Monitoring, Reporting, and Verification (MRV)

Programme title: Green Finance Facility to Improve Air Quality and Combat Climate Change in North Macedonia
Short title: North Macedonia Green Finance Facility (NMGFF)
About MRV

• MRV is a framework commonly used in the context of environmental and climate change initiatives, particularly in the field of carbon emissions and greenhouse gases

• It **plays a crucial role in ensuring transparency, accountability, and effectiveness in the implementation of policies and actions** aimed at mitigating climate change

• It is particularly important in the context of international agreements and frameworks aimed at addressing climate change, such as the Paris Agreement

• The verification process helps ensure that the **reported data is reliable and can be used for assessing progress** toward climate goals
About MRV

**MONITORING**
- systematic collection and analysis of data to track and quantify the relevant parameters
- measuring energy consumption/production, greenhouse gas emissions, and other factors that contribute to climate change
- can involve various methods, such as direct measurements, remote sensing, and modelling

**REPORTING**
- after collecting data through monitoring
- organizations or entities are required to report the information in a standardized and transparent manner
- standardized reporting allows for consistency and comparability across different entities, making it easier to assess progress and performance

**VERIFICATION**
- involves the **independent assessment** of reported data to ensure its accuracy, completeness, and compliance with established standards or guidelines
- it is crucial for building trust and confidence in the reported information
- third-party verifiers or auditors often conduct these assessments to provide an objective evaluation of data
Case study 1
European Union – EED3


- It establishes ‘**energy efficiency first**’ as a fundamental principle of EU energy policy, giving it legal standing for the first time.

- EU countries **must consider energy efficiency** in all relevant policies and major investment decisions taken in the energy and non-energy sectors.
## Case study 1 - EU

<table>
<thead>
<tr>
<th>2012 Directive</th>
<th>2018 updates</th>
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<tbody>
<tr>
<td>Annual reduction of 1.5% in national energy sales 2014 – 2020</td>
<td>0.8% annual final energy consumption averaged over the most recent three-year period prior to 1 January 2019</td>
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<tr>
<td>• Principles to apply to the calculation of additionality to European Union law</td>
<td>• Elevates the issue of <strong>energy poverty</strong></td>
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<tr>
<td>• Materiality of the activities of obligated, participating or entrusted parties</td>
<td>• Clarifies the requirements regarding the <strong>lifetimes of measures</strong> and additionality when calculating energy savings</td>
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<td>• A requirement to ensure that quality standards for energy efficiency measures</td>
<td>• Emphasizes the importance of <strong>monitoring and verification</strong> in ensuring that policy measures achieve their objectives</td>
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<td>• A methodology for the notification of energy efficiency measures to the European Commission</td>
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Case study 1 - EU

- Article 7 EED implementation:
  - Companies have to carry out measures which help final consumers improve energy efficiency (EEOS).
  - EU countries may also implement alternative policy measures which reduce final energy consumption, such as:
    - Energy or CO$_2$ taxes (e.g. Sweden)
    - Financial incentives that lead to an increased use of energy efficient technology
    - Regulations or voluntary agreements that lead to the increased use of energy efficient technology
    - Energy labelling schemes beyond those that are already mandatory under EU law (e.g. ISO50001)
    - Training and education, including energy advisory programmes (UNDP, etc.)
Case study 1 – EU – Austria (EEOS)

- The EEO scheme started in January 2015 (as voluntary)
- The targets are set annually as 0.6% of the reported final energy consumption
- 40% of the target has to be achieved in the household sector (housing or transport)
- The energy savings reported between 2014 and 2017 for Article 7 of the EED (from EEOs and alternative measures (AMs)) contribute 136 PJ (cumulatively) to the savings target of 218 PJ for 2020
- 37.3% of the achieved energy savings derive from actions in households (all actions)
- In households affected by energy poverty, the resulting end-use energy savings are multiplied by the factor 1.5 (motivating for companies to invest in poorer households)
Case study 1 – Hungary (Alternative measure)

Corporate tax relief for energy efficiency **investments in industry**
- Introduced in 2017
- The tax incentive can be up to 30% of eligible costs, but not more than the HUF equivalent of EUR 15 million
- The tax incentive may only be claimed in connection with projects aimed at EE improvement

