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CLIMATE CHANGE IN AGRICULTURE

Project Nr. 586273-EPP-1-2017-1-EL-EPPKA2-CBHE-JP

Cost-effective ammonia emissions reducing measures in agriculture

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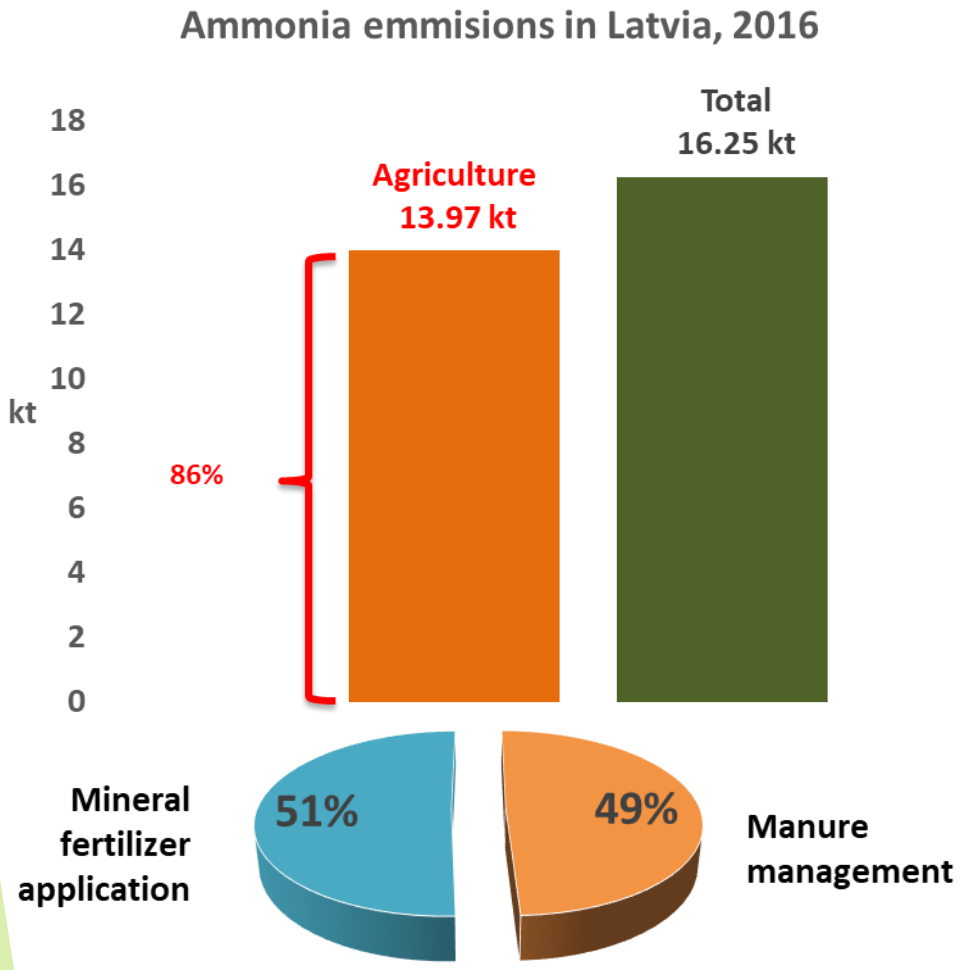
Topicality



86% of ammonia emissions come from agriculture, therefore measures for ammonia emissions reducing must be targeted to the agricultural sector.

