IVM Workshop in Portugal, RGI-REN

20-22 November 2024

1. Executive Summary

The second in-person workshop of RGI's Integrated Vegetation Management (IVM) Working Group was convened in Porto Portugal, inviting grid operators and NGOs to address key challenges in the implementation of IVM practices. These challenges include shifting traditional mindsets regarding right-of-way vegetation management, securing internal buy-in, gaining regulatory and internal company support for funding, and determining standardised scientific indicators to measure the impact of IVM in grid corridors (e.g. wellbeing of ecosystems, interconnectivity, development of biodiversity) .

The ***actions*** to address those challenges in 2025 are as follows:

1.1.1 Detailed case studies

The *highly* detailed business case studies would outline the **cost** (i.e. initial investments, people hired, CAPEX/OPEX, etc.), benefits (i.e. public acceptance, reduced costs over time, biodiversity impact, etc.), and what types of regulations (i.e. support for IVM, fire prevention regulation, bureaucratic hurdles etc.) grid operators are working with to achieve their IVM implementation. Case studies would focus on certain grid operators, who provide access to the data of IVM implementation. RGI in turn would publicise the business case studies as a leading best practice in the industry apart of their operational goals and work under the GINGR project (linked to IUCN).

1.1.2 Support IVM at regulatory level

RGI is working with ACER and ENTSO-E on more regulatory recognition of stakeholder engagement in financing processes. This presents an opportunity to extend this to greater flexibility/support for biodiversity-positive actions in a top-down approach. In the meantime, grid operators are encouraged to work on a bottom-up approach highlighting the struggles and **benefits** of IVM to their superiors and their own national regulatory authorities (NRAs)

1.1.3 Biodiversity monitoring and reporting processes

From 2025 onwards, RGI will be leading a Linear Infrastructure working group under the GINGR initiative. The goal for the group is to construct a framework for the monitoring of the positive & negative impacts of linear infrastructure on nature and people to be used in reporting processes. The IVM workshop participants agreed on the clear link to their work and need for a monitoring standard due to the CSRD and other biodiversity goals/reporting processes that are coming from EU Directives.

- Interested parties included REN, APG, RTE, Red Eléctrica, SEPS (TSOs), E.ON, E-REDES VSD, (DSOs), RPS (NGO), & Ecofirst (Consultancy)

Beyond these structured actions, the IVM WG group identified several priority topics to be discussed during meetings in 2025. The full list is below and their **tentative** groupings. This can be extended by group members:

1.1.4 Q1: **IVM Planning Tools and intiatives**

- Software/tools for IVM planning - Tool from E.ON
- *Tentative:* Vegetation above underground cables/vegetation in substations

1.1.5 Q2: **Reporting**

- CSRD
  - Benchmarking and lessons learned after first year of reporting
  - Status of CSRD after the Omnibus
- LEAP Approach (Task Force on Nature-related Financial Disclosures)
- Database for biodiversity reporting
- Internal reports on benefits of IVM, e.g. APG; Elia

1.1.6 Q3: **Monitoring**

- Scientific target setting for biodiversity and restoration
- Invasive species monitoring – including the effect of climate change on invasive species growth and penetration of the region
- Ecosystem services measurement through IVM

1.1.7 Q4: **Special Topics and Projects Showcase**

- Carbon & Biodiversity Voluntary Markets for financial offsetting
- *Tentative:* Vegetation above underground cables/vegetation in substations

2. Break-out Sessions

The break-out session sought to answer two questions.

1) What is the scope of biodiversity monitoring in each participant organisation?

2) What challenges do participants face in IVM implementation and how are they approaching these challenges?

The four-groups brought together a wide variety of answers, but general challenges and solutions discussed pointed to the actions outlined in sections: **1.1.1 - 1.1.3**

2.1.1 **Scope of Biodiversity Monitoring**

Participants shared a wide range of biodiversity monitoring practices, some grid operators conduct extensive monitoring, while others only monitor to fulfil EIAs (Environmental Impact Assessments) and some only of IAS (Impact Assessments) or not at all. Yet it is important to know also the who, what, how of monitoring.

- **Who conducts the monitoring** – Either in house biologists, external contactors, or work with universities.
- **Methods of Monitoring** – Field survey, satellites, changing intensity, photo traps, cameras, drones, and other technical solutions needed to support.
- **What is monitored (scope)** – Focus tends to be on specific areas of priority plant & animal species, biodiversity hot-spots and grazing areas. This is done to create a

representative overview of biospheres, as monitoring the entire right-of-way areas is not feasible.

