissions that cause air pollution problems.<sup>27</sup> In that regard, the Commission proposal for a binding mandate for SSE by 2030 for container and passenger terminals is a positive start. However, such a mandate lacks ambition on the timeline and scope.

Firstly, the timeline for introduction of SSE should be advanced to 2025 and the mandate should be progressively extended to all maritime ports and terminals in the next 15 years. **To foster rapid deployment, T&E recommends that all passenger terminals provide SSE at berths starting from 2025, and be followed by terminals for containerships, tankers and refrigerated-bulk carriers starting from 2030. Finally, all remaining terminals should install SSE by 2035.** This timeline is considered both realistic and environmentally effective. This is because all ship types can technically use ship-to-shore options, and literature shows all ship types benefit from onshore power supply in terms of GHG savings and air quality gains.<sup>28</sup> Moreover, the direct use of electricity at berth is expected to become

---

vans. Retrieved from

[https://transport.ec.europa.eu/document/download/5bcffc0b-d1fe-468e-9f2c-04026629c907\\_en](https://transport.ec.europa.eu/document/download/5bcffc0b-d1fe-468e-9f2c-04026629c907_en)

<sup>26</sup> See p.41-42, part 5.6. Zero-emission berth mandate in Transport&Environment. (2021). *Decarbonising European Shipping*. Retrieved from [https://www.transportenvironment.org/wp-content/uploads/2021/07/202104\\_Shipping\\_Technological\\_Roadmap\\_to\\_Decarbonization.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/202104_Shipping_Technological_Roadmap_to_Decarbonization.pdf)

<sup>27</sup> In 2017, sulphur oxide emissions from one cruise ship company alone were 10 times as high as the entire European car fleet. Transport&Environment. (2019). *One corporation to pollute them all*. Retrieved from

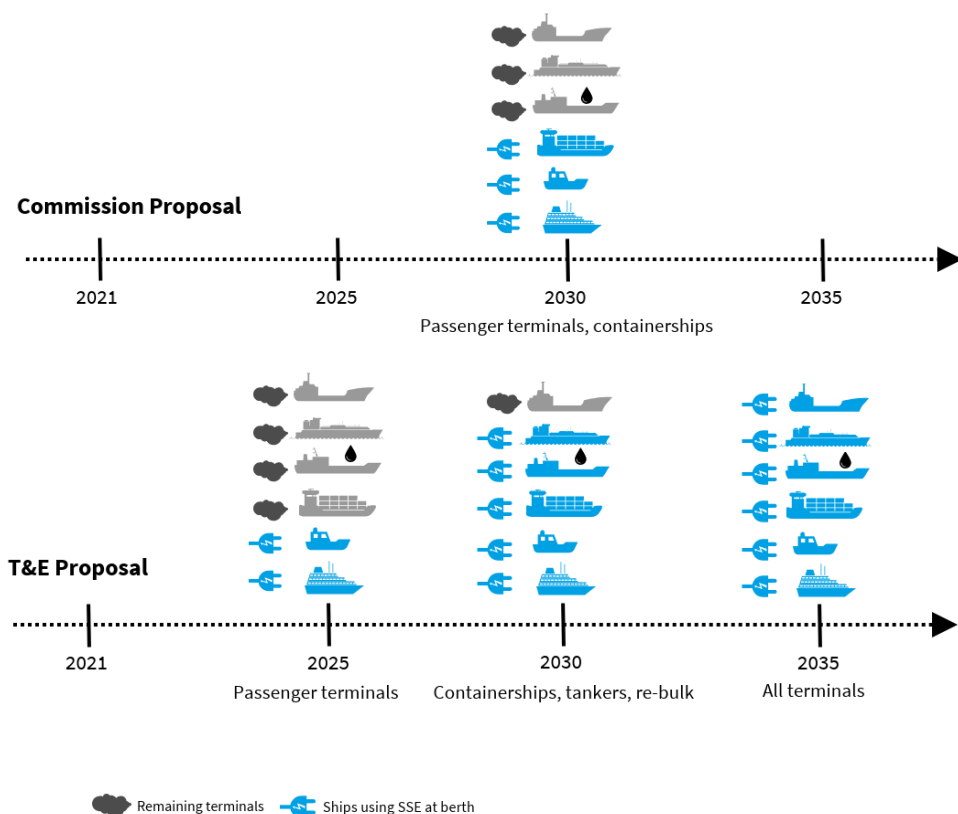
[https://www.transportenvironment.org/wp-content/uploads/2021/07/One%20Corporation%20to%20Pollute%20Them%20All\\_English.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/One%20Corporation%20to%20Pollute%20Them%20All_English.pdf)

