



Horst Stopp, Peter Strangfeld (eds.)

FLOATING ARCHITECTURE 4

Construction on and near water

Horst Stopp, Peter Strangfeld (Eds.)

Floating Architecture 4

Schwimmende Architektur –
Bauen am und auf dem Wasser

Floating Architecture –
Constructions on and near water

herausgegeben vom/edited by

Institut für Schwimmende Bauten /
Institute for Floating Buildings
Brandenburgische Technische Universität /
Brandenburg University of Technology
Cottbus-Senftenberg

Band / volume 4

LIT

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Published with the support of Open Access Brandenburg



Gedruckt auf alterungsbeständigem Werkdruckpapier entsprechend
ANSI Z3948 DIN ISO 9706

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche
Nationalbibliografie; detailed bibliographic data are available on the Internet at
<http://dnb.dnb.de>.

ISBN 978-3-643-91435-4 (pb)
ISBN 978-3-643-96435-9 (PDF)
ISBN 978-3-643-96436-6 (OA)
DOI: <https://doi.org/10.52038.9783643914354>



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A catalogue record for this book is available from the British Library.

© **LIT VERLAG** Dr. W. Hopf
Berlin 2023
Fresnostr. 2
D-48159 Münster
Tel. +49 (0) 2 51-62 03 20
Fax +49 (0) 2 51-23 19 72
E-Mail: lit@lit-verlag.de
<https://www.lit-verlag.de>

LIT VERLAG GmbH & Co. KG Wien,
Zweigniederlassung Zürich 2023
Flössergasse 10
CH-8001 Zürich
Tel. +41 (0) 78-307 91 24
Fax
E-Mail: zuerich@lit-verlag.ch
<https://www.lit-verlag.ch>

Distribution:

In the UK: Global Book Marketing, e-mail: mo@centralbooks.com
In Germany: **LIT** Verlag Fresnostr. 2, D-48159 Münster
Tel. +49 (0) 2 51-620 32 22, Fax +49 (0) 2 51-922 60 99, e-mail: vertrieb@lit-verlag.de

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Opening remarks

Ladies and Gentlemen, dear floating home builders

Droughts and devastating forest fires, as well as heavy rainfall events and even flash floods inundating entire neighborhoods in many cities around the world, are each dramatic consequences of human-induced climate change. There are two ways to respond to this: Enormous efforts must be made to significantly reduce emissions of greenhouse gases such as CO₂ or methane. We even have a duty to do this with a view to the living conditions of young and future generations - as the first senate of the Federal Constitutional Court clearly demonstrated to us all in its decision of March 24, 2021. However, even if correspondingly effective measures to save greenhouse gases are taken with appropriate consequence from now on, we will no longer be able to prevent a further rise in temperatures and a progression of climate change. Therefore, enormous efforts must be made at the same time to implement climate adaptation measures. In this context, the settlement of water areas also comes into focus. The importance of such plans has been strongly expressed not least in the context of the 2nd World Congress "Paving the Waves" in October 2020 in Rotterdam. Three articles from Institute for Floating Buildings (IfSB) selected in the review process demonstrate the capabilities of the BTU's Department of Building Physics and Building Technology in this field.

All the more pleasing is the continuity in which floating architecture is dealt with at our faculty. The topic is of great importance; because it allows us to point out perspectives for younger and future generations, whose future opportunities for development are seriously endangered if action continues to be hesitant. The BTU thus also becomes an ambassador for life perspectives. Moreover, the theme of floating buildings fits in well with our region, which is the site of Europe's largest man-made chain of lakes, the development of which has not yet been completed. In the future, the open-cast lake "Cottbuser Ostsee" will be located directly in front of the BTU's gates. With a planned size of 19 km², it will be larger than any other lake in the state of Brandenburg. These developments would be well supported by the establishment of a national centre of knowledge and technology in the field of floating architecture in Lusatia. The visit of the deputy ambassador of the Socialist Republic of Vietnam also testifies the growing worldwide interest in our expertise.

The upcoming complex of questions can be solved in an interdisciplinary cooperation of the departments united at our faculty concerning design, planning material development, construction, supply and disposal as well as legal, social, safety, ecological and economic aspects.

For this reason, the faculty supports the research of the IfSB with its own funds. Floating structures are in line with our faculty development goals. I wish the 5th conference "Floating Buildings - Building at and on the Water" of the IfSB and the 3rd volume of Floating Architecture all the necessary success!

Prof. Dr.-Ing. Bernhard Weyrauch,
Dean of Faculty 6

Editorial

The foresight with which the LIT publishing house in Berlin and its management levels not only took up the topic of floating and amphibious architecture, but also promoted it professionally, is amazing. The colonization of water surfaces as a result of climate and social change is increasingly becoming a globally topical task.

A special thank you should therefore first and foremost be given to those responsible at the publishing house; in today's fast-paced world, it is often forgotten how much commitment and steadfastness good work results require. For all questions and problems that have arisen in this long-term series of titles, the editors and speakers always found an open ear and advice from the management of the publishing house. Based on comments from the readership, the articles are each preceded by a short German summary.

Floating Architecture 4 essentially contains the contributions from the 6th Floating Buildings Conference, which, as usual, was able to take place again in the rooms of the IBA study house in Großräschen after the end of the most recent pandemic. And the range of topics as well as the circle of speakers is fortunately expanding more and more. This time, for the first time, mobility on the water will be addressed directly, which will play a decisive role during life on the water in the future growing floating settlements in the event of an accident or fire or medical emergencies.

Unfortunately, there is no contribution to amphibious architecture. There is a need to catch up here. The gap is in blatant contradiction to the requirements of European directives in relation to flood protection near rivers. So-called retention areas on the headwater of rivers are intended to protect settlements on their lower reaches from flooding. This leads to resistance from neighboring communities on the upper reaches, since these areas have to be reserved for years without structural use in case of an emergency. A larger, constant economic use could be achieved with amphibious architecture integrated into the existing infrastructure without having to evacuate their residents in the event of a flood. The above remarks may be understood as a call to present smart ideas on this subject at the 7th Conference on Floating Structures.

In November 2022, at the end of the conference, two Polish guests from Warsaw University spontaneously asked to speak and asked the organizers to carry out the upcoming 4th International Conference on Amphibious and Floating Architecture ICAADE at the BTU Cottbus-Senftenberg. With the available experience, the knowledge of the topic and the Lusatian Lake District including the floating architecture created in the background, this should be possible at short notice and will now also be implemented from October 9th to 11th, 2023. At www.icaade.org details can be found on this.

The publishers
Cottbus, May 2023

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Legal requirements for floating architecture: Building on the water – a legal problem?

Juliane Jentsch

Deutscher Vorspann

Gesetzliche Anforderungen an Schwimmende Architektur: Bauen auf dem Wasser – ein rechtliches Problem?

Der Originalbeitrag beginnt mit einem gut strukturierten Inhaltsverzeichnis, das dem Leser ein Erfassen des komplexen Gegenstandes erleichtert. Es soll daher unkommentiert auch im deutschen Vorspann Verwendung finden. Hingewiesen werden darf auf die nahezu 100 Fußnoten, die nicht nur den Arbeitsumfang demonstrieren, sondern eine wertvolle Grundlage bilden für weitere Arbeiten zur Thematik Schwimmende Architektur und aufschwimmende Bauten.

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Legal requirements for floating architecture: Building on the water – a legal problem?

Juliane Jentsch

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A. Definition of floating architecture

So far, there is no general definition of "floating architecture" in Germany, neither in laws, nor in ordinances or in other legal provisions. However, approximations to a general term can be found in case law and in corresponding juridical literature.¹ There is the use of different terms which finally mean more or less the same (cf. Tab. 1).

If one would like to include "floating houses", "floating buildings", "floating structures", "houseboats", "floating facilities" or "floating homes"² under one generic term, the word "floating architecture" would be appropriate. This is to be understood as all architectural objects that can float or be raised by water in the sense of their construction.

Table 1 below provides an overview of the current terms and synonyms for "floating architecture".

¹ Dresbach, Immobilien & bewerten (Property & Evaluation) 1/2020, p. 4.

² Compilation may not be complete in respect to definitions and synonyms which are used for floating houses in literature and judiciary (see Tab. 1).

Tab. 1: Definitions/Synonyms for „floating architecture“

Year	Reference	Term	Definition
1973	Federal Administrative Court, Decision of. 31.08.1973 – IV C 33.71	Houseboat	[...] Also a houseboat can be a building i fit is fixed to the ground [...]
2006	Erbguth/Schubert ³	Floating houses	[...] Floating houses are buildings in the sense of building law, when serving the function of a house fixed to the ground, regardless their potential mobility or solidity with the ground or shore of the water body. [...]
2012	Administrative Court Schleswig, Decision of 30.04.2012 - 8 A 45/11	Floating house	[...] A pontoon with structures conforming a residential or holiday home for mostly fixed use is to be defined as building under Art. 2 para. 1, sent. 1 Building Law in the Federal State of Schleswig Holstein as well as under Art. 29 Federal Building Code [...]
2016	Higher Civil Court Schleswig, Decision of 19.4.2016 – 2 Wx 12/16, Wi.	Building under Condominium Act	[...] A Building under the Condominium Act ⁴ can be also one unit in a complex of floating houses, i fit is fixed with the ground in meeting the requirements of Art. 93, 94 German Civil Code. [...]
2016	Ministry for the Interior, Building and Digitalisation of the Federal State of Mecklenburg-Western Pomerania ⁵	Building in the Water	[...] Building in the water refers to today's usual forms of houseboats, floating houses and stilt houses. Apart from stilt houses, the special feature is that the houses float and are able to be frequently moved to another place with relatively little effort, but still develop an urban planning effect. [...] Thus, the relevant question is, if the building is suitable for the stay of people, which are intended to be used predominantly stationary and do not have the character of a ship or other floating installations in the harbour [...] The subject of regulation are therefore buildings in the water in the form of floating houses, fixed at a location or standing on stilts or piles. [...]
2017	Internationale Bootsexperten e.V. (Society of International Boat Experts) ⁶	Technical Data Sheet Houseboats and Floating Houses	[...] Floating houses differ [...] first of all in that they do not have their own drive, no steering position and no steering gear. As a result, they are stationary and cannot drive or be moved on their own initiative. In current understanding, they are regarded as floating installations in contrast to vehicles. As a result, they are primarily to be understood as a house and by no means as a (water) vehicle, which requires the application of the corresponding standards and technical rules from the area of residential homes. The architectural and constructive principle of a floating house will therefore mainly be based on a (residential) buildings and may, if necessary, adopt individual elements or details from shipbuilding. [...]
2018	Higher Administrative Court Berlin-Brandenburg, Decision of 10.7.2018 – OVG 2 S 13/18 ⁷	Qualification of a houseboat as a building	[...] The distinction if a houseboat is a structural installation or a recreational craft depends on whether, taking into account the circumstances of the individual case, the buoyant installation is intended to replace a building normally permanently connected to the ground, such as a holiday or residential home [...]

³ Erbguth/Schubert, BauR (Building Law) 2006, p. 454.

⁴ Act on the Ownership of Apartments and the Permanent Residential Right (Condominium Act) in the version of 12.01.2021, Fed. Law Gazette I, p. 34, amended by Art. 7 of the Act of 07.11.2022, Fed. Law Gazette I, p. 1982.

⁵ Ministry for the Interior, Building and Digitalisation of the Federal State of Mecklenburg-Western Pomerania, Publikationen und Dokumente (publications and documents), available in the internet under “Leitfaden Bauen im Wasser” (guideline Building in Water), under: <https://www.regierung-mv.de/Landesregierung/im/Bau/Planen-und-Bauen/Planungsrecht/> (last accessed: 22.04.2023).

⁶ Internationale Bootsexperten e.V. (Society of International Boat Experts) Technisches Merkblatt Hausboote und schwimmende Häuser (technical data sheet houseboats and floating homes), 2017, p. 35.

⁷ Higher Administrative Court Berlin-Brandenburg, Decision of 10.07.2018, - OVG 2 S 13/18, NVwZ-RR (New Journal for Administrative Law – Judicial Decision's Report) 2018, p. 843, Reasons for classifying a houseboat as a sports boat: “[...] According to this, the houseboat [...] does not appear as a "structural structure" in a summary examination. [...] Rather, it should have the function of a sports boat, namely primarily and not only to be used exceptionally for trips. [...] nothing [is] evident that the houseboat [...] could be intended to remain predominantly in one place and to be used there [...]”.

2020	Ministry for Infrastructure and Planning of the Federal State of Brandenburg ⁸	Floating houses	[...] Floating houses are buildings that float, but are neither suitable nor equipped for traffic on the water and, above all, are permanently fixed. In this sense, they are buildings according to Art. 29 Federal Building Code and are therefore subject to land use planning and building regulations law. [...]
2021	German Industrial Norm specification (DIN Spec) 80003:2021-06 ⁹	Floating Building	[...] Building that is built on a floating system or is itself part of the floating system due to its structural formation, is stationary by an anchorage and does not have its own drive. [...]
2022	Dresbach ¹⁰	Floating Building	[...]a floating building [...] is a floating structure anchored and made of construction products, "set up or constructed for permanent use according to its individual purpose and according to public opinion physical destruction or severe damage to the part to be replaced or the remaining property is unavoidable or the separation of the component would only be possible under disproportionate costs", may be suitable to be entered in the condominium register according to the Condominium Act, if it is "permanently fixed".

In summary, floating architecture refers to structures that float on the surface of a body of water and are supported by the buoyancy of floating bodies such as pontoons. A floating structure differs from a structure standing on stilts in the water in that it is not permanently attached to the ground and is intended for fixed use. According to the definition used here, it is not necessary for the structure to be permanently on the water in order to be classified as a floating structure. Thus, also structures which float only at high water or floods are included into this definition.

In contrast to recreational vessels such as houseboats or other watercraft, which regularly have their own engine or propulsion system and are mobile and thus not used in a fixed location, floating architecture differs primarily in that it is not constructed and equipped for movement from one place to another. Thus, floating architecture lacks its own propulsion and a steering or rowing system.

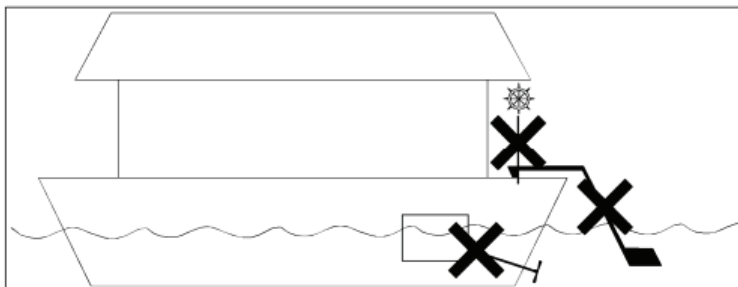


Abb. 1: Floating architecture does not have an own propulsion, steering and or steering system.¹¹

If they are to be transported across a body of water, they have to be towed or pushed. Another difference is that unlike ships, floating architecture usually does not have the typical streamlined elongated shape of a ship, but rather the rectangular layout of a conventional house. However, this is not a constitutive feature, because depending on

⁸ Ministry for Infrastructure and Planning of the Federal State of Brandenburg, Arbeitshilfe Bebauungsplanung (Working Aid Land Use Planning)2022, S. B 16.1, 8/11, available under https://mil.brandenburg.de/sixcms/media.php/9/221216_Arbeitshilfe_Gesamt_Doppelseitig_2022.4_272542.pdf (last accessed: 22.04.2023).

⁹ DIN Spec 80003, Schwimmende Gebäude – Technische Anforderungen und Prüfungen (Floating Buildings – Technical requirements and assessments), p. 7.

¹⁰ Dresbach, LKV (federal state's and communal administration) 2022, S. 108.

¹¹ Internationale Bootsexperten e.V. (society of international boat experts) Technisches Merkblatt Hausboote und schwimmende Häuser (technical data sheet houseboats and floating homes), 2017, p. 35.

local conditions, such an elongated form may be characteristic, e.g. for those that are anchored in a strongly flowing body of water. The term floating architecture according to this definition does not include structures that were built to be buoyant only for transport and are lowered with their lower part to the bottom of the body of water at the place of use, because the buoyancy only serves the purpose of transport and is not an essential feature of the subsequent use.

Furthermore, the building characteristic of floating architecture is discussed in case law and literature. Floating architecture does not differ from "normal" building projects on land with regard to use and design but with regard to special safety-relevant features such as climatic influences (storm, ice and high water), possible tidal changes, flow speed and current behaviour of the water or because of special requirements of the chosen locations.¹²

The following definition of floating architecture can be summarised:

Floating architecture or floating structures or houses are structural installations made of construction products. They do not have their own propulsion system, steering position or steering gear. They lie stationary on the surface of the water with a permanently fixed anchorage and are mainly to be understood as a house.

