

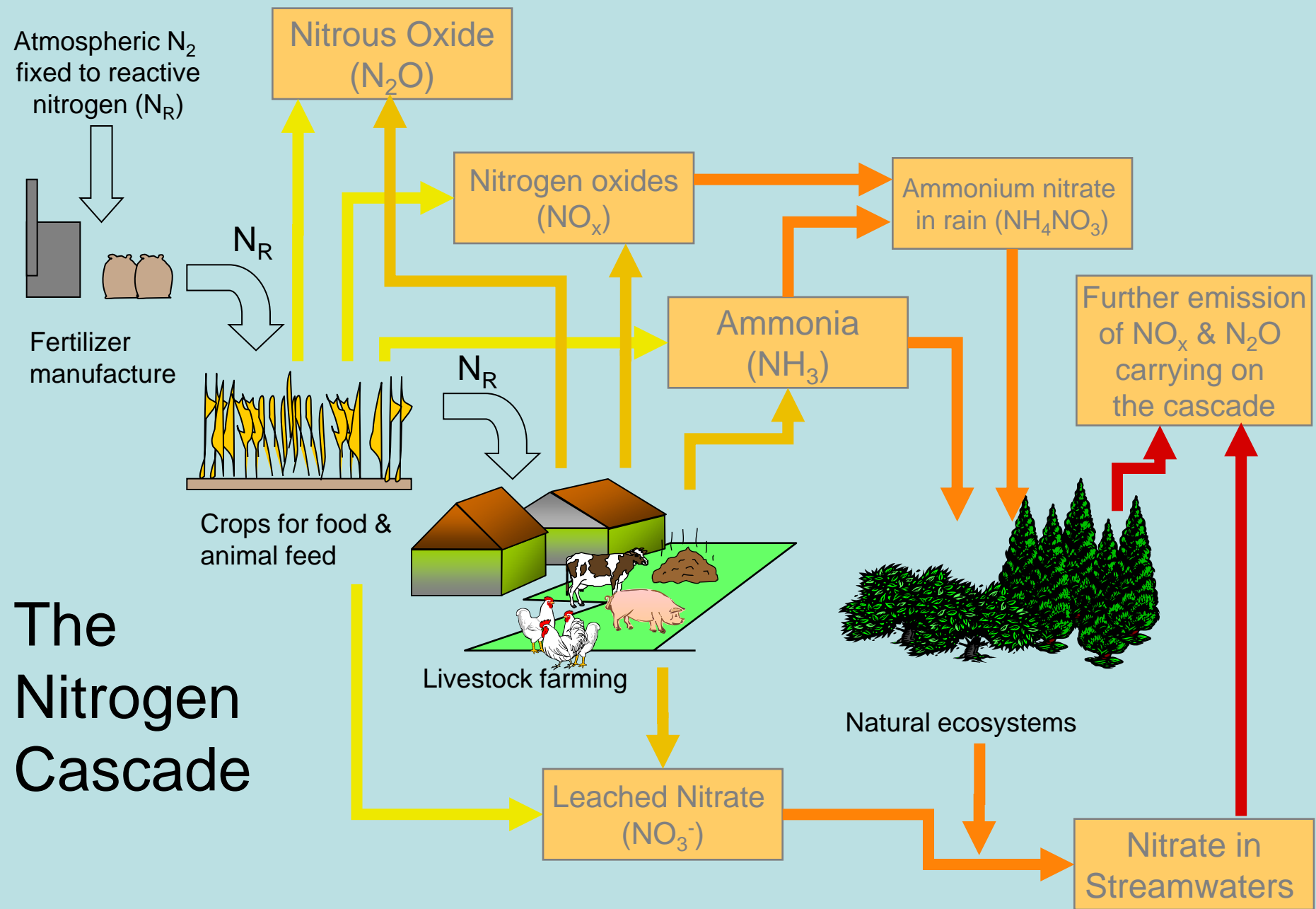


Task Force on Reactive Nitrogen (TFRN)

Update and
Proposals for revision of Annex IX
of the Gothenburg Protocol

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(co-chairs TFRN)

