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Item 6 (b) of the provisional agenda

**Proposals for amendments to Annexes A and B of ADR:
miscellaneous proposals**

Use of Liquefied Natural Gas (LNG), Compressed Natural Gas (CNG) and Liquefied Petroleum Gas (LPG) as fuel for vehicles carrying dangerous goods

Transmitted by the Government of Germany¹

¹ In accordance with the programme of work of the Inland Transport Committee for 2014-2015 (ECE/TRANS/240, para. 100, ECE/TRANS/2014/23, cluster 9, para.9.1).

Summary

Executive summary:	Germany welcomes new technology and as a matter of course the use of LNG, CNG and LPG as fuel for vehicles carrying dangerous goods. Germany therefore proposes to revise and harmonize the exemption provisions for the use of LNG, CNG and LPG as fuel for vehicles carrying dangerous goods – in the spirit of the applicable exemption arrangement for liquid fuels in 1.1.3.3 (a) of ADR. By adapting the exemption arrangement in connection with the carriage of gases, the reference to the ECE Regulations in section 9.2.4 could be dispensed with.
Action to be taken:	Discussion, revision/amendment of the provisions concerning the use of LNG, CNG and LPG as fuels for dangerous goods vehicles in section 9.2.X and sub-sections 1.1.3.2, 9.2.4.3 and 9.2.4.4 of ADR in the 2017 version.
Reference documents:	ECE/TRANS/WP.15/224, paragraphs 31 to 35, Annex II ECE/TRANS/WP.15/2014/2 and related informal documents, ECE/TRANS/WP.15/2015/6, informal documents INF.3 (Sweden), INF.4 (NGV Global), INF.12 (NGV Global), INF.15 (AEGPL) and INF.16 (AEGPL) of the ninety-eighth session; ECE/TRANS/WP.15/224; Annex II;

Introduction

1. At its ninety-sixth session in May 2014, the Working Party adopted some amendments to facilitate the use of LNG as fuel for FL and OX vehicles. These provisions will come into force on 1 January 2017 and are reproduced in Annex II of the report ECE/TRANS/WP.15/224.
2. The amendment of ADR to include provisions for vehicles powered by gaseous fuels has prompted discussions for which an informal working group by correspondence was invited to provide further justification on a formal proposal regarding the use of LPG and CNG at the next session of the Working Party in November 2015.
3. Germany was one of the countries that raised concerns about the adequacy of ECE regulation 110 and the prevention of fire risks.
4. Considering the discussion in the recent session of the Working Party in May and concurrent with the philosophy of creating a harmonized and consistent regulatory approach to gaseous and liquid fuels for heavy goods vehicles carrying dangerous goods, the requirement mentioned below will provide sufficient safety provisions to justify the use of LNG, CNG and LPG. Germany proposes to amend the wording in ADR 2017 accordingly.

I. General position

5. Current studies assume that goods and passenger transport will continue to grow. Globally, goods and passenger transport is expected to nearly double between 2000 and

2020 [ITF 2011]². The majority of motorized transport is based almost entirely on petroleum fuels.

6. Thus, the diversification of the mix of energy sources in the transport sector is an important component in ensuring energy security in the future. Here, CNG, LNG and LPG as fossil alternatives are available in the short and medium term as building blocks for a diversification of the fuel basis petrol and diesel.

7. But the German delegation is of the opinion that there are additional aspects to be taken into account if special vehicles for the carriage of dangerous goods are to be allowed to use LNG, CNG and LPG as fuel. This is not part of the mandate of WP.29 but of WP.15.

8. There is no doubt that WP.29 with its regulation ECE 110 took a sensible decision for the use of LNG as fuel for passenger cars and normal freight vehicles.

II. Proposals

9. The following proposed amendments concerning the use of LNG, CNG and LPG as fuel for vehicles carrying dangerous goods are based on the new text of ADR 2017 as agreed in the May 2014 meeting (ninety-sixth session) set out in ECE/TRANS/WP.15/224 also taking into account the comments of the delegations made at the ninety-eighth session (see ECE/TRANS/WP.15/228).

10. The exemption provision for gases as fuels for the propulsion of the vehicles in 1.1.3.2 (a) of ADR does not contain upper capacity limits as is the case in 1.1.3.3 (a) of ADR for liquid fuels. This objection had already been raised by one delegation at the ninety-eighth session of the Working Party.