Floating architecture is constructed on a floating system (mostly pontoons) and is suitable to be registered in the residential land register according to the Condominium Act.

B. Legal requirements for floating architecture

It is questionable which area of law is to be taken into account in the question of whether floating architecture can be approved. This could be answered with the help of so called "concentration provision" or "provision with concentration effect". These are provisions in a certain area of law which include the assessment of the material law in other fields and/or the decision upon these topics, for example, if projects are subject to several areas of law, e.g. building law and water law, the concentration effects bundles the administrative procedures which shortens the duration and increases the effectivity of such procedures.¹³ In cases where the project may require a water law permit in addition to the building law permit, the question arises which provision (or which subject matter) may prevail. In the Federal State of Brandenburg, this may be answered by Art. 87 para 1, sent. 4 of the Water Act Brandenburg,¹⁴ which regulates that water law take precedence due to its concentration effect.¹⁵

¹² Edler/Keller, Coastline Reports 8 (2007), p. 143.

¹³ See Széchenyi, JA (Law Education) 2011, p. 297 f.

¹⁴ Water Act Brandenburg in the version of 02.03.2012, Law Gazette I, p. 12, last amended by Art. 1 of the Act of 04.12.2017, Law Gazette I, p. 17.

¹⁵ See Hilbert, JuS (Law Training) 2014, p. 983 ff. on the relation between Immission Control Law and Building Law, in particular on the priority of Immission Control Law through the so called "concentration effect".

But, in Brandenburg, Art. 72 para 1, sent. 2 Building Act Brandenburg¹⁶ also provides for a concentration effect.¹⁷ According to Art 72 para 1, sent. 1 Building Act Brandenburg Building Act Brandenburg, the building permit is to be granted "if the project does not conflict with any regulations under public law". According to sent. 2 the building permit includes other administrative decisions required for the project. Sent. 3 mentions provisions in other laws that include the building permit. Thus, the building permit has a partial concentration effect, restricted to those areas where building law prevails. In these cases, all provisions of substantive public law relevant to the building project are examined in the concentrated building permit procedure, unless another concentrated procedure includes the building permit. Thus, the building permit is to be granted according to § 72 Building Act Brandenburg the project does not conflict with any provisions of public law and if it complies with all public law provisions. Art. 72 Building Act Brandenburg establishes a review power of the building authority that is not limited to specific building law, but extends to all public law. However, this only applies if further permits are required for the execution of the project or for its intended use, which do not fall under building law. In these cases, it is disputed whether the building permit can be granted independently of the additionally required technical permits or whether, according to the so-called final point theory, their existence must first be awaited.

A building permit with concentration effect, as effected by Art. 72 para 1 Building Act Brandenburg, includes all other official decisions.¹⁸ These permits are therefore "only a part" of the building permit. The advantage of the concentration effect is that the building owner only has to worry about the building permit as the only administrative act and deals only with the building authority and not with several different authorities. The building permit thus has a comprehensive, declaratory content covering all relevant substantive norms.¹⁹ It avoids „[...] useless parallel administrative procedures with the risk for the administration and the applicants for contradictory decisions for one and the same project if there would not be any bundling through the concentration effect. Legal uncertainty and loss of understanding on the part of applicants would be the result. Concentration provisions have a positive effect on the legal protection of those affected. In the case of approval procedures with concentration effect, those affected by the project only have to object one administrative act. Ultimately, concentration provisions lead to simplification of procedures and to speed up administrative procedures.“²⁰

Art. 72 para 1, sent. 4 Building Act Brandenburg excludes from the concentration effect under § 72 para 1, sent. 2 Building Act Brandenburg decisions under water law on operational water uses. This clarifies that permits under water law are to be included in the building permit only insofar as they are necessary for the construction and for

¹⁶ Brandenburgische Bauordnung – Building Act Brandenburg (Building Act Brandenburg) in the version of 15.11.2018, Law Gazette I, p. 18, last amendment by Law of 09.02.2021, Law Gazette I, p. 21.

¹⁷ Ell, JuS (Law Training) 2005, p. 489.

¹⁸ Anders, JuS (Law Training) 2015, p. 608.

¹⁹ Ortloff, NVwZ (New Journal on Administrative Law) 2003, p. 1219.

²⁰ Ell, JuS (Law Training) 2005, p. 489.

the development of the building (for example when lowering of groundwater is necessary during excavation of the building pit, or the drainage of sealed surfaces by infiltration or the discharge of pre-treatment wastewater from a small sewage treatment plant into a receiving water body).²¹

According to Art. 36 Federal Water Management Act²² and Art. 87 Water Act Brandenburg, the construction and substantial alteration of facilities in and around water bodies requires the approval of the lower water authority.²³ Installations in water bodies refer to installations that are wholly or partially located in, under or above the water body (e.g. jetties, mooring piles, buoys, pipeline routes, bank reinforcements, platforms, stairways). Installations on water bodies are installations located at a distance of up to 10 meters inland from the upper edge of the bank or the shoreline (e.g. mooring piles on land).²⁴

I. Questions of building regulations

Building law regulates the procedure for issuing building permits and serves to prevent hazards. The basis for building law in the state of Brandenburg is the Building Act Brandenburg. A building permit must be applied for from the building authority for the erection, alteration and change of use of structural facilities covered by Art. 59 Building Act Brandenburg. The erection, alteration and change of use of floating architecture thus requires a building permit in accordance with Art. 59 Building Act Brandenburg.

In some cases, there are provisions in the federal state's law that stipulate requirements for floating architecture. In some federal states, certain floating architecture or buildings (which require approval according to water law regulations) do not fall within the scope of application of the respective federal state's building acts. For example, in **Hamburg**, according to Art. 1 para 2, No. 7 Building Act Hamburg,²⁵ „quays, piles and moorings requiring approval in accordance with water law regulations, as well as ships and other floating installations that are used in a fixed location, including their superstructures“ are excluded from the scope of application of the Water Act Hamburg. In Hamburg, however, residential boats, passenger ships and

²¹ More into details: Jäde/Dirnberger/Förster/Böhme/Radeisen/Thom/Spiekermann, Bauordnungsrecht Brandenburg (Commentary on Building Law Brandenburg), 2022, § 72 Building Act Brandenburg, marginal no. 38 f.

²² Federal Water Management Act of 31.07.2009, Fed. Law Gazette I, p. 2585, last amended by Art. 1 of the Act of 04.01.2023, Federal Law Gazette I, no. 5.

²³ Landkreis Ostprignitz-Ruppin – Der Landrat (District Eastern Prignitz-Ruppin – the Head of District Administration), available in the internet under: <https://www.ostprignitz-ruppin.de/Verwaltung/Dienstleistungen/Anlagen-in-an-unter-und-%C3%BCber-Gew%C3%A4ssern-Steganlagen.php?ModID=10&FID=3039.282.1&La=1&call=1&object=tx%7C3033.2.1&redir=1> (last accessed 23.4.2023) ; Stadt Brandenburg an der Havel (City of Brandenburg/Havel), available in the internet under: https://www.stadt-brandenburg.de/fileadmin/pdf/70/Merkblatt_Bootsstege.pdf (last accessed: 23.04.2023).

²⁴ Landkreis Spree-Neiße – Fachbereich Umwelt, Untere Wasserbehörde (District Spree-Neiße – Environmental Department, Lower Water Authority), available in the internet under: https://www.lkspn.de/media/file/formulare/umweltamt/wasser/2015/Merkblatt_Anlagen_Gewaesser.pdf (last accessed: 23.04.2023).

²⁵ Water Act Hamburg in the version of 29.03.2005, Hamburg Law Gazette, p. 97, last amended by Art. 12 of the Act of 04.12.2012, Hamburg Law Gazette, p. 510.

floating restaurants that are moored at a fixed location on the shore are nevertheless subject to the building permit requirement. The same applies in the federal states of Berlin and of Saxony-Anhalt, for example. In the other federal states, the state building codes therefore also apply in full to floating facilities.²⁶

In **Mecklenburg-Western Pomerania**, it was the expressed intention of the legislator to provide for the application of the Building Act to floating houses in Art. 1 para 2 No. 5 Building Act Mecklenburg-Western Pomerania,²⁷ as an exception to the exception. In Mecklenburg-Western Pomerania, there is no difference between a floating house and a stationary ship from the point of view of building regulations.²⁸

In the Federal State of **Schleswig-Holstein**, floating architecture is then expressly excluded from the scope of regulation of the Building Act insofar as they are subject to approval under water law. This is the case if there are provisions under water transport law according to Art. 1 para 2 No. 7 Building Act Schleswig-Holstein. More precisely, no. 16 and no. 17 of the Clarification to the Building Act Schleswig-Holstein²⁹ envisaged in the enforcement notice distinguish the criterion for exemption from the scope of application of the Building Act Schleswig-Holstein. According to no. 16 to Art. 1 para 2, no. 7 of the Clarification to the Building Act Schleswig-Holstein, the exception applies if the construction is actually suitable for the use as watercraft with sufficient propulsion engine, fuel tank or alternative energy sources such as solar panels or battery packs for propulsion engines, a steering and steering position, navigation equipment, anchoring, mooring and towing, or is authorised as a watercraft or has a water authority authorisation for navigating in non-navigable waters. According to the no. 17 to Art. 1 para 2 no. 7 of the Clarification to the Building Act Schleswig-Holstein, it is stated with regard to the building structure (Art. 2 para 1 Building Act Schleswig-Holstein) that it is necessary to consider whether the houses are situated on pontoons or whether the houseboats are predominantly stationary (no. 1 to the Clarification to the Building Act Schleswig-Holstein). In this case, it depends on whether the water takes over the

²⁶ For the Federal State of Brandenburg see Administrative Court Potsdam, Decision of 01.03.2018, AZ.: VG 5 L 92/18; for the Federal State of Bavaria see Higher Administrative Court Munich, Decision of 16.01.1975, BayVBl. (Bavarian Administrative Sheets) 1978, p. 180; for the Federal State of Hesse see Higher Administrative Court Kassel, Decision of 14.04.1986, BRS (Building Law Collection) 46, No. 130.

²⁷ Water Act of Mecklenburg-Western Pomerania of 30.11.1992, Law Gazette, p. 669, last amended by Act of 08.06.2021, Law Gazette, p. 866.

²⁸ Higher Administrative Court Mecklenburg-Western Pomerania, Decision of 15.07.2015 - 3 L 62/10: „This could not be correct and contradicts the expressed intention of the legislature, which provided in Art. 1 para 2 no. 6 Building Act Mecklenburg-Western Pomerania – as an exception to the exception – for the application of the Building Act for floating houses. From the point of view of building regulations, there is no difference between a floating house and a stationary ship.“ (Information of the author: This decision refers to the version of the Building Act prior to 2015; meanwhile no. 6 is now no. 5.

²⁹ Vorläufige Hinweise zum Vollzug der Landesbauordnung für das Land Schleswig-Holstein (Vollzugsbekanntmachung Landesbauordnung – VollzBekLBO), of 24.08.2022 – IV 542-515-429/2016-6655/2022-58389/2022 (Preliminary information on the implementation of the State Building Code for the State of Schleswig-Holstein), available under https://www.schleswig-holstein.de/DE/fachinhalte/B/bauen/Downloads/Bauordnung/220901_Vollzugsbekanntmachung.pdf?__blob=publicationFile&v=7 (last accessed 14.04.2023).

function of the ground and the houseboat is attached to piles or to similar constructions. For facilities that are to be used primarily similar to ships or rafts, a waterway approval procedure may be appropriate instead of a procedure under building law. For this purpose, coordination with the Water and Shipping Administration must be carried out.“ In the other federal states, the federal state’s building regulations therefore also apply fully to floating facilities.³⁰

For the Federal State of **Brandenburg**, there is no explicit regulation regarding floating architecture, houses or buildings. Thus, it can be assumed that a floating structure or floating architecture is a structural installation. In this case, building law is applicable. The prerequisite for this is not that the structure is firmly founded, but rather that it is firstly connected to the ground, secondly that it is erected in a fixed location and thirdly that it is made of construction products. Accordingly, the prerequisites of Art. 87 para 1, sent 1 Water Act Brandenburg, which refers to Art. 36 Federal Water Management Act, must be met.

The approval procedure under water law is likely to take precedence for a variety of reasons, although a building permit procedure is necessary. Thus, the literature also argues with a "building permit under water law".³¹

II. Questions of Building Planning Law

The preconditions for the permissibility of projects under building planning law are not automatically opened due to the reservation of Art. 29 para 2 Federal Building Code³² in favour of public-law regulations outside of building planning law, because the regulations of the building code and the other public-law regulations remain unaffected. This includes water law.³³

A prerequisite for the applicability of the building planning law provisions of Art. 30-35 Federal Building Code is that the project is a project within the meaning of Art. 29 Federal Building Code.³⁴ Since floating architecture is constructed in a fixed location

³⁰ For the Federal State of Brandenburg see Administrative Court Potsdam, Decision of 01.03.2018, AZ.: VG 5 L 92/18; for the Federal State of Bavaria see Higher Administrative Court Munich, Decision of 16.01.1975, BayVBl. (Bavarian Administrative Sheets) 1978, 180; for the Federal State of Hesse see Higher Administrative Court Kassel, Decision of 14.04.1986, BRS (Building Law Collection) 46, no. 130.

³¹ Spannowsky, Wasserrechtliche Vorgaben für die Bauleitplanung als Folge der Festsetzung von Überschwemmungsgebieten (Water law requirements for binding land-use planning as a result of the setting of flood-prone areas under the Federal Water Management Act), in: Spannowsky/Hofmeister (eds.), Umweltrechtliche Einflüsse in der städtebaulichen Planung (Influence of environmental law to urban planning), 2009, p. 169 f.

³² Federal Building Code in the version of 03.11.2017, Fed. Law Gazette I, p. 3634, last amended by Art. 2 of the Act of 04.01.2023, Federal Law Gazette I, no. 6.

³³ Spannowsky, Wasserrechtliche Vorgaben für die Bauleitplanung als Folge der Festsetzung von Überschwemmungsgebieten (Water law requirements for binding land-use planning as a result of the setting of flood-prone areas under the Federal Water Management Act), in: Spannowsky/Hofmeister (eds.), Umweltrechtliche Einflüsse in der städtebaulichen Planung (Influence of environmental law to urban planning), 2009, p. 169 f.

³⁴ Administrative Court Potsdam, Decision of 01.03.2018, AZ.: VG 5 L 92/18.

and is relevant in terms of planning law,³⁵ the quality of the project is to be assumed in accordance with Art. 29 Federal Building Code,³⁶ so that building planning regulations are relevant. It must be taken into account that the erection of floating architecture may also be opposed by concerns under building planning law, e.g. in the case of projects in the outer area³⁷ or a dedication of the site as a waterway.³⁸ This is the only issue that has been discussed more broadly, at least to some extent, in legal terms. Thus, the question of spatial planning control of the planning permissibility of floating architecture as a project in an external area (Art. 35 Federal Building Code) is discussed extensively.³⁹ Furthermore, the control of floating architecture via urban land-use plans, in particular development plans, can be considered.⁴⁰

III. Permit of Water Law

Art. 87 para 1, sent 1 of the Water Act Brandenburg requires a water law permit for the construction or substantial modification of installations. This permit requirement would therefore also be applicable to the construction of floating architecture. For the construction of an installation, a permit would have to be obtained from the lower water authority. This authority bundles all the specialist authorities affected by the project in the application procedure, as the permit has a concentration effect and includes all other public-law permits required for the project under federal state's law.⁴¹

Art. 59 para 1 Building Act Brandenburg regulates that the construction, alteration and change of use of structural facilities as well as other facilities and installations require a building permit. This means, there are two provisions which are in competition: Art. 87 para 1 sent. 1 of the Water Act Brandenburg and Art. 59 para 1 Building Act Brandenburg. The question is which legal matter prevails. This can be answered by the wording of the provisions: Art. 59 para 1 Building Act Brandenburg regulates clearly that the "construction, modification and change of use of buildings and other installations and facilities for which requirements are imposed in this Act or in regulations based on this Act shall require a building permit, unless otherwise provided for in Art. 60 to 62, 76 and 77". The mentioned exception clauses (Art. 60 to 62, 76 and 77 Building Act Brandenburg) do not regulate the relation to water law or even a preference of water law procedures, thus, the clear wording of Art. 59 para 1 Building Code Brandenburg indicates that building law prevails water law.

³⁵ Administrative Court Potsdam, Decision of 01.03.2018, AZ.: VG 5 L 92/18.

³⁶ Administrative Court Schleswig, Decision of 30.04.2012, AZ: 8 A 45/11.

³⁷ There were so called „non-privileged“ projects subject to the decision; this means, that they are principally not lawful in areas outside of settlements or of areas outside of binding land-use plans, see Administrative Court Potsdam, Decision of 01.03.2018, AZ.: VG 5 L 92/18.

³⁸ Administrative Court Schleswig, Decision of 30.04.2012, AZ: 8 A 45/11.