Residential sector – green investment system and green economy financing scheme

Services sector and industry – corporate tax relief

Transport – CO₂ quotas for e-mobility
Case study 1 – Energy Community countries experience

• 2020 Article 7 targets for Contracting Parties were a scaled back version of EU Member States

• Cumulative target for 2017-2020
  • New savings equivalent to 0.7%/annum of reference quantity (2013-2015)
  • Cumulative savings of 7% by 2020 prior to allowed reductions

• Member States were to Notify ECS by 15 October 2017 (Only Serbia (17 Jan 2020) sent a formal Notification)

• Cumulative target for 2021-2030
  • To be confirmed
  • 10-year period rather than 4-year period
  • Could be significantly more demanding
  • EU target on new savings equivalent to 0.8%/annum of reference quantity (2016-2018) would mean > doubling ambition for CPs
Case study 1 – EU (after 10.10.2023)

2030 baseline (REF2020)  
2030 real consumption

11.7% Decrease in energy consumption

An indicative PEC target of 992,5 Mtoe
A binding FEC target of 763 Mtoe

RH – NECP2023: FEC 6,55 Mtoe; PEC 8,14 Mtoe
RH – EC*: FEC 6,01 Mtoe; PEC 6,83 Mtoe (with 2,5% deviation)

*Based on Annex I of the EED3 “ambition gap” mechanism

<table>
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<th>Article</th>
<th>Description</th>
<th>Assessment</th>
<th>Grading</th>
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<tr>
<td>Energy efficiency contribution</td>
<td>Croatia notifies an energy efficiency contribution in 2030 of 6.55 Mtoe for final energy consumption and 8.14 Mtoe for primary energy consumption.</td>
<td>The objectives for final and primary energy are not in line with the EED formula (even taking into account the possibility to deviate from the formula's result by 2.5%). Final energy consumption should not be higher than 6.01 Mtoe (EED formula result for final energy with 2.5% deviation) and 6.83 Mtoe (EED formula result for primary energy without 2.5% deviation).</td>
<td>Insufficient</td>
</tr>
</tbody>
</table>

Source: [https://energycoalition.eu/wp-content/uploads/2021/03/Planning-for-the-2023-EED_Are-EU-countries-up-to-the-task.pdf](https://energycoalition.eu/wp-content/uploads/2021/03/Planning-for-the-2023-EED_Are-EU-countries-up-to-the-task.pdf)
Case study 1 - EU

• Chapter III – Efficiency in energy use
  • Article 8 – Energy savings obligation
  • Article 9 – Energy efficiency obligation schemes
  • Article 10 – Alternative policy measures

• New savings each year from 1 January 2021 to 31 December 2030, four obligation periods:
  1. 01.01.2021. do 31.12.2023. -> **0.8 %**
  2. 01.01.2024. do 31.12.2025. -> **1.3 %**
  3. 01.01.2026. do 31.12.2027. -> **1.5 %**
  4. 01.01.2028. do 31.12.2030. -> **1.9 %**

of annual final energy consumption (FEC) averaged over the most recent three-year period preceding 1 January 2019
Case study 1 - EU

Underachievement by 2030: impact on 2031-2040 obligation period (n)

- Outstanding energy savings (period [n-1])
- Cumulative energy savings (period [n])

Adjusted cumulative energy savings (period [n])

Overachievement by 2030: impact on 2031-2040 obligation period (n)

- Cumulative energy savings (period [n])

Adjusted cumulative energy savings (period [n])

eligible surplus energy savings (period [n-1])
Case study 1 - EU

• Member States shall designate obligated parties among:
  • Transmission system operators
  • Distribution system operators
  • Energy distributors
  • Retail energy sale companies
  • Transport fuel distributors
  • Transport fuel retailer

• The amount of energy savings needed to fulfil the obligation **shall be achieved by the obligated parties among final customers**, designated by the Member State, independently of the calculation made pursuant to Article 8(1) or, if Member States so decide, **through certified savings stemming from other parties** as set out in paragraph 11, point (a), of this Article.
Case study 1 - EU