<sup>28</sup> Table 4. "Overall CO<sub>2</sub> reduction potential of SSE compared to total shipping emissions". B.Stolz, M.Held, G.Georges, K.Boulouchos.

(2021). *The CO<sub>2</sub> reduction potential of shore-side electricity in Europe*. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0306261920317864?via%3Dihub>

more cost-effective than generating electricity from sustainable fuels onboard, taking into account both infrastructure and electricity costs.<sup>29</sup>

## Timeline for the introduction of shore-side electricity in European ports, T&E 2021



TRANSPORT & ENVIRONMENT [transportenvironment.org](https://transportenvironment.org)

**Figure 5: Timeline for the introduction of shore-side electricity in European ports, T&E 2021**

Secondly, there are a number of caveats in the text of the proposal that might result in loopholes of implementation:

- The current SSE mandate is limited to the TEN-T network, whereas it could be extended to all maritime ports;
- The mandate is also conditioned on the number of port calls for certain types of ships, over an average of 3 years, and limited to 90% of port calls. This could introduce uncertainty for ships that are mandated under the proposed FuelEU Regulation to plug in at berth and fragilise the scaling

<sup>29</sup> See p.28, part 3.4. Costs and energy demand. “The total installed power required is calculated to be 2480 MW in 2030 (in the high energy efficiency and fuels only scenarios), and 2780 MW in 2050. With these assumptions and a constant HFO price of €326/t, we calculate zero-emission berths to have a negative marginal abatement cost in 2050, i.e. sparing more fuel cost than the required infrastructure and electricity costs.” in Transport & Environment. (2021). *Decarbonising European Shipping*. Retrieved from [https://www.transportenvironment.org/wp-content/uploads/2021/07/202104\\_Shipping\\_Technological\\_Roadmap\\_to\\_Decarbonization.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/202104_Shipping_Technological_Roadmap_to_Decarbonization.pdf)

up of the SSE-OPS market. It is also unclear from the proposal whether the administrative burden of extra reporting and calculations would fall on port authorities, on member states or on the European Commission, in the absence of EU public data<sup>30</sup>.

Instead, the mandate should be clarified and simply require all European ports to provide SSE at relevant terminals, including non-TEN-T ports and regardless of the average number of port calls. For example, a port with a passenger terminal would be required to install SSE infrastructure for passenger ships from 2025; whereas a port with only cargo terminals would be required to deploy SSE infrastructure from 2030 only for the relevant ship types.

Moreover, the current 5000 GT limit is not justified as smaller ships can even more easily connect at berth and also have smaller power needs. We suggest lowering the limit to 400 GT, similarly to what we recommend for the FuelEU Maritime and ETS Maritime vessel size scope, in order to avoid a two-tier market whereby shipping companies would increasingly use ships below the 5000GT limit.

Last but not least, it is important that the same adjustments to the timeline and types of ships are introduced under Article 5 of FuelEU Maritime, which mandates ships to make use of onshore power supply. Binding requirements on both supply and demand side will be key to create a business case for SSE and give enough predictability to ports to plan future infrastructure investments. It is also important that port users and individual ports cooperate in order to identify the at-berth energy demands of ships and agree on the best infrastructure investments.