³⁹ See Erbguth/Schubert, UPR (Environmental and Planning Law) 2006, p. 51 ff.

⁴⁰ Erbguth/Schubert, UPR (Environmental and Planning Law) 2006, p. 54 ff.

⁴¹ Stadt Brandenburg an der Havel, Fachbereich Bauen und Umwelt (City of Brandenburg/Havel, Building and Environmental Department, S. 1 f., available at https://www.stadt-brandenburg.de/fileadmin/pdf/70/Merkblatt_Bootsstege.pdf (last accessed: 15.04.2023).

Thus, if a floating structure is a **building structure**, the scope of application of building regulations is initially opened. The prerequisite for this is not that the structure is firmly founded, but rather that it is firstly **connected to the ground** (see below under 1.), secondly that it is constructed in a **fixed location** (see below under 2.) and thirdly that it is **made of construction products** (see below under 3.).

1. Connection with the ground

This result does not interfere with Art. 36 Federal Water Management Act and its federal state's law counterpart in Art. 87 para 1 sent. 1 Water Act Brandenburg which both use the term "installation". This term "installation" is indeterminate and can be interpreted broadly.⁴² The term "installation" according to Art. 87 para 1 sent. 1 Water Act Brandenburg and Art.36 para 1 sent 1 Federal Water Management Act includes installations "in, on, over and under surface waters". On the other way round: installations which are parts of the bed or bank of a body of water are not installations under Art. 87 para 1 Water Act Brandenburg and Art. 36 para 1 Federal Water Management Act. This argument may be supported by Art. 82 Water Act Brandenburg which regulates that installations which, as part of the water, determine and secure its state of development, are regulated differently in respect to maintenance than installations under Art. 87 para 1 sent. 1 Water Act Brandenburg.⁴³ Floating architecture is designed, as the name suggests, to always be in the water and to float, which seems to exclude them from the definition under Art. 36 para 1 Federal Water Management Act or Art. 87 para 1 sent. 1 Water Act Brandenburg.

2. Fixed location

But, an installation subject to water law is any fixed or movable installation created for a certain period of time that is capable of influencing the condition of a body of water or its water discharge.⁴⁴ Art. 36 para 1 sent. 2 Federal Water Management Act refers to structural installations as buildings (Art. 36 para 1 sent. 2, no. 1). The Federal Administrative Court has decided that a "*residential boat*" can also be regarded as a structural installation according to the "installation concept" of Art. 36 Federal Water Management Act, "if it is connected to the ground" (cf. Tab. 1).⁴⁵

3. Made of construction products

Furthermore, floating architecture are under the definition of Art. 2 para 2 Building Act Brandenburg buildings, because they are "independently usable, covered structures

⁴² Berendes, WHG-KurzKomm (Comprehensive Commentary on the Water Management Act), § 36 marginal no. 3.

⁴³ Berendes/Frenz/Müggenborg, WHG (commentary on the Water Management Act), § 36 WHG, marginal no. 5; Czychowski/Reinhard, WHG (commentary on the Water Management Act), § 36, marginal no. 2, 7.

⁴⁴ Higher Administrative Court Baden-Wuerttemberg, Decision of 20.05.2010, 3 S 1253/08, marginal no. 22; Berendes/Frenz/Müggenborg, WHG (commentary on the Water Management Act), § 36 WHG, marginal no. 5.

⁴⁵ Federal Administrative Court, Decision of 31.08.1973 – IV C 33.71.

that can be entered by people and are suitable or intended to serve the protection of people, animals or property” (Art. 2 para 2 Brandenburg Building Act).⁴⁶ The term **construction product** is defined uniformly⁴⁷ under federal and federal state’s law and is legally defined in Art 2 of the EU Construction Products Regulation.⁴⁸ According to this, a construction product is: „any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works”. products to construct floating architecture do fall doubtless under this definition.⁴⁹

4. Discussion

The only criterion among the three mentioned above for defining floating architecture as building is probably the connection to the ground according to Art. 2 para 1, sent. 1 Building Act Brandenburg According to this provision, this is to be assumed if the structure rests on the ground by its own weight, is movable to a limited extent by stationary tracks or is in any case intended by its purpose to be used predominantly stationary.

Accordingly, it is not required that the installation is **permanently and stably connected to the ground**, e.g. by means of a foundation. Also a purely functional connection is sufficient.⁵⁰ In the case of permanently floating architecture or structures, the connection with the ground is usually ensured by fastening with piles or ropes to the ground. It is even possible that a connection with the ground via a footbridge or similar with the shore, i.e. the ground, is sufficient.⁵¹ Indisputably, watercourse beds could be the ground floor according to the German Building Code.

⁴⁶ Federal Administrative Court, Decision of 31.08.1973, IV C 33.71, marginal no. 18 ff. (Residential raft as a structural facility under Art. 29 Federal Building Code); Higher Administrative Court Berlin-Brandenburg, Decision of 10.07.2018, OVG 2 S 13.18, marginal no. 5 (Houseboat and similar buoyant structures); Higher Administrative Court Mecklenburg-Western Pomerania, Decision of 15.07.2015, 3 L 62/10, Rn. 52 (stationary wooden cog); Higher Administrative Court Mecklenburg-Western Pomerania, Decision of 26.04.2001, 1 M 107/00, Rn. 7 (juris) (stationary houseboat); Administrative Court Berlin, Decision of 15.12.2016, VG 10 K 250.13, marginal no. 17 (floating houses); Administrative Court Schleswig, NordÖR (Public Law in the North) 2012, p. 454 ff., (floating house); Higher Civil Court Schleswig, Decision of 19.04.2016, 2 Wx 12/16, marginal no. 21 (floating house as building under Condominium Act); see also Battis/Krautzberger/Löhr, BauGB (Commentary on Federal Building Code), 14th ed. 2019, Art. 29, marginal no. 10 and table 1 above.

⁴⁷ Reimus/Semtner/Langer, Die neue Brandenburgische BauO (the new Building Act Brandenburg), 2009, § 2 marginal no. 36.

⁴⁸ Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, OJ L 88, p. 5;

⁴⁹ Erbguth/Schubert, Rechtsfragen der Zulassung und planerischen Steuerung schwimmender und pfahlgestützter Häuser in Küsten- und Binnengewässern (Legal issues of approval and planning control of floating and stilt houses in coastal and inland waters), 2005, p. 34.

⁵⁰ Federal Administrative Court, Decision of 31.08.1973, IV C 33.71, marginal no. 20, 22; Higher Administrative Court Berlin-Brandenburg, Decision of 10.07.2018, OVG 2 S 13.18, marginal no. 5; see also Battis/Krautzberger/Löhr, BauGB (Commentary on Federal Building Code), 14th ed. 2019, § 29, Rn. 10.

⁵¹ Administrative Court Potsdam, Decision of 01.03.2018, AZ.: VG 5 L 92/18; Erbguth/Schubert, Rechtsfragen der Zulassung und planerischen Steuerung schwimmender und pfahlgestützter

According to the clause of Art, 87 para 1, sent. 4 Water Act Brandenburg, those installations are exempt from the requirement for a permit according to sent. 1 which require a permit on the basis of the Federal Water Management Act or the Building Act Brandenburg.⁵²

According to Brandenburg law, there is no requirement for a permit based on Water Law, as they are subject to a licensing procedure under Art. 59 I Building Act Brandenburg. According to this provision, the construction, alteration or change of use of building structures requires a building permit, unless otherwise provided for in §§ 60 to 62, 76, 77 Building Act Brandenburg. But these exceptions do not refer to water law (see above), so a building law permit is required.

Thus, floating architecture are buildings in accordance with Art. 59 para 1 and para 2 Building Act Brandenburg. But, the question arises if such floating architecture may be suspended from licensing requirements. Such an exemption is only possible if floating architecture would fall into such categories of buildings which necessarily require a permit.

So called “special buildings” according Art. 2 para 4 no. 20 Building Act Brandenburg require a licensing procedure. If floating architecture could be qualified as **special buildings** according to this provision, it is clear that an exemption from the building permit procedure according to Art. 61 para 1 Building Act Brandenburg (para 1, no. 1 g, possibly also no. 10 a), h) or Art. 62 para 1 Building Act Brandenburg would not be possible at all.⁵³

Special buildings according to Art. 2 para 4 Building Act Brandenburg are facilities and rooms of a special type or use. These are structural installations for which there is a need for preventive assessment from the perspective of building safety regulations. This is the case if the building structure has a special risk potential in respect to the topics regulated in the Building Law. The focus here is on aspects of stability and fire protection.⁵⁴ The building law refers to a "standard residential building" as a benchmark, with a rectangular floor plan and low to medium height.⁵⁵ If the installations deviate significantly from this standard building, the qualification as a special building is maybe not mandatory, but should at least be considered.⁵⁶ Brandenburg building law does not contain arguments against subsuming floating architecture under “special building”, in particular because the specific challenges of fire protection (escape routes,

Häuser in Küsten- und Binnengewässern (Legal issues of approval and planning control of floating and stilt houses in coastal and inland waters), 2005, p. 32.

⁵² Art. 87 para 1 sent. 4 Water Act Brandenburg explicitly regulates: “Excluded from the need for approval are (...) installations that (...) require another official permit on the basis of the Water Management Act, this [Water] Act or the Building Act Brandenburg (...).

⁵³ Dirnberger, in: Simon/Busse BayBO (Commentary on the Building Code Bavaria) 2019, Art. 2, marginal no. 363.

⁵⁴ Dirnberger, in: Simon/Busse BayBO (Commentary on the Building Code Bavaria) 2019, Art. 2, marginal no. 364.

⁵⁵ Higher Administrative Court North Rhine-Westphalia, NVwZ-RR (New Journal for Administrative Law – Judicial Decision’s Report) 2008, p. 521;

⁵⁶ BeckOK BauordnungsR NRW/Henke, BauO NRW, (Building Law, North Rhine-Westphalia) § 50 marginal no. 8; Dirnberger, in: Simon/Busse BayBO (Commentary on the Building Code Bavaria) 2019, Art. 2, marginal no. 494.

accessibility of rescue services), stability questions and the protection against wind, ice drift, waves, etc.

The material requirements for a license must be fulfilled. There shall be **no harmful changes to water bodies** caused by floating architecture. This is an own category of legal requirements, assessed in the building permit procedure, and require that all changes to water bodies which violate the general welfare (Art. 6 Water Management Act) or other water law regulations, including federal state's law requirements.⁵⁷ This refers to Art. 87 para 3 sent. 1 Water Act Brandenburg which regulates that a permit may only be granted if the intended project does not conflict with any regulations under public law and the **public welfare is not impaired**.⁵⁸ According to Art. 6 para 1 no. 3 Federal Water Management Act, the water bodies and their management must serve the "public welfare". The term "public welfare" is an undefined legal term; undefined legal terms are principally subject to judicial review and must be decided on the basis of a specific case-by-case analysis.⁵⁹ The term is to be interpreted broadly and includes the prevention of water pollution and the avoidance of an avoidable impairment of the ecological functions of water bodies. It also covers public health and the cleanliness of water bodies.⁶⁰ It is the task of the water authorities to manage water in such a way that the "scarce and endangered resource water"⁶¹ is properly and carefully distributed and its interests are balanced. To this end, all public and other water management concerns have to be taken into account.⁶²

IV. Planning on water areas as a potential threat to water quality

According to Art. 9 para 1, no. 16a Federal Building Code, it is possible to determine so called "water areas" in land use planning. This also includes the determination of the type and extent of the use of the area for buildings or the construction method within the meaning of Art. 9 para 1 no. 1, 2 Federal Building Act.⁶³ Also Art. 68 and Art. 19 para 1 Water Management Act generally assume that planning of water areas is possible. But, when planning includes water areas, the requirements of water law must be considered; if a measure has a recognisable detrimental or damaging effect on

⁵⁷ Czychowski/Reinhardt, WHG (Commentary on the Water Management Act), § 3, marginal no. 69.

⁵⁸ See Administrative Court Frankfurt (Oder), Decision of 01.02.2013, - VG 5 K 1099/10; Higher Administrative Court Baden-Wuerttemberg, Decision of 08.11.2005, - 3 S 538/05;

Czychowski/Reinhardt, WHG (Commentary on the Water Management Act), § 6, marginal no. 28.

⁵⁹ Higher Administrative Court Baden-Wuerttemberg, Decision of 08.11.2005, - 3 S 538/05, marginal no. 8; see also Albrecht/Küchenhoff, Staatsrecht (constitutional law), 3rd. ed. 2015, marginal no. 124.

⁶⁰ BeckOK UmweltR (environmental law)/Schulz WHG (Commentary on the Water Framework Act) § 55 marginal no. 1, 2.

⁶¹ BeckOK UmweltR (environmental law)/Schulz WHG (Commentary on the Water Framework Act) § 55 marginal no. 1, 2.

⁶² Berendes/Frenz/Müggenborg, WHG (Commentary in the Water Framework Act), § 6, marginal no. 18.

⁶³ Ministry for Infrastructure and Planning of the Federal State of Brandenburg, Arbeitshilfe Bebauungsplanung (Working Aid Land Use Planning) 2022, A1 p. 3/5 and B 16.1, p. 1/11, available under https://mil.brandenburg.de/sixcms/media.php/9/221216_Arbeitshilfe_Gesamt_Dop-pelseitig_2022.4272542.pdf (last accessed: 22.04.2023).

water quality, Art. 9 para 2, sent. 2 Federal Water Management Act is relevant as a catch-all provision. but ⁶⁴

But, it is questionable whether even the over-planning of water areas does not carry an abstract potential threat to water quality.⁶⁵ As an argument against this opinion, Art. 19 Federal Water Management Act can be used. This provision distinguishes between so called “planning approvals” and use permits. If planning of water areas would be considered as a “use” according to Art. 9 para 2, no. 2 Federal Water Management Act, this distinction would be obsolete.

Furthermore, a case group-oriented approach of Art. 9 para 2, no. 2 Federal Water Management Act has been developed by case law.⁶⁶ This includes under “use” the storage and dumping of materials with water hazard potential, fertilisation and pest control in the context of agricultural land use,⁶⁷ as well as the introduction of materials that can potentially have an adverse effect on groundwater quality.⁶⁸ The mere planning of water areas cannot be classified in any of those groups developed by the courts. Also an indirect connection cannot be assumed between urban land use planning and potential water hazards resulting from its implementation; the planning itself is rarely fully implemented in practice. If there would be a water law approval requirement for urban land use planning, this would lead to duplications of assessments and licenses. This would mean, the planning of water areas, as well as the concrete implementation of such a plan, would require an approval. This would be impractical and not necessary for the realisation of floating architecture project.

Thus, it remains to be examined which legal requirements must be met with regard to land-use planning concerning water areas. Without doubt, the binding land-use plan must be in accordance with higher or priority law and the municipality must observe water law when planning of water areas. If the binding land-use plan does not require approval according to Art. 8 ff. Water Management Act, floating architecture permitted under Art, 30 para 1 Federal Building Code would at least require building permit. Furthermore, a water law assessment would have to be carried out according to Art. 64 No. 3 Building Act Brandenburg. Accordingly, the municipality would have to assess all water law requirements during the plan preparation procedure. With regard to floating architecture, these would be the installation-related regulations of Art. 36 Federal Water Management Act and Art. 87 Water Act Brandenburg. Consequently, it would be contradictory in the sense of the principle of non-contradictory behaviour,⁶⁹

⁶⁴ Czychowski/Reinhardt, WHG, § 9, marginal no. 87; see also Kotulla, WHG, § 9, marginal no. 49.

⁶⁵ Berendes/Frenz/Müggenborg, WHG (Commentary in the Water Framework Act), § 9, marginal no. 79 ff.; Kotulla, WHG (Commentary in the Water Framework Act), § 9, marginal no. 53 ff.

⁶⁶ Berendes/Frenz/Müggenborg, WHG (Commentary in the Water Framework Act), § 9, marginal no. 78 ff.

⁶⁷ Berendes/Frenz/Müggenborg, WHG (Commentary in the Water Framework Act), § 9, marginal no. 82 ff.; Czychowski/Reinhardt, WHG (Commentary in the Water Framework Act), § 9, marginal no. 89 ff.

⁶⁸ Berendes/Frenz/Müggenborg, WHG (Commentary in the Water Framework Act), § 9, marginal no. 92 f.