WGSR-46, 14 April 2010



TFRN is developing the integrated perspective needed to manage the interactions

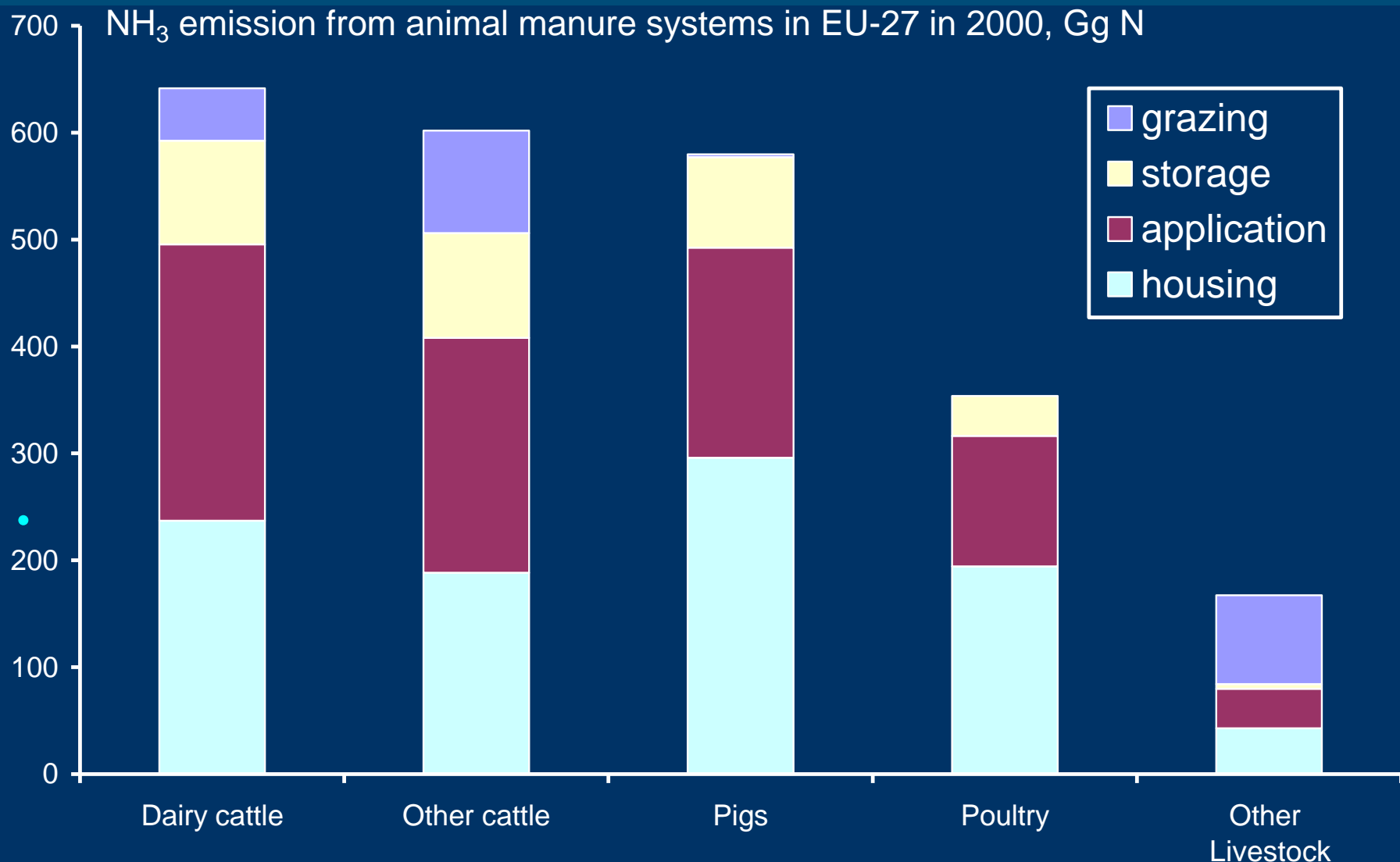
TFRN Elements

- **EP Mitigating Agricultural Nitrogen** (EPMAN) – Annex IX and Guidance Doc.
- **EP Nitrogen Budgets** – developing framework and future guidance document.
- **EP Nitrogen & Food** – links between diet choice, N and environment. Scenarios.
- **Nitrogen & Climate** – Special Report for WGSR-47 and EB during 2010 – highlighting the co-benefits of an integrated approach.