## 5.2 LNG refuelling infrastructure for shipping

The European Commission has proposed a mandate on maritime ports to install LNG refuelling infrastructure in ports, turning a blind eye, among others, to the World Bank's latest report on the use of LNG as a marine fuel<sup>31</sup>, as well as the latest IEA report showing the ephemeral role for LNG in shipping's decarbonisation.<sup>32</sup> The World Bank report explicitly called on regulators to avoid any policy support to LNG in the maritime sector, including as a transitional fuel, due to the risk of stranded assets it creates. Many other studies show that LNG has very marginal GHG benefits over existing marine fuels and depending on the ship engine, LNG can have a worse climate impact than the fuel it is supposed to replace.<sup>33</sup> Therefore, mandating EU ports to install LNG infrastructure goes against the objectives of the Fit for 55 package and Europe's Climate Law that binds the European economy to achieve climate neutrality by 2050 and puts European ports at high risk of stranded assets.

---

<sup>30</sup> The proposed condition on the number of port calls in the SSE mandate would require to determine every year which ports are subject to the SSE mandate. But to date, Eurostat provides data on the number of port calls per ship type in EU "main ports" only, which definition is quite restrictive and leaves out of the radar many TEN-T core and comprehensive ports. See Vessels in main ports by type and size of vessels (based on inwards declarations) - quarterly data. (2021, November 2). [ec.europa.eu/eurostat](https://ec.europa.eu/eurostat/web/products-datasets/-/mar_tf_qm). Retrieved November 3, 2021, from [https://ec.europa.eu/eurostat/web/products-datasets/-/mar\\_tf\\_qm](https://ec.europa.eu/eurostat/web/products-datasets/-/mar_tf_qm)

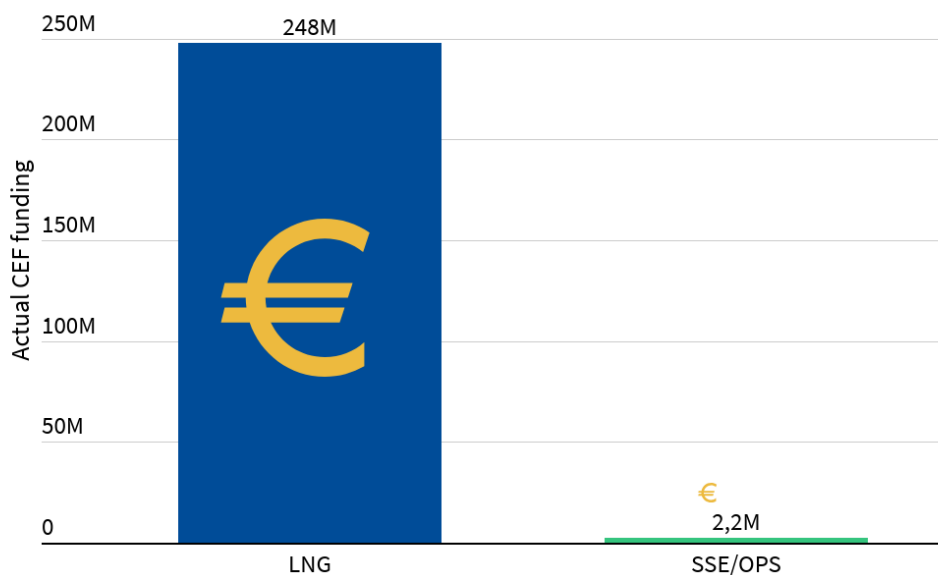
<sup>31</sup> World Bank. (2021). *The Role of LNG in the Transition Toward Low- and Zero-Carbon Shipping*. Retrieved from <https://openknowledge.worldbank.org/handle/10986/35437>

<sup>32</sup> IEA (2021), *Net Zero by 2050*. Retrieved from <https://www.iea.org/reports/net-zero-by-2050>

<sup>33</sup> ICCT. (2020). *The climate implications of using LNG as a marine fuel*. Retrieved from [https://theicct.org/sites/default/files/publications/LNG%20as%20marine%20fuel%2C%20working%20paper-02\\_FINAL\\_20200416.pdf](https://theicct.org/sites/default/files/publications/LNG%20as%20marine%20fuel%2C%20working%20paper-02_FINAL_20200416.pdf)

Plenty of taxpayers' money continue to pour in fossil LNG infrastructure in the meantime. It is estimated that about half of the LNG infrastructure funding in the EU comes from public coffers.<sup>34</sup> Moreover, the EU funds to LNG infrastructure comes at the expense of funding spent on green infrastructure such as shore-side electricity. The main EU financing instrument for transport infrastructure, Connecting Europe Facility (CEF), allocated nearly 250 million euros to projects of LNG bunkering infrastructure in the 2014-2019 period. This is roughly 100 times more than for projects dedicated to SSE infrastructure (see figure below).<sup>35</sup>