⁶⁹ Bethge, in: Schmidt-Bleibtreu/Klein/Bethge (eds.), BVerfGG (Commentary on the Act on the Federal Constitutional Court) § 91 marginal no. 67; Federal Constitutional Court, BVerfGE (Official Collection of Decisions Volume) 119, p. 331 ff.

which is also valid in public law, if a binding land-use plan would allow projects whose approval, and thus their actual realisation, would ultimately have to be rejected for reasons of water law.⁷⁰

1. Harmful water body alteration

Art. 36 para 1, sent. 1 Federal Water Management Act regulates that the construction, operation, maintenance and closing of installations in, above, at and under water bodies shall not cause harmful changes to water bodies. Art. 3 no. 10 Water Framework Act defines „harmful changes to water bodies“ as: „Changes in water properties that impair the public welfare, in particular the public water supply, or that do not meet the requirements resulting from this law, from regulations enacted on the basis of this law or from other water law regulations.“⁷¹ Water properties according to Art. 3 no. 7 Water Management Act refers to water quality, water volume, water ecology and hydromorphology.

A central term of Art. 36 Water Management Act is **public welfare**. The concept of public welfare in German law is broad and is hidden in a web of different, diversely interwoven, public and private, partly parallel and partly opposing interests.⁷² The term “public welfare” can be regarded as an undefined legal concept⁷³ that is discussed in the literature and in case law. It is not clear whether the general interest is to be understood solely in a narrow water management context or whether other interests of the general public, e.g. the material interests of nature and landscape protection, are included.⁷⁴ However, water management public interests, i.e. interests that are regulated by water law itself, such as public water supply or flood protection, are to be included under the term.⁷⁵

A further approach could be provided by Art. 6 para 1, no. 3 Water Management Act. This provision makes clear that water bodies are to be managed sustainably and that water bodies are public goods. They serve everyone (the people) and not individuals.⁷⁶ The use of the water body for the common good takes precedence over individual

⁷⁰ See Federal Administrative Court, Decision of 11.08.2016, 7 A 1/15, marginal no. 159.

⁷¹ Czychowski/Reinhardt, WHG (Commentary in the Water Framework Act), § 3, marginal no. 69.

⁷² Breuer, in: Bitburger Gespräche in Rheinland-Pfalz (Bitburger talks in Rhineland Palatinate), 1983, Umweltschutz und Gemeinwohl in der Rechtsordnung, dargestellt am Beispiel des Wasserrechts (protection of the environment in law, discussed at the example of water law), p. 65f.; available under: https://www.uni-trier.de/fileadmin/fb5/inst/IRP/03_Events/02_Bitburger_Gespraechen/1983/Doc/06_Breuer_Umweltschutz_und_Gemeinwohl_in_der_Rechtsordnung.PDF (last accessed 22.04.2023).

⁷³ Attendorn, UPR (Environmental and Planning Law) 2013, p. 47 ff.

⁷⁴ Pape, in: Landmann/Rohmer, Umweltrecht (environmental law), 97. complementary delivery December 2021, § 12 WHG (Commentary in the Water Framework Act), marginal no. 14 f. Federal Administrative Court, NVwZ (New Journal on Administrative Law) 2016, p. 308, Rn. 41; Kotulla, WHG (Commentary in the Water Framework Act), § 3, marginal no. 84; Berendes, in: Berendes/Frenz/Müggenborg, WHG (Commentary in the Water Framework Act), § 6, marginal no. 18.

⁷⁵ Pawlowski, in: Schink/Fellenberg, GK-WHG (Joint Commentary in the Water Framework Act), § 6 marginal no. 51.

⁷⁶ See also Czychowski/Reinhardt, WHG (Commentary in the Water Framework Act), § 6, marginal no. 33.

interests.⁷⁷ As a result, the scope of protection of the public interest clauses under water law is fundamentally limited to the interests of water management. The limitation, which the Federal Administrative Court⁷⁸ helped to develop, that any public interest can justify the refusal of a water law permit, was confirmed by the Federal Constitutional Court, which argued that the purpose of the norm is to regulate the water balance, and not, for example, to protect jobs or prevent undesirable construction projects.⁷⁹ *Vice versa*, if a water authorities decides against an application under water law on base of the public welfare clause, only water law related public welfare reasons may be used; the reference to other laws would not be lawful.⁸⁰ But, it is clear that a project that is not in accordance with the legal system as a whole does not serve the public welfare at all.⁸¹

2. Prohibition of deterioration and ecological and chemical improvement

A further requirement is the **prohibition of deterioration** resulting from Art. 27 para 1 no. 1 Water Management Act. This provision is directly applicable to any water-body related activity or project. But, due to its rather vague formulation, it causes difficulties for water authorities in respect to its interpretation.⁸² Art. 27 Federal Water Management Act differentiates between (natural) water bodies (para 1) and artificial or heavily modified water bodies (para 2) and sets different management objectives. The objectives for natural water bodies are stricter than those for artificial or heavily modified waters. For natural water bodies the requirements address the **ecological and chemical state** of the water body whereas for artificial and heavily modified water bodies the provision addresses the **ecological and chemical potential**.

a) *Legal requirements of Art. 27 Federal Water Management Act*

Art. 27 Water Framework Act sets environmental quality objectives, transposed from the European Water Framework Directive (2000/60/EC).⁸³ The provision itself contains two legal requirements: (1) the prohibition of deterioration, and (2) the requirement to

⁷⁷ Pawlowski, in: Schink/Fellenberg, GK-WHG (Joint Commentary in the Water Framework Act), § 6 marginal no. 50 ff.

⁷⁸ Federal Administrative Court, Decision of 17.03.1989, 4 C 30/88, marginal no. 12 ff.; BVerwGE (Official Collection of Decisions Volume) 55, 220 (229): „[...] The Water Management Act answers the question under which conditions an impairment of the public welfare is to be expected in a solely water management context; [...]“.

⁷⁹ Federal Constitutional Court, BVerfGE (Official Collection of Decisions Volume) 58, 300 (348) – Nassauskiesung (wet silting).

⁸⁰ Breuer/Gärditz, Öffentliches und privates Wasserrecht (Public and Private Water Law), 2017, 3. chapter, marginal no. 596; critical to Art. 3 no. 10 Water Management Act: Czychowski/Reinhardt, WHG (Commentary in the Water Framework Act), § 3, marginal no. 69.

⁸¹ Similar Federal Administrative Court, Decision of 10.02.1978, IV C 25/75; Federal Administrative Court, Decision of 17.03.1989, 4 C 30/88, marginal no. 16; Breuer/Gärditz, Öffentliches und privates Wasserrecht (Public and Private Water Law), 2017, chapter 3, marginal no. 599.

⁸² Dallhammer/Fritzsich, ZUR (Journal for Environmental Law) 2016, p. 340.

⁸³ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, OJ L 327, p. 1; see also Durner, NuR (Nature and Law) 2019, p. 1.

achieve or improve the objectives of the Water Management Act. The differences between these two requirements is difficult to identify,⁸⁴ because they seem to address the same objective. The second one is a commandment to the authorities to improve the ecological quality of the waters. Here, the authorities have a wider range of discretion and are less legally bound to certain measures,⁸⁵ than in the commitment to the prohibition of deterioration clause. For this, the European Court of Justice decided in the Decision on the deepening of the River Weser in Bremen⁸⁶ which involved the physical expansion of a body of water, that the concept of the prohibition of deterioration is to be addressed directly to the approval authorities.

b) Prohibition of deterioration clause as part of approval decisions

This decision moved the prohibition of deterioration into the centre of an individual approval decision. Consequently, each water body use must be assessed separately for deterioration by the permitting authority in order to allow any use, if necessary, according to the exemption criteria.⁸⁷ According to the decision, the prohibition of deterioration must be interpreted as a condition for an approval. But, the question remains, if floating architecture is able to cause water or water quality deterioration. For a "normal house" which is built on land this matter does not come up at all.

c) The whole water body as subject of the decision

In the assessment of the project in respect to the prohibition of deterioration clause the whole water body needs be regarded, not only parts, even though the monitoring may take place on selected representative locations.⁸⁸

d) Assessment of the qualities of construction materials

Furthermore, the question which construction materials are ecologically safe for the use of floating architecture must be addressed.⁸⁹ Thus, only such materials or construction products should be used for which the components and substances are known and evaluated in respect to the contact with water. This is especially true for

⁸⁴ See in detail: Ekardt/Weyland, NuR (Nature and Law) 2014, p. 17; Schmid, in: Berendes/Frenz/Müggenborg, WHG (Commentary in the Water Framework Act), § 27, marginal no. 127 ff.; Köck, ZUR (Journal for Environmental Law) 2009, p. 227 ff., 229 f.

⁸⁵ See below under (9).

⁸⁶ European Court of Justice, Decision of 01.07.2015, - C-461/13 (Deepening of the River Weser), for more details see Franzius, ZUR (Journal for Environmental Law) 2015, p. 643 ff.

⁸⁷ Durner, NuR (Nature and Law) 2019, p. 4; Faßbender, ZUR (Journal for Environmental Law) 2016, p. 195 ff.

⁸⁸ European Court of Justice, Decision of 01.07.2015, - C-461/13 (Deepening of the River Weser); Fülser, UPR (Environmental and Planning Law), p. 458.

⁸⁹ For details see Fraunhofer-Institut für Solare Energiesysteme ISE (Fraunhofer Institute for Solar Energy Systems ISE), available in the internet under: <https://www.ise.fraunhofer.de/de/geschaeftsfelder/photovoltaik/photovoltaische-module-und-kraftwerke/integrierte-pv/schwimmende-photovoltaik.html> (last accessed: 22.04.2023).

materials that come into direct or indirect contact with the surrounding water, especially to avoid corrosion and to ensure that the materials used are impermeable.⁹⁰ In the case of metal constructions, sufficient corrosion protection or the use of rust-free materials must be ensured.⁹¹

e) Consideration of shadowing effects

It is questionable if and how far a possible shadowing effect of floating architecture needs to be considered when assessing negative effects for the water body and its ecology. It is clear, that in particular large-area or clustered floating architecture could prevent solar radiation from entering the water which may negatively influence the mass transfer process between water and air.⁹² To assess this, a research project called "PV2FLOAT" was carried out and could provide some results.⁹³ In this project, an interdisciplinary research team investigates the effects of so-called floating PV or floating solar with regard to the impact on water ecology. The project is still ongoing, so there are no results on this matter, yet.

f) Human behaviour on floating architecture causing negative impacts on the water quality

It is furthermore questionable whether human behaviour associated with the use of floating architecture may have a negative impact on water quality. Here, in particular accidents have to be considered, but also normal human behaviour. Since floating architecture is usually located close to the shore and requires appropriate access routes and media connections, negative effects on the ecologically important shallow water zone are possible and need to be assessed.⁹⁴

⁹⁰ Hafentechnische Gesellschaft e.V. (HTG) (Society for Harbour Technique), Empfehlungen des Arbeitsausschusses Sportboothäfen und wassertouristische Anlagen, Kapitel 9: Schwimmende Häuser in Sportboothäfen (Recommendations of the Working Committee on Pleasure Boat Harbors and Water Tourism Facilities, Chapter 9: Floating Houses in Pleasure Boat Harbours), 2015, p. 9.

⁹¹ Internationale Bootsexperten e.V. (Society of International Boat Experts) Technisches Merkblatt Hausboote und schwimmende Häuser (Technical Data Sheet Houseboats and Floating Homes), 2017, p. 42.

⁹² Comparison of Floating PV, detailed potential-analysis by Fraunhofer-Institut für Solare Energiesysteme ISE (Fraunhofer Institute for Solar Energy Systems ISE), available in the internet under: <https://www.ise.fraunhofer.de/de/presse-und-medien/presseinformationen/2020/fraunhofer-ise-analysiert-potenzial-fuer-solkraftwerke-auf-braunkohle-tagebauseen.html> (last accessed: 22.04.2023)

⁹³ See the project „PV2FLOAT“ which assesses chances and challenges of floating PV on open pit lakes to prepare technical, ecological and socio-economic requirements for the development of this potential; for more details see: : <https://www.ise.fraunhofer.de/de/forschungsprojekte/pv2float.html> (last accessed: 23.04.2023)

⁹⁴ In respect to this see Higher Administrative Court Baden-Wuerttemberg, Decision of 20.05.2010, 3 S 1253/, marginal no. 26.

g) Approval of floating architecture as a case-by-case decision

Finally, because there is no general conclusion whether floating architecture is generally negative, neutral or even positive for water bodies, the approval decision still needs to be based on a case-by-case approach, taking into consideration the specific situation of the project. So far, it is clear that floating architecture does not have necessarily negative effects on water bodies; thus binding land use planning for floating architecture is not necessarily a risk of deterioration of water bodies pursuant to Art. 36 para 1 in conjunction with Art. 3, no. 10 and Art. 27 para 1 Federal Water Management Act.

h) Floating architecture in open cast mining areas and in urban areas

For planning and realisation of floating architecture, opencast mining regions seem to be rather well suited, as the water bodies to be used are usually not natural waters, but artificial or heavily modified lakes in respect to Art. 28 Water Management Act.⁹⁵ The same is true for water bodies in urban areas which are usually not in its natural state anymore. Here, Art. 27 para 2 Water Management Act addresses not the actual state, but the potential of the water body which may the water authority more discretion in its decision making. And, such water bodies are also suitable for floating architecture, because they are already well connected in terms of network technology and access infrastructure. Furthermore, the approval of floating architecture may lead to minor and local negative effects of the water body, but probably not to a deterioration of the status of the entire water body.

However, the use of water bodies in urban areas for floating architecture may cause negative effects, for example increased volume of traffic on and near the water as well as steadily growing settlement pressure⁹⁶ which may worsen water bodies.

i) Requirement to improve the quality the potential of the water body

Art. 27 para 1, no 2 and para 2, no. 2 Water Management Act contains furthermore a command to the water authorities to improve the ecological and chemical state (para 1) or potential (para 2) of the water body. But this provision can be used to reject a binding land use plan approval or a licensing decision on base of such a plan if the realisation of the project will result in the non-compliance with the environmental targets of Art. 27 Federal Water Management Act. Finally, this cannot be assumed if a project of floating architecture is not causing negative effects. Thus, if a project meets the requirements of the prohibition of deterioration clause of Art. 27 para 1 no. 1 and para 2 no. 1 Federal Water Management Act, then the improvement clause of Art. 27

⁹⁵ Berendes, WHG-KurzKomm (Comprehensive Commentary on the Water Management Act), § 28 marginal no. 1.

⁹⁶ See Higher Administrative Court Baden-Wuerttemberg, Decision of 20.05.2010, - 3 S 1253/, marginal no. 26; Higher Administrative Court Baden-Wuerttemberg, Decision of, 08.11.2005, - 3 S 538/05, marginal no. 47.

para 1, no. 2 and para 2, no. 2 Water Framework Act is also not violated. Thus, the improvement clause does not prevent floating architecture from being approved under building planning law.

V. Other Law

For the approval of floating architecture, further specialised laws and standards could be affected. This includes for example water law permit according to Art. 87 Water Act Brandenburg, licenses of the river and navigation authorities. These are independent and separate administrative decisions which need to be applied for separately with the respective authority.⁹⁷ If the project is located on a federal waterway, a license of the Waterways and Shipping Authority pursuant to Art. 31 Federal Waterways Act for the construction, modification and operation of facilities in, above or below a federal waterway is needed.⁹⁸ Also, nature conservation requirements under the Federal Nature Conservation Act may also be relevant.

C. Conclusion

Although building on water is not new, it leads to legal uncertainty, especially for the approval authorities due to the applicability of different laws. *In concreto*, the question is, if building law or water law provides for the relevant legal basis. Or, to formulate it differently: is floating architecture more linked to building law planning, licensing and assessment procedures or is it closer to the using of a water body. There are good arguments for the priority of water law and there are good arguments for building law. So, for the realisation of projects with floating architecture, a concrete legal framework would be beneficial to clarify which authority is responsible for the planning and licensing procedure. Even though much speaks for the applicability of building law for floating architecture, a clarification would help to reduce uncertainties. The question which laws need to be complied with, is – on the other side – less problematic, because – at least in the Federal State of Brandenburg – both legal matters provide the authorities with the so called “concentration effect”. This means that the authority responsible for the licensing procedure takes care for the involvement of the other authorities and their legal claims, objections and requirements. As already stated, there are better arguments for the application of building planning and licensing law in respect to floating architecture; such projects can be subject to binding land-use planning according to Art. 9 para 1, no. 16 Federal Building Code which allows for defining water areas, including the structural installations permitted on or above the water area, e.g. floating architecture. Such planning can be subject to existing water

⁹⁷ Landkreis Dahme-Spreewald (District Dahme-Spree Forest), available in the internet under: <https://www.dahme-spreewald.info/de/verwaltung/verwaltungsstruktur/dezernat3/umweltamtes/steganlagen-genehmigungen1/> (last accessed 22.04.2023).

⁹⁸ Stadt Brandenburg an der Havel, Fachbereich Bauen und Umwelt (City of Brandenburg/Havel, Building and Environmental Department, S. 1 f., available at https://www.stadt-brandenburg.de/fileadmin/pdf/70/Merkblatt_Bootsstege.pdf (last accessed: 15. 04.2023).

areas or to the creation of new water areas. In the licensing procedure building law requirements and water law-related requirements are assessed and subject to the licensing decision. Possible negative effects of floating architecture are then part of the licensing procedure and is considered in it. If and what kind of such negative effects occur is at the moment not really clear and is subject of several research projects. But, it is clear that in particular projects of floating architecture on artificial or heavily modified water bodies could be less problematic than in natural water bodies. But, finally, this is a question which needs to be assessed and decided in a case-by-case decision.