• Annex V – Common methods and principles for calculating the impact of EE obligation schemes or other policy measures under Articles 8, 9, and 10 and Article 30(14)
  • **DEEMED SAVINGS** (Ex-ante), by reference to the results of previous independently monitored energy improvements in similar installations
  • **METERED SAVINGS** (Ex-post), whereby the savings from the installation of a measure, or package of measures, are determined by recording the actual reduction in energy use, taking into account factors such as additionality, occupancy, production levels, and the weather, which may affect consumption
  • **SALED SAVINGS**, whereby engineering estimates of savings are used (for example, replacing a compressor or electric motor with a different kWh rating from that for which independent information about savings has been measured or where those estimates are carried out on the basis of nationally established methodologies and benchmarks by qualified or accredited experts that are independent of the obligated, participating or entrusted parties involved.
  • **SURVEYED SAVINGS**, where consumers’ response to the advice, information campaigns, labelling or certification schemes, or smart metering is determined. This approach shall be used only for savings resulting from changes in consumer behaviour and not for installing physical measures.
Case study 1 - EU

1. More Energy Savings

Main changes of the EED recast

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<th>Year Interval</th>
<th>Energy Savings (%)</th>
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<tr>
<td>2028-2030</td>
<td>1.9%</td>
</tr>
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Energy savings rate will gradually rise to meet 2030 targets.

Member States can phase savings flexibly over the period, if they achieve the same cumulative amount. Energy savings in the first years count for more years: clear incentive to act early!

2. Ensuring a just and inclusive energy transition

Main changes of the EED recast

A share of energy savings must be achieved among priority groups.

This new ringfence will help to tackle energy poverty and make sure that everyone can benefit from energy efficiency policies.

3. Aligned with Climate Goals

Main changes of the EED recast

Energy savings from fossil fuel technologies will progressively become ineligible.

This gives a clear signal that public funds should no longer support fossil fuel technologies.
Case study 2
Croatia

- First methodology adopted in 2012
  - Bottom-up (BU) methods recommended by EC, assessing applicability of methods and determination of national reference values

- Intensified work on M&V with EED transposition
  - Tool for M&V was developed; both the database on implemented projects and the calculation tool

- SMiV tool – funded by GIZ in 2015

- Regulation on amendments and supplements to the Regulation on the Monitoring, Measurement, and Verification of Energy Savings System (NN 98/21, NN 30/22)
Case study 2 - Croatia

• Monitoring
  • Data and information collection process on all the EE/RES measures:
    • type of measure
    • Input data for energy-saving calculation
    • Cost of implementation
    • Received subsidies

• Measurement
  • Calculation of new annual energy savings achieved by EE/RES measures using prescribed methods -> **always using project-specific data** rather than reference data prescribed in methodology
  • For measures for which methods are not prescribed, energy savings should be calculated by the **authorized design engineers** of **energy auditors**
  • For EEOS – **obligatory preparation of elaborate on energy savings** by an authorized person independent from the obligated party
Case study 2 - Croatia

• Verification
  • Process of confirming energy savings by the authorized body – National EE Coordination Authority within the Ministry of Economy and Sustainable Development
  • Elaborate on energy savings is an obligatory document based on which verification is performed
    • Elaborate prepared by authorized person

• Reporting
  • Annually by 15th of February
  • Savings from EEOS and AM
  • All other data and information required by Regulation (EU) 2018/1999
  • Reported savings to be based on data from SMiV
  • Report to be published on the national website for EE
Case study 2 - Croatia

• SMiV tool
  • Database of implemented EE measures in Croatia (> 26,600 EE projects)
  • The obligatory tool for subsidy providers, public sector, obligated parties, ESCOs, and TSO dominant users is EE Fund – subsidy provider (ca. 90% of all entries)
• Functionalities:
  • Calculation of new annual and cumulative savings in line with M&V regulation
  • Transfer of savings among obligated parties
  • Transfer of overachievement in one year to the next year
  • Stimulation of energy poverty-related measures – 10 to 30% higher savings are accounted
  • Calculation of primary energy savings (primary energy factors)
  • Calculation of CO₂ emission reductions (emission factors)
Case study 2 - Croatia

Source: ENSMOV PLUS project (Energy Institute Hrvoje Požar)
Case study 2 - Croatia