### EU's CEF funding for shipping spent 100 times more on LNG projects than on shore-side electricity in 2014-2019



TRANSPORT & ENVIRONMENT [transportenvironment.org](https://transportenvironment.org)

**Figure 6: Distribution of EU funding between LNG projects and SSE projects (CEF support to Maritime and Motorways of the Sea), T&E 2021**

In this context, setting a binding LNG mandate in AFIR as proposed by the Commission would further divert public finances to fossil infrastructure when ports crucially need EU funding to be dedicated to SSE infrastructure deployment. Not to mention new financing needs for hydrogen and ammonia refuelling infrastructure.

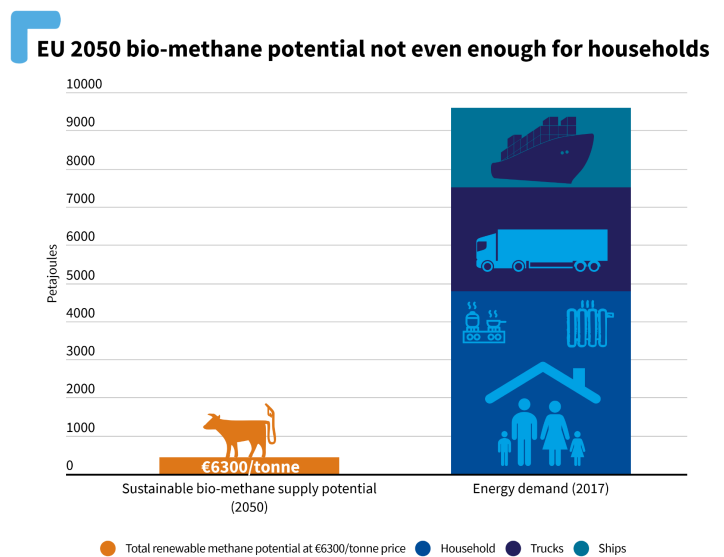
<sup>34</sup> UMAS. (2018). *LNG as a marine fuel in the EU*. Retrieved from [https://www.transportenvironment.org/wp-content/uploads/2021/07/2018\\_06\\_LNG\\_marine\\_fuel\\_EU\\_UMAS\\_study.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/2018_06_LNG_marine_fuel_EU_UMAS_study.pdf)

<sup>35</sup> T&E calculation, derived from European Commission data. The calculation compares actual funding to projects dedicated to liquefied natural gas infrastructure in ports and projects dedicated to shore-side electrification (SSE) only, excluding a handful of projects from which SSE and LNG funding could not be differentiated (worth 14mln€). European Commission. (2020). *CEF support to Maritime and Motorways of the Sea*. Retrieved from [https://ec.europa.eu/inea/sites/default/files/cefpub/cef\\_transport\\_2020-corridor-report\\_maritime-mos\\_metadata.pdf](https://ec.europa.eu/inea/sites/default/files/cefpub/cef_transport_2020-corridor-report_maritime-mos_metadata.pdf)

According to the Commission’s impact assessment, mandating LNG will result in the 91 TEN-T core ports being required to install LNG bunkering facilities<sup>36</sup>, versus 36 of them today.<sup>37</sup> Should such a mandate be adopted by EU legislators, the scale of needed investments would be astronomical and dramatically increase the risk of stranded assets faced by EU ports. Some projects of LNG terminals are already getting cancelled around Europe, amid society concerns over imports of US fracked gas, or simply lack of demand.<sup>38</sup> For instance, the Cork LNG terminal project in Ireland got cancelled in January 2021, as well as the Wilhelmshaven project in Germany where Uniper decided to cancel its LNG terminal project, and invest in a green hydrogen hub instead. Similarly, due to market conditions and lack of demand Fluxys and Novatek cancelled their mid-scale LNG project in Rostock, Germany.<sup>39</sup>

Last but not least, the possibility to use the built LNG infrastructure for renewable gas to avoid lock-in is in reality likely to be extremely limited. This is because biomethane sustainable production potential is limited, and is already under pressure from competing uses in other sectors (e.g. to generate power and heat in sectors reliant on gas).<sup>40</sup>

**Figure 7 (right): The limits of sustainable biomethane supply potential compared to large demands from competing sectors**



**Notes:** The chart is conservative as it compares 2050 supply with 2017 demand. This supply would only be feasible at a retail price of €6300/t (excluding taxes), which is more than 10 times higher than the current LNG prices. Energy demand for households is limited to natural gas demand only.