11. The exemption in 1.1.3.2 (a) of ADR:

“1.1.3.2 Exemptions related to the carriage of gases

The provisions laid down in ADR do not apply to the carriage of:

(a) Gases contained in the tanks of a vehicle, performing a transport operation and destined for its propulsion or for the operation of any of its equipment [used or intended for use during carriage] (e.g. refrigerating equipment);”

is already applicable for all kinds of motor vehicles, passenger cars, buses, commercial vehicles, heavy goods vehicles. However, the use cases that have become evident in the course of the discussions within the Working Party and are becoming increasingly important require the exemption to be clarified.

12. Deletions are formatted as strikethrough and new text as underlined.

Proposal 1

1.1.3.2 (a)

13. Subsection 1.1.3.2 (a) could be amended as follows (new text underlined):

“1.1.3.2 Exemptions related to the carriage of gases

The provisions laid down in ADR do not apply to the carriage of:

² International Transport Forum 2011 Transport Outlook – Meeting the Needs of 9 Billion People. 2011.

- (a) Gases contained in the tanks of a vehicle, performing a transport operation and destined for its propulsion or for the operation of any of its equipment [used or intended for use during carriage] (e.g. refrigerating equipment).

The fuel may be carried in fixed fuel tanks, directly connected to the vehicle's engine and/or auxiliary equipment or transportable pressure vessels, which comply with the pertinent legal provisions."

The total capacity of the fixed tanks shall not exceed [xx] litres per transport unit and the capacity of a tank fitted to a trailer shall not exceed [xx] litres. These restrictions shall not apply to vehicles operated by the emergency services."

Proposal 2

9.2.4.3 (a), (b) and (c)

14. Subsection 9.2.4.3 (a) of ADR 2017 (see ECE/TRANS/WP.15/224; Annex II) could be amended to read as follows (new text underlined):

"9.2.4.3 (a) In the event of any leakage in the normal operating conditions of the vehicle, the liquid or gaseous fuel shall not come into contact with the load or with hot parts of the vehicle ~~or of the load~~;"

15. Subsection 9.2.4.3 (b) of ADR 2017 could be amended to read as follows (new text underlined):

"9.2.4.3 b) ~~Fuel tanks for liquid fuels shall comply with ECE Regulation No. 34⁶.~~ Fuel tanks containing petrol shall be equipped with an effective flame trap at the filler opening or with a closure enabling the opening to be kept hermetically sealed. Any liquid or liquefied fuel shall drain to the ground."

⁶ ~~*ECE Regulation No. 34 (Uniform provisions concerning the approval of vehicles with regard to the prevention of fire risks)."*~~

16. Renumber existing footnotes accordingly.

17. The following new sub-section 9.2.4.3 (c) could be inserted into ADR (new text underlined):

"9.2.4.3 (c) The discharge opening(s) of pressure relief devices and/or pressure relief valves of fuel tanks containing gaseous fuels shall be directed away from air intakes, fuel tanks, the load or hot parts of the vehicle. Pipes shall not be fixed on the shell. "

Proposal 3

9.2.4.4

18. Subsection 9.2.4.4 of ADR 2017 could be amended to read as follows (new text underlined, deleted text as strikethrough):

"9.2.4.4 Engine

The engine propelling the vehicle shall be so equipped and situated to avoid any danger to the load through heating or ignition. ~~The use of liquefied natural gas (LNG) as fuel shall be permitted only if the specific components for LNG are approved according ECE Regulation No. 1107 and their~~

~~installation on the vehicle complies with the technical requirements of ECE Regulation No.110⁷.~~

In the case of EX/II and EX/III vehicles the engine shall be of compression-ignition construction using only liquid fuels with a flashpoint above 55 °C. Gases including liquefied gases shall not be used."

- ⁷ ~~ECE Regulation No. 110 (Uniform provisions concerning the approval of:~~
- ~~I. Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system;~~
 - ~~II. Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system.)".~~

19. Renumber existing footnotes accordingly.

Proposal 4

9.2.X

20. The following new section 9.2.X could be inserted into ADR:

"9.2.X Prevention of other risks caused by fuels

9.2.X.1 An engine propelling the vehicle by means of liquefied natural gas shall be so equipped and situated to avoid any danger to the load due to the gas being refrigerated."