Current Annex IX of Gothenburg Protocol

- A. Advisory code of good agricultural practice
- B. Urea and ammonium carbonate fertilizers:
ban on ammonium carbonate fertilizers;
no quantitative targets for urea fertilizers
- C. Manure application: soft target >30% reduction
from reference method in the Guidance Doc.
- D. Manure storage: large pig & poultry farms: firm
target >40% reduction for new stores
- E. Animal housing: large pig & poultry farms: firm
target > 20% reduction for new housing

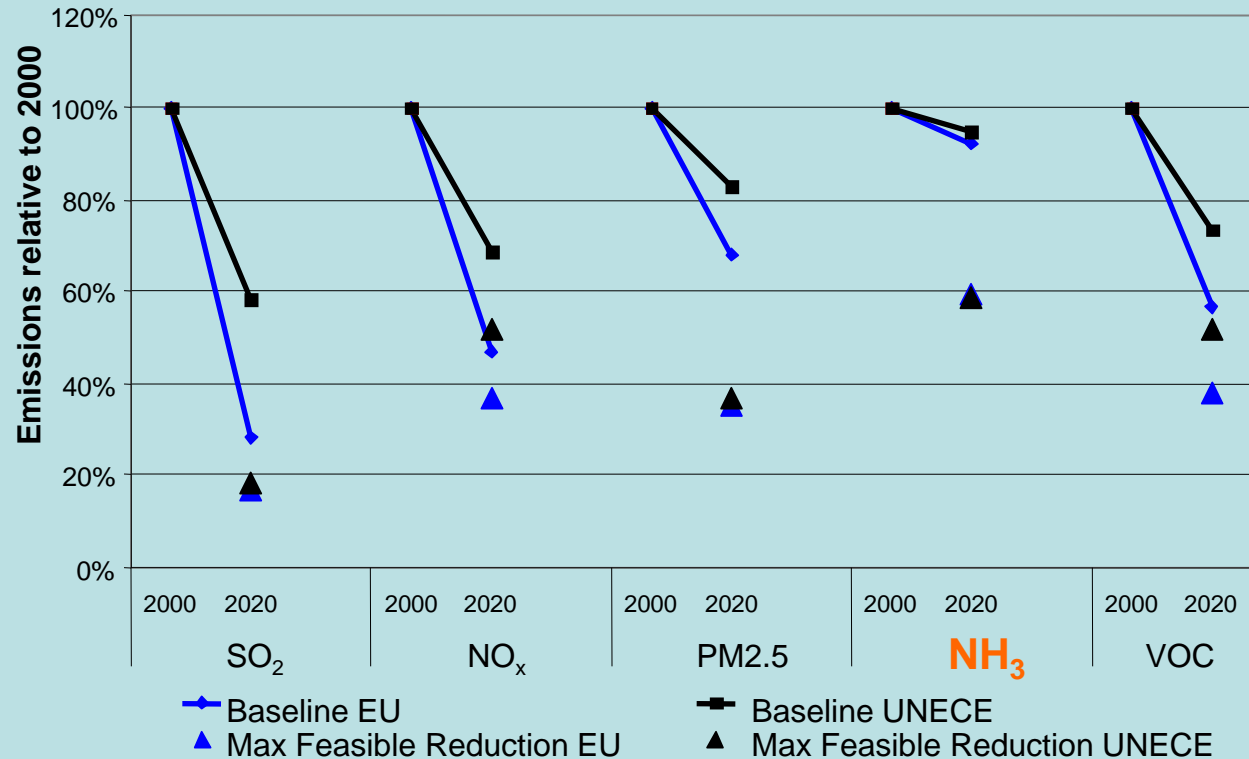
What are the main sources of NH₃ emission?



Plus 10% from fertilizers + 10% from other sources

It is clear that more can be done...

- Only a few countries have so far implemented existing technical capability
- A long-term perspective encouraging gradual change may be needed



Amman, IIASA

TFRN documents to WGSR-46

Provided for this meeting:

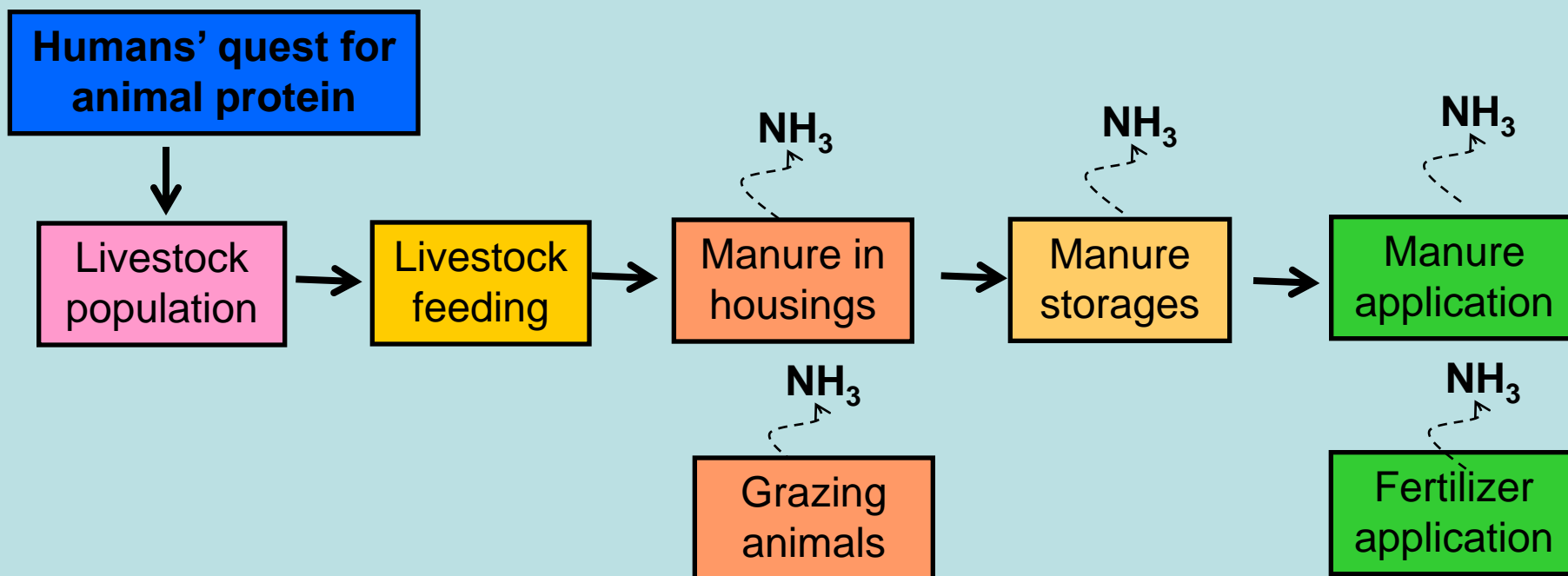
- **Annex IX options** (ECE/EB.AIR/WG.5/2010/5)
- **Report of TFRN-3**, including explanation of Annex IX options (ECE/EB.AIR/WG.5/2010/4)
 - **Appendix I:** Simple method for farm size thresholds
 - **Appendix II:** Alternative detailed approach for thresholds based on manure nitrogen
- **Informal Note 11:** Factors affecting net costs and benefits of ammonia abatement

Proposals for Updated and **New** measures in Annex IX

- **Nitrogen management, considering the whole N cycle**
- **Livestock feeding strategies**
- Animal housing, **including cattle housing**
- Manure storage, **including those for cattle manure**
- Manure spreading, including those for cattle manure
- Mineral fertilizer use, including urea, **ammonium phosphate and ammonium sulphate**

- Possibility for a “Pick and Mix” approach

Sequence of processes that affect total NH₃ emissions



Measures of proposed/ revised Annex IX

- | | |
|----------------------------------|--|
| 1. Nitrogen management: | affect all sources |
| 2. Livestock feeding strategies; | affect all manure sources |
| 3. Animal housing systems: | affect one source |
| 4. Manure storage systems; | affect one source |
| 5. Manure application | affect one source, but cumulative |
| 6. Fertilizer application: | affect one source |

Ammonia Guidance Document and Category 1, 2, 3 techniques

- The Guidance Document for ammonia lists 3 categories of techniques:
 - Category 1: well proven methods
 - Category 2: sound, but some uncertainties
 - Category 3: problems and not recommended
- Category 2 and 3 methods may be used to meet Annex IX commitments, but suitable verification should be provided by the Party.
- Guidance document being updated. Drafts on TFRN Website: Revised versions after TFRN-4 (11-13 May 2010, Prague)

Three ambition levels

- A. Technically feasible options that reflect a high level of ambition in reducing NH_3 emissions, while remaining cost effective
- B. Technically feasible options that reflect a moderate level of ambition, as well as being cost effective;
- C. Technically feasible options that reflect a modest level of ambition, as well as being cost effective;