2.1.2 Challenges IVM practitioners face in biodiversity monitoring and impact sharing.

IVM practitioners face several challenges, including the need for standardised monitoring, expertise development, regulatory hurdles, and integrating biodiversity considerations into business frameworks. Addressing these issues requires coordinated efforts, financial investment, and clearer communication within the sector. The main challenges are listed are below:

- **Monitoring Standardisation:** A common approach is required, especially for regulatory reporting, and an online portal or digital tool could help streamline data collection.
- **Expertise & Cost Barriers:** Personnel training and tools for effective monitoring take time and resources, with new technologies like drones and cameras being costly.
- **Regulatory & Stakeholder Challenges:** Interactions with regulators and regional legislation can limit IVM implementation, while private landownership adds further complexities.
- **Biodiversity Integration & Business Alignment:** There is a lack of clarity on biodiversity-related concepts, and more work is needed to integrate IVM into business strategies, such as linking biodiversity impact to financial mechanisms like green bonds.

3. IVM Presentations & Discussions

Over the course of three days participants discussed and presented on the topics of financing, training, undergrounding, community engagement, regulation, and monitoring. The following notes are a detailed overview.

3.1.1 Financing

The consensus is that grid operators can always do more with EU LIFE Project funding. However, each grid operators have different hurdles they must overcome to internally fund IVM implementation.

- **E.ON (Europe/Czechia):** Regulators prioritise low energy prices, hindering funding for IVM due to its higher initial costs and a limited focus on biodiversity. Also, management likes to see returns on investments in two-three years and it is difficult to make a case on actions that would be best to study over 10 years.

- **RTE (France):** RTE is not able to classify IVM as CAPEX (capital expenditure) because they do not own the land in their rights-of-way so it cannot be valorised. Therefore, each IVM site in France is OPEX (operational expenditure) and needs to have a return on investment within 10 years. There is even more pressure to have a unit price/ hectare, even though costs can vary due to biome types and quality of habitat, because the regulator does not recognise IVM as an appropriate response to regulation.
    - **Ongoing discussion**: To see if incentive regulation could support IVM but this requires answers to associated funding, unit price per hectare for an average cost for IVM.

- **REN (Portugal):** IVM is a CAPEX cost as it is seen as an investment in fuel management to prevent forest fires. This enables more sophisticated IVM implementation for the TSO. REN is also compensated through government funding for the maintenance of their grid corridors/fire breaks.

- **APG (Austria):** IVM is OPEX (operational expenditure) and is built into the project budget at APG. Since 2013 IVM has been a part of vegetation management in all of APG's forested areas. Additionally, since they have been implementing IVM for so long, IVM costs are now fixed for 10 years.

- **ELES (Slovenia):** Due to land fragmentation, the grid operator spent €1.5 million acquiring 700 parcels for compensatory measures and habitat restoration.

- **50Hertz (Germany):** They have a goal of IVM in 90% of forested areas by 2030 but mostly focus IVM monitoring in special habitats to be more cost effective.

- **Fingrid (Finland):** Selective cutting is funded through CAPEX, and when management compares the prices with other CAPEX projects it is not as expensive, so Fingrid does not see their biodiversity actions as a major cost.

3.1.2 Metrics and Monitoring

With new CSRD and Nature Restoration laws, metrics and monitoring are increasingly vital, but TSOs are still establishing baselines. Using drone mapping, TSOs usually identify key areas for IVM, focusing on invasive species and special interest zones.

- **50Hertz (Germany):** The TSO uses helicopter to LiDAR map areas every 3 years and identify risks zones for selective vegetation removal. The grid operator also:
    - Prioritises project areas for monitoring
    - Have a challenge finding data points that are measurable and understandable to management.
    - Need a measure for negative environmental impacts as it is required for the CSRD.

- **Ecofirst (Belgium):** Use a land cover map as their baseline measurement and prioritise measurement of 33% of corridors (special areas) and invasive species for economical monitoring. The consultancy is hesitant to put a price on ecosystemic services as that could be more harmful than helpful in biodiversity protection. **See section 4 for more in-depth discussion on monitoring.**

- **RPS & SEPS(Slovakia):** The NGO (RPS) states that biodiversity monitoring baselines should be assessed in context of the entire ecosystem. This could then be a better tool for the CSRD monitoring. They also advocate for different indicators around SPA (Special Protection Areas) and SCI (Sites of Community Interest) as they have different priorities when making up the

Natura 2000 network.

- **REN (Portugal):** Current indicators derive from Environmental Impact Assessments (EIA) and bird monitoring, but they seek broader metrics, including abstract benefit measurements. Their current monitoring needs are:
    - A centralised database for improved data reporting and monitoring.
    - Funding aligned with regulator requests to support diverse and abstract benefit indicators.
    - Monitoring after project completion.

