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SPECIES**

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**RECONCILING ENERGY DEVELOPMENT WITH THE CONSERVATION OF
MIGRATORY SPECIES: AN ANALYSIS OF
NATIONAL REPORTS TO CMS COP11 AND COP12**

*(Prepared by BirdLife International for the multi-stakeholder Task Force on Reconciling
Selected Energy Sector Developments with Migratory Species Conservation)*

Summary:

This paper provides an overview of the efforts and progress made by Parties to reconcile the deployment of renewable energy and powerlines with the conservation of migratory species of wild animals, in accordance with Resolutions 7.4, 7.5, 10.11 and 11.27. It has been informed by an analysis of the national reports submitted by Parties in 2017, in advance of the 12th Meeting of the Conference of the Parties, as well as national reports submitted in 2014.

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1. Background

Global energy demand is expected to increase 30% by 2040, largely from growth in developing countries (IEA, 2016).¹ Meeting this demand, while simultaneously curbing climate change, will require a significant increase in renewable energy technologies (RET) and associated infrastructure such as powerlines. While the deployment of RET can have positive impacts on migratory species by mitigating climate change, it can also have negative impacts if poorly planned.²

In recognition of the risks to migratory species from the deployment of renewable energy and associated infrastructure, Parties to the Convention on the Conservation of Migratory Species of Wild Animals (CMS) adopted *Resolution 7.4 Electrocutation of Migratory Birds*, *Resolution 7.5 Wind Turbines and Migratory Species*, *Resolution 10.11 Powerlines and Migratory Birds*, and *Resolution 11.27 Renewable Energy and Migratory Species*. This Information Paper reviews the efforts taken by Parties to the CMS to implement these Resolutions, as reported by the Parties themselves in their national reports to the CMS Conference of the Parties (COP). This paper was written by BirdLife International on behalf of the CMS Task Force on Reconciling Selected Energy Sector Developments with Migratory Species Conservation (the Energy Task Force).

2. Scope and outline

The paper is based on an analysis of the national reports³ submitted in 2017 in preparation for the CMS COP12, as well as national reports submitted in 2014 in advance of COP11. At the time of analysis, 90 countries had submitted national reports to CMS in 2017, compared to 59 in 2014.

The analysis focusses on the threats posed by RET and powerline deployment, and efforts taken by countries to address these threats by implementing relevant CMS Resolutions (7.4, 7.5, 10.11, 11.27). While other threats such as poaching and habitat destruction are also important, and compound the threat posed by renewable energy and other infrastructure, they are beyond the scope of this paper. For an overview of these threats, and efforts made by Parties to implement other Resolutions, please refer to documents UNEP/CMS/COP12/Doc.19.1 and UNEP/CMS/COP12/Inf.30. The paper considers all taxa and RET. However, some taxa and RET may receive wider coverage in national reports due to the specific focus of Resolutions 7.4, 7.5, and 10.11, and the relatively recent adoption of Resolution 11.27, which addresses wind, solar, hydro-power and geo-energy as well as multiple taxa.

¹ IEA (2016), *World Energy Outlook 2016*, IEA, Paris.

<http://dx.doi.org/10.1787/weo-2016-en>

² Van der Winden, J., F. van Vliet, C. Rein, and B. Lane (2014), *Renewable Energy Technology Deployment and Migratory Species: an Overview*, commissioned by: International Renewable Energy Agency, Convention on Migratory Species, African-Eurasian Waterbird Agreement and Birdlife International, UNDP/GEF/Birdlife MSB project

³ All reports are available online at <http://www.cms.int/en/documents/national-reports>

This paper first examines and discusses the extent to which RET and associated infrastructure has been identified as an obstacle to CMS Appendix 1 species, and proceeds with an analysis of efforts made to address these threats. The paper then discusses the barriers to the implementation of the COP Resolutions, drawing on the outputs from the first meeting of the Energy Task Force, held in Cape Town, South Africa, in December 2016.

3. Renewable energy and powerlines as obstacles to Appendix I migratory species

Section 1.1 of the CMS national report framework asks Parties to indicate obstacles to migratory species. Possible responses related to the implementation of Resolutions 7.04, 7.05, 10.11, and 11.27 are limited to ‘electrocution’ and ‘wind turbines’. Powerline collision and obstacles posed by other RETs are not among the possible responses. The figures below therefore provide a conservative view of the geographic extent of the threat posed by RETs and powerlines to migratory species.

Of the 90 reports submitted in 2017, 47% (42 Parties) explicitly indicated that electrocution is an obstacle to CMS Appendix 1 migratory species in their country, while 38% (34 Parties) reported that wind turbines are an obstacle. Forty percent (36 Parties) did not identify either as obstacles (Fig. 1).

