United Nations
Educational, Scientific and
Cultural Organization

Österreichisches Nationalkomitee
Man and the
Biosphere Programme

Position Paper of the Austrian National Committee for the UNESCO Programme 'Man and the Biosphere (MAB)' for Using Renewable Energies in Austrian Biosphere Reserves

Please note that the position paper is focused on Austrian biosphere reserves and is thus based on the legal, environmental and social framework in Austria. In consequence, it might be somewhat difficult to transfer the views of the Austrian MAB Committee to other countries. Nevertheless, we are convinced that our paper may serve as valuable resource for dealing with similar issues in other regions of the world.

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1. INTERNATIONAL CONTEXT

The scale of climate change in our time confronts our society with unprecedented challenges. The goal set in the Paris climate protection agreement (2015) is to keep the increase in global average temperature to well below 2°C above pre-industrial levels thus necessitating fundamental changes in all aspects of everyday life and the economy. This means, above all, to phase out fossil fuels as far as possible, to increase energy efficiency and to expand the use of renewable energies.

In 2011 the steering committee of UNESCO's '*Man and the Biosphere* (MAB)' Programme, the so-called '*MAB International Co-ordinating Council*', posited in its 'Dresden Declaration' climate protection as one of the core ecological challenges of our time. At the same time, Biosphere Reserves (in Austria: Biosphere Parks)[1] were called upon to augment their commitment to this field and to become model regions for sustainable development, at the same time as safeguarding biological diversity thus acting as pioneers in both respects. In this light, they are also called upon to contribute to the implementation of the Green Economy concept intended to decouple economic growth from resource consumption as set out in 'Horizon 2020' (EU).

On the occasion of the General Assembly of the United Nations held in September 2015, the 193 member states broke new ground by adopting 17 global *Sustainable Development Goals* (SDGs). By means of the *MAB Strategy* (2015-2025) and the *Lima Action Plan* (2016-2025), the MAB Programme and its global biosphere network contribute significantly to the implementation of Agenda 2030 and the SDGs.

In this context biosphere reserves can become effective tools for climate protection and for adapting to climate change. This applies in particular to the fields of environmentally compatible and resource-conserving management, sustainable land use, energy efficiency and renewable energies. Energy transition, i.e. the development – based on renewable energy sources - of an energy system fit for the future, provides good opportunities to our own biosphere reserves for further advancement of their social, ecological and economic development. On the other hand, this confronts biosphere reserve regions with new challenges, because the expansion of renewable energies is bound up with demands on the utilisation of space which run into conflict with nature conservation requirements and which may affect a landscape's appearance.

Renewable energies such as wind, water, sun and biomass involve spatial demands thus potentially competing directly with our efforts to safeguard biodiversity. In this context, wind and hydropower as well as large-scale photovoltaic plant – in view of their structural impacts – are likely to represent the greatest conflict potential. On the other hand, the use of renewable energy sources can also provide synergies in our endeavour to achieve nature conservation objectives, such as the moderation of climate change by means of the valorisation of biomass resulting from land management. Changes in the use of open spaces by the installation of technical plant for energy production (e.g. wind power, large-scale photovoltaics, hydropower utilisation) or large-scale monocultures planted for energy crops, can lead to considerable impacts on ecosystems and the scenic value of landscapes thus causing a decline in the quality of a biosphere reserve. Moreover, such impacts can trigger conflicts with local residents.

2. SITUATION IN THE AUSTRIAN UNESCO BIOSPHERE RESERVES

The Austrian UNESCO Biosphere Reserves 'Großes Walsertal', 'Wienerwald' and 'Salzburger Lungau und Kärntner Nockberge' have set themselves the goal of serving as model regions for sustainable development. Through a number of projects and measures, these three biosphere reserves have been

making important contributions to climate protection and adaptation to climate change. The pilot projects they have been running are of exemplary standard worldwide - in the fields of sustainable land use, management systems that are both environmentally compatible and resource-conserving, as well as projects to safeguard ecosystem services, projects involving energy efficiency and the production of various forms of renewable energy. Naturally, energy is a core subject regarding the future of our domestic biosphere reserves. Consequently, it is one of the declared objectives of Biosphere Reserve 'Großes Walsertal', to achieve 100% self-sufficiency on the basis of regionally produced energy. This Biosphere Reserve is a 'Klima- und Energie-Modellregion'[2], '*e5*-Region'[3] and Member of the Climate Alliance[4]. Its numerous projects make an important contribution to the sensible use of energy. This entails essential factors such as energy efficiency, sustainable production of energy, economic cycles at the regional scale and sustainable mobility.