- **Fingrid (Finland):** The TSO uses basic camera traps to monitor animal species in the corridors. However, they do find the cameras too slow to monitor the endangered flying squirrels.

- **IPTO (Greece):** The TSO uses drones to evaluate corridor vegetation on fire risk. This is then used to implement conventional vegetation management in corridors. To offset impacts, they use compensatory measures in other locations.

- **APG (Austria):** A new focus for them is the monitoring of lichens inside their corridors, and their impact on air quality. Otherwise, they do monitor biodiversity with a focus on pylons bases. See **section 3.1.1** for more information their guidelines around vegetation management in pylon bases and maintenance worker safety.

- **VSD (Slovakia):** Biologists individually assess each area, and use drones to identify trees for removal, and monitor invasive species growth.

- **E.ON (Czechia):** They map specific habitats under the lines, and aim is to have 100% of the grid mapped & IVM implemented in all '**appropriate**' HV corridors by 2029. The have developed two tools for mapping:
        - 1) A biotope index, which is a simplification of the EUNIS index.
        - 2) SAMS – A digital solution redefines vegetation management through data-driven and predictive insights leading to standardised, sustainable practices and enhanced ecology. Uses satellite data, LiDAR & helicopter flight data for implementation of IVM through refined mapping & planning. NB: A presentation and demonstration of this tool will take place in the next online meeting of the IVM Working Group in late February 2025.

- **Bayernwerk (Germany):** Mapping, monitoring, and IVM implementation is contracted out, and the focused on specific species for monitoring.

3.1.3 Training: Worker safety & Capacity building

Worker safety is one dimension that is featured in the CSRD, that has not been fully discussed in detail but is at play in IVM implementation.

- **RTE (France):** Maintenance workers argue that selective cutting with chainsaws increases injury risk and vegetation around pylons hinders climbing for maintenance.

- **APG (Austria):** Maintenance workers can be trained to identify trees and shrubs for removal, with safety gear to mitigate risks. Physical injuries most typically occur with larger trees which are not the usual target of selective removal.

  For vegetation in and around the base of pylon's APG has three rules.

  1) No thorny shrubs.
  2) No maintenance during nesting season.
  3) Workers can remove vegetation to safely access the pylon.

- **Red Eléctrica (Spain):** They educate their contractors around safety procedures.

- **Bayernwerk (Germany):** They use grazing sheep and goats in difficult-to-access areas which reduces machinery costs and enhances worker safety by minimising chainsaw-related risks.
  - **Steps for implementation are**:
    - Identify landowners
    - Create agreements with landowners and conservation authorities
    - Set up usage contracts with the landowners and owners of animals
    - Preparation of designated areas
    - Set up of fences (funded by Bayernwerk)

- **50Hertz Germany:** A technical guide written by tech & environmental departments include nature law and corridor management processes for workers. This also includes training for service providers (foresters/woodcutters) to know what to do and what not to do in the corridors. Additionally, to maintain compliance and updated knowledge of IVM across the company 50Hertz also:
  - Conducts common inspections around 'alternative' concepts for challenging corridors.
  - Holds a workshop every six months with one fieldworker from each region of 50Hertz network area to exchange on current issues best practices and share new technologies.

3.1.4 Undergrounding

Some working group members underlined the complexity of undergrounding cables and the panoply of factors at play in taking the decision to 'go underground':

- **APG(Austria):** Undergrounding is feasible only for lower voltages, as over 380 kV is impractical. Undergrounding can also disrupt more of the biome than overhead lines and has more limitation to what can be maintained in the area, i.e. wetlands.

- **E-REDES (Portugal):** It is more practical to have overhead lines in the rocky and mountainous areas, as it would be vastly more expensive to underground.

3.1.5 Community Engagement

IVM is only possible with proper interaction with landowners and their permission to do something other than conventional maintenance. Additionally, engagement with community members means better relationships in the development of infrastructure projects and ability to be ambitious in IVM.

- **APG(Austria):** Community engagement is not only in building support for IVM with regulators, and community members, but also internal staff (esp. management). They host educational sites for all groups to build support for new IVM projects. One benefit of their work is the reduced the time it requires to obtain new permits**,** as administration and public perceive IVM as a benefit, thus shortening consultation time.

- **IPTO (Greece):** Community engagement primarily involves compensatory payments via NGOs or funding mechanisms, with individuals submitting applications for approval directly to IPTO.