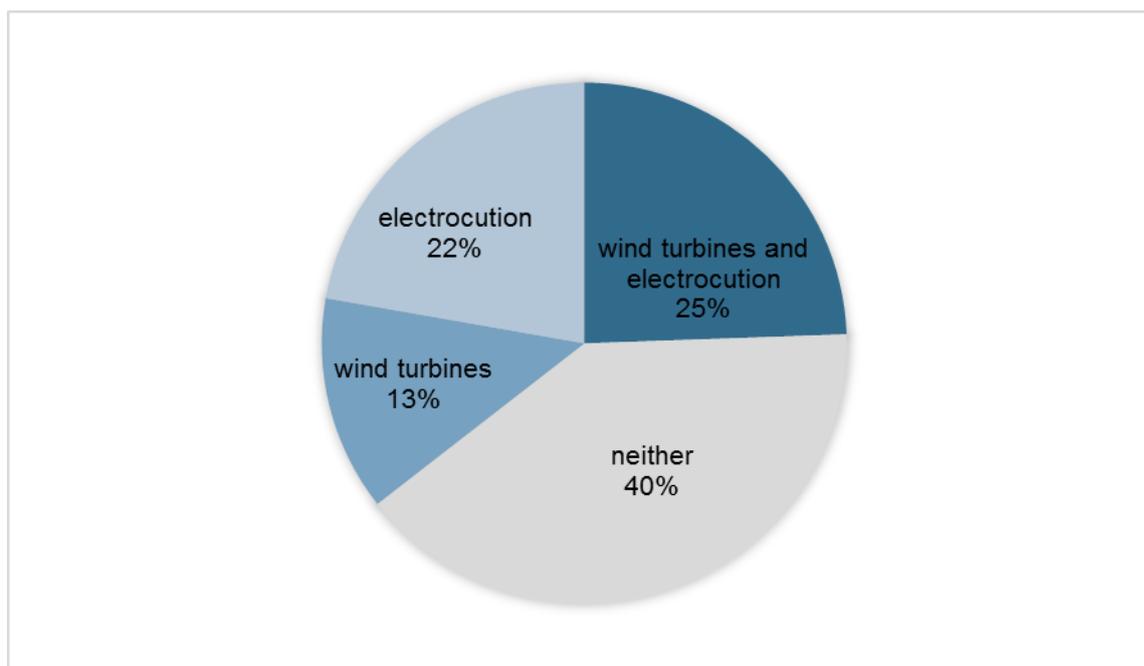


Figure 1: Percentage of Parties identifying wind turbines and electrocution as obstacles to migratory species in 2017 national reports.

Fifty Parties submitted reports in both 2014 and 2017. Of these, only 5 Parties identified additional obstacles in 2017 compared to 2014, and 4 Parties identified fewer. The remaining Parties reported the same obstacles (electrocution and/or wind turbines, or neither) in both years. Different responses between 2014 and 2017 may reflect changes in national circumstances, for example, new energy infrastructure or progress in applying avoidance and mitigation measures, or may be due to inconsistent reporting.

Several countries did not indicate that wind turbines or electrocution were an obstacle in Section 1.1 of their national reports, yet provided information on these issues in later sections of the report. Conversely, several countries flagged these as obstacles but did not report any action to address them. These inconsistencies are addressed in the relevant sections of this paper in relation to each obstacle.

4. Implementation of CMS Resolutions related to renewable energy and powerlines

All Parties that reported taking action to implement the relevant Resolutions included information on avifauna, for example, large soaring birds in Egypt and Eastern Europe, seabirds in the North Sea and Baltic Sea, and white storks and cranes across Europe and parts of Africa. Nine Parties (10%) reported actions to address impacts on bats: Belgium, Croatia, the Czech Republic, Germany, Macedonia, Malta, Netherlands, Poland and Serbia. Nine Parties (10%) also provided information on fish: Belgium, Estonia, Fiji, Georgia, the Netherlands, Slovakia, Switzerland, Ukraine and the UK. Seven Parties (8%), reported on marine mammals: Brazil, Croatia, Germany, Kenya, Malta, the Netherlands and Poland.

4.1. Resolutions 7.4 and 10.11: Power lines and Electrocution

While only 32 countries (36%) reported taking action to implement Resolution 7.4 Electrocution of Migratory Birds and/or Resolution 10.11 Powerlines and Migratory Birds in Section X of their national reports, an additional 24 Parties nevertheless reported relevant actions in other sections of the report. In total, 56 Parties (62%) mentioned actions taken to address either electrocution and/or powerline collision somewhere in their national reports.

Of these 56 Parties, 34 reported creation of, or ongoing compliance to, national or international legislation and 19 cited spatial planning and mapping. While only 7 Parties reported conducting Strategic Environmental Assessments (SEA), 26 referred to Environmental Impact Assessments (EIA). Mitigation measures, such as material and technical alteration of existing and planned infrastructure, were reported by 25 Parties. Monitoring and evaluation was mentioned by 24 Parties, and multi-stakeholder/sector cooperation by 23 Parties (Fig. 2).