The conservation and sustainable development of biotopes and the provision of regionally renewable energy represent great opportunities for the future of our biosphere reserves. These objectives have paved the way for the creation of new income opportunities thus safeguarding long-term job security and high quality of life in the region. An essential prerequisite is that we maintain a well-functioning local supply system at the same time as promoting the creation of added value at the regional scale. The sustainable use of renewable resources is not just a valuable contribution to climate protection; it is also an opportunity for increasing the added value created within the region. Particular significance is therefore to be attributed to regional initiatives and service providers engaged in the expansion of renewable energies. For the sustainable use of renewable resources for energy production it is vital that the conservation of nature and landscapes is not neglected in favour of any putative economic or commercial benefit.

Climate change and the concomitant intention to phase out fossil fuels dictate new framework conditions which may in some cases require the redrawing of demarcation lines between conventional nature conservation and climate protection. It is imperative, however, to make every effort to reconcile the expansion of renewable energies with the requirements of nature conservation and the avoidance of land use conflicts. All measures must be designed in a way that our biosphere reserves are able to continue fulfilling the obligations placed upon them in view of their status awarded by UNESCO. The region's transition to self-sufficiency in matters of energy and towards having no net impact on the climate will not be achievable, however, without complete 'buy-in' by the population. Only then will biosphere reserves deserve the accolade of ‚model region' for sustainable energy.

According to UNESCO's guidelines, a biosphere reserve is divided into **core, buffer and transition zones.** The criteria laid down for biosphere reserves in Austria by the MAB National Committee (Österreichisches MAB-Nationalkomitee 2016) require that the **core zones** must be safeguarded in permanence as strict conservation areas (e.g. nature reserves, wilderness areas). Core zones must be entirely free from any form of utilisation. Exempted from this prohibition of use are extensively (as against intensively) managed types of traditional use (careful alpine farming, sheep farming etc.) as well as wildlife control or hunting/fishing carried out in line with ecological criteria.

As far as **buffer zones** are concerned, these have to be protected by suitable conservation categories (e.g. sanctuaries, Natura 2000 designated areas, areas of outstanding natural beauty). As far as utilisation is concerned, it is imperative to safeguard any relevant natural or cultural assets.

The **transition zone** is where the population lives, where they find recreation and where they are economically active. Our priority goal must be to ensure sustainable utilisation in order to conserve, manage and develop the cultural landscape and to maintain the landscape image specific to this region in terms of its natural and cultural assets. In line with the catalogue of criteria laid down for Austria, the objective is to set exemplary standards in transition zones, by means of innovative, sustainable forms of

economy and management, e.g. in the field of energy use, so that these standards can serve as models beyond the boundaries of our biosphere reserves.

3. WHY DO WE NEED A NATIONAL POSITION PAPER?

In our domestic biosphere reserves we are increasingly confronted with questions regarding renewable energies. That is why the Austrian MAB National Committee has prepared a position paper which was discussed at an international workshop held in the Biosphere Reserve 'Großes Walsertal' in 2016. This workshop was entitled 'Forms of Renewable Energy in Biosphere Reserves – what is permitted?'. It was attended by external experts who took part in discussions on this subject, which helped to clarify and progress our position. It is important to point out in this context that the National Committee is by no means against the use of renewable energies in biosphere reserves. On the contrary, the use of innovative methods is to be positively encouraged. The National Committee is conscious of the fact that in view of the stupendous technical progress taking place in our times, new technological solutions may emerge which might make their use perfectly conceivable in zones where this was originally (and currently still is) prohibited. Naturally, such developments would require the discussion process to be re-opened. The same would apply in case of any shifts in societal values.

This position paper is intended to provide recommendations and guidelines on sustainable production of renewable energies for anyone involved in the administration of a biosphere reserve and for lawmakers, in strict accordance with UNESCO's international criteria and our relevant national guidelines. This is to give biosphere reserves the chances and opportunities to guide and support Austria's 'energy transition' in a way that is largely free from conflict and will enable them to become model regions for the socially and ecologically sustainable production of renewable energy. By achieving their development goals, Austrian biosphere reserves can contribute significantly to the implementation of Agenda 2030.