- **VSD (Slovakia):** Social engagement is funded through the IVM budget, so they focus more on monitoring and implementation than social engagement. Thus, IVM management interactions are mostly 1-on-1 conversations with landowners to talk through the process of IVM. Also, they work in collaboration with universities to investigate best management techniques around invasive species, including the black locust (*Robinia pseudoacacia).* Four methods have been tested so far, 1) rotary milling, 2) herbicides, 3) cutting and discarding wood, 4) cutting and wood disposal.

- **ELES (Slovenia):** It is difficult to identify landowners and build trust with them in Slovenia. Thus, an alternative approach to IVM implementation is compensatory measures such has wetland habitat restoration.

- **Red Eléctrica (Spain):** A pilot project in La Rioja uses extensive grazing for environmental conservation. The project has multiple benefits in terms of vegetation control, natural capital, sustainable employment, reduction of greenhouse gas emissions, biodiversity, soil fertility, pollinator presence. It is also valued as Nature-based Solution by IUCN.
  NB: La Rioja remains a pilot project with no successor found yet.

- **REN (Portugal):** They collaborate with communities to explore economic benefits from harvesting native species or creating other benefits for community members. Currently, REN is contacting about 25,000 landowners a year to find shared value projects.

- **RPS & SEPS (Slovakia):** SEPS (DSO) demonstrate that a human approach to IVM projects can achieve a strong, positive emotional link. They did this with cooperation on a wetland habitat restoration project between RPS (NGO), the TSO, landowners, the local municipality, hunters, and an agricultural company. The project consisted of revitalization of three small water bodies with a total area of almost 100 m^2, a 5 m long stone wall, and shelters were built for reptiles, amphibians, insects, hunting game species, and birds. One results of the project is that the water bodies now still exist during the hot and dry summer months.

****It is noted that grid operators need to be make sure community engagement and storytelling is organic. Otherwise, it might be considered green washing*.

3.1.6 Regulation

Varying national regulations on forestry, environment, and energy offer little to no flexibility around vegetation management. This fact often requires grid operators to reconcile conflicting laws to comply with guidelines. Operators spoke on two priorities fire management and general forest management.

1) Fire Management

- **IPTO (Greece)**: Greece hosts over 1,249 protected areas, including 446 Natura 2000 sites. Balancing nature protection with community needs is challenging. Moreover, in 2020 legislation permitted increased clear-cutting to mitigate forest fires. This has been the general practice to protect security of supply. However, for new projects IPTO is obliged to reforest areas equivalents to areas deforested in the project's construction phase.
  - **Plans for future**:
    1) to develop early detection of forest fires through smart sensors and cameras (in collaboration with climate ministry & fire service)
    2) Use of drones to inspect OHLs in the future.

- **50Hertz (Germany)**: They use helicopters instead of drones to evaluate forest areas, due to German law that states drone operators can only fly drones as along as operators can see the drone. Through the mapping they identify areas to reduce fire risk either with grazing sheep or manual removal of vegetation.

- **Red Eléctrica (Spain):** They are exploring grazing as a strategy against fire risk.

- **E-REDES (Portugal):** Portugal's fire management, electricity stability, and forestry regulations lack alignment. The current safety distances for the DSO level are mandated only 2.5 meters on either side of the OHLs vs. 7.5 meter to establish the right-of-way as a firebreak. To find a nuanced solution to fire management and biodiversity protection E-REDES worked with universities to develop an index of 107 native species, aligned with the compatible occupation law, to benefit communities and reducing fire risks.

- **REN (Portugal)**: Fuel management is a top priority, as their grid corridors fulfil two missions: transporting electricity and a firefighting network of 'fuel breaks' in the landscape. They must maintain vegetation to always be under 50 cm, but exceptions are made for certain species to that are fire resistant like olive, strawberry, and orange trees. The TSO is compensated for their maintenance of fire lanes and REN works with community members when applicable to identify use cases of compatible occupation species, grazing, or other types of IVM in fire and biodiversity management.
  - **Currently in Development:**

1) A tool to anticipate when and where fires could impact infrastructure.
2) A mobile transformer truck to recharge the big electric machines under their lines by connecting to the pylons and giving electricity at the right voltage

2) Forest Management

- **Fingrid (Finland):** Finland is home to the endangered flying squirrel and must follow regulations on resting, breeding, and foraging areas to protect the species. This includes selective cutting of younger trees as the squirrel prefers older trees and leave shorter trees or place artificial trees to allow squirrels to glide through the rights-of-ways Also to increase invertebrate populations, Fingrid leaves dead wood in the edges of the corridor.
    - **Future actions**: Use technical solutions to place towers closer together (200 m instead of 250/350m) so that the cables are higher, and the trees can grow taller and still be within safety distance compliance. Strips of forest will be also 50 m wide.