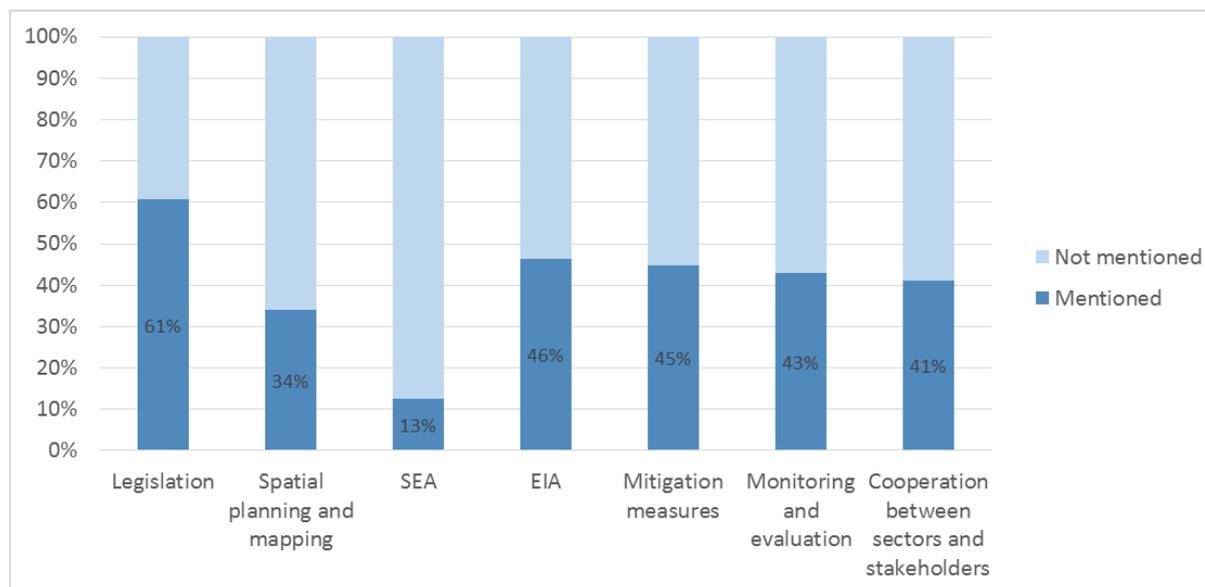


Figure 2: Reported measures taken by Parties to counter powerline-related obstacles to migratory species, as a percentage of the number of Parties that reported any relevant action in 2017 national reports, $n=56$

Slovakia reported cooperation between non-governmental organisations and energy companies, through a LIFE project targeting 10 CMS Appendix 1 bird species. Artificial nests, barriers, and flight diverters have been installed on power lines in order to avoid collision or electrocution of birds such as the Eastern Imperial Eagle *Aquila heliaca*, and the Great Bustard *Otis tarda*. Slovakia also mentioned systematic monitoring of avian mortality. Portugal, Hungary and Israel, amongst others, also reported successful alteration and adaptation of power lines, while Egypt reported progress on the safeguarding of soaring birds, and Morocco highlighted effective legislative measures. Ethiopia, Kenya, Latvia, India and Georgia, among others, mentioned EIA provisions. Moldova described the introduction of new national legislation governing relevant mitigation measures and prohibiting siting of new power grids in state protected areas or key migration corridors of wild birds, and Spain also described new legislation on mitigation. Pakistan and Norway reported applying CMS/AEWA guidelines to power transmission line projects. Saudi Arabia reported that it had published a study on power lines and migratory birds, but indicated a need for further research on mitigation. South Africa reported longstanding cooperation between an electricity company, Eskom, and the Endangered Wildlife Trust (EWT), but identified the need to review monitoring and mitigation measures.

Several countries reported on measures taken to prevent electrocution of bats: Belgium and Macedonia reported national requirements to assess impacts on bats prior to power line construction and all energy projects, respectively, while Serbia reported on efforts to implement the EUROBATS agreement, including mitigation of electrocution risk.

4.2. Resolutions 7.5 and 11.27: Wind turbines and Renewable Energy

In 2017, Resolutions 7.5 and 11.27 were generally reported on together. Only 25 Parties (28%) explicitly stated in Section X of their national reports that they have taken actions to implement Resolutions 7.5 Wind Turbines and Migratory Species and/or 11.27 Renewable Energy and

Migratory Species. However, an additional 20 Parties reported relevant measures in other sections of their report. In total, 45 Parties (50%) reported taking measures to address renewable energy-related obstacles to migratory species.

Of these 45 Parties, 27 mentioned spatial planning and mapping, 6 mentioned SEAs, and 30 reported conducting EIAs. Thirty-two Parties mentioned monitoring and evaluation, while only 2 mentioned cumulative impact assessments, and 2 stated adherence to the precautionary principle (Fig. 3).