4. THE MAB NATIONAL COMMITTEE'S GENERAL RECOMMENDATIONS FOR THE SUSTAINABLE USE OF RENEWABLE ENERGIES IN BIOSPHERE RESERVES

The scale of climate change in our time confronts our society with unprecedented challenges. The MAB-National Committee therefore supports the biosphere reserves' initiatives aimed at reducing energy consumption and the expansion of renewable energies. It is desirable for biosphere reserves to become shining examples for the kind of contributions that can be made by a region and its inhabitants in order to replace fossil fuels by alternative models, with the goal to achieve sustainable energy provision. The following recommendations are given with a view to presenting our biosphere reserves as model regions for sustainability:

- Unless this is already in progress, communities or regions should develop an energy concept which is in harmony with the conservation goals of their biosphere reserve. This concept should embody the sustainable use of renewable energies as well as measures to increase energy efficiency and energy conservation. Ideally this concept should incorporate zoning (designation) of new plant whose design enables them to be concentrated in the smallest possible number of sites. Prior to the construction of such plant, it is essential to examine and, where possible, to exhaust all feasible ways of increasing energy efficiency and reducing energy consumption. Any relevant measures should be given preference over the construction of new plant.
- Top priority must be given to the reduction of energy consumption, not only at the structural level (key phrase 'structural development planning for energy') but also at the level of individual technologies and plant (e.g. LED lighting, passive house, building refurbishment). The authors of this position paper recommend participation in the development and implementation of a regional energy concept and the use of quality assurance tools such as participation in the programs 'e5' or 'Klima- und Energie-Modellregionen (KEM)' and to take part in developing regional funding programmes.

- As far as space heating provision is concerned, the substitution of fossil fuels (especially oil-fired heating) with renewable energy sources should be promoted systematically.
- Sustainable mobility services (public transport, cycling, e-mobility and other innovative forms of mobility) should be expanded on the basis of a regional energy concept.
- Biosphere reserve communities should ensure credibility of their regional energy concept by increasing energy efficiency comprehensively in terms of street lighting, public buildings, transport fleet and their use of renewable energies, thus achieving model status beyond their own biosphere reserve. Efficient lighting also reduces light pollution which makes sense not just in environmental terms but also with regard to tourism (key phrase *La Palma Declaration 2007* on the 'Right to Starlight'), by providing profitability as a by-product.
- The resources used in a biosphere reserve for producing renewable energies must be adapted to the exigencies of the area.
- Where regionally renewable energies are used, preference should be given to technologies which bear no or little conflict potential regarding the requirements of nature conservation, landscape protection and water pollution control, such as heat pumps, small wind power plant, thermal solar energy and photovoltaics as integral parts of buildings.
- As a rule, the use of technologies and plant for the production of renewable energy in transition zones is to be supported. In cases where technologies might bear a high conflict potential, the MAB National Committee should be consulted for comment.
- The use of renewable energy sources should take place only where it is compatible with the requirements of nature conservation, landscape protection and water pollution control; it must also be in line with the prevailing structural development plans.
- In this context, education and knowledge transfer are vital control tools. Information communication and a wide-ranging consulting service on energy transition help to sensitise the population thus bringing about changes in attitude and value systems. Accordingly, it is recommended to intensify themed educational activities in the schools of the biosphere reserve region.
- The population and other interest groups must be closely involved both in the development of regional and energy/mobility concepts and in the implementation of new measures to harness sources of energy (e.g. wind power plant, hydropower). Where this is done from the outset and with due regard to complete transparency, it is possible to achieve tolerance of alternative opinions and support for the reconciliation of interests thus paving the way for decisions of higher quality and acceptance.
- With regard to the use of open spaces for energy production plant (wind power plant, solar power plant) or large-scale monocultures for energy crops in the transition zone of the biosphere reserve, the MAB National Committee should be consulted at the given moment. This applies equally in respect of hydropower plant which might change the ecological functionality of the catchment area.
- Preference is to be given to underground cables, provided this is compatible with nature conservation requirements.
- Priority is to be given to regional operators in order to retain value creation within the biosphere reserve. In cases where innovative plant/installations are to be constructed for decentralised distribution among rural areas, it would be desirable to link these into the local (own) demand of communities and companies, as components of an energy concept which adapts energy efficiency measures and the use of various renewable energy sources to local demand.
- Biosphere reserves can act as pioneers and model/test regions for state-of-the-art technologies aimed at energy-savings and the production of renewable energy, thereby serving as a tool for exploring the region's potential to contribute to technology transition. For example, biosphere reserves might act as model regions for adapting the forestry industry to climate change. Furthermore, biosphere reserves might explore the impacts of increased biomass use on forest ecology and they might trial various felling cycles with a view to optimising the production of biomass for energy purposes.