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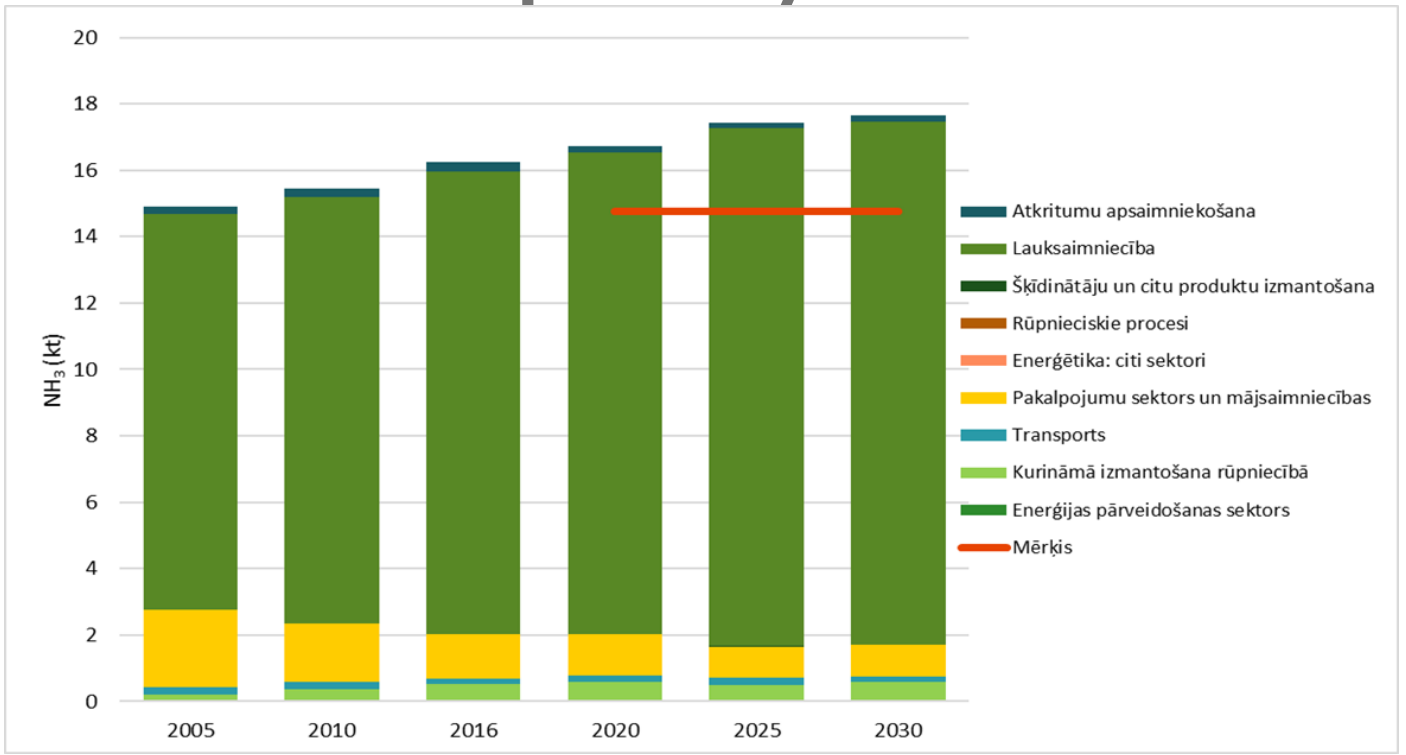

- Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe sets emission targets for EU Member States for ammonia emissions.
- The following emission projections exceed the national targets for the reduction of ammonia emissions.

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Potential ammonia emission reducing measures in Latvia

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Selected and analysed ammonia emission reducing measures in Latvia

Aim	Measure
Effective nitrogen fertiliser application	Precision mineral fertilizer application
	Fertilization planning and practical implementation
	Direct application of liquid manure into soil Option 1 – piplines Option 2 – injector Option 3 – band spreader
	Reduced time for poultry manure incorporation into soil (4 h)
	Reduced time for slurry incorporation into soil (4 h)
	Reduced time for litter manure incorporation into soil (12 h)
	Nitrogen fixation by introducing leguminous plant into crop rotation
Effective manure management outside animal housing	Covering of liquid manure storage Option 1 – expanded clay Option 2 – film Option 3 – tent Option 4 – concrete
	Construction of new cylindrical manure storage facilities
	Promotion of biogas production
Development of organic farming	Promotion of organic dairy farming

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Assessment of costs-effectiveness and ammonia emission reduction potential of selected measures

