ICAT Kyrgyzstan Project

Report on Policy and Measures impact assessment for transport sector

Deliverable 8

Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic

ICAT Initiative for Climate Action Transparency

Initiative for Climate Action Transparency

Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic

Initiative for Climate Action Transparency – ICAT

Diagnosis/Scoping report containing the scope in activity 1

Deliverable #8

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Report P&M impact assessment for transport sector

1. Introduction

The transport sector of the Kyrgyz Republic plays a key role in the country's economic development, providing internal and external mobility, as well as access to social and economic services. However, at the same time, transport remains one of the main sources of greenhouse gas (GHG) emissions, especially carbon dioxide (CO_2), due to the high share of road transport and the active use of fossil fuels, mainly gasoline and diesel.

Given the country's commitments under the Paris Agreement and Nationally Determined Contributions (NDCs), assessing the effectiveness of existing and proposed policies and measures in the transport sector is of strategic importance. Such assessment allows us to determine the potential for reducing GHG emissions, analyze the impact on fuel demand and consumer behavior, and identify associated economic and social effects.

This report aims to provide a quantitative and qualitative assessment of the impact of a price measure — a change in fuel tax rates — on the level of GHG emissions in the transport sector. The report uses an ex-ante approach based on an analysis of the price elasticity of demand for gasoline and diesel fuel, as well as on calculations of changes in emissions associated with changes in fuel consumption. The assessment covers the period from 2025 to 2035 and is indicative in nature, based on available national data and the international ICAT methodology.

1.1 Evaluation Summary

This report is an ex -ante assessment of the impact of pricing policies in the transport sector of the Kyrgyz Republic, aimed at analyzing the potential impact of introducing or increasing taxes on fuel (gasoline and diesel) on reducing greenhouse gas (GHG) emissions. The assessment is conducted in the context of national climate commitments and efforts to implement the Updated Nationally Determined Contribution (NDC) of the Kyrgyz Republic.

Policy Title:
Assessing the impact of changes in transport pricing policy (fuel taxes) on greenhouse gas emission reductions.

In this report, we placed a particular emphasis on one measure — the introduction of a fuel tax/levy — although other transport policies are also being implemented in the Kyrgyz Republic (see list below). This focus was intentional. While many of the other measures have been discussed and considered in previous projects and analyses, and are already well-known within the professional community, progress tracking has shown that most of them have so far delivered only limited results.

At the same time, transport pricing measures — and especially the introduction of a fuel tax — demonstrated significant greenhouse gas (GHG) mitigation potential when modelled using the ICAT Transport Pricing Methodology.

The high forecasted potential of this measure, as well as its nationwide coverage (rather than being limited to a single city or specific mode of transport), justify the increased attention given to it in this analysis. Nevertheless, other measures are in place or under consideration in the Kyrgyz Republic, including:

- Shift away from private vehicle use (reducing reliance on personal cars)
- Improving traffic management and developing cycling infrastructure
- Improving the overall system of public transport management and vehicle use
- Economic measures (various non-pricing interventions)
- Development of electric transport (electric cars, electric buses)
- Replacement of internal combustion engine buses with gas-powered buses (Bishkek, Osh, suburban routes)
- Improving the system of vehicle operation and management (eco-driving, maintenance, route optimization)

These non-pricing measures are important and form part of the broader NDC implementation context. However, for the purposes of this study — given the scale of the projected mitigation potential — the primary analytical focus has been placed on the fuel tax policy.

Policy type:
A stand-alone price measure (fuel tax) considered as part of a possible climate package in the transport sector.

Organization that conducted the assessment:
The assessment was conducted with the support of the Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic (MNRES) together with international partners / UNEP Copenhagen Climate Centre / independent consultant.

Completion date:
June 2026.

Update or first version:
The assessment is conducted for the first time. In case of subsequent changes in pricing policy, updates in the next versions of the report are possible.

Purpose of assessment:

- To determine how increasing gasoline and diesel prices (through fiscal measures) might affect fuel demand and associated GHG emissions.

- Assess the contribution of this measure to achieving the NDC emission reduction targets.
- Support informed decision-making in climate and tax policy.

Target audience:
Politicians and regulators (Ministry of Energy and Commerce of the Kyrgyz Republic, Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic, Ministry of Transport and Communications, Ministry of Finance of the Kyrgyz Republic), international donors, experts, NGOs and other stakeholders.