- **APG (Austria):** The corridors managed by APG remain classified as forests, restricting the planting of new species or complete vegetation removal. APG collaborates with landowners and contractors to develop Integrated Vegetation Management (IVM) plans that comply with these regulations.

- **RTE (France):** The regulators want to keep more open areas in French forests as they are slowly declining. Yet, the forestry laws also complicate vegetation management, as they can be inflexible on the creation/maintenance of ‘open areas’ in grid corridors and what is not permitted to be removed.

- **ELES (Slovenia):** Natura 2000 areas take up to 37% of Slovenia and 20% of ELES’s transmission lines are in protected areas. ELES presented on their compensatory habitat restoration due to power lines passing through important wetlands in Slovenia.

4. Discussion on Biodiversity baselines, mapping & bird protection

Ecofirst (Belgium): The consultancy firm conducts IVM implementation, biodiversity monitoring, and mapping for Elia (TSO) in Belgium. They focus on enhancing corridors to reduce barriers and enhance habitat connectivity through targeted monitoring and mapping. When IVM is implemented, it is done to meets one of Europe's ambitions to improve the state of forests (i.e. selective cutting).

NB: According to Ecofirst, monitoring is a regulatory obligation

4.1.1 Forest Connectivity

To map connectivity Ecofirst discussed different scales (EU, National , Regional) it is up to the practitioner implementing IVM to decide what scale they want to work on. Ecofirst believe that the point of IVM is to integrate the grid into a mosaic of habitats that host populations of species and increase forest resilience**.** This includes work with glades, deadwood, edges, and unproductive species, as all vegetation layers are components of forest ecosystems.

4.1.2 Target setting for monitoring & mapping

How do we evaluate the environmental value of areas?

- Step 1) Define your targets: e.g. halt the erosion of biodiversity? Compensate for biodiversity loss?
- Step 2) Define baseline: i.e. what do we compare? Before/after implementation of infrastructure? Of vegetation management techniques? What is the geographical/temporal scale?
- Step 3) Define the tools you want to use: i.e. what, where and how measure the metrics of the state of biodiversity and environment?

4.1.3 Mapping the before/after:

Ecofirst's mapping exercises begin with constituting a baseline to compare with the future progression. They tend to find that while there are existing forests maps for baseline analysis, the maps are rarely, sufficiently, precise. Yet many forest mapping resources exist to define the baseline such as: remote sensing methods (aerial photos can help), Drone/LiDAR, etc. These tools, along with a field visit can provide more precise information on the biodiversity context in grid corridors. It is noted that mapping is time-consuming, so it is recommended to focus on priority or unique habitats. Other points to keep in mind with mapping:

- Ecofirst found when working in Belgium it was worth mapping only a one-third of surfaces in detail, where important species/populations can further develop and spread in the forested region.
- Invasive Alien Species (IAS) should be mapped as they decrease value of habitats and require specific actions to prevent further colonisation
- Habitat description (typology) and measuring their surfaces are key quantitative indicators to assess the evolution of the environmental value of corridors & substations, e.g. EU Habitat Directive Annex I

4.1.4 Monitoring of species

Populations of animals & plants form complex and dynamic assemblages. A list of species will never be comprehensive and does not answer the question on 'value' of ecosystems. Therefore, scientists look for **proxies by** sampling key taxa that are typical, closely associated with targeted habitats aka: umbrella species, protected/threated/red-listed species etc.

Argument around species sampling: It complex and time consuming vs. lack of accuracy/comparability/repeatability?

Potential interesting idea for new monitoring approaches

- Monitoring using passive acoustics

- Citizen science (i-naturalist), e.g. sensitisation + open data + huge potential

False good ideas:

- E-DNA
- Acoustic monitoring of pollinators

4.2 Stork Nesting solutions

BIOPOLIS (Research Institute): BIOPOLIS has done much work around Birds and OHLs infrastructure including wire maker effectiveness and stork nesting habits. In Portugal, they have a lot of storks on the pylons, 20% of the white stork population lives on the pylons. Many other species live via the storks' nests (given the size, it's a big home for other species). However, nesting on pylons is problematic as it is a risk for stork electrocution and flashover on the grid.

The recent study to prevent nesting showed that the non-mobile beacons used resulted in 50% efficiency, for dynamic beacons it was much higher.

Yet, when storks manage to block beacons if they have a little room on either the side of the beacons, in this case, it is better to place two beacons next to each other to prevent movement blockage.
NB: *Presentation slides from Wingspan2024 Day 1 are slides 155-166, the recording of live presentation starts on 7:16:00.*