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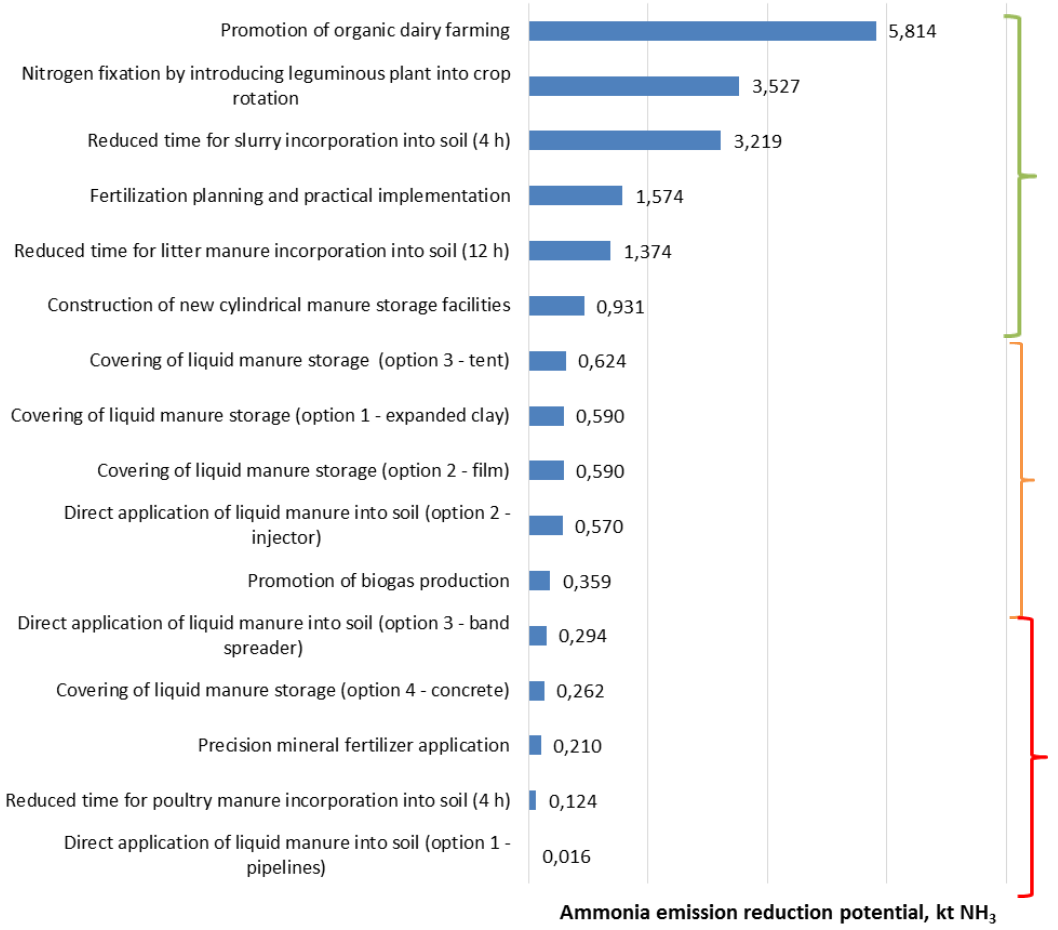
Ranking of measures according to ammonia emission reduction potential (potential calculated for 2021-2030), kt NH_3



Measures with **high reduction potential** (77% of the total reduction potential)

Measures with **medium reduction potential** (total 18% of total reduction potential)

Measures with **low reduction potential** (total 5% of total reduction potential)