Source: **ENSMOV PLUS project** (Energy Institute Hrvoje Požar)
Case study 2 - Croatia

• Lessons learned:
  • Art. 7 targets are very tough to achieve -> but art. 7 has become the single most important driver for energy savings
  • M&V system is critical for evaluating the progress
    • IT platform is a practical and comprehensive way of collecting all the data
    • Subsidy providers (EE Fund) qualified and experienced for entries
    • Obligated parties – struggle, especially smaller -> clear guidelines, support and education is needed
  • Verification based on documentation (evidence)
    • Huge amount of paperwork to be delivered (often not possible to upload in the system)
    • New regulation introduces Elaborate of energy savings – systematic representation of saving calculation and accompanying evidence – prepared by authorized experts (design engineers, energy auditors) -> facilitates the verification process for the competent authority

Source: ENSMOV PLUS project (Energy Institute Hrvoje Požar)
Case study 3
Energy and Climate Change Programme

• The EEA Financial Mechanism and the Norwegian Financial Mechanism aim to:
  • contribute to reduction of social and economic inequalities in Europe
  • strengthening bilateral cooperation between donor countries (Iceland, the Principality of Liechtenstein and the Kingdom of Norway) and beneficiary countries

• Period 2014. – 2021. : 2,8 billion € for 15 European countries

• Republic of Croatia:
  103,4 million €
  + 9,8 million € (national contribution)
  = 113,2 million €
Case study 3 - Energy and Climate Change Programme (EEA Financial Mechanism)

Funding

- Public: 85%
- Private: 30, 40 or 50%

1. **Bilateral Output 1** – „Increased cooperation between entities in beneficiary state and donor states“

2. **Outcome 2** – „Increased renewable energy production“

   2.1. **Output 2.1** – „Renewable energy capacity installed“

   2.2. **Output 2.2** – „Strengthened capacity to manage and promote renewable energy“

**Publishment of the call(s):** 14. 9. 2021
**Deadline for submission:** 29.11.2021 at 12:00 CET
**Project implementation:** No later than 30.4.2024
Case study 3 - Energy and Climate Change Programme (EEA Financial Mechanism)

Technical documentation for geothermal energy
- Kutina
- Vukovar
- Lipik
- Križevci
- Sisak
- Topusko
- Krapinsko-zagorska
- Sv. Nedjelja
- Bjelovar

Increased geothermal energy production capacity
- Karlovac
- Bjelovar
- Križevci

Shallow geothermal energy database
- FSB

Deep geothermal energy database
- CHA

Iceland
Liechtenstein
Norway grants

REPUBLIC OF CROATIA
Ministry of Regional Development and EU Funds
Case study 3 - Energy and Climate Change Programme (EEA Financial Mechanism)

• 9 projects
  ➢ existing deep wells in all 9 projects
  ➢ 7 projects with obtained exploration licence
  ➢ plan to develop a district heating network
Case study 3 - Energy and Climate Change Programme (EEA Financial Mechanism)

**INCREASED GEOTHERMAL ENERGY PRODUCTION CAPACITY**

- **3 projects**
  - 1 deep well to be drilled (1500 m)
    - Korenovo (Bjelovar)
  - well testing
    - Križevci
  - well site preparation
    - Karlovac
Case study 3 - Energy and Climate Change Programme (EEA Financial Mechanism)

- Project applicant Viktor Lenac d.d. (VLEN) is one of the largest Croatian shipyards and one of the leading shipyards for repair, conversion and offshore shipbuilding in the Mediterranean.

- The aim of the project is the implementation of the seawater intake and the improvement of the central heating system by the installation of a SWHP within the Stara Martinšćica zone.

- Characteristics of the SWHP to be installed:
  - Total electric power is 80 kW;
  - Total thermal power is 300 kW;
  - Total cooling power is 230 kW;
  - Seasonal heating factor is 4.7 SCOP;
  - Seasonal cooling factor is 6.24 SEER;
  - The global warming potential is 299 GWP.
Case study 3

- Solar energy projects:
  - 172 integrated photovoltaic powerplants and 1 battery storage
  - 11.58 MW (12.37 MWp)
Discussion

Thank you!

Matija Vajdić