**Sources:** ICCT (2018), Eurostat (2017), UNFCCC (2017).

Unlike biomethane, e-methane could be theoretically produced at scale. The problem however lies in the production costs of e-LNG compared to other efuel alternatives, such as

<sup>36</sup> See Table 12: Effectiveness of the different policy options; Table 52: Policy measures and final screening, in European Commission (2021). Impact Assessment accompanying the Proposal for a Regulation on the deployment of alternative fuels infrastructure. Retrieved November 3, 2021, from [https://ec.europa.eu/info/sites/default/files/revision\\_of\\_the\\_directive\\_on\\_deployment\\_of\\_the\\_alternative\\_fuels\\_infrastructure\\_with\\_an\\_nex\\_0.pdf](https://ec.europa.eu/info/sites/default/files/revision_of_the_directive_on_deployment_of_the_alternative_fuels_infrastructure_with_an_nex_0.pdf)

<sup>37</sup> See number of core ports in EAFO list of ports with LNG bunkering facility for LNG fueled vessels. (2021, March). *eafo.eu*. Retrieved November 3, 2021, from <https://www.eafo.eu/shipping-transport/port-infrastructure/lng/bunkering-for-ships>

<sup>38</sup> Urgewald. (2021). *Taking the next step. Why insurers should not support new gas infrastructure, starting with LNG*. Retrieved from [https://urgewald.org/sites/default/files/media-files/urgewald\\_LNG\\_report.pdf](https://urgewald.org/sites/default/files/media-files/urgewald_LNG_report.pdf)

<sup>39</sup> Europe Drops Another Project to Buy U.S. LNG in Green Push. (2021, January 14). *bloomberg.com*. Retrieved November 3, 2021, from <https://www.bloomberg.com/news/articles/2021-01-14/europe-drops-another-project-to-buy-u-s-lng-in-green-push>; Uniper plans green hydrogen hub instead of LNG terminal at German North Sea port. (2021, April 14). *rechargenews.com*. Retrieved November 3, 2021, from <https://www.rechargenews.com/energy-transition/uniper-plans-green-hydrogen-hub-instead-of-lng-terminal-at-german-north-sea-port/2-1-995697>; Fluxys, Novatek cancel mid-scale LNG project in Germany due to market conditions. (2021, October 7). S&P Global Platts.com. Retrieved November 3, 2021, from <https://www.spglobal.com/platts/en/market-insights/latest-news/lng/100721-fluxys-novatek-cancel-mid-scale-lng-project-in-germany-du-e-to-market-conditions>

<sup>40</sup> Transport&Environment. (2021). *Decarbonising European Shipping*. Retrieved from [https://www.transportenvironment.org/wp-content/uploads/2021/07/202104\\_Shipping\\_Technological\\_Roadmap\\_to\\_Decarbonization.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/202104_Shipping_Technological_Roadmap_to_Decarbonization.pdf)

direct use of green hydrogen or green ammonia, and thus would likely leave the industry at the mercy of fossil LNG. In addition, hydrogen and ammonia have different chemical properties than LNG, making any retrofit extremely challenging from both technical and economical perspectives.<sup>41</sup>

**For all of the reasons above, T&E strongly recommends discontinuing the LNG mandate on ports in the AFIR review.** This is essential in order to avoid stranded assets of LNG infrastructure, and put a hold on public money diverted to fossil infrastructure instead of financing much needed green hydrogen and ammonia refuelling points.