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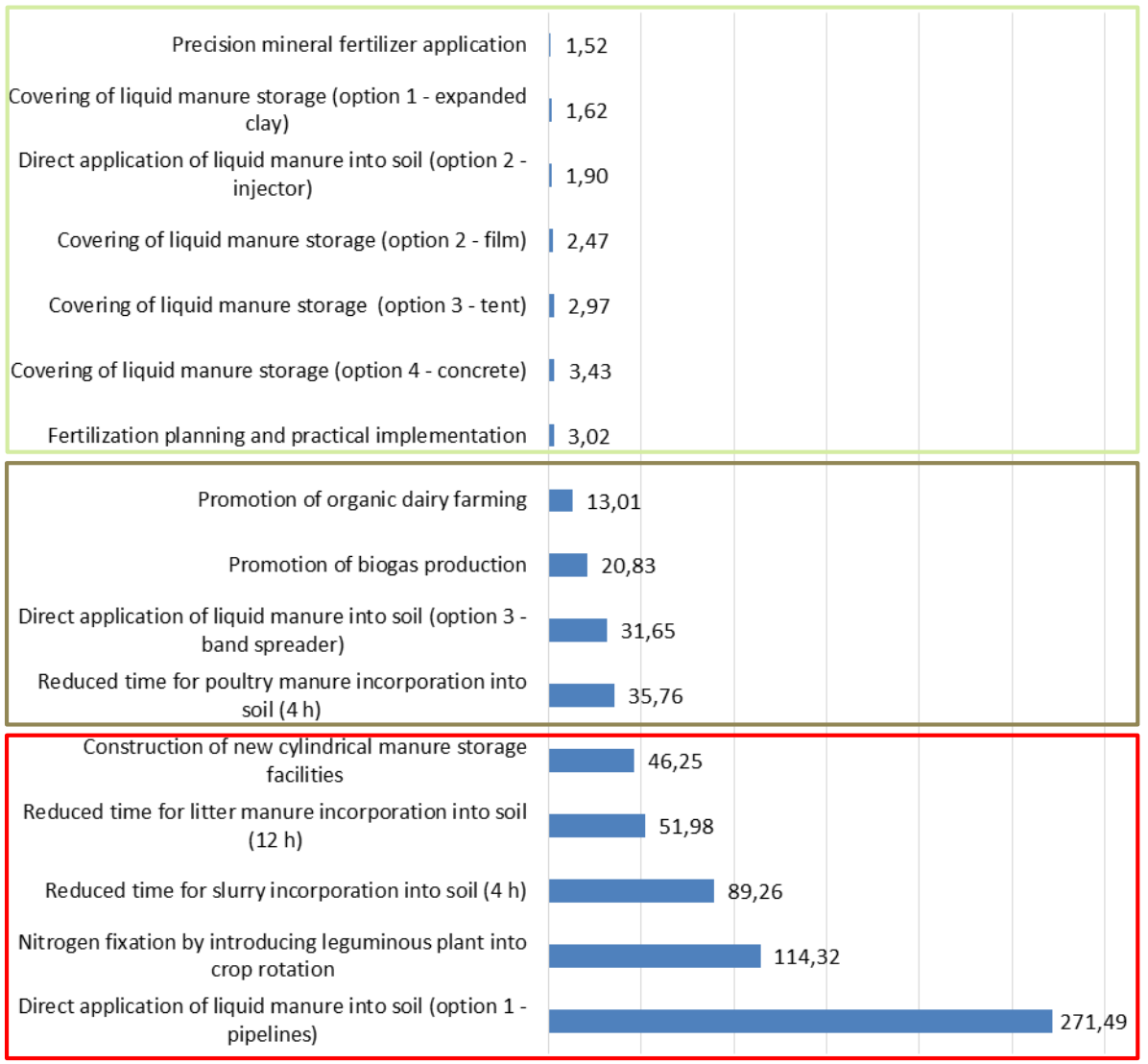
Ranking of measures according to the cost of reducing ammonia emissions, EUR kg^{-1} NH_3