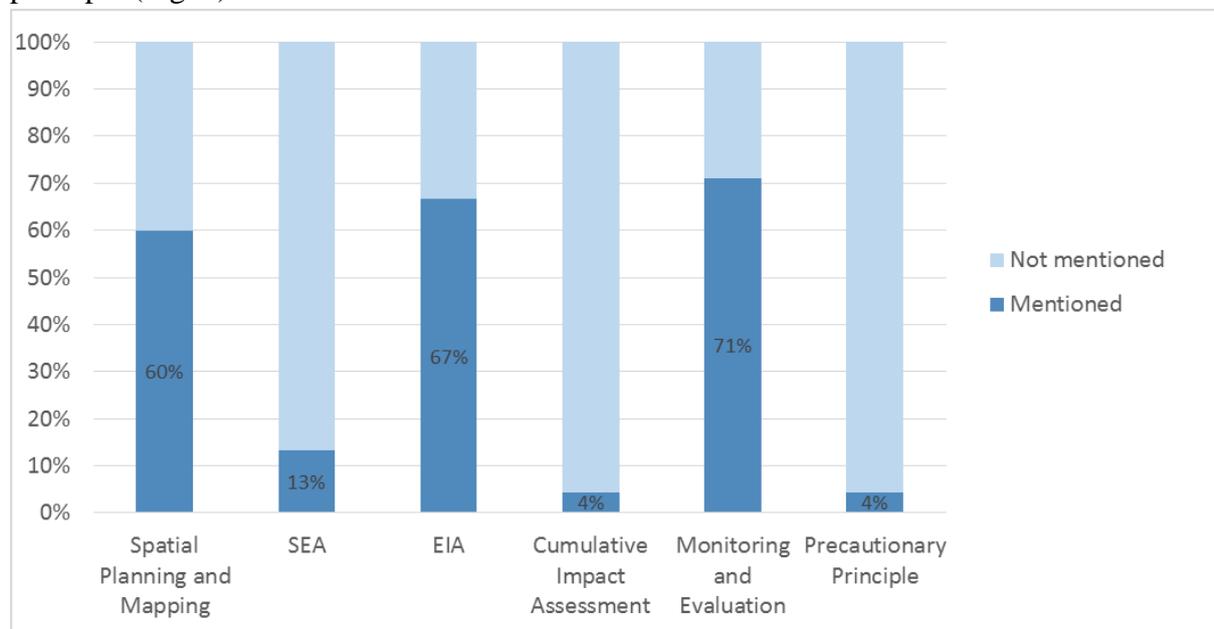


Figure 3: Reported measures taken by Parties to counter renewable energy-related obstacles to migratory species, as a percentage of the number of Parties that reported any relevant action in 2017 national reports, n=45

Several European countries mentioned the Natura 2000 scheme in relation to RET, noting that these areas require stringent EIAs. Finland, France and Portugal also reported that Natura 2000 sites are instrumental in the monitoring and assessment of the impacts of power lines and other infrastructure. Poland highlighted that the creation of its network of Natura 2000 sites is nearing completion, and will protect the habitats of harbour porpoises (*Phocoena phocoena*) and bats, in addition to migratory birds.

4.2.1. Wind turbines

Of the RETs, wind energy was reported by the largest number of Parties. Thirty-six Parties (40%) reported action to address the potential impact of wind turbines somewhere in their national report. Of these 36 Parties, 23 reported conducting spatial planning and mapping to avoid impacts of wind turbines on migratory species. Two Parties mentioned SEA, while 26 mentioned EIA. Five Parties reported on planning or alteration of infrastructure, and 15 reported on monitoring and evaluation. Cumulative impact assessment and the precautionary principle were each reported by 2 Parties. (Fig. 4).