5. THE MAB NATIONAL COMMITTEE'S SPECIFIC RECOMMENDATIONS FOR THE SUSTAINABLE USE OF RENEWABLE ENERGIES IN BIOSPHERE RESERVES

5.1 WIND ENERGY

In some areas of Austria such as the Northern Burgenland (Nordburgenland) the use of wind energy plays a major role. It is important to acknowledge, however, that wind energy does not just have a plus side. It can entail drawbacks for the inhabitants, for the landscape and for biodiversity. In respect of nature conservation, these drawbacks can involve biotope deterioration and changes in habitat use, and – especially with regard to birds and bats – mortality through fatal collisions with rotor blades owing to the suction effect caused by them. Potential impacts on human beings involve noise pollution, shading and ice throw. In view of the structural height required for reasons of efficiency and because of usual sitings in exposed places, wind power plant can be perceived by local inhabitants as an aesthetic impairment. Moreover, the fact that surfaces tend to be sealed in the course of wind power plant construction as well as the access routes required for construction and maintenance can also give rise to complaints. It is therefore crucial to take a multitude of factors into account in planning and installing wind power plant and to involve the relevant interest groups in the planning process as early as possible. The perceived impairment of the landscape image is subjective and partly dependent on the preceding planning process.

Consequently, the MAB National Committee has formed the following opinion:

Under the criteria for biosphere reserves in Austria as laid down by the MAB National Committee (Österreichisches MAB-Nationalkomitee 2016), core zones must be safeguarded in permanence as strict conservation areas; the same applies to the conservation of assets of the natural and cultural landscape in buffer zones.

Consequently, the construction of wind power plant in core and buffer zones is prohibited. On the other hand, microplant as stand-alone solutions as an alternative to diesel generators, for example to provide electricity for existing mountain huts and shelters in areas of transhumance, are justifiable.

Subject to underlying Federal or State legislation precluding the use of wind energy, the construction of wind power plant in transition zones is permitted. However, the planning process requires the observation of particularly stringent technical, ecological and aesthetic standards. In this context, migration corridors and the remote visual impact of new plant have to be taken into consideration.

5.2 PHOTOVOLTAICS

In the course of recent years, prices for installing photovoltaics have fallen considerably thus increasing their distribution. Compared to fossil fuels, photovoltaic systems are characterised by a low carbon footprint, and the investment in such installations is therefore recouped more rapidly. This is making photovoltaic systems increasingly desirable to biosphere reserves in view of their role in climate protection. As far as humans and the landscape are concerned, the drawbacks are minor compared to other plant/installations, as long as such systems are integrated into other objects (such as walls and roofs of buildings, sound barriers, car parks, conversion sites) without taking up any additional ground space.
In cases where large-scale photovoltaic systems are to be installed in open spaces on the ground, the conflict potential is substantially higher, as such plant are more obvious, thus potentially constituting a visual impairment of the landscape image; they might also come into conflict with near-natural or traditional forms of land use. Moreover, such plant influence the local microclimate, and this may lead to changes in biodiversity. In such cases, the actual size of the plant will have to be taken into

consideration. Besides, the plant may have negative impacts on wildlife, for example, if it has to be fenced in.

Consequently, the MAB National Committee has formed the following opinion:

Under the development objectives for biosphere reserves in Austria as laid down in the catalogue of criteria for Austrian biosphere reserves, it is prohibited to install any large-scale plant in open spaces in core or buffer zones. On the other hand, the installation of microplant as stand-alone solutions in open spaces, as an alternative to diesel generators, for example to provide electricity for existing mountain huts and shelters in areas of transhumance, is desirable.

- Photovoltaic systems integrated into buildings are permitted in all zones and should always be given preference over placing installations in open spaces.
- When planning the siting of photovoltaic plant in open spaces in the transition zone, it is imperative to examine whether the plant would be in harmony with the biosphere reserve's conservation goals. The installation of such plant in areas of nature conservation value would not be considered compatible with biosphere reserve goals.
- When planning the installation of photovoltaic plant in open spaces, the highest possible aesthetic standards will have to be observed in order to avoid any impairment of the landscape image.

5.3 BIOMASS

Biomass has great potential as a renewable energy source. The benefits of biomass use are its largely closed CO_2 cycle, its storability and ready availability. Its other advantages are inherent in its potential for strengthening the regional economy of rural areas owing to its potential for facilitating decentralised generation and utilisation. Biomass energy can be used in solid, liquid or gaseous form. Examples are the generation of heat (e.g. by means of a wood-fired heating system or a biomass heating plant), the generation of electricity and heat in Combined Heat and Power (CHP) plant (for instance by means of a biomass heat and power plant or a CHP unit fuelled by biogas); and last not least the generation of fuels (e.g. from vegetable oils or biogenic residues). The greatest efficiency of use is achieved in heat-driven CHP plant; in terms of heating, a sustainable alternative is provided by heating units fuelled by firewood logs, woodchips or wood pellets. With regard to electricity, heat-driven CHP units and biogas plant fuelled by slurry and residues are recommended.