Cheap measures

Moderately expensive measures

Very expensive measures

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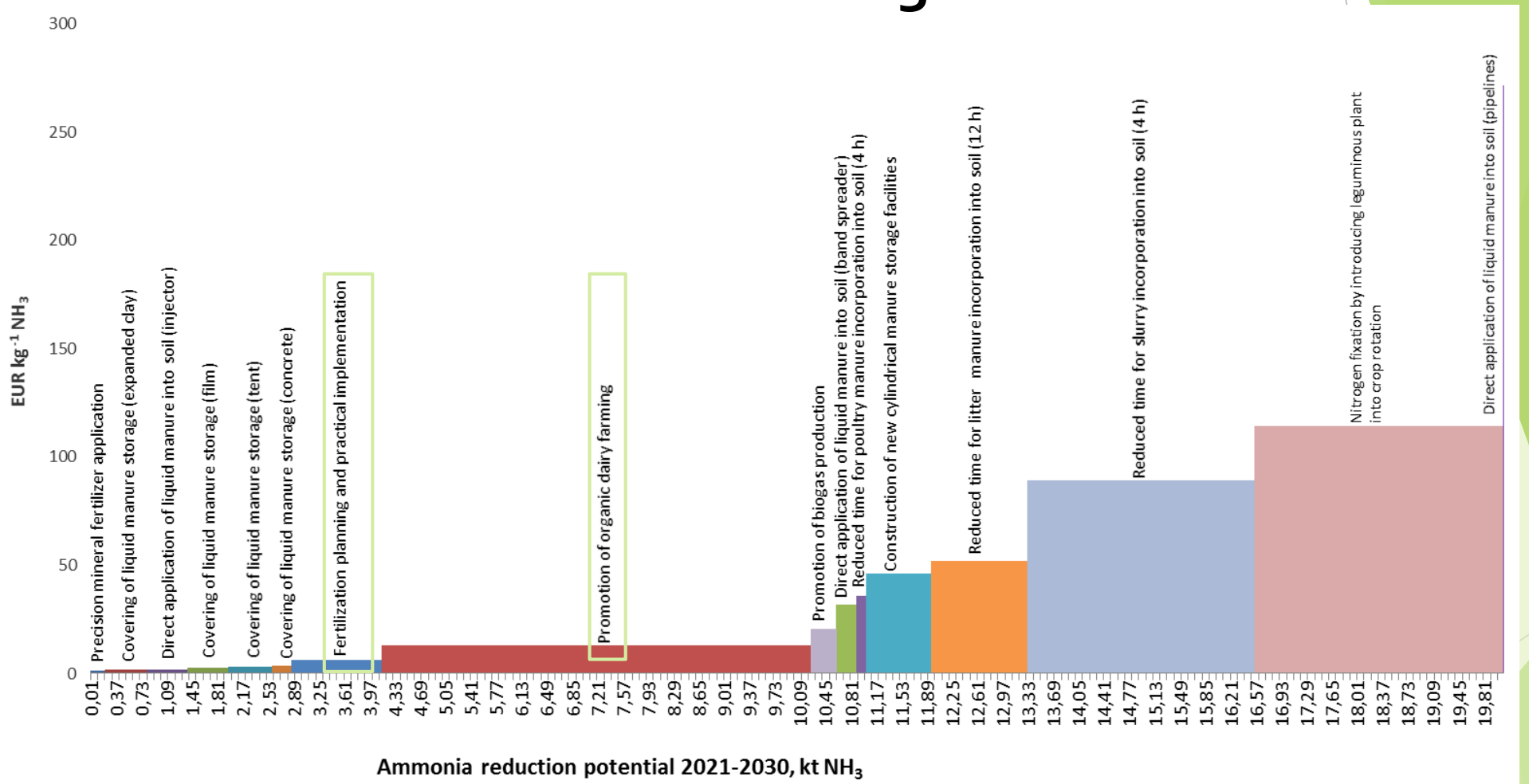
Marginal Abatement Cost Curve (MACC) for ammonia emissions reducing measures



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Cost effective measures with high NH_3 emissions reduction potential. These measures are considered to be the most effective both economically and environmentally and should be prioritized for more active implementation in practice.