Stakeholder participation:
The assessment preparation stage included a preliminary collection of opinions from experts and government officials, a discussion of the assessment methodology, and a discussion of the results through consultation meetings with ICAT consultants. Copenhagen Climate Centre Subash Dhar and Aiymgul Kerimray .

Assessment limits:

- **Impacts:** Only direct impacts on GHG emissions associated with gasoline and diesel consumption.
- **Geographical scope:** national level (Kyrgyz Republic).
- **Industry coverage:** on-road and off-road transport.
- **Period:** 2023–2035 (with the base year 2023). The base year is 2023, because all fuel consumption by transport is known for this year. If we start proposing a policy for implementing a fuel tax now, this measure will take real shape in the form of a regulatory legal act in about 3–4 years. Progress can be monitored in 2030 and beyond.

Assessment type:
Preliminary (ex-ante), with modeling of an alternative price increase scenario and calculation of changes in demand and emissions.

Key findings and recommendations:

- Assuming a 10% increase in gasoline prices and a 4% increase in diesel fuel prices, there is a corresponding decrease in fuel demand of 2.2% and 0.88%, respectively.
- The total reduction in GHG emissions for the period up to 2030 could amount to approximately 60-70 thousand tons of CO_2.
- The measure could be an effective and relatively inexpensive way to reduce emissions, especially when combined with support for alternative modes of transport.
- It is recommended to consider including fuel taxes in the climate package, and to use the tax revenues for investment in sustainable transport infrastructure.

1.2 Description of the measure

Name of the measure:
Introduction or increase of a tax on motor fuels (petrol and diesel) in order to reduce greenhouse gas emissions in the transport sector for petrol by 10% and for diesel by 4%. In order to protect agricultural producers, the introduction of a tax on diesel is always done with extreme caution.

Type of measure:
Price (economic) measure. The increase in fuel tax is aimed at internalizing [1]environmental costs and changing consumer behavior through price incentives. The measure is considered as a climate policy instrument, as well as a source of budget revenues.

Target sector:
Transport sector, primarily road (passenger and freight vehicles), as the main consumer of gasoline and diesel fuel, and off-road transport.

Expected effects:

- Reduction in consumption of gasoline and diesel due to rising fuel prices.
- Associated reductions in greenhouse gas emissions, primarily CO_2, associated with the combustion of fossil fuels.
- Potential shift in demand towards more efficient or low-carbon transport solutions.
- Increase in budget revenues, possible redistribution to sustainable mobility measures.

Status:
The measure will be proposed for implementation. The measure is considered as a potential climate and fiscal initiative and has not yet been implemented in practice.

Responsible authorities:

- Ministry of Finance of the Kyrgyz Republic – development and implementation of tax policy.
- Ministry of Transport and Communications of the Kyrgyz Republic – taking into account transport specifics, integration into sectoral strategies.
- Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic – coordination with national climate goals and emission reduction plans.
- State Tax Service of the Kyrgyz Republic – administration of tax revenues.

[1]Internalization is the process of including external costs or benefits (which are not usually included in market prices) into the internal costs of market participants. Simply put, when talking about internalization of environmental costs, we mean that those harmful consequences for the environment that were previously "external" (that is, paid for by society or nature, and not by the producer or consumer) are now included directly in the cost of the product or service.
Raising the fuel tax forces consumers and producers to take into account the environmental damage of burning fuel, since the tax increases the price and thus "incorporates" the environmental costs into the cost of the fuel. This encourages more environmentally friendly behavior, such as reducing fuel consumption or switching to cleaner alternatives.

1.3 Objectives of the assessment

The objective of this assessment is to analyze the expected impacts of the proposed price measure — an increase in the fuel tax — in the transport sector of the Kyrgyz Republic. The assessment is preliminary (ex-ante) in nature and aims to quantitatively and qualitatively assess the following aspects:

- **Impact on Greenhouse Gas (GHG) Emissions:**
  Determining the amount of CO_2 emission reduction that could be achieved by reducing petrol and diesel consumption as a result of higher prices.
- **Impact on fuel demand:**
  Modeling changes in fuel consumption volumes based on known values of price elasticity of demand, taking into account a scenario of price increases.
- **Economic and fiscal effects:**
  Preliminary assessment of the potential increase in tax revenues and the associated impact on the structure of transport costs and households.