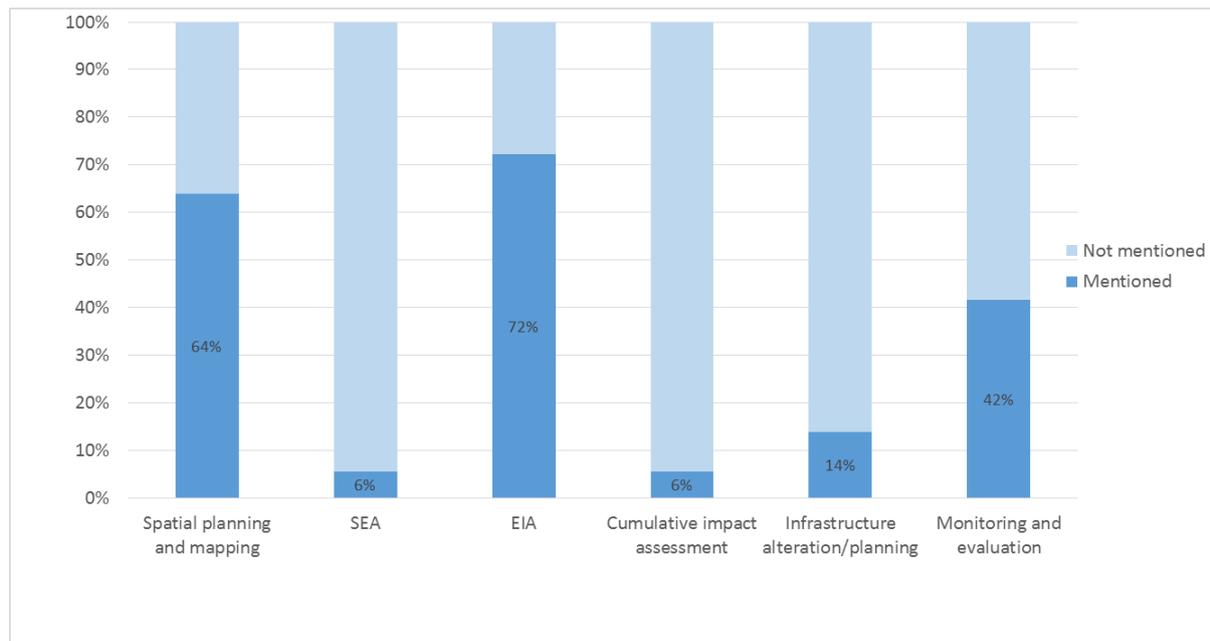


Figure 4: Reported measures taken by Parties to counter obstacles to migratory species relating to wind turbines, as a percentage of the number of Parties that reported any relevant action in 2017 national reports, n=36

Moldova reported the adoption of new legislation which prohibits siting of wind farms in state-protected natural areas and important migratory bird corridors, and mandates mitigation measures for existing installations. Poland reported that a law on wind investment has restricted the establishment of new wind farms in certain locations, reducing threats to migratory birds and bats. Belgium referenced flyway and migratory bird mapping carried out by the Research Institute for Nature and Forest, which is being used in the planning of all proposed wind projects in Flanders. Germany reported, among other things, successful studies and programmes to reduce bat collisions with wind turbines (RENEBAT); efforts to reduce bird and bat collisions with offshore wind farms; and the implementation of guidelines to mitigate bird and bat collisions by most German federal states. Jordan highlighted collaboration with energy developers, and implementation of CMS guidelines. The Netherlands reported undertaking monitoring, as part of an ASCOBANS National Report, to assess the impact of wind farms and their construction on marine mammals and fish. Kenya reported raising awareness of the impact of wind turbine noise disturbance on migratory turtles. The United Kingdom highlighted concerns regarding the impact of offshore wind turbines on fish species, and reported taking action to address this, off the coast of Gibraltar.

4.2.2. Hydro and dams

In 2017, 12 countries (13% of reporting Parties) reported on hydropower and dams as obstacles to migratory species. This compares to just 3 in 2014 (5% of reporting Parties), although it should be noted that Resolution 11.27 was adopted after the 2014 reporting period.

Four key measures were reported in relation to this issue: spatial planning and mapping, alteration or planning of infrastructure, monitoring and evaluation, and EIA. Spatial planning and mapping to reduce or avoid issues caused by dams and hydropower plants was reported by the largest number of countries (7 Parties). Belgium reported developing inventories and

mapping obstacles to fish migration, as well as transboundary cooperation with Luxembourg and the Netherlands, while Georgia reported incorporating considerations of migratory routes into project planning. The alteration and planning of infrastructure was reported by several countries: Belgium reported using protection netting in hydropower plants; Switzerland reported the construction of upstream and downstream fish passes as recommended by The Federal Office for Environment (FOEN); and Slovakia reported planning fish passes dependent on local geography and water course characteristics, and monitoring of fish passage through barriers.

4.2.3. Solar

In 2017, two countries reported on solar energy in relation to migratory species. This compares to no mention of solar energy in the 2014 reporting cycle, although it should be reiterated that there was no relevant Resolution at the time of the 2014 reports.

Ethiopia stated that CMS Guidelines were taken into account when implementing environmentally friendly energy resources, including solar energy. Jordan reported working with solar energy developers in order to implement international safeguards and national guidelines to mitigate threats to migratory and resident birds.

5. Assistance

Of the 54 countries which indicated energy-related obstacles, 33 requested assistance with implementation (37% of total reports). In 2014, 26 countries (44% of total reports) asked for assistance with similar obstacles.

In 2017 national reports, financial assistance featured most frequently, with 21 countries requesting financial/economic assistance. This equates to 23% of total reports and 64% of reports requesting some form of assistance. Other requests were for material and technical support (40%), regional and international cooperation (30%), capacity-building and training (27%), sharing of best practice and knowledge-exchange (21%), raising awareness (18%) and help with scientific monitoring and assessment (15%) (Fig. 5).