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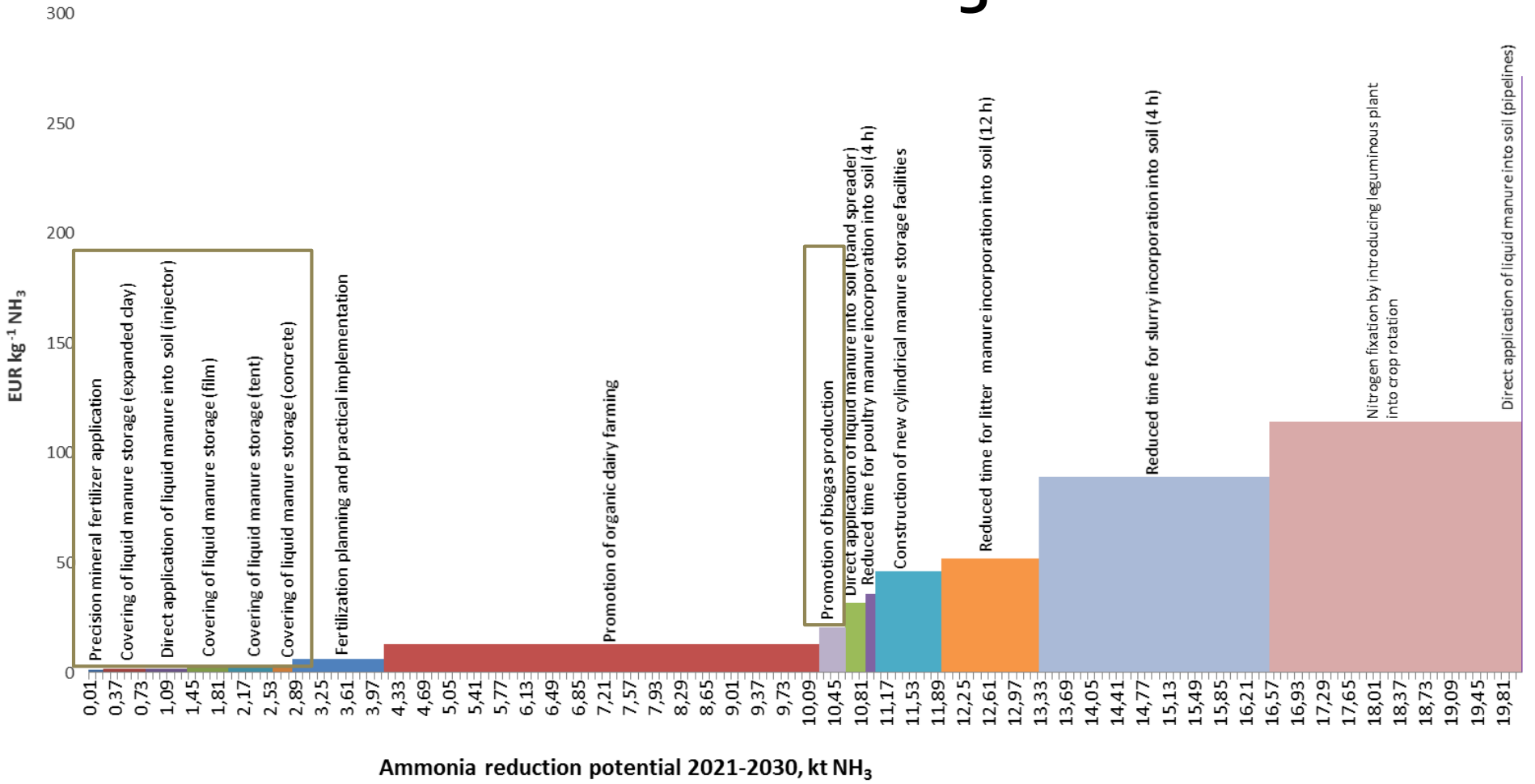
Marginal Abatement Cost Curve (MACC) for ammonia emissions reducing measures



Cost effective measures but with low NH_3 emissions reduction potential. These measures are considered effective, but with little effect on reducing NH_3 emissions. In order to maximize the impact, the scope for increasing the number of target farms, animals, the target area should be reviewed.