Use of thresholds to vary ambition levels of Options A-C

Farm Size Thresholds

- Medium and large farms (future economic development)
- Small farms (few animals per farm and different economics)

Options for scaling farm size (TFRN-3 Appendices I & 2):

- Number of livestock units on the farm
- Amount of N excreted by housed animals on the farm

Other Threshold Options

(e.g., equipment standards for manure spreading)

Decisions needed from WGSR on thresholds approaches

Threshold Indicator	Number of Livestock units on each farm	Total N excretion of housed livestock on each farm
Described	TFRN-3: App I	TFRN-3: App II
Benefits	<ul style="list-style-type: none">• Simple to calculate• Available statistics• Costings easier	<ul style="list-style-type: none">• More accurate and equitable indicator
Disadvantages	<ul style="list-style-type: none">• N excretion technically superior	<ul style="list-style-type: none">• Harder to apply detailed method• Additional resources needed to develop and estimate costings

Specific Proposals

- To use the simpler approach (Appendix I), unless WGSR expresses a preference otherwise
- To investigate supporting thresholds based on equipment standards for manure spreading (e.g. simple exemption for small slurry tankers)

Selecting thresholds

Threshold for cattle farming (~50% agric NH₃)

- 50 livestock units: 13% of farms in EU; 72% of cattle
- 100 livestock units: 6% of farms in EU; 50% of cattle

Threshold for pig farming (~20% agric NH₃)

following EU-IPPC regulations:

- Sows 750
 - Fattener Pigs: 2000
- } Covering ~20% of pigs in EU

Threshold for poultry farming (~15% NH₃)

following EU-IPPC regulations:

- 40,000 broilers /laying hens ~70% of EU poultry in EU

25%
decrease
→ 3% NH₃
reduction

Overall
IPPC
covers
13% agric
NH₃

Specific Proposals

- For cattle farms: use threshold of 50 livestock units, unless certain parties request to use 100 livestock units (e.g. for EECCA countries).
- TFRN consider a second pig threshold for simple basic measures

Nitrogen management & livestock feeding

Good Nitrogen Management

- Nitrogen Use Efficiency (NUE) and Nitrogen Input-Output Balances (NIOB) proposed as indicators for integrated N management at farm level
- A-C Options proposed initially for demonstration farms

Livestock Feeding Strategies

- Protein content of animal feed and emission potential of the excreta as indicators for housed animals
- A-C Options proposed for medium and large farms

Farm-specific targets listed in the Ammonia Guidance Document on the basis of a transparent calculation program. (see TFRN website)



Animal housing & Manure Storage

Animal housing

- Applies to new housing only
- A-C Options have specific achievable targets for cattle, pig, poultry, other.
- For pigs: a specific relaxation to Option A, B, applies to areas with defined warm climate

Manure Storage

- Options A-C given for new slurry stores
- Well-established methods listed in the Guidance Doc.
- Only option C applies for existing stores
- Solid manure: no mandatory options agreed

Slurry spreading: a wide range of low-emission techniques are available



Splash Plate Spreader
- 1950s technology



Trailing Hose



Trailing Shoe



Slot Injector

The car and the exhaust pipe...

Land application of animal manure

- Low-emission spreading methods, such as band spreading and slurry injection have been shown to be cost-effective.
- Proposed to phase out the unabated, surface application of slurry: according to three levels of ambition (A-C).