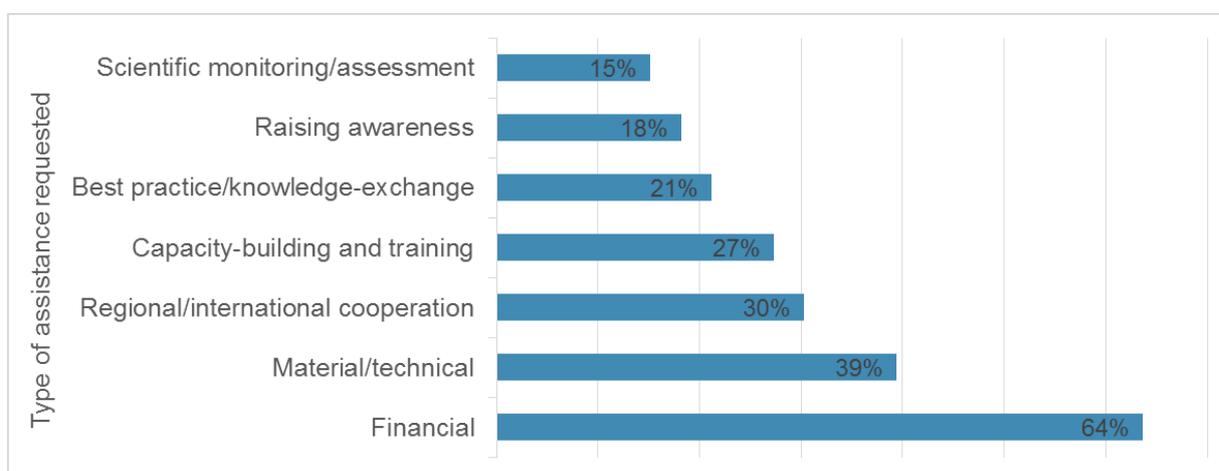


Figure 5: Types of assistance requested by Parties who identified wind turbines and electrocution as obstacles to migratory species in CMS Appendix 1, taken as a percentage of the total number of Parties requesting assistance, n=54.

6. Barriers to Implementation

Barriers to the implementation of Resolution 11.27 were identified during the first meeting of the Energy Task Force. Workshop participants identified barriers under four key groupings. These are discussed below.

i. Inadequate legislation and monitoring

Participants stressed that a key problem is the inadequate enforcement of policy and legislation, and the lack of monitoring of guideline implementation. Participants recommended standardising frameworks on EIA, monitoring protocols and cumulative impact assessment, and creating codes of practice for data collection, planning, mitigation and operational guidelines.

ii. Technical barriers

Participants reported technical barriers that restrict the effective implementation of the Resolutions, for instance, a lack of precise species-site data for the mapping of migratory species pathways, and a lack of knowledgeable, qualified and/or skilled personnel on the ground. It was suggested that species-specific information should be made available to project developers, alongside information on best practice. Workshop participants concurred that where there is a need for more data, targeted studies and training should be carried out.

iii. Information and communication issues

Another key issue which was raised is the lack of awareness within the private sector of the impact of energy development on migratory species. It was suggested that more biodiversity-related knowledge be disseminated, together with a strong economic argument, so that actors are fully informed and understand the win-win opportunities to save both wildlife and money in the development of energy projects.

It was explained that action on migratory species sparks fears that climate and economic action could be inhibited, and there is apathy and resistance from the energy and environment sector due to a lack of awareness. Further efforts are needed to engage with different types of stakeholders to emphasize the importance of, and opportunities for, developing energy infrastructure which is both climate- and species-friendly.

The Energy Task Force members noted that there is a lack of dialogue between stakeholders, and a lack of knowledge about best practice. Training and skills transfer must therefore be strengthened between Task Force members and other stakeholders. It was specified that tools and brochures for informing and training must be developed, and guidelines promoted. Some members indicated that more must be done to dispel fears about the reputational risk of data sharing, whilst respecting (or altering as appropriate) agreements on non-disclosure. Political will is required to drive legislative change. The participants identified the need for governments

to provide oversight throughout the entire lifecycle of a project, stressing that decision-making does not end with the EIA.

iv. Lack of resources and capacity

Inadequate financial support for projects was a recurring theme. It was suggested that priority projects and species must be identified, and made the focus of fundraising and of existing funding and resources. It was also stated that capacity-building is key to ensure that new and ongoing projects can be supported.

7. Summary and discussion

The deployment of energy infrastructure was reported as an obstacle to migratory species by the majority of Parties reporting to the CMS COP12. The extent of this obstacle can be expected to increase as countries pursue universal energy access and climate change mitigation targets, in the context of a rapidly growing global population.