Provided it is used prudently, bio energy does indeed offer humans and the environment great opportunities. Nevertheless, the staggering increase in demand for biomass for the generation of bioenergy in the heat, power and mobility sectors has led to high pressure of utilisation on areas required for the production of food crops. The challenges involved are in safeguarding sustainable agricultural production and in avoiding the large-scale cultivation of maize, oil-seed rape and other energy plants used in close crop rotations. The risk is not only a distinct impoverishment of the landscape and the decline of animal and plant kingdoms, but also the impoverishment of soils. Moreover, the input of nutrients and harmful substances through fertilisers and crop protection substances into soils and water bodies constitutes another problem. The generation of renewable energy from biomass can be achieved not only by cultivating annual crops, but also by the thermal use of wood for energy production.

The burning of wood from a tree releases as much CO_2 as this tree has absorbed from the atmosphere during its lifetime. Apart from CO_2 emissions which result from wood harvesting, transport and processing, this means that the generation of energy from wood is CO_2 neutral. As far as sources for generating energy from 'energy wood' are concerned, it is possible, apart from using wood from plantations with short felling cycles ('energy forests') and felled trees from other forests, to use by-products from wood-processing operations (e.g. sawmills, joinery workshops), wood waste and recycled wood, as well as offcuts resulting from biotope and landscape maintenance. In the course of recent

decades, Austria for example has experienced increasing volumes of deadwood. However, the rising demand for 'energy wood' resulting from the expansion of biomass heating systems (e.g. wood pellets, woodchips) might mean that this trend will be terminated or even reversed. It is therefore conceivable that the increasing intensity of energy wood management in the forest might affect the wood waste and deadwood fauna and flora which depends on dying trees or solid deadwood. In that regard, it will be crucial to address the removal of nutrients by so-called whole-tree harvesting which means that not just the trunk wood but also the entire crown is removed from the forest, and it will be necessary to enforce site-specific solutions. As far as whole-tree harvesting in deciduous forests is concerned, it is vital to insist also in future that this type of harvesting is not carried out until after leaf fall. The challenge is to achieve sustainable utilisation of wood as energy source, thus ensuring that the forest can continue to fulfil all its functions well into the future.

The energy-related use of slurry, biowaste and other organic residues should be given priority over the cultivation of energy plants. The advantage of using residues is that this contributes to reducing greenhouse gases, whereas energy plants have high requirements for nitrogen and water and may also be an additional source of ammonia emissions. In the interest of open-space conservation, prunings can be used in the generation of biogas. It is therefore recommended to use this type of climate-neutral material emanating from the processes involved in biotope and landscape management.

Biosphere reserves contain valuable natural and cultural landscapes. Consequently, the MAB National Committee has formed the following opinion in respect of the sustainable use of biomass:

- **The utilisation of biomass from core zones is prohibited.** Wood waste and deadwood must be left in core zones in order to protect the fauna and flora which depend on this type of wood as facilitator of natural conservation processes. This is true, above all, in core zones dedicated to restoring some kind of original state (e.g. 'virgin forest'). Exceptions can be made in cases of officially mandated regulations (for example in respect of a phytosanitary risk).
- The planting of energy crops in buffer zones should be restricted to a minimum.
- In the transition zone and the buffer zone, the planting of energy crops must be carried out on the basis of ecological principles (e.g. environmentally sound use of fertilisers, crop rotation, flower strips containing wild plants typical of arable fields, landscape elements used in biotope networking). The size of the felling area should be consistent with local custom. Plantations of fast-growing species of energy wood (mostly varietal clones of poplars and willows) are also liable to produce undesirable effects. Nevertheless, it is possible to produce energy wood by using a greater variety of tree species involving different felling cycles and, where possible, also by optimising their spatial distribution in an eco-friendly manner, and even – where possible - with positive effects on the landscape image, at the same time as ensuring compatibility with the objectives of nature conservation.
- It is generally recommended to use slurry and by-products from landscape management for energy production in biogas systems.
- It is undesirable to gain additional arable land by ploughing up grassland. This applies in particular to sites in or near moorlands, wet meadows, alluvial areas and sites at risk of erosion.