### 5.3 Hydrogen refuelling infrastructure for shipping

While AFIR sets a LNG mandate on EU ports, it fails to set any binding or even optional targets for the deployment of green e-fuels infrastructure, namely hydrogen and ammonia refuelling points. This is despite the world's leading shipyards in China and South Korea having committed to deliver ammonia powered ships at sea by 2025.<sup>42</sup> Considering fleet renewal rates, e-fuels could represent between 5 and 7% of EU-related shipping demand by 2030, if the right incentives in FuelEU Maritime and AFIR are in place.<sup>43</sup> Thus, it is crucial to roll up the infrastructure in this decade.

It is also a matter of EU industry leadership. Although the shipbuilding industry is now largely located in Asia, with the exception of cruise ships, Europe can still lead the way to a maritime hydrogen economy if it invests rapidly in e-fuels domestic production and distribution to ports. Already today, some European ports and shipping companies are planning together such investments. For example, the port of Antwerp is already equipped with a hydrogen refuelling station that supplies local green hydrogen to ships; and in Norway, a large green ammonia bunkering terminal is to be built.<sup>44</sup> The role of EU policy-makers should then be to encourage these early movers and support deployment of zero-emission vessels from 2025 already, by setting appropriate targets to deploy e-fuels infrastructure.

---

<sup>41</sup> The first conversion of a fuel oil ship to a LNG ship was completed in 2021; however the cost was so high (over 30 billion dollars) that the company has resigned from further exploring this option. No retrofit of a LNG ship to an ammonia ship exists yet, but the industry estimates costs would be in the same range.

Thomsen, J. (2021, October 1). Hapag-Lloyd scraps further LNG retrofitting of vessels: More expensive than expected. *ShippingWatch.com*. Retrieved November 3, 2021, from <https://shippingwatch.com/carriers/Container/article13330724.ece> See also: DNV (2021) *Maritime Forecast to 2050, Energy Transition Outlook 2021*.

<sup>42</sup> Green technology development alternative fuel. (2021, February 21). *cdn.imo.org*. Retrieved November 3, 2021, from [https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Symposium%202021/Presentations/First%20day%20-%200Blocks%201%20and%202/Symposium%20presentations%20-%20First%20Day/Block%202.1%20-%20Peng%20Guisheng\\_Green%20Technology%20Development-Ammonia%20Fuel.pdf](https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Symposium%202021/Presentations/First%20day%20-%200Blocks%201%20and%202/Symposium%20presentations%20-%20First%20Day/Block%202.1%20-%20Peng%20Guisheng_Green%20Technology%20Development-Ammonia%20Fuel.pdf); Daewoo wins approval for ammonia-fired ship from Lloyd's Register. (2020, October 6). *koreaherald.com*. Retrieved November 3, 2021, from <http://www.koreaherald.com/view.php?ud=20201006000301> ;

<sup>43</sup> Transport&Environment. (2021). *Decarbonising European Shipping*. Retrieved from [https://www.transportenvironment.org/wp-content/uploads/2021/07/202104\\_Shipping\\_Technological\\_Roadmap\\_to\\_Decarbonization.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/202104_Shipping_Technological_Roadmap_to_Decarbonization.pdf)

<sup>44</sup> Word First: Hydrogen distribution station in the port of Antwerp functionally operational. (2021, April 6). *fuelcellworks.com*. Retrieved November 3, 2021, from <https://fuelcellworks.com/news/world-first-hydrogen-distribution-station-in-the-port-of-antwerp-functionally-operational/> ; World's First Green Ammonia Terminal Receives Large Governmental Grant. (2021, September 2). *yara.com*. Retrieved November 3, 2021, from <https://www.yara.com/news-and-media/news/archive/2021/ammonia-bunkering-technology-company-azane-fuel-solutions-and-project-partners-receives-public-funding-for-worlds-first-green-ammonia-bunkering-terminal/>



## **Further information**

Fabian Sperka  
Vehicles policy manager  
Transport & Environment  
fabian.sperka@transportenvironment.org  
Mobile: +32 486 17 10 85

### **Shipping aspects:**

Delphine Gozillon  
Sustainable Shipping Officer  
Transport & Environment  
delphine.gozillon@transportenvironment.org  
Mobile: +32 478 10 00 88