III. Justification for proposals

Proposal 1

1.1.3.2 (a)

21. The amendment to 1.1.3.2 (a) first sentence in square brackets is taken by analogy from 1.1.3.3 (a) of ADR for the carriage of gases. If gases for equipment e.g. in camping vehicles are carried in portable cylinders, this type of carriage might be covered by the exemption in 1.1.3.1 (a) of ADR.

22. The amendment to 1.1.3.2 (a) second sentence is taken by analogy from 1.1.3.3 (a) second sentence of ADR for the carriage of gases. The wording "which comply with the pertinent legal provisions" makes the reference to the entire ECE regulations in section 9.2.4 of ADR superfluous. Only additional, dangerous goods specific provisions going beyond the ECE regulations need to be added to that section. Gas cylinders need to comply with the relevant requirements laid down, among other things, in dangerous goods legislation.

23. The amendment to 1.1.3.2 (a) third sentence should be examined, the proposal of a quantity limitation for gases, i.e. the maximum filling quantities in accordance with the current state of the art for LNG, CNG and LPG tanks used on commercial vehicles, should be entered in the placeholders in square brackets in 1.1.3.2 (a) third sentence.

In any case, the Working Party should discuss the introduction of an exemption for the carriage of gaseous fuels by analogy to 1.1.3.3 (a) third sentence of ADR for the exemptions related to the carriage of liquid fuels.

24. The question of a quantity limitation for gases should be considered in the light of existing relevant scientific opinions in the field of automotive engineering. These opinions should, if possible, include an assessment of additional factors related to the new gaseous phase and its risks with regard to the dangerous good carried.

Proposal 2

9.2.4.3 (a), (b) and (c)

25. This amendment to 9.2.4.3 (a) clarifies two issues:

- Both liquid and gaseous fuels may be used. This corresponds to the two exemptions in 1.1.3.3 (a) and 1.1.3.2 (a) of ADR.
- This suggestion had already been made during the session of the Working Party in May 2015 by a delegation and clarifies that the fuel must not come into contact with the load as a whole or with hot parts of the vehicle.

26. The requirement in 9.2.4.3 (b) that the fuel tank has to comply with ECE Regulation 34 can be deleted, as this requirement in principle follows from the exemption provision in 1.1.3.3 (a) for liquid fuels: "...*which comply with the pertinent legal provisions*". With the proposed recast of 1.1.3.2 (a), this requirement applies equally to liquid and gaseous fuels. General automotive engineering regulations that apply equally to all vehicles are not part of the ADR.

27. The requirement that liquid fuels should drain to the ground in ADR 2015 and earlier has not been identified as being fundamentally wrong. However, it must be clarified that this requirement only makes sense if, on the one hand, it applies to liquid fuels – or liquefied fuels such as LPG – while, on the other hand, not excluding gaseous fuels.

28. The new paragraph 9.2.4.3 (c) corresponds to the provision for liquid or liquefied fuels. It is intended to extend the current provisions for liquid or liquefied fuels on keeping the fuel away from the vehicle and the load, by analogy to include gases and also focus on the direction of the vented gases. The pressure-relief device must not result in possible damage to the tank.

Proposal 3

9.2.4.4

29. The requirement that the fuel tank has to comply with ECE Regulation 67-01 or 110 can be deleted, as it follows in general from the exemption provision in 1.1.3.3 (a) for liquid fuels and analogously from the proposed recast of the exemption provision in 1.1.3.2 (a) for gases. General automotive engineering regulations that apply equally to all vehicles are not part of the ADR.

30. The last sentence in sub-section 9.2.4.4 also takes into account the Swedish concerns discussed in INF.3 in the WP.15 session in May.

Proposal 4

9.2.X

31. This amendment addresses the fact that the fire hazard emanating from LNG as a fuel is smaller than the hazards resulting from its cryogenic state with temperatures of as low as -162 °C.

III. General justification

Safety:	See above. Harmonized safety requirements with respect to gaseous and liquid fuels for heavy goods vehicles carrying dangerous goods will provide sufficient safety provisions to justify the use of LNG, CNG and LPG.
Feasibility:	Carriers and heavy goods vehicles manufacturers will have the option to have vehicles carrying dangerous goods that are propelled by gaseous and/or liquid fuels.
Enforceability:	No specific