In particular, in the Federal State of Brandenburg, there is a great potential to realise floating architecture because there are many former open-cast mining areas becoming lakes and which therefore qualify as artificial or heavily modified waters. The use of these lakes for floating architecture may help to reduce settlement pressure on land and could provide for homes, suitable for living, adapted to climate change.

Ecological requirements for floating architecture by the example of floating photovoltaic systems

Dieter Leßmann

Deutscher Vorspann

Gewässerökologische Anforderungen an schwimmende Bauten am Beispiel schwimmender Photovoltaikanlagen

Neben der thermischen Nutzung von Gewässern zur Wärmeerzeugung und Kühlung steigt auch die Nachfrage nach der Nutzung von Wasserflächen zur Stromerzeugung aus schwimmenden Photovoltaikanlagen (FPV). Eine wesentliche Voraussetzung für die Zulassung von FPV ist deren ökologische Verträglichkeit nach den Rechtsvorschriften der EU-Wasserrahmenrichtlinie, die keine Verschlechterung des ökologischen Zustands durch neuartige Wassernutzungen zulässt (EU-WRRL 2000). Während in Deutschland nur wenig Erfahrung mit regenerativer Energiegewinnung durch FPV auf Gewässern vorliegt, werden neben südostasiatischen Ländern vor allem in den Niederlanden seit einigen Jahren FPV in zunehmendem Maße eingesetzt.

Der Beitrag gibt einen Überblick über die Rahmenbedingungen und den aktuellen Wissensstand zur Nutzung von Gewässern zur Stromerzeugung durch den Einbau von FPV unter den Aspekten der Gewässerökologie und des Gewässerschutzes.

Dabei werden zwei Arten von Seen unterschieden: flache Seen und tiefe Seen. Während der Wasserkörper flacher Seen das ganze Jahr über gut durchmischt ist, weisen tiefe Seen in den Sommermonaten eine Schichtung auf, wobei ein warmer Wasserkörper nahe der Oberfläche von einem tiefen kalten Wasserkörper getrennt ist, deren Folgen dargestellt werden.

Zudem wird eine Ergänzung des deutschen Wasserhaushaltgesetzes näher betrachtet, die spezifische Forderungen bzgl. des Errichtens von FPV enthält. Auf Regelungen der EU WFD (2000) und ihre Umsetzung in nationales Recht wird verwiesen.

Eine aussagekräftige grafische Darstellung zeigt die potenziellen Effekte schwimmender Fotovoltaik Systeme auf Binnengewässern. Die direkten Einflüsse und deren Folgewirkungen reichen von Strahlungs-, Wind-, und pflanzlichen Einwirkungen bis hin zur Eutrophierung.

Abschließend wird der sog. Inseleffekt, d.h. die Nutzung der FPV-anlagen als Rast- und Brutplatz näher betrachtet und die Wirkung der Wasseroberflächenbedeckung durch die FPV auf die Fisch- und Pflanzenproduktion. Hinweise auf zeitnahe Literatur zur Thematik erhöhen die Aktualität des Beitrages.

Ecological requirements for floating architecture by the example of floating photovoltaic systems

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Introduction

Due to the acceleration of the energy transition in Germany towards an increased use of regenerative energies, the pressure to include the potential that water bodies can offer has escalated. Besides the focus on the thermal use of water bodies for heat generation and cooling, the demand for the use of water surfaces to generate electricity from floating photovoltaic systems (FPV) is also increasing (fig. 1). The aim of the German federal government is to establish a total of 215 GWp in 2030 and 400 GWp in 2040 from the several kinds of photovoltaic systems (EEG 2023), starting from about 59 GWp in 2020. An essential prerequisite for the approval of FPV is their ecological compatibility according to the legislation specified by the EU Water Framework Directive, which does not allow any deterioration of the ecological status by new kinds of water uses (EU WFD 2000).

While in Germany there is only little experience with regenerative energy generation by FPV on water bodies, besides Southeast Asian countries for several years FPV have been used to an increasing extent in the Netherlands in particular.

This article is intended to provide an overview of the framework conditions and the current state of knowledge on the use of water bodies to generate electricity through the installation of FPV under the aspects of freshwater ecology and water conservation.



Fig. 1: Floating photovoltaic plant on a gravel pit lake in south-western Germany (photo: Fraunhofer ISE).

Lake ecosystems

Aquatic ecology distinguishes between two types of lakes: shallow lakes and deep lakes. While the water body of shallow lakes is well mixed throughout the year, deep lakes exhibit stratification in the summer months, with a warm water body near the surface separated from a deep cold water body. This leads not only to the formation of a temperature gradient, but also to differences in various substances concentrations in the two layers from oxygen to plant nutrients as the most important ones.

Stability and duration of the stratification are determined by the degree of the temperature differences. Changes in surface temperatures have the potential to cause changes in the stratification development, in the oxygen balance and in matter cycling, as well as changes in the duration of the ice cover in winter.

Natural changes in biological colonisation occur with increasing water depth. The shallow areas close to the lakeshore form the littoral zone with its species-rich colonisation by plants and animals. In the large open water area of deep lakes, light cannot penetrate to the bottom. This is the pelagic habitat, where the plankton dominates.

The protection of the littoral zone from human uses is of particular importance. Furthermore, there should be no negative effects on matter cycling and the lake's oxygen budget due to changes in stratification behaviour and temperature changes.

Legal background

With a supplement to the German Water Resources Act (Wasserhaushaltsgesetz, WHG 2023), a legal basis for the installation of FPV systems on lakes is available since the beginning of 2023. An addendum was included in §36: "(3) A solar system may not be installed and operated 1. in and above a surface water that is not an artificial or heavily modified water, and 2. in and above an artificial or heavily modified if, ..., a) the system covers more than 15 percent of the water body or b) the distance to the shore

is less than 40 meters". Hereby natural water bodies are excluded from FPV uses and restrictions occur with regard to the degree of water surface cover and the distance from the shoreline. Additionally, the regulations of the EU WFD (2000) and their implementation in national legislation must be observed.

Freshwater ecological aspects

A potential analysis by Fraunhofer ISE (2021) estimates a technical potential for FPV plants of 44 GWp for artificial water bodies in Germany. Of particular interest are large post-mining lakes, which have an economically feasible potential of around 2.7 GWp (Fraunhofer ISE 2020). The FPV utilization potential on dredging or gravel pit lakes is also estimated to be considerable.

In addition to the higher module efficiency due to the cooling effect of the water, the high availability without competing uses is seen as an advantage of the use of artificial water bodies. In addition, proponents of FPV postulate various positive effects for the water bodies as that the shading should result in lower water temperatures, which can lead to less evaporation. The lower light availability is also supposed to reduce algae growth and eutrophication effects (Fraunhofer ISE 2023).

However, these considerations may ignore the complexity of the interactions in aquatic ecosystems. Depending on the degree of coverage of the water surface of lakes, various direct effects due to the reduced solar radiation and the reduced wind influence on the water surface as well as resulting consequential effects can be expected. Important potential effects of the installation of FPV plants on lakes for the overall ecosystem can be summarized as shown in fig. 2.

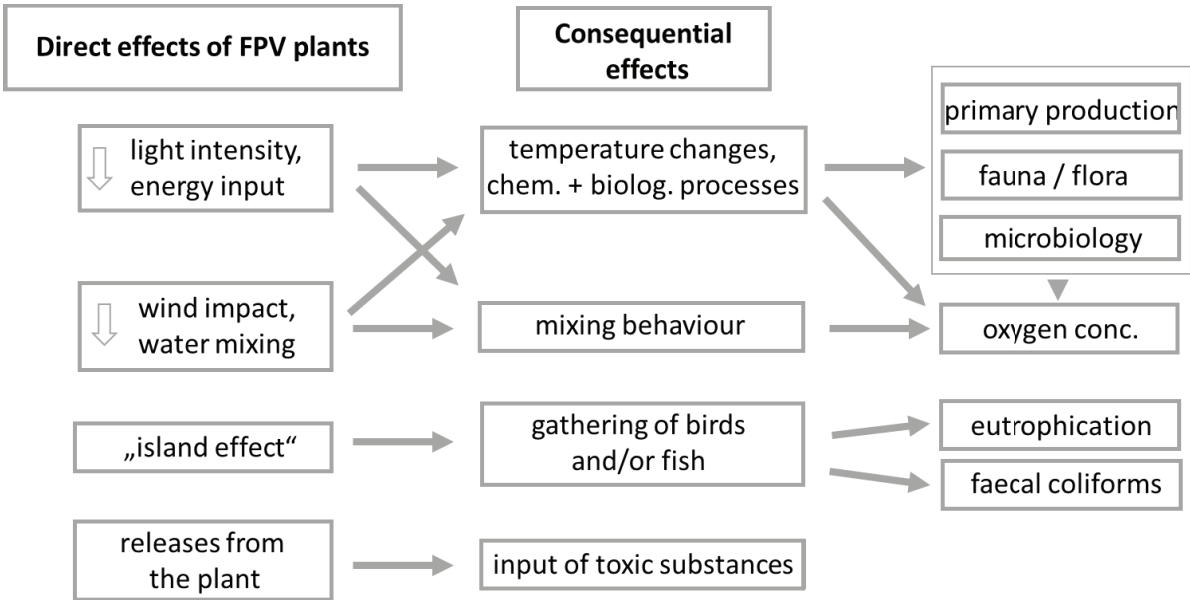


Fig. 2: Potential effects of floating photovoltaic systems on the ecology of freshwater lakes.

It can be expected that both the water temperature and the mixing behaviour of the water body will be influenced by the decrease in energy input from solar radiation and the reduced wind impact on the water surface. Temperature changes can directly affect chemical and biological processes, which in turn can influence biological colonisation. The lake's oxygen balance is directly linked to this.

Another aspect of ecological relevance is the "island effect" of floating solar plants. They can be an attractive resting place for birds. This can lead to an increased nutrient input into the water body in their vicinity. The distribution of fish in the lake could also be influenced by FPV systems. From an environmental point of view, it is also important to use construction materials that do not release ecotoxicologically relevant substances.

Initial results of investigations carried out in the Netherlands on the Bomhofsplas FPV plant, which covers around 30 % of the surface of a gravel pit lake, have shown no negative effects on the ecology of the water body within in the first year after the plant was constructed. Oxygen concentrations decreased only slightly while light availability remained good under the plant. Due to reduced wave activity, erosion in shore areas decreased, which resulted in an increased growth of littoral vegetation (de Lima et al. 2021, Hannen 2021).

The data and modelling of aquatic ecological changes of FPV plants on fish ponds in Taiwan showed the most significant effects on primary production, depending on the degree of water surface coverage. At a coverage of 60 %, a decrease in Chlorophyll-a concentrations as indicator for the formation of algae biomass of around 15 % can be expected, combined with a decrease in BOD values of the same amount and a significant increase in nitrogen and phosphorus concentrations. In contrast, only minor changes resulted for fish production (Château et al. 2019).

Conclusions

Floating photovoltaic systems may have the potential to contribute to an increase in renewable energy production. First steps for the establishment of a legal framework were taken.

However, it has to be considered that so far there is only little knowledge about the ecological effects on water bodies. Important open questions comprise the effects on the structure of plankton coenoses, the trophic state, on matter cycles including the nutrient and oxygen balance as well as questions of sediment formation, macrozoo-benthos colonisation and the behaviour of fish and water birds.

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Aspects of the approval of a floating photovoltaic field from a municipal perspective

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Aspekte der Genehmigung eines schwimmenden Photovoltaik-Feldes aus gemeindlicher Sicht

Mit dem Beginn der größeren Photovoltaik-Felder auf Freiflächen vor ca. 20 Jahren regelte vornehmlich das Erneuerbare-Energien-Gesetz (EEG) die Flächenauswahl und die Bevorrechtigung in den gemeindlichen Flächennutzungsplanungen bzw. die Stromabnahme durch die Regionalversorger in ihrem Mittelspannungsnetz. Bevorrechtigt waren zunächst nutzungsseitig ausgewiesene „Gewerbliche Bauflächen“, militärische Konversionsflächen und Landwirtschaftsflächen bzw. Brachen. In der Regel erfolgte ein größeres Flächenprojekt an Land. Konkret in Ostdeutschland waren militärische Konversionsflächen und ungenutzte Gewerbliche Bauflächen Anfang/Mitte der 2000-er Jahre quadratkilometerweise im Angebot. Auf kleinen Baggerseen (Kies-/Sandnassgewinnung) sind auch schwimmende Anlagen zu finden. Derartige Betriebsgelände sind meist nach außen gesichert und unterliegen dem Bundesbergrecht. Die allgemeinen Rechtsfragen gehen in zwei Richtungen: Wasserrecht und/oder Bauplanungs-/Bauordnungsrecht?

Wasserrechtlich steht im Vordergrund, dass von dem Vorhaben keine schädlichen Beeinträchtigungen auf den Gewässerkörper ausgehen dürfen. Baurechtlich fächert sich die Rechtsfrage etwas auf: ist das Vorhaben raumbedeutsam im Sinne der Raumordnung/Landesplanung oder kann die Gemeinde nach BauGB beurteilen und über die zuständige Kreisbehörde eine Baugenehmigung ermöglichen; sind die bauplanungsrechtlichen Zulässigkeitsvoraussetzungen gegeben oder zu schaffen mittels Bauleitplanung gemäß BauGB? Folge: Große Ermessensspielräume zzt. in den Bundesländern und Fallbetrachtungen von Vorhaben. Der aktive Braunkohlenabbau wurde Ende Dezember 2015 durch die Lausitz Energie Aktiengesellschaft (LEAG) beendet. Zum Gewässerausbau gab es nach Wasserhaushaltsgesetz ein Planfeststellungsverfahren bei der Bergbehörde des Landes Brandenburg. Eine Teilnutzung des künftigen Gewässers mit einer PV-Anlage war in 2014 bis 2019 nicht mit Verfahrensgegenstand gewesen. Die rechtliche Vorklärung mit der Landesberg- und der Landesumweltbehörde seitens der LEAG hatte ergeben, dass es keiner Ergänzung/Änderung des Planfeststellungsbeschlusses der Bergbehörde vom 12.04.2019 bedarf. Die Stadtverwaltung Cottbus/Chósebus entschied sich ein Bebauungsplanverfahren nach BauGB durchzuführen, um Baurecht auf dem beabsichtigten Teilstück des späterhin öffentlich zu nutzenden Sees herzustellen. Das öffentlich-rechtliche Verwaltungsverfahren wurde von Juni 2021 bis Oktober 2022 durchgeführt. Ergänzend zur Bebauungsplan-Aufstellung fand ein paralleles Flächennutzungsplan-Änderungsverfahren in 2021/2022 seitens der Stadt Cottbus/Chósebus statt. Damit wurde dem Bebauungsplan die rechtliche Grundlage gegeben, da kommunale Bebauungspläne sich aus dem übergeordneten Flächennutzungsplan der Gemeinde (siehe BauGB) ableiten müssen.

Aspects of the approval of a floating photovoltaic field from a municipal perspective

Thomas Kramer, Stadtverwaltung Cottbus/Chósebusz ,FB Stadtentwicklung

With the beginning of the larger photovoltaic fields on open spaces about 20 years ago, the Renewable Energy Sources Act (EEG) from that time (several amendments followed later) primarily regulated the selection of areas and the priority in municipal land use plans and the power purchase by the Regional suppliers in their medium-voltage grid with regard to the feed-in tariff for the electricity generated as a federal subsidy for the nationwide expansion of an energy mix with an increasing share of renewable energies in general. "Commercial building areas", military conversion areas and agricultural areas or fallow land were initially given priority. As a rule, a larger area project was carried out on land. Specifically in East Germany, square kilometers of military conversion areas and unused commercial building areas were available in the early to mid-2000s. In contrast to Asia, the installation of PV fields on bodies of water has only been on the rise in Germany in recent years, but more on small quarry ponds (gravel/sand wet extraction). Such company premises are usually secured from the outside and are subject to federal mining law. As a rule, these are not bathing waters and are associated with hazard prevention requirements for the gravel pit operator.

The general legal questions go in two directions: water law and/or building planning/building law?

In terms of water law, the priority is that the project must not have any harmful effects on the body of water. In terms of building law, the legal question is somewhat fanned out: is the project spatially significant in terms of spatial planning/state planning or can the municipality assess it according to the Building Code and enable a building permit through the responsible district authority; Are the admissibility requirements under building planning law met or can they be created by means of land use planning in accordance with the BauGB? The aim is to resolve conflicts with facts from the public interests of a wide variety of agencies. In terms of building planning law, a project in the outdoor area can be privileged according to individual assessments (§35 BauGB), but generally must not conflict with the goals of state planning.



