# Statistics Norway
# Eurostat Grant Agreement 2016
# No. 05121.2015.001-2015.543

## "Work towards meeting new requirements of PEFA, EGSS and EPEA in Regulation (EU) No 538/2014 (phase IV)"

# Part 1

## Physical Energy Flow Accounts

The project was initiated by a grant proposal from Statistics Norway under the leadership of Ms. Kristine E. Kolshus, in cooperation with the head of the Division for Energy and Environmental Statistics, Ms. Tonje Køber.

The project has been carried out by the Division for Energy and Environmental Statistics.
The main editor of this report has been Ms. Sigrid Moe Hendriks from the Division for Energy and Environmental Statistics.

# Content

# 1. Introduction

This document presents the results and work undertaken in part 1 of the pilot study "Work towards meeting new requirements of PEFA, EGSS and EPEA in Regulation (EU) No 538/2014 (phase IV)"according to Eurostat grant agreement No.05121.2015.001-2015.543.

Physical Energy Flow Accounts (PEFA) was in April 2014 amended in the EU-regulation 691/2011 on environmental accounting through the new regulation new regulation 538/2014, meaning obligatory reporting of PEFA from 2017 on.

This document presents the results of part 1 on PEFA of the 2015 Grant Agreement. Our main challenge, before being able to comply with the reporting requirements of PEFA, was that our statistical production system was not able to produce detailed supply and use tables by renewable and non-renewable energy products and waste. Although we collected data on renewables, these details was on most cases aggregated away on an early stage of the production process. The system was very manual (Excel based) and it was complicated and sometimes not even possible to implement the changes we wanted. There was also a need for an evaluation of the different data sources and methods used.

I 2016, we developed a new statistical production system for energy accounts and energy balances. The system compiles and harmonizes data without loosing the details from the data source. The data are harmonised by using standard international classifications (e.g. NACE Rev 2 and SIEC) and a self-developed classification systems for energy statistics. All the tables for dissemination and reporting to Eurostat, IEA and others will in 2017 be produced from the same master table. The PEFA table reported as part of this years' test reporting to Eurostat is generated from this master table, and are to be considered as confidential since the figures have not yet been published. Revised time series for the energy accounts will be published in 2017.

We also have automatic functionality that impute missing values and disaggregate data using break down keys. These features are needed in order to produce detailed production and consumption data for renewables. Another positive effect of the project is that we now have much better documentation of the methods used. We are thereby much better equipped to assess data quality.

**Main objective for this years grant project for PEFA:**

- **Establishing a production system for the compilation of the PEFA tables**
  Develop a production system that processes the different data sources and that allows the PEFA to be compiled in an efficient and comparable way each year
- **Further development of PEFA**
  Particularly focus on identifying the bio-share of the energy products where this is relevant as well as identifying the share of the waste-residual that is regarded as renewable.
- **2016 data collection of PEFA tables**
  Participate in the 2016 data collection for PEFA with data for at least one year.

## 2. Liquid biofuels and biogas

The following tasks from the grant application were linked to liquid biofuels and biogas:

***2.1:*** *Identify sources and methods in order to estimate the total supply and use of the energy products without bio (Motor spirit w/o bio (P14), Transport diesel w/o bio (P17), Heating and other gasoil w/o bio (P18), others?) as well as identify sources and methods in order to estimate the total supply and use of Liquid biofuels (P24) and Biogas (P25).*

***2.2:*** *Identify sources and methods in order to estimate the supply and use of the products in mentioned in 1.1 by NACE industries.*

### 2.1. Biogasoline and biodiesel

In Norway, we have a regulation that states that motor gasoline and transport diesel sold for road transport must contain at least 5.5 percent biofuels. We use sales data from oil companies as the data source for the intermediate consumption of motor gasoline and transport diesel used for road transport. We assume that accumulation of inventory, being the potential the difference between sales and the actual consumption is small and that it will be smoothed out over time.

Some of the road transport fuel is sold directly to the consumer, and then it is easy to allocate the consumption to the correct NACE. Most of the road transport fuels are on the other hand sold from petrol stations and other resellers. These quantities are allocated to groups of NACE and households by using a set of break down keys and estimations. The key data includes information from The Register of Vehicles, estimations from the emission statistics over fuel consumption by type of vehicle, the shares of the direct sales by NACE and energy costs for fuel consumption from the structural business statistics (also here shares by NACE). We also use consumption data collected through annual business surveys for the manufacturing industries without changing total limit set by the annual sales data.

We also get the total amount of added biogasoline and biodiesel from the oil companies. We assume that the biofuels are mixed evenly for all consumer groups, so the allocation to NACE are done with the same set of break down keys as for motor gasoline and transport diesel without bio.

Before allocating motor gasoline and transport diesel with and without bio to NACE, we need to subtract the renewable share of motor gasoline and transport diesel. This is not so straight forward as it sounds, since biogasoline and biodiesel has different energy content and density than motorgasoline and transport diesel without bio.

We have developed an automatic step in the new production system that takes these considerations into account. We use the amount of motor gasoline and transport diesel in litres (this data includes bio) and the amount of biogasoline and biodiesel in litres. The motor gasoline and transport diesel are split into a renewable and non-renewable share by using the factor ratio for the energy content and density. The amounts are then calculated into a common energy unit and then allocated to NACE using breakdown keys.