This assessment also aims to inform the inclusion of the measure in future climate strategies and action plans, including the implementation of the Kyrgyz Republic's NDCs and sustainable transport development plans, improve policy development and implementation.

1.4 Methodology

Approach:
An ex -ante approach was used to conduct the assessment, aimed at analyzing the potential impact of a yet-to-be-implemented measure — an increase in taxes on motor fuels — on key indicators: GHG emissions, fuel demand, and consumer behavior. This approach allows for modeling the effects of the policy before its implementation and using the results to make informed decisions.

Method:
The assessment is based on **the analysis of price elasticity of demand for fuel**, which allows us to predict changes in the volume of gasoline and diesel fuel consumption when prices rise. Average elasticity values from international sources were used to calculate the changes:

- Gasoline: price elasticity = -0.22 for the Kyrgyz Republic.
- Diesel: price elasticity = -0.22 for the Kyrgyz Republic

The calculations were carried out using the formula:
ΔQ (%) = Elasticity × ΔP (%), where ΔQ is the relative change in demand, ΔP is the change in price.

Estimates of changes in CO_2 emissions were then made based on changes in the volume of fuel consumed. Carbon content factors in fuel (in t/TJ) were used, followed by conversion to CO_2 equivalent using the standard formula:
$CO_2 = C \times (44 / 12)$, where 44 is the molecular mass of CO_2 and 12 is the mass of carbon.

Assessment period:
The analysis covers the period 2023–2035, including forecast values of fuel demand, prices, elasticity and expected changes in greenhouse gas emissions. The base year is 2023.

1.5 Evaluation Boundaries

1.5.1 Sectoral Boundaries:
The assessment covers mainly road transport, including passenger cars, trucks and commercial vehicles powered by gasoline and diesel fuel. Other modes of transport (air, water) are not included in the assessment.

1.5.2 Gas Boundaries:
The assessment only considers carbon dioxide (CO_2) emissions from the combustion of petrol and diesel fuel. Emissions of other greenhouse gases such as methane (CH_4) and nitrous oxide (N_2O) have not been taken into account, as their contribution to total emissions from fuel combustion in the transport sector is considered to be insignificant in this context.

1.5.3 Geographical scope:
The assessment covers the entire territory of the Kyrgyz Republic and reflects changes in demand and emissions at the national level.

1.5.4 Temporal boundaries:
The assessment is carried out for separate years - 2023, 2030 and 2035 - to reflect the short-, medium- and long-term effects of the measure. The base year for comparison is 2023. The base year is the year in the assessment from which future projections will be made.

1.6 Data and parameters

- To conduct the assessment, a set of quantitative data and parameters was used that reflect the current and forecast characteristics of demand, prices and emissions in the transport sector of the Kyrgyz Republic.
- Approach B is a simple approach to calculating GHG impacts (CO2 only) where separate annual fuel consumption data are available for petrol and diesel. It is appropriate to use Approach B where separate annual fuel consumption data are available for petrol and diesel, but not for PKM or TKM for freight transport.

1.6.1 Fuel demand:

Gasoline and diesel fuel consumption volumes (in terajoules, TJ) in the base year (2025) and projected values for 2030 and 2035 were obtained based on official statistics and national expert calculations. Example [2]:

- Gasoline: 27,023 TJ (2023), 30,136 TJ (2030), 31,007 TJ (2035)
- Diesel: 21,431 TJ (2023), 23,900 TJ (2030), 24,591 TJ (2035)

1.6.2 Price elasticity of demand:

Average values of short-term price elasticity are used:

- Gasoline: -0.22 for the Kyrgyz Republic
- Diesel: -0.22 for the Kyrgyz Republic
  These parameters allow us to estimate how much demand will change when the price changes by 1%.

1.6.3. Price changes:

The following price growth values for the Kyrgyz Republic were adopted as the assessment scenario:

- Gasoline: +10%
- Diesel: +4%
  Price increase is modelled as a result of the introduction of a fuel tax.

1.6.4. Emission factors:

The following values were used to calculate CO_2 emissions:

- **Carbon content of gasoline:** 18.9 tC /TJ
- **Carbon content of diesel:** 20.2 tC /TJ
- Conversion of carbon to CO_2: multiplier (44/12) reflecting the molecular mass ratio. IPCC default values – diesel: 74.1 tCO2/TJ; gasoline: 69.3 tCO2/TJ.