5.4 HYDROPOWER

Hydropower is an important renewable energy source that contributes significantly to achieving the objectives laid down for renewable energies as prescribed by the EU. In view of the fact that this method generates electricity without causing direct CO_2 emissions, hydropower makes a substantial contribution to climate protection. However, a grave drawback of hydropower use is the fact that it can have negative impacts on aqueous habitats. The construction and operation of hydropower plant can have significant impacts on any immediately affected as well as adjacent river sections and any related wetland areas. Factors are, in particular, the disruption of the continuum of flowing water, changes in specific hydraulic

characteristics owing to water abstraction or impoundment of water resulting from demand-dependent electricity generation, thus causing variations in water levels, as well as sedimentation owing to reservoir flushing. The factors stated all have negative impacts on the aquatic fauna (fish, aquatic insects etc.) and on the status or condition of the water.

Flowing waters constitute vital biotopes for plant and animal communities. Today's pressures on these biotopes and the wildlife living in flowing water are already very high. It is therefore essential to do everything humanly possible to safeguard the functionality of near-natural flowing waters which are indispensable for maintaining biological diversity and for the protection of our climate. It is not easy to reconcile the use of hydropower with the concurrent conservation of water bodies; conflicts are therefore almost predictable. This makes it crucial to ensure that the utilisation of our water bodies is sustainable and compatible with the interests of all relevant parties. The generation of electricity from hydropower plays an important role in climate protection. On the other hand, it often competes with the interests of nature conservation and fisheries. A necessary prerequisite for the energy-related use of hydropower therefore is that it is ecologically compatible and socially acceptable.
Hydropower must be in conformity with the goals of the EU Water Framework Directive. According to this, by the end of 2027 all water bodies should have achieved good ecological status or good ecological potential.

Consequently, and in accordance with the default objective laid down in the EU Water Framework Directive stating that there must be 'no deterioration in status' of water bodies, the MAB National Committee has formed the following opinion regarding the construction of new plant:

- **In core zones the construction of hydropower plant is prohibited.**
- The buffer zone is another area where the construction of new hydropower plant has to be viewed in a very critical light and should be limited to small plant in compliance with high ecological standards, on condition that the remaining water levels are kept high. In cases where the water body is of very good ecological status, it is not acceptable for the quality component ‚water balance' to deteriorate. In major construction projects, it is required to seek the National Committee's comments.
- In buffer zones, the only installations justifiable would be micro-plant that conform to the highest technical standard and would cause only minimal interference with a water body (e.g. microturbines), installed as stand-alone solutions and acting as an alternative to diesel generators, for example to provide electricity for existing mountain huts or shelters in areas of transhumance.
- The use of hydropower is subject to strict compliance with the objectives laid down in the EU Water Framework Directive (no deterioration, good ecological status etc.) and in line with the implementation of our National Water Management Plans.
- Only innovative, near-natural hydropower technologies should be used. In this context it will be important to stipulate scientifically-based monitoring of compatibility with fish ecology.
- In cases where river sections in a biosphere reserve are to be designated as core zones, care must be taken that the core zone conservation goals are not jeopardised by interventions made in the upper or lower reaches of a river. Ideally, it would be advisable to make legal provisions apt to prevent negative impacts on the conservation content of the core zone. In cases where interventions in the upper or lower reaches of a river would be inclined to affect the ecological functionality of the river, any potential impacts on the core zone are to be explored. In cases where lakes are to be designated as core zone, care must be taken that the conservation function of the core zone is not jeopardised by any interventions made in the catchment area. Ideally, the catchment area should be incorporated into the biosphere reserve, or legal provision should be made to prevent, as far as possible, any negative changes in the core zone induced by interventions in the catchment area.

Where existing plant are concerned, the National Committee recommend to take the following rehabilitation measures in accordance with the precepts for upgrading the status of water bodies, as laid down in the EU Water Framework Directive:

- The modernisation of existing hydropower plant should be restricted to their actual structural size;
- Networking of biotopes by restoring contiguity (especially by the construction of fish ladders or bypass channels) and connectivity with inflows and side waters;
- Structuring heads of reservoirs;
- Increasing the diversity of habitats by means of restructuring water bodies (e.g. by means of localised widenings);
- Gradual achievement of a minimum water flow appropriate to the relevant type of water body in any residual water sections; dynamised residual water outflow equating as closely as possible to the good ecological status required by Austrian legislation on the quality objectives for the ecology of surface waters (QZV);
- Developing concepts intended to minimise hydro peaking;
- The objective is to achieve a sedimentary continuum (natural sediment dynamics and transport).

6. LITERATURE

Akademien der Wissenschaften Schweiz (2011). Erneuerbare Energien in Pärken der Alpen: Nutzungskonflikte, Handlungsbedarf und Lösungsansätze. Bern (Schweiz), 37 pp.