Fig. 1: location of the PV-system on the Cottbus Ostsee

Consequence: Large scope for discretion currently in the federal states and case studies of projects.

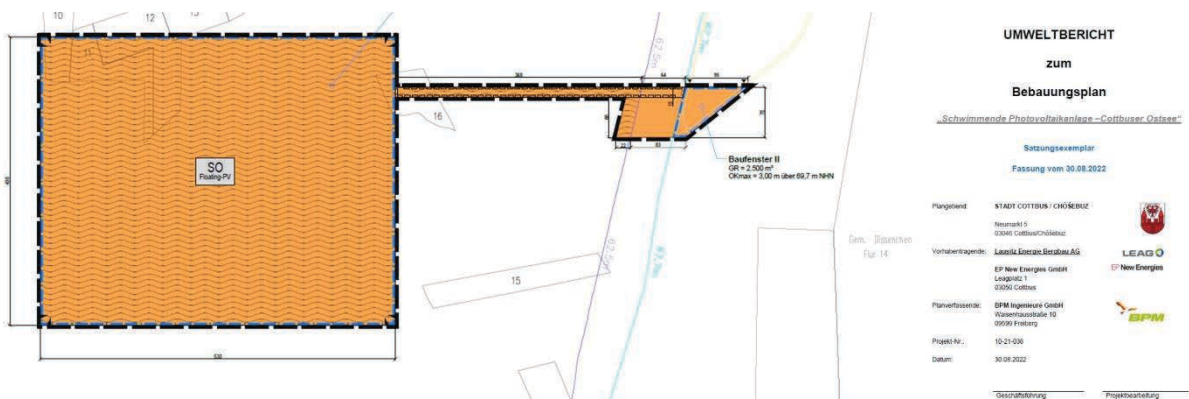


Fig. 2: PC-system

PV systems on a body of water must therefore also be checked for legal water issues in the approval process.

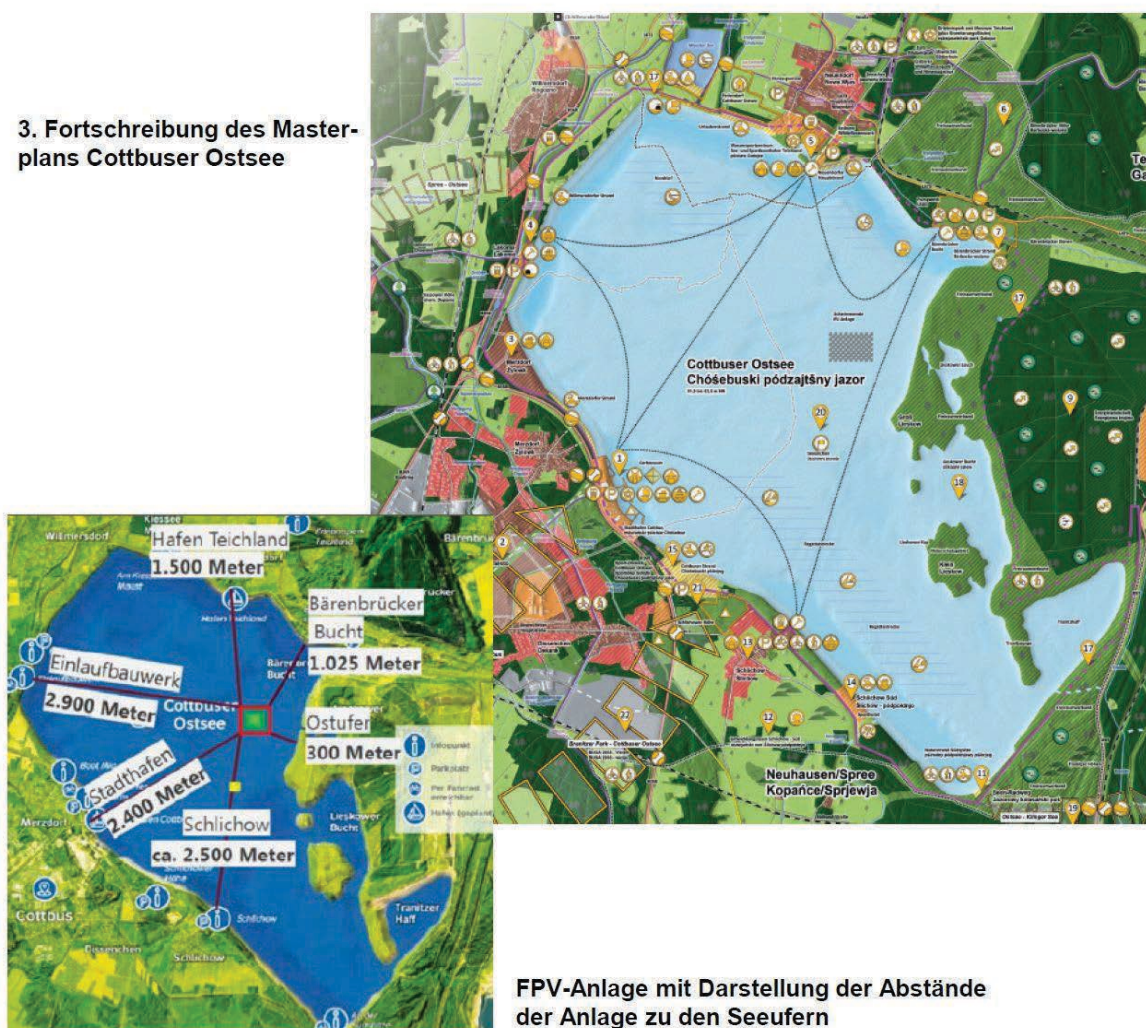
The status of the post-mining water use is as follows at the Cottbus-Nord opencast mine:

The Cottbus-Nord lignite mine plan of 2006 (statutory ordinance of the Federal State of Bbg) provides for multiple uses of the resulting body of water in terms of water management, nature conservation, fishing and tourism.

Active lignite mining was ended at the end of December 2015 by Lausitz Energie Aktiengesellschaft (LEAG). In accordance with the Water Resources Act, there was a

plan approval procedure with the mining authority of the state of Brandenburg for the development of water bodies. Partial use of the future body of water with a PV system was not part of the subject of the proceedings in 2014 to 2019. The flooding began in April 2019. The ground level of the inner dump at +59.8 m NHN has not yet been reached by the rising water level. The mining company LEAG submitted the project idea of a floating PV system to the Cottbus/Chóšebuz city administration in autumn 2020. The project area is less than 1% of the future lake area with a future area of around 19 km². The preliminary legal clarification with the state mining and environmental authorities by LEAG as a private project developer had shown that there was no need to supplement/change the planning approval decision of the mining authority of April 12, 2019, as the effects were estimated to be very small due to the small area. Even the state planning authority did not see the goals of the lignite plan for the Cottbus-Nord opencast mine as being affected.

3. Fortschreibung des Masterplans Cottbuser Ostsee



FPV-Anlage mit Darstellung der Abstände der Anlage zu den Seeufern

Fig. 3: master plan „Cottbuser Ostsee“

The city administration of Cottbus/Chóšebuz decided to carry out a development plan procedure in accordance with the BauGB in order to establish building rights on the intended section of the lake, which will later be used by the public. The administrative

procedure under public law was carried out from June 2021 to October 2022 (application to statute resolution in the Cottbus/Chósebuz city council). The private-law building application by LEAG was/is being made in stages: the tipping soil consolidation was applied for and approved by the state mining authority via mining law; the dolphin setting as a partial building permit takes place via the approval of the lower building authority of the independent city of Cottbus. Due to a delay in the flooding process (4 sometimes extremely dry years 2018-2021), the dolphins will not be brought in until spring 2023. A final assembly of the PV system should be completed in 2024 before the water level, which continues to rise to +62.5 m NHN, will start the floating of the system.

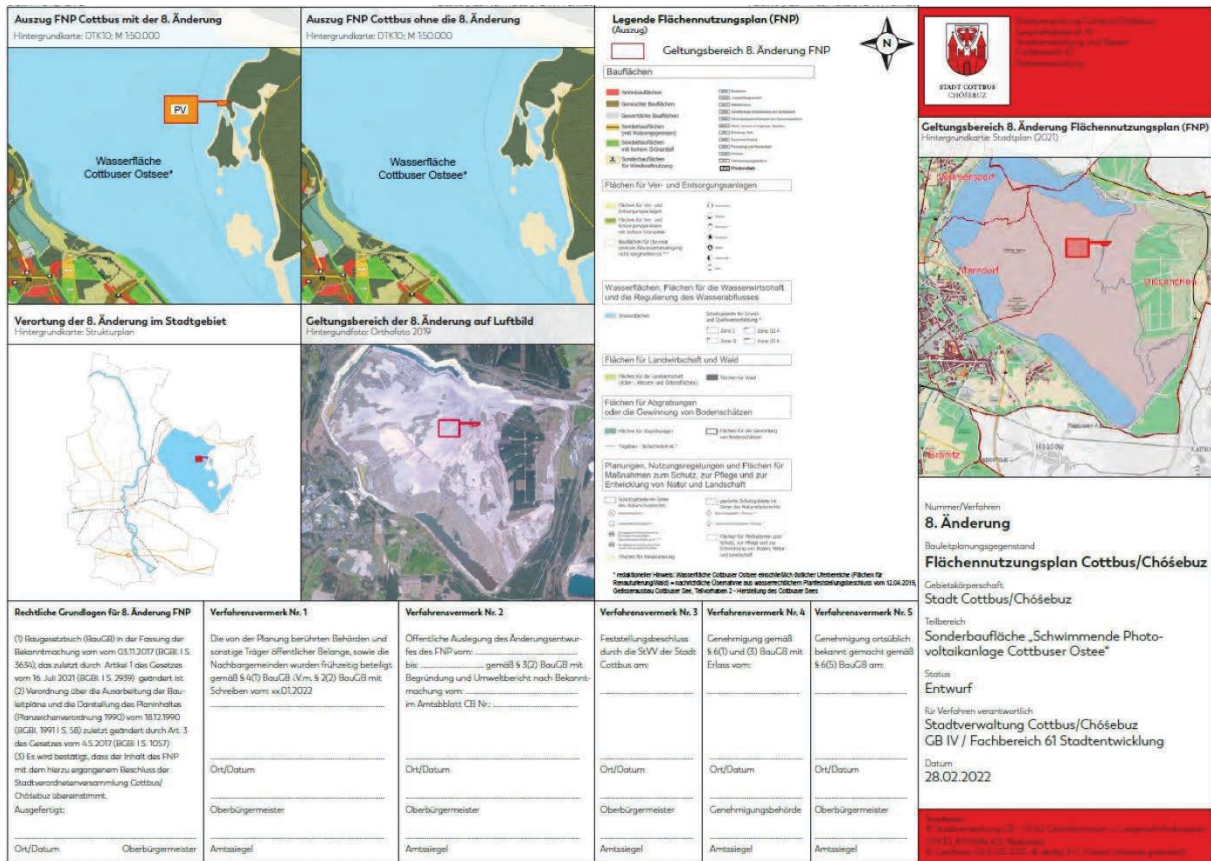


Fig 4: zoning plan Cottbus

In addition to the preparation of the development plan, the city of Cottbus/Chósebuz carried out a parallel land use plan change procedure in 2021/2022 in order to classify the intended use of the area in accordance with the building use ordinance and to identify it here as a "special area PV system". This gave the development plan the legal basis, since municipal development plans must be derived from the overarching land use plan of the municipality (see BauGB).

Remedial measures of the LMBV for the further development of the Lusatian Lake District

Gerd Richter

Deutscher Vorspann

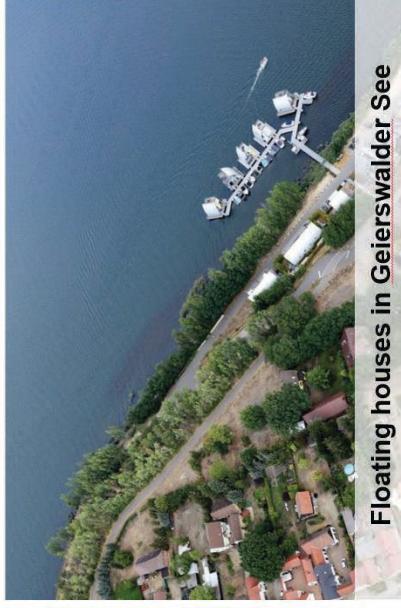
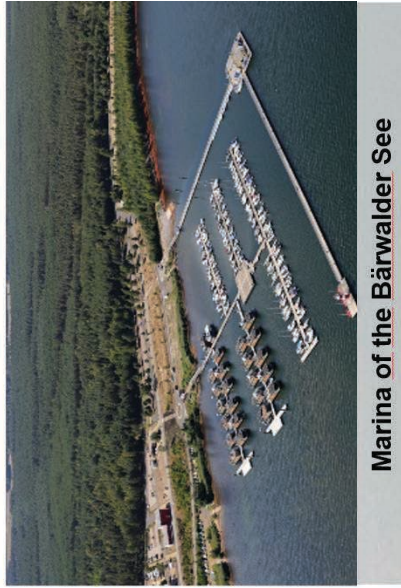
Sanierungsmaßnahmen der LMBV für die weitere Entwicklung des Lausitzer Seenlandes

Die gegenwärtige Situation bei den anstehenden Sanierungsarbeiten wird kurz dargestellt und erläutert. Die höchste Priorität besitzt derzeit die Fertigstellung der schiffbaren Restlochkette und der Großräschener See. Entsprechend dem Wasserdargebot soll dies bis 2026 erfolgen. Die Sanierungsmaßnahmen werden jeweils an einer grafisch unterlegten Karte übersichtlich ausgewiesen und sollen hier nur an Beispielen kurz benannt werden:

- Am Sedlitzer und Großräschener See stehen u.a. zu unterschiedlichen Zeiträumen an verschiedenen Ortslagen das Errichten von Wellenbrecher, Abtrag von Überhöhen, Filterbrunnenverwahrungen und der Rückbau der Flutungsleitung an.
- Beim Geierswalder und Partwitzer See mit den Überleitern 9 und 10 betrifft dies z.B. die Nordböschung Skado und die Innenkippen Koschen und Skado sowie weitere und Betonschutzmaßnahmen und Fischtreppe am Neuwieser See.
- Aktivitäten am Bergheider See betreffen Sicherungsmaßnahmen an der Nordböschung und Altbergbau Grube Helga sowie Erdarbeiten an der Südböschung.
- Am Restloch Greifenhain bzw. am Altdöberner See konzentrieren sich die Arbeiten auf sog. Fallgewichtverdichtungen.
- Weitere Sanierungsmaßnahmen betreffen Restlöcher in Ostsachsen.

Eine Übersichtskarte demonstriert die Ausdehnung und Größe des Sanierungsgebietes von insgesamt 9.900 km². Sie beträgt in O-W-richtung etwa 110km und in N-S-Richtung ca. 90km.