More than 60% of reporting Parties are taking action to address the threat of electrocution or powerline collision to migratory species, while around 50% are taking action to address threats posed by RETs.

Effectively reconciling the development of RETs and powerlines with migratory species conservation will require interventions across the entire planning cycle, from spatial planning through to monitoring and evaluation. However, countries tended to report actions on only part of the planning cycle. For example, while EIAs are commonly reported across the different Resolutions, only a handful of countries reported conducting SEAs or cumulative impact assessments.

There are inconsistencies and gaps within countries' reporting. More comprehensive and consistent reporting would provide a more accurate assessment of progress made globally and by individual Parties, and to inform strategic planning for the future.

Important progress has been made to implement Resolutions on RET and related infrastructure. Parties are encouraged to ramp up their work to implement the CMS Resolutions 7.4, 7.5, 10.11, and 11.27 in a comprehensive and ambitious manner. The Energy Task Force will continue to work to support the implementation of these Resolutions, and, ultimately, to ensure that all energy sector developments are undertaken in such a way that negative impacts on migratory species are avoided.

Annex 1: List of country name abbreviations

<i>Full name</i>	<i>Abbreviated name</i>
Plurinational State of Bolivia	Bolivia
Republic of the Congo	Congo
Republic of Moldova	Moldova
Republic of Serbia	Serbia
Syrian Arab Republic	Syria
The Former Yugoslav Republic of Macedonia	FYR Macedonia
United Kingdom of Great Britain and Northern Ireland	United Kingdom
United States of America	United States

Annex 2: Breakdown of CMS Resolutions and thematic analysis

Key asks from Resolutions 7.4 and 10.11 are summarised in the table below, alongside the 7 themes used for analysis of country reports.

Themes	Resolution 7.4 Electrocution	Resolution 10.11 Power Lines
Environmental Impact Assessment		2.1 <i>apply</i> , in the African-Eurasian region as far as possible, and as applicable elsewhere, AEWA Conservation Guidelines No. 11 on Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) procedures regarding the development of power lines;
Strategic Environmental Assessment		2.1 <i>apply</i> , in the African-Eurasian region as far as possible, and as applicable elsewhere, AEWA Conservation Guidelines No. 11 on Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) procedures regarding the development of power lines;
Spatial Planning and Mapping		2.3 <i>establish</i> a baseline of bird distribution, population sizes, migrations and movements, including those between breeding, resting and feeding areas, as early as possible in the planning of any power line project, over a period of at least one year, and with particular emphasis on those species known to be vulnerable to electrocution or collision and if such studies identify any risks, to make every effort to ensure these are avoided. 2.4 <i>design</i> the location, route and direction of power lines on the basis of national zoning maps and avoid, wherever possible, construction along major migration flyways and in habitats of conservation importance, such as Important Bird Areas, protected areas, Ramsar sites, the East Asian-Australasian Flyway Site

		Network, the West/Central Asian Site Network for Siberian Crane and other waterbirds and other critical sites as identified by the Critical Site Network (CSN) Tool for the African-Eurasian region;
Mitigation Measures	<p>3 <i>Encourages</i> constructors and operators of new medium-voltage transmission lines and associated towers to incorporate appropriate measures aimed at protecting migrating birds against electrocution.</p> <p>4 <i>Calls</i> on Parties and non-Parties to appropriately neutralise existing towers and parts of medium-voltage transmission lines to ensure that migratory birds are protected against electrocution</p> <p>5 <i>Invites</i> all concerned to apply as far as possible the catalogue of measures contained in document UNEP/CMS/Inf.7.21, which are based on the principle that birds should not be allowed to sit on parts that are dangerously close to the transmission parts under voltage</p>	2.5 <i>identify</i> those sections of existing power lines that are causing relatively high levels of bird injury and/or mortality due to electrocution and/or collision, and modify these as a matter of priority by applying the techniques recommended by the Guidelines in UNEP/CMS/Conf.10.30
Legislation	2 <i>Calls</i> on all Parties and non-Parties to include appropriate measures in legislation and other provisions for planning and consenting medium-voltage electricity transmission lines and associated towers, to secure safe constructions and thus minimise electrocution impacts on birds	
Cooperation between Sectors and Stakeholders	<p>1 <i>Calls</i> on all Parties and non-Parties to curb the increasing electrocution risk from medium voltage transmission lines to migratory birds and to minimise this risk in the long term</p> <p>6 <i>Encourages</i> constructors and operators to cooperate with ornithologists, conservation organizations, competent authorities and appropriate financial bodies in order to reduce the electrocution risk posed to birds from transmission lines</p>	<p>2.2 <i>consult</i> regularly relevant stakeholders, including government agencies, scientific bodies, non-governmental organizations and the energy sector, in order to monitor jointly the impacts of power lines on birds and to agree on a common policy of action;</p> <p>3 <i>Urges</i> Parties and <i>invites</i> non-Parties, inter-governmental organizations and other relevant institutions, as appropriate, to include the measures contained in this</p>