1.6.5. Additional parameters:

- Conversion factors and energy value of fuel
- The projected growth rate of energy demand is 0.5% per person. In road transport, there has been a slight decrease in fuel consumption over the past 5 years. While we do not have other data from the Ministry of Economy of the Kyrgyz Republic, we accept these growth rates as experts.
- Structure of consumption in the transport sector by type of fuel from the Fuel Balance of the National Statistical Committee.
- The cost of gasoline is 0.63$/ l, and the cost of diesel fuel is 0.73$/ l
- rgasoline = 720 kg/m3

[2] The calculations are provided in Excel format. This Excel file Calculations for assessing the impact of policies on GHG emissions is provided V application

- rdiesel = 835 kg/m3
- NCVgasoline = 44.3 TJ/ Gg
- NCVdiesel = 43.0 TJ/ Gg

The data sources were official statistics of the Kyrgyz Republic, data from international organizations (IEA, IPCC), as well as expert calculations as part of the preparation of the report.

1.7 Impact assessment

This section presents calculations of the expected impact of the proposed price measure (introduction of a fuel tax) on fuel demand and associated greenhouse gas emissions in the transport sector of the Kyrgyz Republic. The methodology is based on the use of price elasticity and emission factors for each type of fuel.

1.7.1 Change in demand

To estimate the change in demand, the following formula was used:

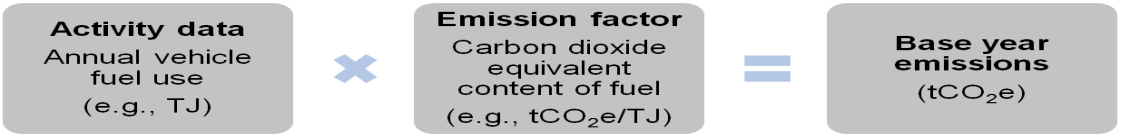
Price elasticity of demand:

Price elasticity of demand =(% Change in goods own demand)/(% Change in goods own price)[3]

Example: with a 10% increase in the price of gasoline and an elasticity of -0.22, the decrease in demand will be -2.2%. For diesel, with a 4% increase in price and an elasticity of -0.22, the decrease will be -0.88%.

1.7.2 Calculation of emissions

The following formula is used to calculate CO_2 emissions:



1.7.3 Results

Results include:

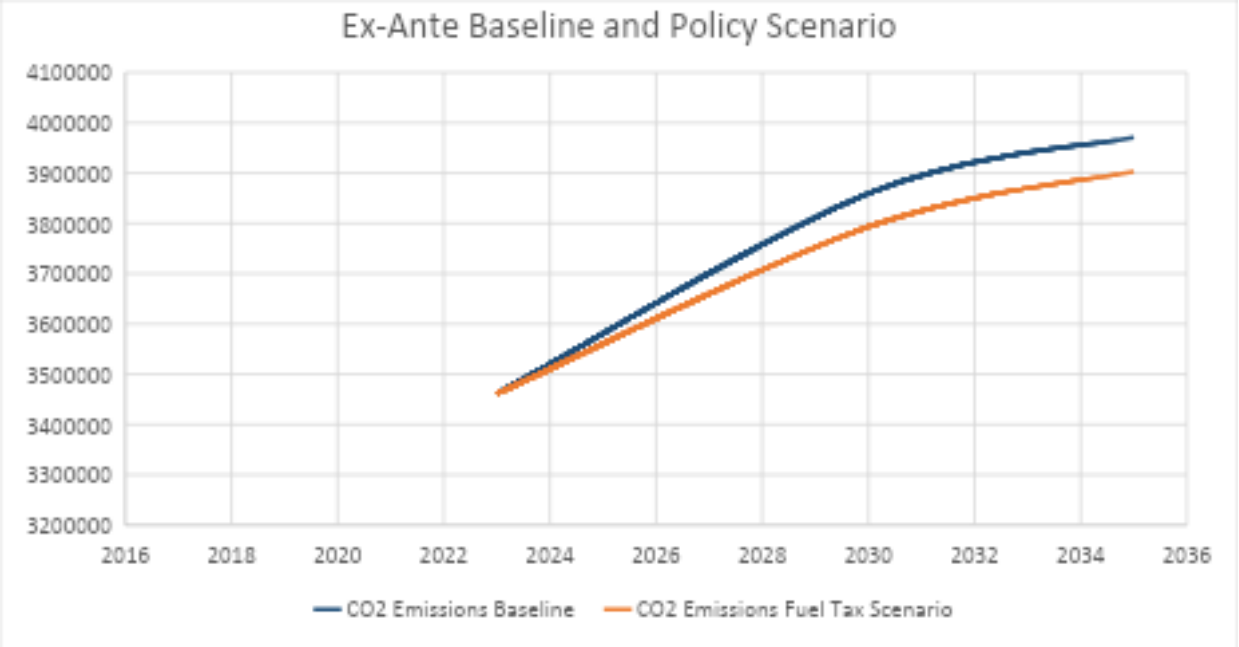
- Demand for gasoline and diesel fuel in the baseline and tax scenarios for 2023, 2030 and 2035.
- Comparable CO_2 emission values
- Calculating absolute emission reductions