6 th Conference Floating Buildings



**Remedial measures of the LMBV for the further
development of the Lusatian Lake District**

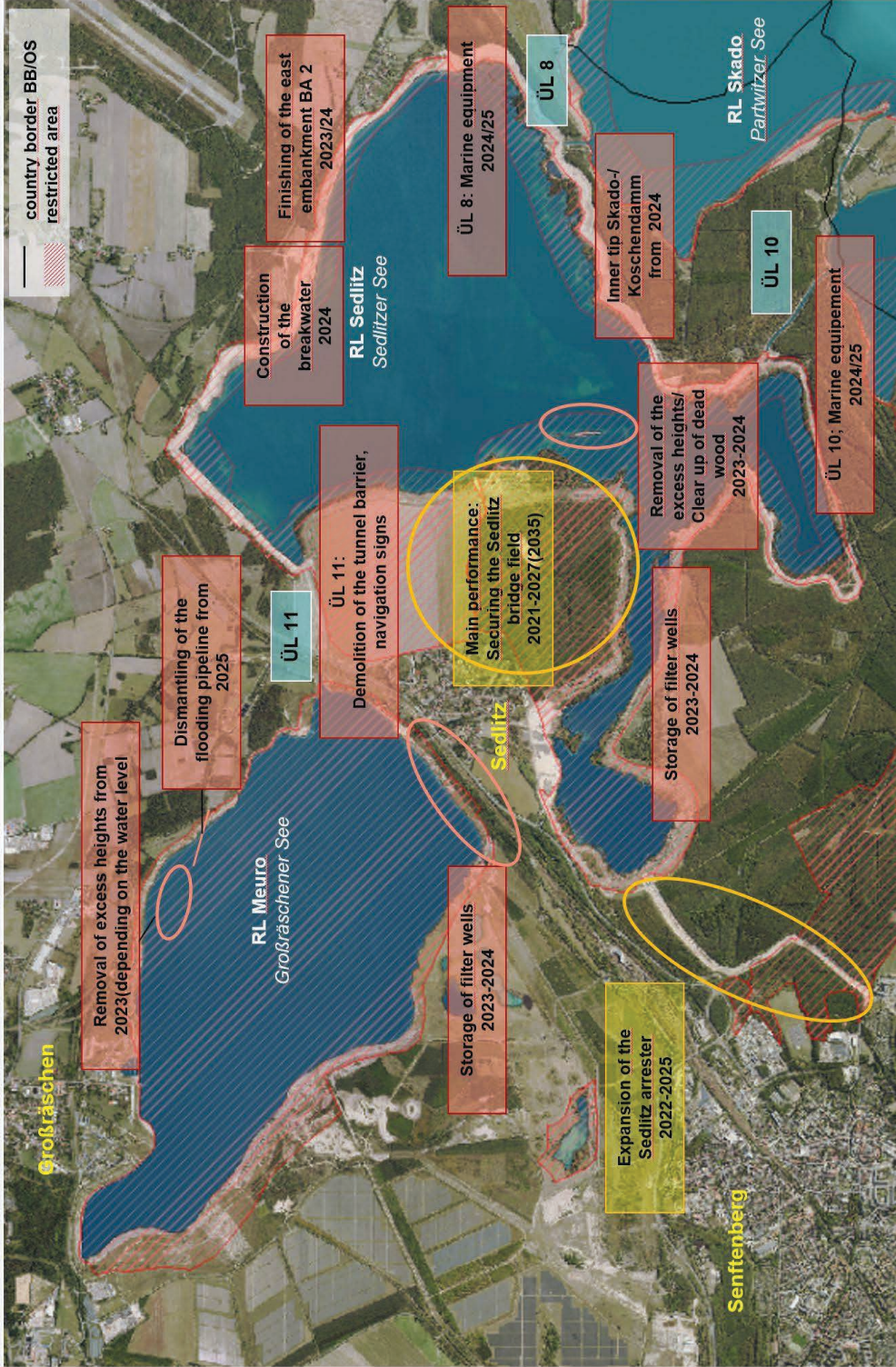
1st priority: Completion of navigable residual hole chain + Großräschener See



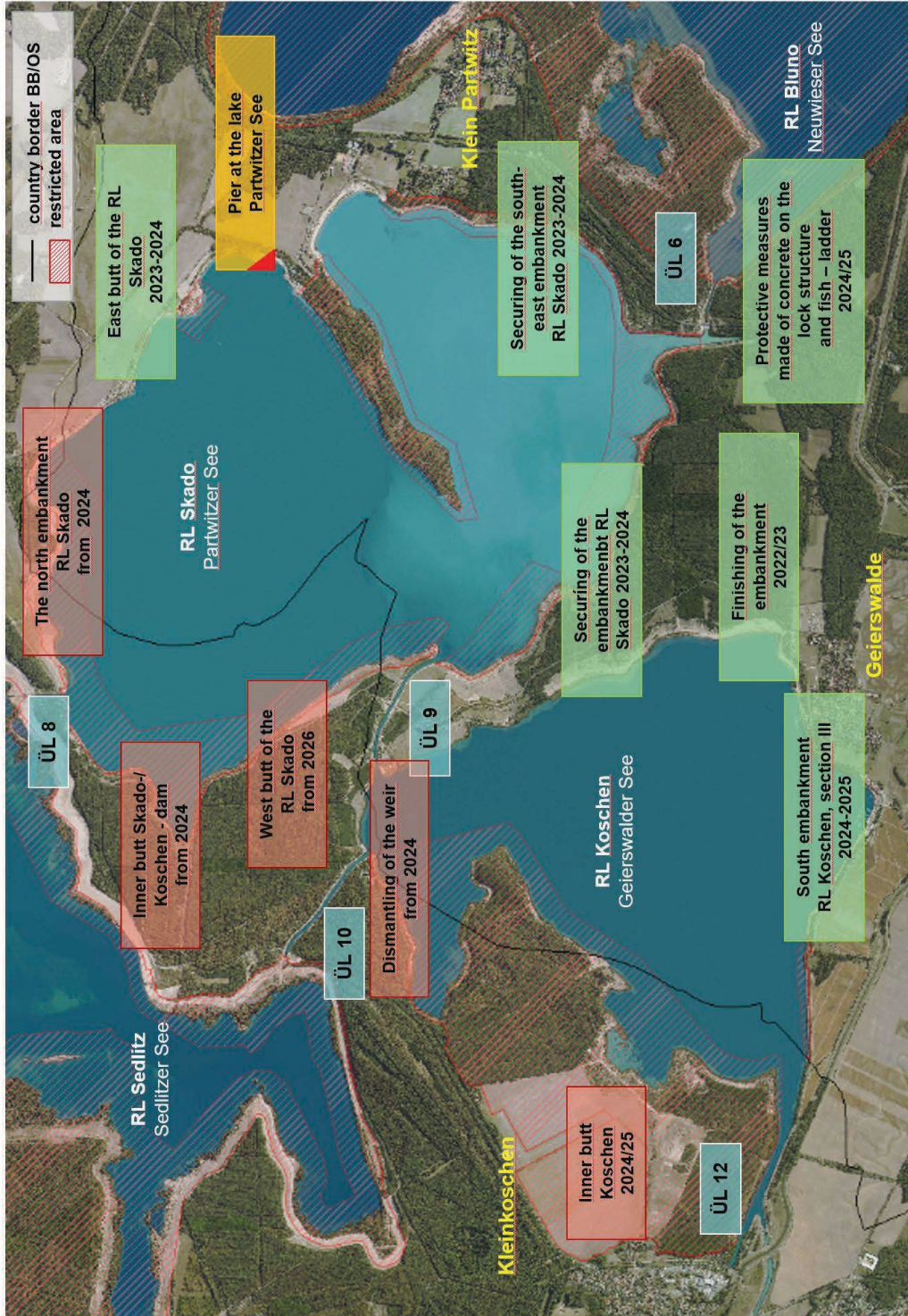
Completion of renovation of the water surface at + 100/101 m NHN2026 according to available water supply:

- Großräschener See (RL Meuro) ca. 820 ha (10000 sqm) water surface
 - Sedlitzer See (RL Sedlitz) ca. 1.420 ha water surface
 - Partwitzer See (RL Skado) ca. 1.100 ha water surface
 - Geierswalder See (RL Koschen) ca. 650 ha water surface
- Σ ca. 4.000 ha water surface**

Remedial measures at the lakes near Großräschen and Sedlitz



Sanitation measures at the Partwitzer See and Geierswalder See

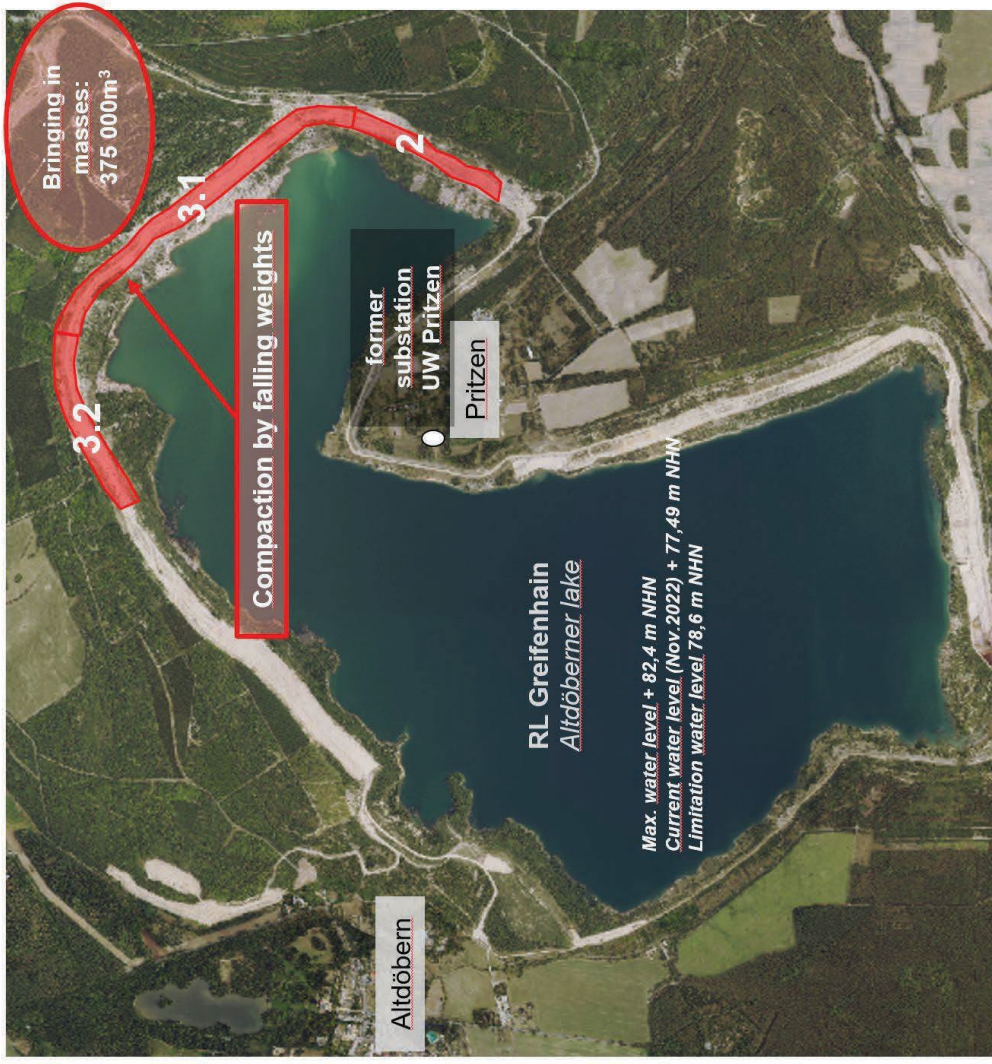


Sanitation measures at the lake Bergheider See



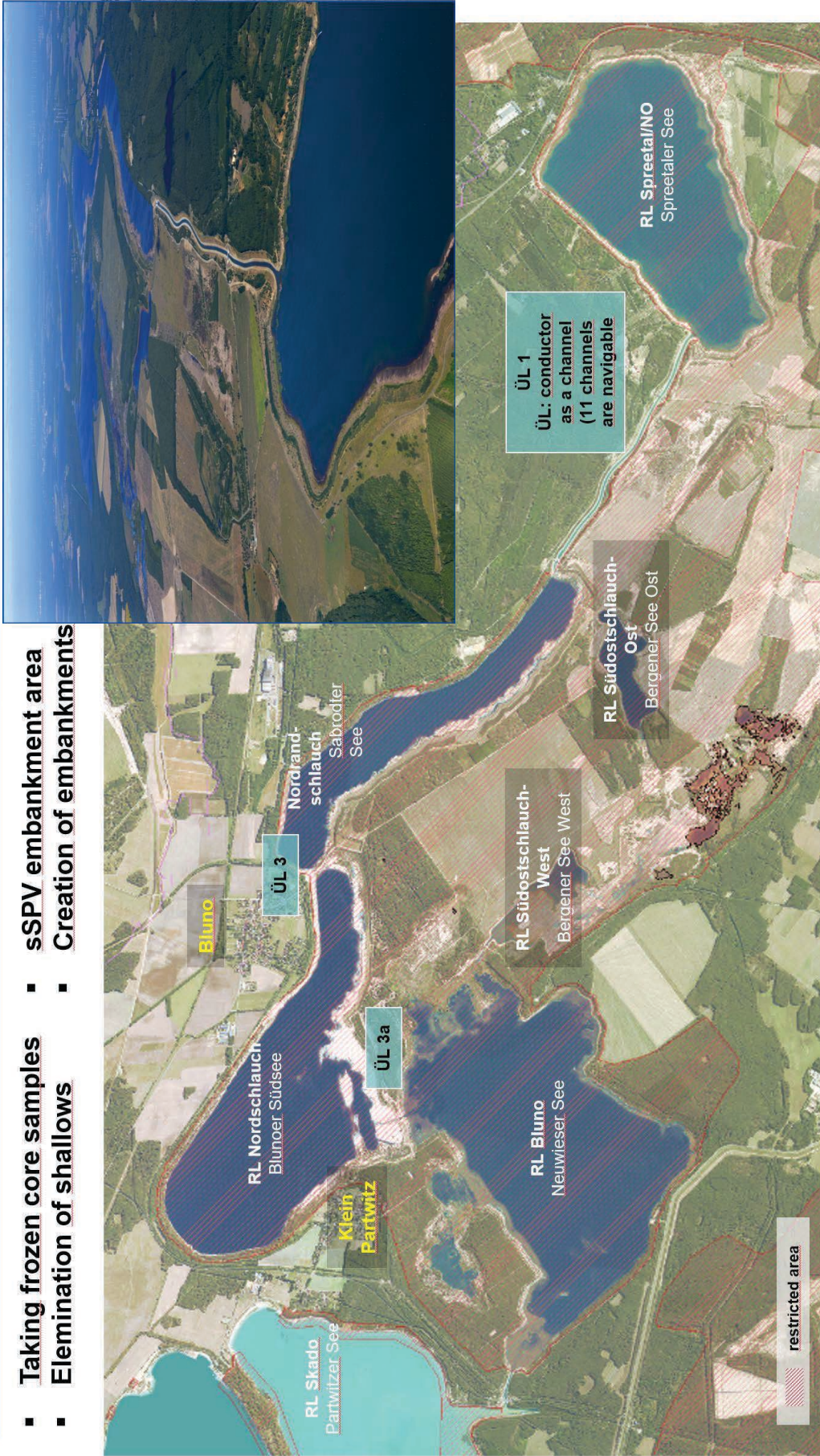
Sanitation measures at the RL Greifenhain – drop weight compaction (FGV)

- **Compaction by falling weights from 09/2022:**
 - Area 3.1 – Northwest embankment
 - Area 3.2 – Northeast embankment
- **further FGV from 03/2023:**
 - Area 2 – East embankment
- **Soil remediation of the former UW-Pritzen from July 2023**