Alpine Convention (2016). Best-Practice-Beispiele für landnutzungs- und naturschutzverträgliche Erneuerbare-Energien Projekte im Alpenraum. Deutsches Bundesministerium für Wirtschaft und Energie, Berlin (Deutschland), 92 pp.

BBSR (2015). Neue Mobilitätsformen, Mobilitätsstationen und Stadtgestalt – Kommunale Handlungssätze zur Unterstützung neuer Mobilitätsformen durch die Berücksichtigung gestalterischer Aspekte. Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) im Bundesamt für Bauwesen und Raumordnung (BBR), Bonn(Deutschland), ISBN 978-3-87994-171-1, 95 pp.

BfN (2011). Windkraft über Wald – Positionspapier des Bundesamtes für Naturschutz, Bonn (Deutschland), 8 pp.

BFW (2012). Unser Wald. Bundesforschungszentrum für Wald, Wien (Österreich), ISBN 978-3-902762-14-6, 27 pp.

Leitbild des Biosphärenparks Großes Walsertal (2011). Biosphärenparkmanagement der REGIO Großes Walsertal, Sonntag (Österreich), www.grosseswalsertal.at, 16 pp.
BMLFUW (2010). Verordnung des Bundesministers für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft über die Festlegung des ökologischen Zustandes für Oberflächengewässer (Qualitätszielverordnung Ökologie Oberflächengewässer – QZV Ökologie OG), Wien (Österreich), 57 pp.

Deutsches MAB-Nationalkomitee (2012) Positionspapier des MAB-Nationalkomitees zur Nutzung von Windkraft und Biomasse in Biosphärenreservaten. 8 pp. Download unter: https://rp.baden-wuerttemberg.de/Themen/Energie/Documents/positionspap-ee-mab.pdf.

Deutsche UNESCO Kommission (2011). Dresdner Erklärung zu Biosphärenreservaten und Klimawandel. Internationale Konferenz „Für das Leben, für die Zukunft: Biosphärenreservate und Klimawandel“, 27.-28. Juni 2011, Dresden (Deutschland), 4 pp. Download unter: https://www.unesco.de/wissenschaft/biosphaerenreservate/mab20110/dresdner-erklaerung.html.

Dittrich M., S. Giljum, S. Lutter, C. Polzin (2012). Green economies around the world? Implications of resource use for development and the environment. Sustainable Europe Research Institute (SERI), Vienna (Austria), ISBN978-3-200-02640-7, 83 pp.

Europäische Wasserrahmenrichtlinie (WRRL) (2000). Richtlinie 2000/60/EG zur Schaffung eines Ordnungsrahmens für Maßnahmen der Gemeinschaft im Bereich der Wasserpolitik. 92 pp.

Forum Biodiversität Schweiz (2014). Biodiversität und Energie, 27 pp.

Österreichisches MAB-Nationalkomitee (2016). Kriterien für Biosphärenparks in Österreich. Wien (Österreich), 7 pp.

Lachat, T., T. Reich, B. Wermelinger (2014). Waldenergieholz: Energieholz und Totholzfauna – ein Dilemma. In: Forschung und Praxis im Dialog – Informationen des Forum Biodiversität Schweiz: Biodiversität und Energie, HOTSPOT 29, 20.

La Palma Declaration (2007). Declaration in defence of the night sky and the right to starlight. Starlight Initiative, La Palma Biosphere Reserve Canary Islands (Spain), 12 pp.

Reddmann, P. (2013). Auswirkungen des Ausbaus der erneuerbaren Energien auf die Freiraumstruktur Deutschlands – Konflikte und Steuerungsbedarf durch die Regionalplanung. In: Troeger-Weiß, G. & H.-J. Domhardt (Hrsg.). Arbeitspapiere zur Regionalentwicklung (Internet) – Elektronische Schriftenreihe des Lehrstuhls Regionalentwicklung und Raumordnung der Technischen Universität Kaiserslautern Band 15; Selbstverlag Lehrstuhl Regionalentwicklung und Raumordnung Technische Universität Kaiserslautern, 263 pp.

Thibault Lachat, T., P. Brang, M. Bolliger, K. Bollmann, U.B. Brändli, R. Bütler, S. Herrmann, O. Schneider, B. Wermelinger (2014). Totholz im Wald Entstehung, Bedeutung und Förderung. Merkblatt für die Praxis. Eidg. Forschungsanstalt WSL, Birmensdorf (Schweiz), ISSN 1422-2876, 12 pp.
Tiroler Umweltanwaltschaft (2012). Windenergienutzung – Vorläufiges Positionspapier der Tiroler Umweltanwaltschaft. Innsbruck (Österreich), 12 pp.