[3]Assessing the impact of greenhouse gas mitigation measures in the transport sector. Subash Dhar , ICAT Copenhagen Climate Centre.

- Comparative analysis of trends by year
- Tax revenues to the budget from fuel taxes

All calculations are performed in an Excel file [4]using built-in formulas and are presented in the form of tables and graphs.

Chart 1.7.3 Shows a description of the pricing policy visually, the scenario before the policy and after the policy implementation.



1.8 Additional effects

In addition to the primary impact of reducing greenhouse gas emissions and reducing fuel demand, the price measure may have a number of social, economic and environmental impacts that are important to consider in policy decisions.

1.8.1 Economic effects

- Increased tax revenues from increased excise tax on fuel may replenish the state budget and be directed towards the development of transport infrastructure or "green" technologies **$77,709,194 in 2030 and $79,955,276**[5] year.
- Higher transportation prices may lead to higher prices for transportation services and goods, especially in remote and rural areas.
- Possible reduction in dependence on fuel imports, especially when some users switch to more economical or alternative modes of transport.

1.8.2 Social effects

[4] This The file Calculations for assessing the impact of policies on GHG emissions is provided V application
[5]The calculations are provided in Excel format. This Excel file Calculations for assessing the impact of policies on GHG emissions is provided V application

- Burden on vulnerable populations, particularly where there are no public transport alternatives or compensation programmes (e.g. rural residents, low-income families).
- Behavioural changes including reduced unnecessary travel, increased interest in carpooling, public transport, cycling or walking.
- The possibility of stimulating employment in new sectors, such as the production and maintenance of electric vehicles.

1.8.3 Ecological effects

- Reducing Pollution air by reducing the use of fossil fuels, especially in cities suffering from high emissions.
- Positive impact on the health of the population, especially vulnerable groups (children, elderly), due to improved air quality.
- Potential reduction in noise and congestion by reducing traffic volumes.
- Reduction of CO2 emissions in **2030 by 66,061 tCO2 and in 2035 by 67,970 tCO2** [6]**.**

1.9. Conclusions and recommendations

During the analysis and assessment of the measures implemented, key areas were identified that contribute to the reduction of greenhouse gas emissions and the enhancement of environmental sustainability of the sector in question. The effectiveness of existing approaches is confirmed by the positive dynamics of emission reduction and the improvement of institutional mechanisms for monitoring and accounting.

However, certain limitations have been identified, related to insufficient data completeness, fragmented methodologies and the need for increased coordination between responsible structures. To achieve more significant results, it is recommended:

- Strengthen the systematic collection and verification of data using modern technologies and digital tools.
- Develop and implement standardized methods for calculating emissions and removals, adapted to national conditions.
- Improve the skills of personnel responsible for monitoring, reporting and managing emission reduction measures.
- Strengthen interdepartmental cooperation and ensure transparency of information flows.
- To intensify the implementation of innovative mitigation measures taking into account economic feasibility and social impact.

Implementation of these recommendations will not only improve the quality of monitoring and forecasting, but also ensure the achievement of national climate goals in the long term.

[6]The calculations are provided in Excel format. The Excel file *Calculations for assessing the impact of policies on GHG emissions* is attached to this report.

1.10. Appendices

Table in Excel file With original data, formulas: Calculations for assessing the impact of policies on GHG emissions.

1.11. Sources

ICAT, IPCC, national reports, international elasticity studies

National Consultant for the Transport Sector  **Baialiev R.**