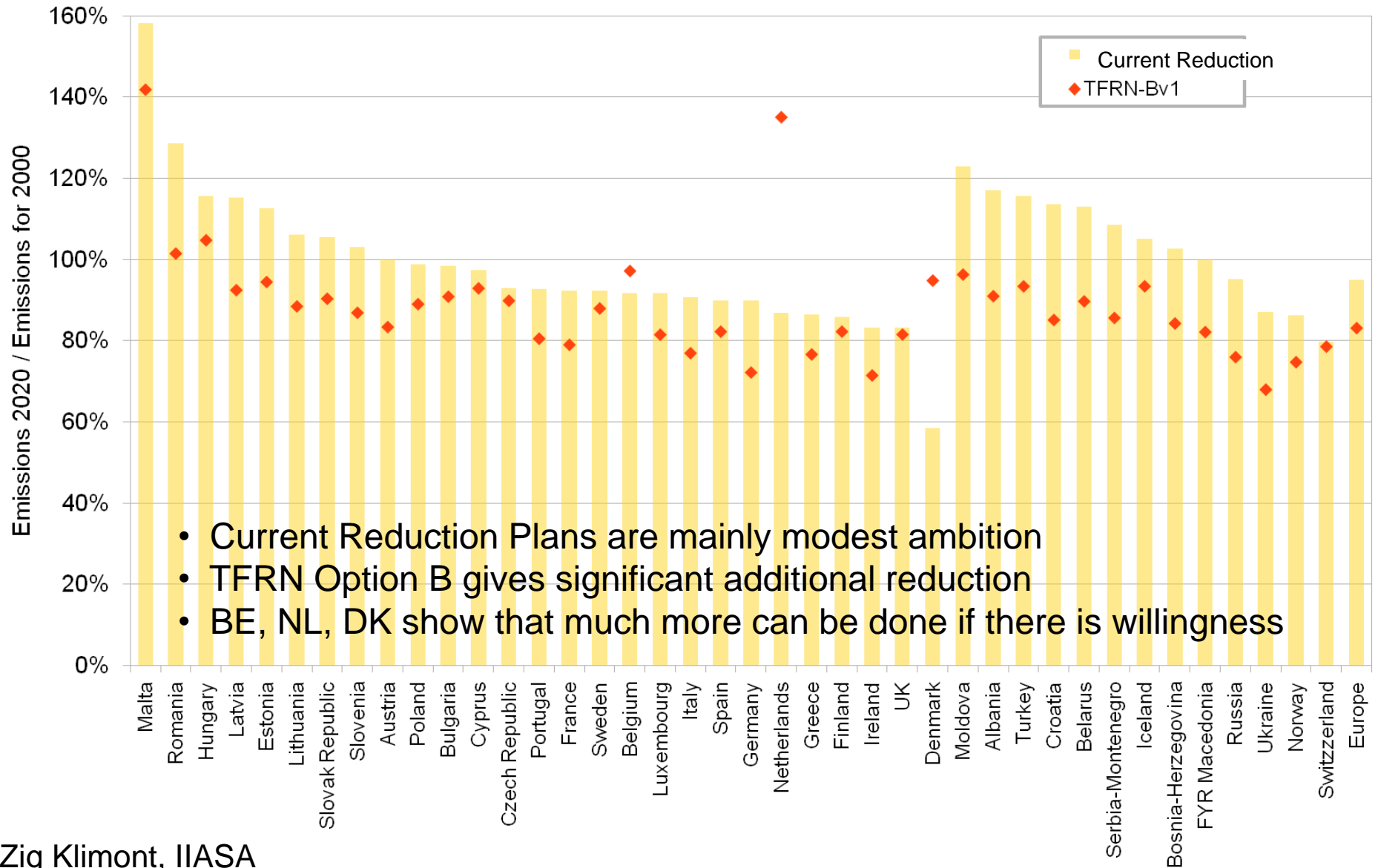
Targets and Options

- Alternative technologies can be included subject to verification by adopting Parties, e.g. “Application Timing Management Systems” (ATMS) and slurry dilution.
- Other exemptions apply for specific soil types, solid manure applied to cropped land, etc.
- Possibility for additional simple exemption for small slurry tankers

Urea and ammonia-based fertilizers

- No prohibition on urea use is proposed because of market interactions and the availability of low-emission methods.
- Quantitative urea targets are proposed for Options A-C that match to available techniques for fertilizer application.
- New targets for ammonium sulphate and ammonium phosphate based fertilizers applied to calcareous soils (subject to confirmation by results of new field tests)

TFRN Option B compared with Current Plans



Concluding Remarks

- Option A has the potential to reduce NH_3 emissions by 30-50%: already by NL and DK.
- **Invitation to TFRN-4**
11-13 May 2010, Prague
Thanks to Czech Ministry of Agriculture
- **Ongoing work**
 - Completing of revised Guidance Document.
 - More detailed calculations, for all options, still have to be made by IIASA.
 - Overview of cost interactions: Informal Doc. 11

Questions to WGSR

1. Does WGSR disagree with the proposed approach for setting farm size thresholds? (e.g. animal numbers rather than N excretion)
2. Are the options A-C suitably ambitious? (e.g. **all** options, even A, are less than MFR)
3. Are different target dates, thresholds or ambition levels requested by EECCA countries?