		<p>Resolution in their National Biodiversity Strategies and Action Plans and relevant legislation, if applicable, in order to ensure that the impact of power lines on bird populations is minimized</p> <p>4 <i>Encourages</i> electricity companies such as RWE Rhein-Ruhr Netzservice GmbH to disseminate the Guidelines widely within their networks, including at relevant conferences;</p> <p>7 <i>Urges</i> Parties and <i>invites</i> UNEP and other relevant international organizations, as well as the energy sector, to support financially the implementation of this Resolution</p>
<p>Monitoring and evaluation</p>		<p>2.6 <i>regularly</i> monitor and evaluate the impact of power lines on bird populations at the national scale, as well as the effectiveness of mitigation measures put in place to minimize the impact of power lines on bird populations;</p> <p>3 <i>calls on</i> Parties to report progress in implementing this Resolution to each Conference of the Parties as part of their National Reports;</p> <p>5 <i>Requests</i> the Scientific Council, specifically the Working Groups on birds and flyways, to monitor the implementation of this Resolution and to provide further guidance when relevant new developments on reducing the impact of power lines on birds become available, such as improved mitigation techniques;</p>

Key asks from Resolutions 7.5 and 11.27 have been summarised in the table below, which shows the 6 themes used for the analysis of country reports.

Themes	Resolution 7.5 Wind Turbines	Resolution 11.27 Renewable Energy
Environmental Impact Assessment	<p>1. <i>Calls</i> upon the Parties:</p> <p>b) to apply and strengthen, where major developments of wind turbines are planned, comprehensive strategic environmental impact assessment procedures to identify appropriate construction sites</p> <p>c) to evaluate the possible negative ecological impacts of wind turbines on nature, particularly migratory species, prior to deciding upon permission for wind turbines</p>	<p>2.1 apply appropriate Strategic Environment Assessment (SEA) and EIA procedures, when planning the use of renewable energy technologies, avoiding existing protected areas in the broadest sense and other sites of importance to migratory species</p>
Strategic Environmental Assessment		<p>2.1 apply appropriate Strategic Environment Assessment (SEA) and EIA procedures, when planning the use of renewable energy technologies, avoiding existing protected areas in the broadest sense and other sites of importance to migratory species</p>
Cumulative Impact Assessment	<p>1. <i>Calls</i> upon the Parties:</p> <p>d) to assess the cumulative environmental impacts of installed wind turbines on migratory species</p>	<p>2.3 apply appropriate cumulative impact studies to describe and understand impacts at larger scale, such as at population level or along entire migration routes (<i>e.g.</i>, at flyways scale for birds)</p>
Spatial Planning and Mapping	<p>1. <i>Calls</i> upon the Parties:</p> <p>a) to identify areas where migratory species are vulnerable to wind turbines and where wind turbines should be evaluated to protect migratory species</p> <p>e) [...] to develop wind energy parks taking account of exchange of information provided through the spatial planning processes</p>	
Monitoring and Evaluation	<p>1. <i>Calls</i> upon the Parties:</p>	<p>2.2 undertake appropriate survey and monitoring both before and after</p>

	e) [...] to develop wind energy parks taking account of environmental impact data and monitoring information as it emerges	deployment of renewable energy technologies to identify impacts on migratory species and their habitats in the short- and long-term, as well as to evaluate mitigation measures
Precautionary Principle	1. <i>Calls</i> upon the Parties: e) to take full account of the precautionary principle in the development of wind turbine plants [...]	

Resolution 11.27: priorities for different types of renewable energy

3. *Urges* Parties to implement, as appropriate, the following priorities in their development of renewable energy technologies:

3.1 **wind energy:** undertake careful physical planning with special attention to the mortality of birds (in particular of species that are long-lived and have low fecundity) and bats resulting from collisions with wind turbines and the increased mortality risk to cetaceans from permanently reduced auditory functions, and consider means of reducing disturbance and displacement effects on relevant species, including deploying measures such as ‘shutdown on demand’ as appropriate;

3.2 **solar energy:** avoid protected areas so as to limit further the impacts of deploying solar power plants; undertake careful planning to reduce disturbance and displacement effects on relevant species, as well as to minimise the risks of solar flux and trauma related injuries which could be a consequence of a number of solar energy technologies;

3.3 **ocean energy:** give attention to possible impacts on migratory species of increased noise and electromagnetic field disturbance especially during construction work in coastal habitats, and injury;

3.4 **hydro-power:** undertake measures to reduce or mitigate known serious impacts on the movements of migratory aquatic species, such as through the installation of measures such as fish passageways; and

3.5 **geo-energy:** avoid habitat loss, disturbance and barrier effects in order to continue to keep the overall environmental impacts at their current low level;