Tiroler Umweltanwaltschaft (2013). Photovoltaikanlagen – Vorläufiges Positionspapier der Tiroler Umweltanwaltschaft. Innsbruck (Österreich), 7 pp.

Umweltdachverband (2011). Positionspapier des Umweltdachverbandes. Umweltfreundliche Nutzung der Windenergie – eine Frage der Standortwahl. Wien (Österreich), 14 pp.

Umweltdachverband (2015). Gewässer schützen – Wasserkraft nützen: Flüsse im Spannungsfeld der Interessen. Wien (Österreich), 40 pp. Download unter: http://www.umweltdachverband.at/assets/Umweltdachverband/Publikationen/Eigene-Publikationen/Wasserkraftbroschuere-final-WEB.pdf.

UNESCO (2015). Final report of the 27th Session of the International Coordinating Council of the Man and the Biosphere (MAB) Programme. Download unter: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/FINAL_REPORT_27_MAB-ICC_en-v2.pdf.

UNESCO (2016). Lima Action Plan for for UNESCO's Man and the Biosphere (MAB) Programme and its World Network of Biosphere Reserves (2016–2025). UNESCO, Paris. Download unter: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/Lima_Action_Plan_en_final.pdf.

UNESCO (2017). A new roadmap for the Man and the Biosphere (MAB) Programme and its World Network of Biosphere Reserves: MAB Strategy (2015-2025), Lima Action Plan (2016-2025), Lima Declaration. United Nations Educational, scientific and Cultural Organization, Paris, ISBN 978-92-3-100206-9, 55 pp. Download unter: http://unesdoc.unesco.org/images/0024/002474/247418E.pdf.

7. EXPLANATION OF SPECIFIC AUSTRIAN TERMS

[1] The official UNESCO term 'biosphere reserve' is translated with 'Biosphärenreservat' in German. However, in view of the fact that this term is perceived by many people as redolent of 'reservation' in a pejorative sense, the term used in Austria is 'Biosphärenpark' which translates as ‚biosphere park'.

[2] The Climate Alliance is a global partnership for the protection of the world's climate. By now more than 1700 communities in 26 European countries are linked by the Alliance with indigenous peoples in South America. The Alliance's mutual goals consist in the reduction of greenhouse gas emissions and the conservation of the Amazonian Rainforest. In Austria, the climate alliance incorporates not only communities but also playschools, schools and companies, and this makes it the greatest domestic network for climate protection. The nucleus of climate alliance work in Austria is focused on information, awareness raising, networking and training/education of climate alliance partners and the execution of projects and campaigns in fields such as energy, mobility, soil conservation, agriculture, sustainable lifestyle and co-operation on development.

[3] *e5* is an Austrian programme for the qualification and distinction awarded to communities and towns which, by efficient use of energy and the increased use of renewable energy sources, aspire to make a contribution to the future-compatible development of our society. To this end, *e5* affords aid and support to communities participating in the programme to assist them in determining and achieving their energy and climate protections goals.

[4] The programme entitled 'Klima- und Energie-Modellregionen' (KEM/Model Regions for Climate and Energy) supports Austrian regions in making optimal use of their local resources for the production of renewable energy, thus enabling them to exploit the full potential of energy savings and to work sustainably. The programme enables regions to develop concepts based on cross-sectoral and integrative approaches to problem solutions.

8. ACKNOWLEDGMENTS

The MAB National Committee would like to express its gratitude to numerous experts taking part in workshops thus contributing to the development of this position paper.

Michael Reischer (Tiroler Umweltanwaltschaft)
Hans–Jürgen Baschinger (OÖ Umweltanwaltschaft)
Christian Ineichen (Biosphäre Entlebuch)
Adi Gross (Vorarlberger Landtag)
Johannes Prüter (Biosphärenreservat Niedersächsische Elbtalaue)
Werner Konold (Universität Freiburg, Deutsches MAB Nationalkomitee)
Reinhard Braun (Biosphärenreservat Rhön)
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Maximilian Albrecht (Amt der Vorarlberger Landesregierung)
Lisa Tonis (Amt der Vorarlberger Landesregierung)

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Harald Brenner (Biosphärenpark Wienerwald)
Herbert Greisberger (Biosphärenpark Wienerwald)
Christine Klenovec (Biosphärenpark Großes Walsertal)
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9. LINKS

Homepage of the Austrian MAB-National Committee: http://www.biosphaerenparks.at/

Criteria for Biosphere Reserves in Austria:
https://www.bpww.at/sites/default/files/download_files/MAB_%C3%96sterreich_Kriterien_BPs_2016.pdf

10. KEY CONTACTS

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Vienna, September 2017