

NZETS Reporting requirements

Natural Gas



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Agenda

Session One

- Prescribed documents
- Emissions returns format
- Overview of draft regulations
- Example: importing natural gas

Session One cont.

- Example: mining natural gas
- Verification

Session Two

- Opt in
- So, what's next?



Prescribed documents

- Climate Change Response Act 2002
- Climate Change (...) Regulations 2009
- Participant Registration Forms
- Emissions Return Forms
- Standards (incorporated by reference)

Non prescribed documents

- ETS Bulletin 10
- Workshop documents: emissions calculation forms
- Draft guidance materials (BECA)
- Consultant's report



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Emissions Returns Format

Interim

- Based on calculation formulas as set out in regulations
- Reporting templates by activity – excel based
- Signature

Long term

- On line Registry reporting tool



Draft regulations: overview

- Measurement at point of sale
- By fiscal meter and gas chromatography for sales gas
- Use hydrocarbon accounting systems to calculate processing emissions (Question for discussion)
- Additional factor for losses (Question for discussion)



Example: importing natural gas

- Import 3.5m cubic metres of LNG
- Re-Export 2.0m cubic metres
- Storage adjustment $B = D - F$

325,000 GJ injected and 500,000 GJ extracted

= -175,000 GJ

From 3.3.1 of BECA report
(corrected)



Example - imports cont.

$$E = ((A \times CV) - (C \times CV) - B) \times EF$$

imports minus exports minus storage

(A and C divided by 1000 to convert MJ into GJ)

$$= [(3500 \times 51.45) - (2000 \times 51.45) - (-175000)] \times 0.052$$

$$= [180075 - 102900 + 175000] \times 0.052$$

$$= 252175 \times 0.052$$

$$= 13,113 \text{ tCO}_2\text{e}$$



Mining Natural Gas

- Emissions from sales gas measured by gas chromatography at point of sale
- Emissions from processing accounted for in hydrocarbon accounting systems
- Losses



Example: Mining natural gas

$$TE = \sum(ES) + \sum(EU) + \sum(EF) + \sum(V) + L$$

emissions from sales gas, processing and losses

$$- \sum(EE) - \sum(EO)$$

emissions from exports and opt-in gas



Example - mining cont.

$$E = [OF \times (A/B) \times C] + (D \times CEF) + (D \times NEF)$$

oxidation factor x mass fraction of carbon times 3.67 x tonnes of gas + methane and nitrous oxide emissions

$$V = [(A/B) \times C] + (21 \times (F/B) \times C)$$

mass fraction of carbon x tonnes of gas

+ mass fraction of methane x tonnes of gas x methane factor

$$L = NGP \times NGL$$

share of national gas production x total national gas losses



Example - mining cont.

$$E = [OF \times (A/B) \times C] + (D \times CEF) + (D \times NEF)$$

oxidation factor x mass fraction of carbon times 3.67 x tonnes of gas + methane and nitrous oxide emissions

This equation applies to:

mined gas sold (including exports and opt-in)
flared gas & own use gas

based on Beca report 4.3.1



Example - mining cont.

Class of sales gas:

$$\begin{aligned} E &= (0.995 \times 2.56 \times 200,000) + \\ &\quad (9,351 \times 0.027) + (9,351 \times 0.031) \\ &= 509,440 + 542 \\ &= 509,982 \text{ tCO}_2\text{e} \end{aligned}$$



Example - mining cont.

Venting: $V = [(A/B) \times C] + (21 \times (F/B) \times C)$

(mass fraction of carbon × tonnes of gas) + (methane GWP × mass fraction of methane × tonnes of gas)

$$\begin{aligned} V &= [0.12 \times 1,000] + [21 + 0.75 \times 1,000) \\ &= 15,870 \text{ tCO}_2\text{e} \end{aligned}$$



Example – Losses

$$L = \text{NGP} \times \text{NGL}$$

share of national gas production × total national gas losses

$$= (9.351/180.88) \times 340,000$$

$$= 0.052 \times 340,000$$

$$= 17,680 \text{ tCO}_2\text{e}$$

MED data sources:

NGL = Total losses = 340 kt CO₂-e (NZ Energy Greenhouse Gas Emissions 1990 -2007, Table 2.8a Fugitive Emissions: Losses)

NGP = Total production = 180.88 PJ (MED Annual Energy Data File Table 4)



Example - mining cont.

Total Emissions

all sales gas (including 10 kt/yr of emissions from LPG sales, half of which are exported, & 25% sales to an opt-in participant) + all processing emissions + losses

$$TE = \sum(ES) + \sum(EU) + \sum(EF) + \sum(V) + L - \sum(EE) - \sum(EO)$$

$$ES = (509,892 + 10,000) = 519,982$$

$$EU = 10,200; EF = 1,530; V = 15,870; L = 17,860; EE = 5,000$$

$$EO = 509,982 \times 0.25 = 127,496$$

$$TE = 519,982 + 10,200 + 1,530 + 15,870 + 17,680 - 5,000 - 127,496$$

$$\underline{\underline{TE = 432,766 \text{ tCO}_2\text{e}}}$$



Verification

- Currently no third party verification required, unlike UEF regulations
- May need to include requirements for certification by an approved verifier that prescribed standards for sampling and testing were met.



Questions

- What level of robustness do the existing hydrocarbon accounting systems possess to justify numbers to be reported for processing emissions?
- Are default emissions factors needed for GHG emissions from processing, with only volumes to be derived using HAS?
- How widely used are the prescribed standards?
- Are there other ways to effectively and fairly attribute losses?



Gas Opt-in

- Current provisions
 - More than 2 PJ in a year
 - Purchased direct from a gas miner
 - No factor for losses included (at present)
- Access to data requirements
 - Measurement at point of sale
 - By fiscal meter and gas chromatography



Example: purchasing natural gas

$$TE = \sum(EP) - \sum(EE) - S$$

gas purchased minus gas exported minus storage

$$E = [OF \times (A/B) \times C] + (D \times CEF) + (D \times NEF)$$

oxidation factor x mass fraction of carbon times 3.67 x tonnes of gas + methane and nitrous oxide emissions

$$S = (G - H) \times EF$$

gigajoules injected – gigajoules extracted x emissions factor



Example: purchasing cont.

Net emission from gas purchased from Northumberland mine (NM)

$$\begin{aligned} E &= (OF \times (A/B) \times C) + (D \times CEF) + (D \times NEF) \\ &= (0.995 \times 2.78 \times 19,143) + (1,000 \times (0.027 + 0.0031)) \\ &= 53,009 \text{ tCO}_2\text{e} \end{aligned}$$

Emissions from NM gas exported = 26,503

Emissions from West Cape mine purchase = 127,496

Storage adjustment = 0

$$TE = \sum(EP) - \sum(EE) - S = 79,512 + 127,496 - 26,503 = \underline{\underline{180,505 \text{ tCO}_2\text{e}}}$$

Example 5.3.1 from Beca report



So what's next?

- Submissions on draft regulations
- Further engagement

- Questions?

emissionstrading@climatechange.govt.nz

katherine.wilson@mfe.govt.nz



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