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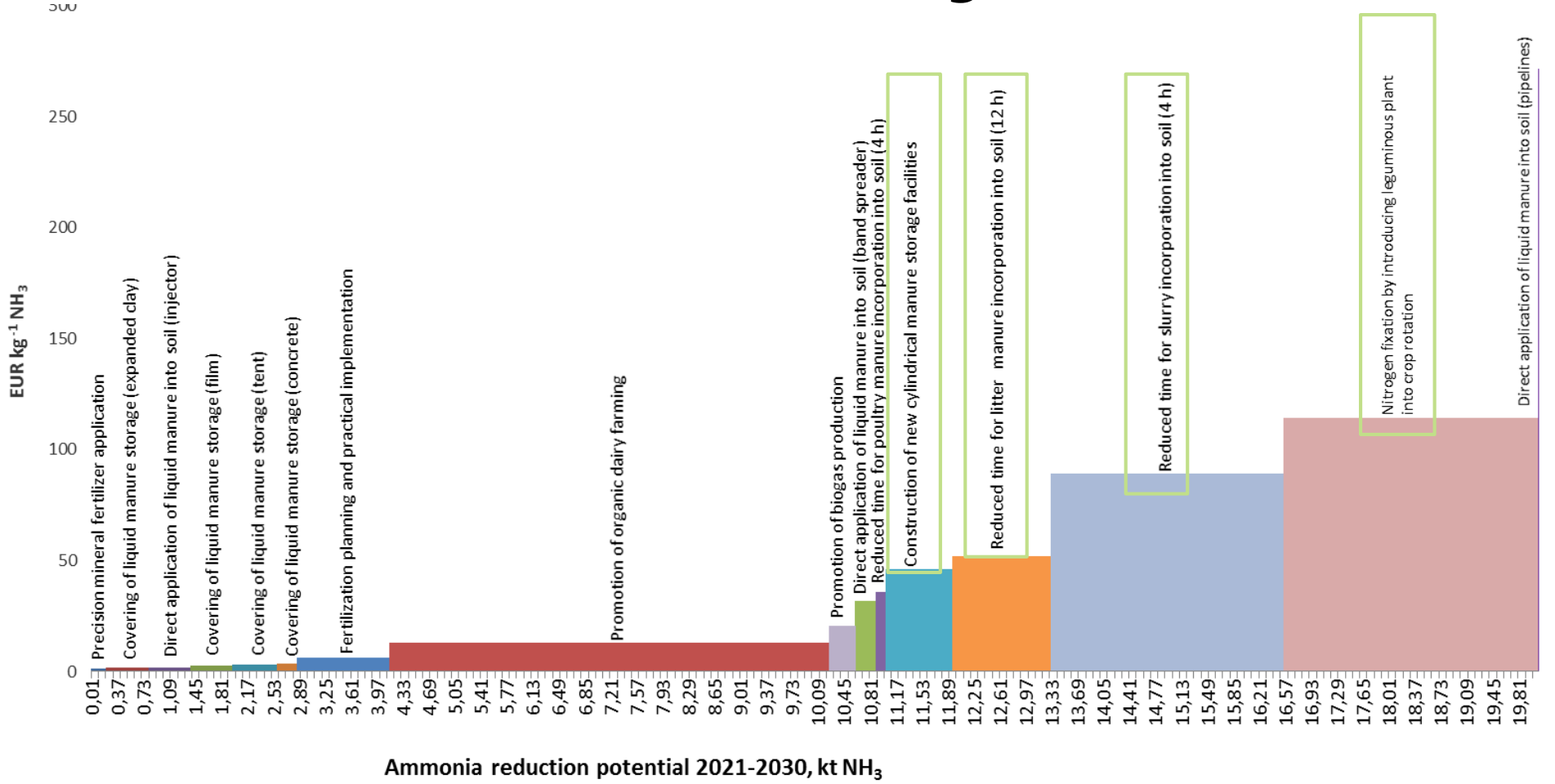
Marginal Abatement Cost Curve (MACC) for ammonia emissions reducing measures



Measures that are cost-inefficient but with high NH_3 reduction potential. These measures are considered to be economically inefficient but very effective from the environmental point of view as they have a significant impact on reducing NH_3 emissions. Therefore, financial support to farms is needed to facilitate the practical

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Conclusions

- Latvian farmers as a whole are ready to move more actively towards climate and environmentally friendly agriculture by introducing various measures on their farms. However, there are currently many technological, environmental, economic and social constraints that hinder the practical implementation of measures on farms.
- Detailed evaluation of ammonia emission reduction measures - cost-effectiveness calculations, calculations of emission reduction potential, allow the evaluated measures to be grouped according to their priority:
  - Cost effective measures with high NH_3 emissions reduction potential;
  - Cost effective measures but with low NH_3 emissions reduction potential;
  - Measures that are cost-inefficient but with high NH_3 reduction potential.

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