Motor gasoline and transport diesel without bio are then allocated in PEFA Table B under “P14 Motor spirit (without bio)” and “P14 Transport diesel (without bio)” respectively, and the biogasoline and biodiesel are placed under “P24 Liquid biofuels”.

We do currently not have any national production on biogasoline and biodiesel. All the supply is imported.

### 2.2. Other liquid biofuels

We collect liquid biofuels used for stationary purposes in manufacturing and energy producing industries through annual business surveys. These data are collected per enterprise, so the intermediate consumption can easily be allocated to NACE. Some of the consumption in manufacturing is self-produced (e.g. liquid bio fuels from animal waste in "C10 Manufacture of food products"). This production is allocated to the same NACE as it used in. We do not yet have any companies that produce liquid biofuels as their principal activity. We therefor impute the consumption that is not self produced as import.

We do not yet have consumption data for bio jet kerosene. This will change from the reference year 2016. Oslo International Airport was in the beginning of 2016, the first international airport hub in the world to supply bio jet kerosene via the main fuel hydrant system.

Liquid biofuels is a part of the Norwegian energy market that is under a significant development. We currently have no large scale enterprises producing biofuels as their principal activity, but we have indications that this will change in the near future. We have to follow the development closely and do a mapping if needed. Also, we do currently not have any data on liquid biofuels used for heating in service industries and in the public sector. The import data is too aggregated to identify the total amount of liquid biofuel and possible users.

### 2.3. Biogas

The production and use of biogas is relatively new in Norway. Our time series starts in 2006 and until 2014 we collected consumption data from only a few units (included losses from flaring). This was mainly biogas used for land transport (NACE 49) and in sewerage management (NACE 37). We also had consumption data from a few units in manufacturing and from district heating plants. The production was imputed by summing up the intermediate consumption.

In 2016, we sent out questionnaire to potential producers and suppliers of biogas. This was successful, and we will send out an annual survey from now on. From the year 2015, we have data on production and losses by 5-digit NACE, and we have sales data to NACE aggregates.

In some cases, these sales data are more aggregated that the requirements in PEFA. We then use break-down keys and simple assumptions to allocate the data. For example; sales to NACE division 77-82 are grouped together. We place this sale as consumption under "N80-N82 Security and investigation, service and landscape, office administrative and support activities" in full.

Intermediate consumption in manufacturing and energy producing industries are excluded from the biogas questionnaire. This data is instead collected by our annual business surveys. We also use some additional data from the Norwegian Environment Agency to make sure that we cover all the consumption (by type of use; for transformation and own use) in "E37-E39 Sewerage, waste management, remediation activities".

## 3. Waste

The task for improving the data on waste in the grant application was the following:

***1.3:*** *Identify sources and methods in order to split the energy residual waste by renewal waste (R28) and non-renewable waste (R29).*

Mainly due to the limitations of our old statistical production system, the intermediate consumption of waste for energy purposes was grouped together with biofuels. We were not able to report the data

according to the requirements in PEFA. The biggest users of waste are district heating plants in "E37-E39 Sewerage, waste management, remediation activities" and "D Electricity, gas, steam and air conditioning supply" with respectively around 55 and 35 percent of total use. Only around 10 percent are used by other industries.

We collect consumption data from these district heating plants and we ask them to report the renewable share of incinerated waste. The challenge is that most of the plants do not now their own renewable share. For these plants, we use the results from a waste stream analysis conducted by the Norwegian Waste Management and Recycling Association. The last report from 2013 showed that the average split in Norwegian district heating plants was a 50/50 split between renewable and non-renewable waste. The biggest district heating plants often conduct their own waste stream analysis. We then use the reported renewable share instead of the 50/50 split.

The remaining 10 percent of the waste are used by manufacturing industries and in the production of electricity. It is only a few enterprises who incinerate waste for energy purposes, and we ask the biggest ones to specify the type of waste and the renewable share. The biggest users of waste in manufacturing are in "C23 Manufacture of other non-metallic mineral products" with around 7 percent of total use. For the remaining consumption of mixed waste in manufacturing and in the production of electricity, we use the 50/50 split.

We apply the renewable shares to the production system by using break down keys. These break down keys can be specified towards a single enterprise identified by its own unique organization number, or it can be specified towards a group of observations (e.g. by type of energy product or by type of economic activity). The more enterprise specific renewable share we are able to collect, the better the split between renewable and non-renewable waste.

The production of waste is imputed by summing up the intermediate consumption of waste. The renewable/non-renewable shares are kept from the consumption data. Waste is produced by the whole economy, so we do not use break down keys to disaggregate the production to NACE.

## 5. Conclusion:

This year's project has resulted in the overall conclusion that the obligatory reporting requirements will be fulfilled for the main part of the PEFA questionnaire, also the bio-share of the energy products where this is relevant as well as identifying the share of the waste-residual that is regarded as renewable. The emission relevant energy use is not part of the test-reporting, but will be included in the obligatory reporting of the PEFA-figures in 2017.

The PEFA-questionnaire will been reported via Edamis. Since the figures in the reporting questionnaire is based on the new statistical production system for energy accounts and energy balances, all figures have to be considered as confidential. These figures have not yet been published in Norway.