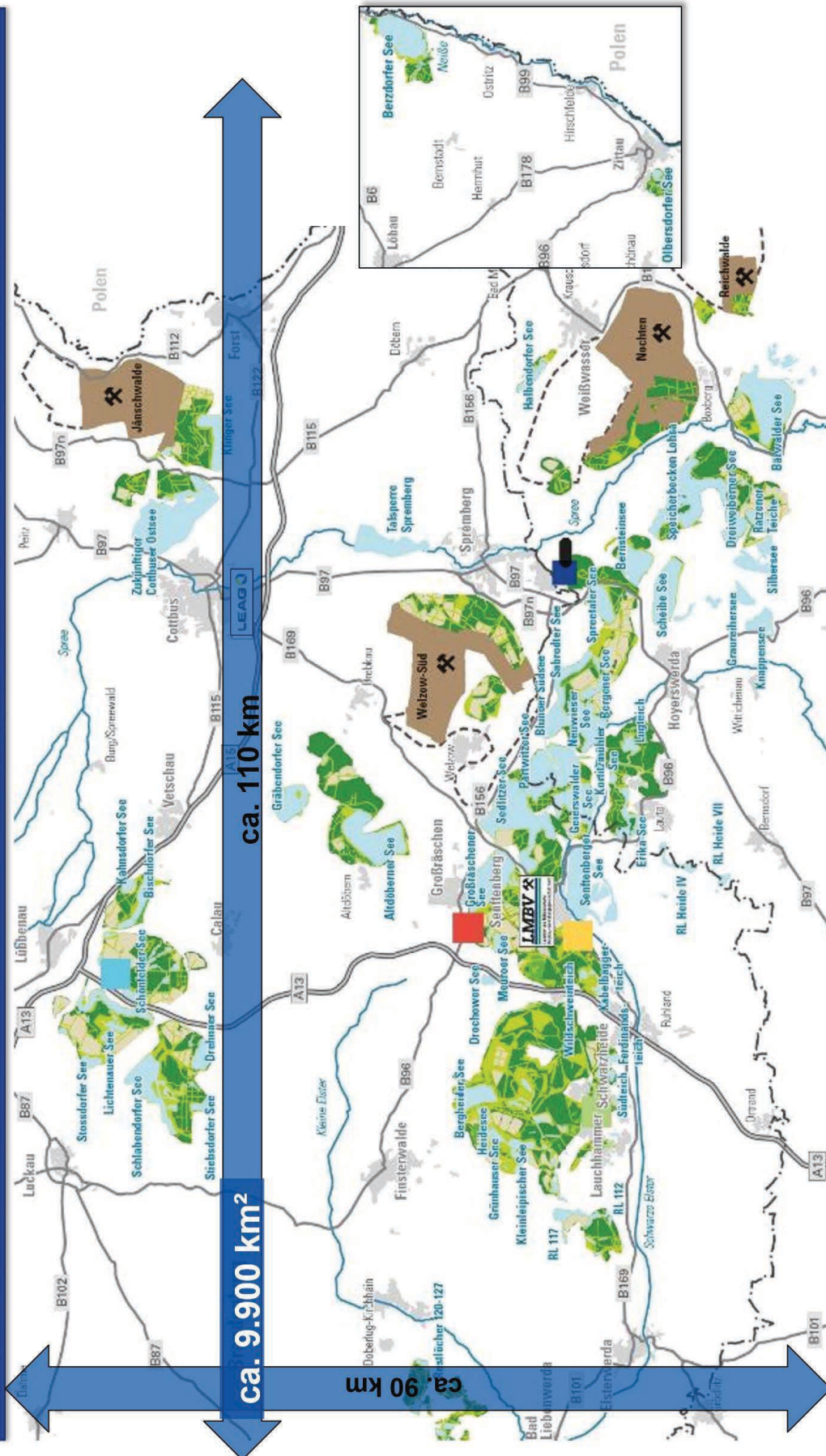


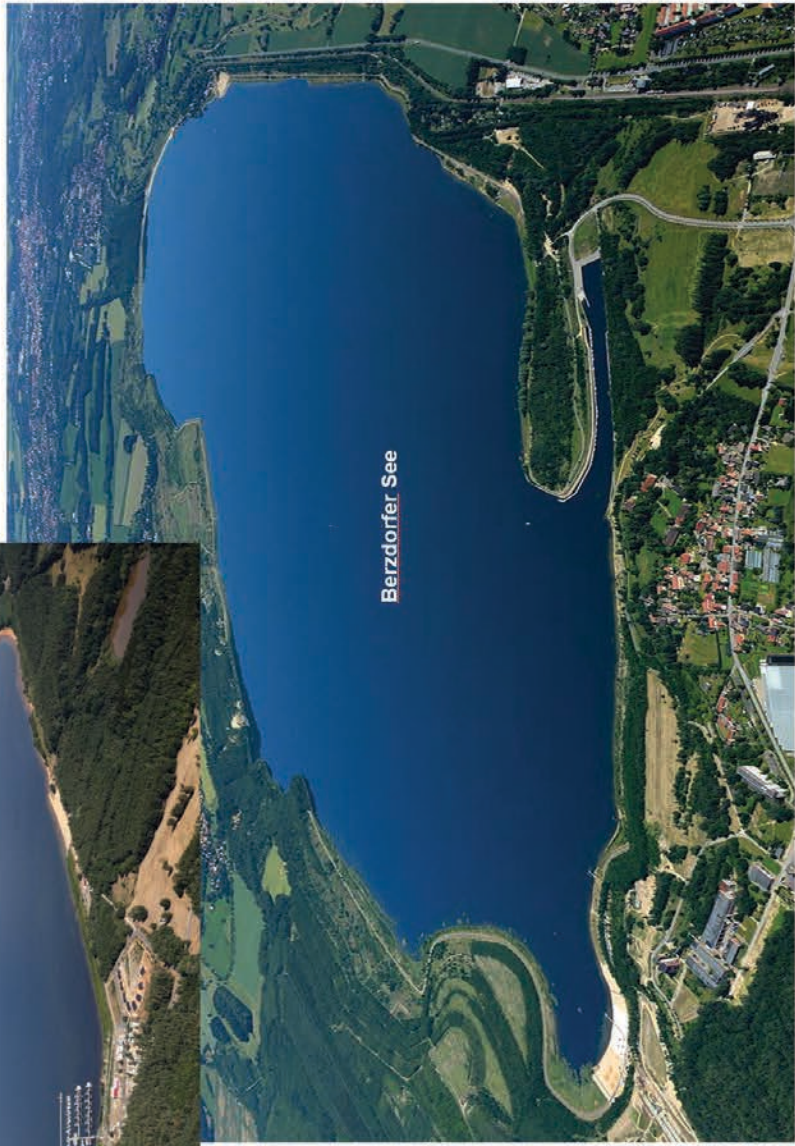
Sanitation of further former opencast mines in East - Saxony

- Taking frozen core samples
- Elimination of shallows
- sSPV embankment area
- Creation of embankments



Overview of the redevelopment area Lusatia





G L Ü C K
auf!

Financing and valuation of floating homes in Austria

Deutscher Vorspann

Finanzierung und Bewertung von schwimmenden Häusern in Österreich

Der Beitrag zeigt die Teilergebnisse einer umfangreichen Untersuchung zu Finanzierungs- und Bewertungsmöglichkeiten von schwimmenden Häusern in Österreich mit Blick auf eine mögliche Immobilien- bzw. Realkreditfinanzierung. Obwohl sich die Ausführungen auf die Bedingungen in Österreich beziehen, so bieten sie doch eine gute Grundlage auch für den europäischen Raum, wie die Verhältnisse in Deutschland und sind zudem weltweit in Teilen übertragbar.

Das österreichische Liegenschaftsbewertungsgesetz (LBG) und zwei realisierte Projektentwicklungen von schwimmenden Häusern in Österreich bilden die Ausgangsbasis für die Untersuchung. In diesem Beitrag wird zunächst eine der beiden Projektentwicklungen beschrieben und deren Ergebnisse werden aufgeführt. Dabei handelt es sich um ein Projekt in Oberösterreich mit vier schwimmenden Häusern aus dem Jahr 2017 im Linzer Winterhafen. Von diesen werden drei zur Wohnnutzung vermietet, während ein schwimmendes Haus als Musterobjekt dient. Der Ponton besteht aus Stahl, die Aufbauten nutzen Massivholzplatten, die Wohnfläche beträgt 111qm. Die Heizung erfolgt autark über Fotovoltaik incl. Luftwärmepumpe, während zur Strom- und Wasserversorgung die Infrastruktur des Hafens genutzt wird.

Die zweite Projektentwicklung und die Schlussfolgerungen aus den beiden Projektentwicklungen für die Finanzier- und Bewertbarkeit von schwimmenden Häusern kann der nachfolgenden Ausgabe der Broschüre „Floating Architecture Vol. 5“ entnommen werden. Diese erscheint, wie die Vorgänger der zweijährigen Titelreihe, im LIT-Verlag Berlin-Zürich-Wien und ist auch als elektronische Variante erwerbbar. Um einen besseren Lesefluss des Beitrages zu ermöglichen, sind die unter Punkt III 3.1.4 verwendeten Sekundärquellen und die dazugehörigen Primärquellen, die eine sehr lange Zeichenlänge aufweisen, nicht in den jeweiligen Fußnoten niedergeschrieben. Die dazugehörigen Quellennachweise zu den jeweiligen Fußnoten (Kurzbeleg) sowie das Literaturverzeichnis (Vollbeleg) stehen auf Anfrage beim Institut für Schwimmende Bauten der Fakultät Architektur - Bauingenieurwesen -Stadtplanung der Brandenburgischen Technischen Universität BTU Cottbus-Senftenberg zur Verfügung.

Financing and valuation of floating homes in Austria

I Introduction

The article shows and explains the results of a theoretical and empirical analysis of the financing and valuation options for floating homes in Austria with a view to possible real estate or real estate loan financing. Even if the explanations refer to the conditions in Austria, they also offer a good basis for the European area such as Germany and are also transferable in parts worldwide.

The Austrian Real Estate Valuation Act (LBG) and two realized project developments of floating homes in Austria form the starting point for the investigation. In the present article, one of the two project developments is first described and its results are listed. The second project development and the conclusions from the two project developments for the financing and assessability of floating homes can be found in the following edition of the brochure "Floating Architecture Vol. 5". Like the predecessors of the two-year title series, this is published by LIT-Verlag Berlin-Zurich-Vienna and can also be purchased as an electronic version.

Note: In order to enable a better reading flow of the specialist article, the secondary sources used under point III 3.1.4 and the associated primary sources, which have a very long character length, are not written down in the respective footnotes. The corresponding source references for the respective footnotes (short reference) as well as the bibliography (full reference) are available on request from the Institute for Floating Structures of the Faculty of Architecture-Civil Engineering-Urban Planning of the Brandenburg Technical University.

1 Initial Situation Real Estate Financing of Floating Homes in Germany

According to practical experience, real estate mortgage banks in Germany do not grant real estate loans in most cases for financing floating homes, neither as ship loans nor as real estate loans.

Significant reasons regarding the failure of real estate refinancing for floating homes according to empirical and theoretical studies are as follows: ¹

- Little knowledge in the area of floating homes at credit institutions
- No legal definition or demarcation of buildings on or near water → legal uncertainty regarding the classification of a floating home as a lendable object
- Marketability/liquid market, rentability and usability is estimated to be currently non-existent, mainly due to lack of experience
- High research costs for the determination of the market value and mortgage lending value of necessary parameters are in contrast to an overall low to insufficient data pool

¹Vgl. o.V. (2019), S. 114 ff.; o.V. (2021), S. 86; 112.

- Lack of institutions and associations in Germany that develop interdisciplinary technical and legal principles and impart specialist knowledge

2 Issue and approach

Central issue of analysis:

Can the financing and valuation practice of credit institutions in Germany for floating homes be facilitated by means of the financing and valuation practice of floating homes in Austria?

Approach

- Examination of financing and valuation modalities in Austria for floating homes by means of loans from banks for real estate and movable property with real estate economic reference according to the Liegenschaftsbewertungsgesetz (LBG)
- Identification of basic credit-economical financing and valuation modalities in relation to valuation objects according to the LBG
- Examination of the financing and valuation possibilities of floating homes as real estate or movable property with real estate economic reference on the basis of concrete project developments
- Conclusion and outlook

3 Floating home (sH) as subject of the study

In the context of this analysis, the subject of the study, the floating home, is defined on the basis of the definition "schwimmendes Gebäude" according to DIN SPEC 80003 ².

Definition *schwimmendes Gebäude* according to 3.1 DIN SPEC 80003

„Gebäude, das auf einem **Schwimmsystem** errichtet oder aufgrund seiner konstruktiven Ausbildung **selbst Teil des Schwimmsystems** ist, durch seine **Verankerung ortsfest** gehalten ist und **über keinen eigenen Antrieb** verfügt.“

"A building that is erected on a floating system or, by virtue of its design, is itself part of the floating system, is held stationary by its anchorage, and has no propulsion of its own."

Definition *floating home* in sides of the author

A **schwimmendes Gebäude** used for **living**.

² DIN SPEC 80003: 2021-06 (DIN SPEC 80003), Schwimmende Gebäude – Technische Anforderungen und Prüfungen in der aktuell gültigen Fassung.

In the following, the term "sH" is used as an abbreviation for a "floating home" when necessary.

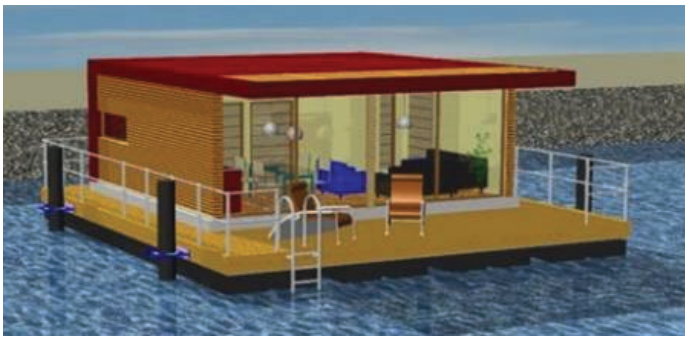


Fig. 1 Example für a floating home

Source: Own illustration based on Perebo GmbH & Co. KG (editor) (2016).

II Fundamentals of credit financing and valuation of real estate and movable property with real estate-related aspects according to the LBG in Austria

In the following, the fundamentals of the market and mortgage lending value determination methodology of real estate and movable property with real estate economic relevance according to the Liegenschaftsbewertungsgesetz (LBG) as well as essential characteristics of the valuation objects to be considered according to the LBG are listed.

1 Fundamentals of market value determination of real estate and movable property with real estate economic reference according to the LBG in Austria

The essence of market value is followed by the basics of market value determination and essential characteristics of valuation objects according to the LBG.

1.1 Definition and essence of the market value according to the LBG

The term "market value" is defined at the national level in the Liegenschaftsbewertungsgesetz (LBG), ÖNORM B 1802³ and the Bankwesengesetz⁴. The LBG is fundamentally mandatory to be applied in legal proceedings and can be considered comparable to the definition of the German market value (Verkehrswert) according to § 194 BauGB.⁵

Definition Verkehrswert (market value) according to § 2 Abs. 2 u. 3 LBG

„(2) Verkehrswert ist der Preis, der bei einer Veräußerung der Sache **üblicherweise im redlichen Geschäftsverkehr** für sie erzielt werden kann.

(3) Die **besondere Vorliebe und andere ideelle Wertzumessungen** einzelner Personen haben bei der Ermittlung des Verkehrswertes **außer Betracht zu bleiben.**“

³Alle Ausführungen in diesem Fachartikel basieren auf der ÖNORM B 1802:1997-12-01 außer es wird etwas Anderes in diesem Fachartikel gesagt.

⁴Bankwesengesetz (BWG) in der aktuell gültigen Fassung.

⁵Vgl. Roth (2014a), S. 51 f.

1.2 Basics of market value determination methodology and procedure according to LBG

All valuation methods that reflect the state of the art can be applied for the determination of market value according to the LBG, which include in particular income approach, the asset valuation and the comparative value method.⁶ In the opinion of the author, the latter procedures are comparable with the valuation procedures according to the German Immobilienwertermittlungsverordnung (ImmoWertV)⁷.

1.3 Valuation subjects according to the LBG

The valuation object according to the LBG and ÖNORM B 1802 can be so-called "objects" within the meaning of § 285 ABGB⁸, which include *immovable objects* (real estate) such as real estate (land) including its appurtenances, real estate shares and building rights on the one hand, and *movable objects* with real estate economic reference, the Superädifikat, on the other hand (see also figure below).⁹

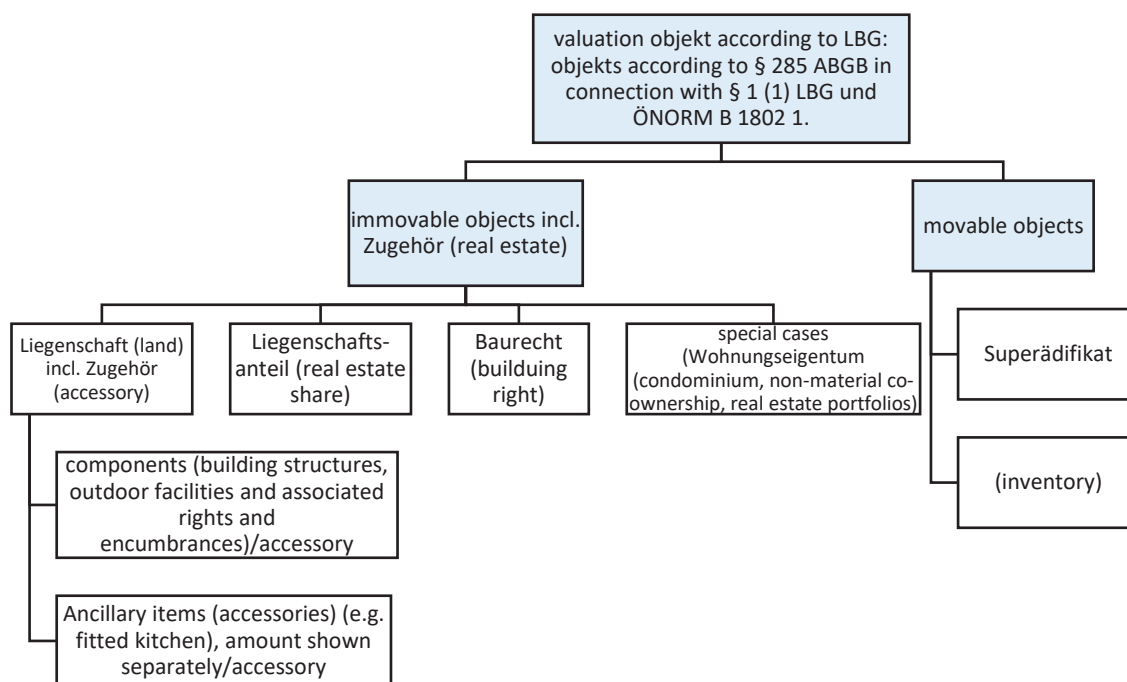


Fig. 2 Valuation objects according to the LBG

Source: Own illustration based on Bienert (2014), p. 59 f., see. § 1 LBG, ÖNORM B 1802 and § 285 ABGB.

Details valuation subjects¹⁰

a) Immovable assets (real estate)

Liegenschaft (land) incl. Zugehör (accessory/building)

⁶Vgl. Roth (2014a), S.51 f.

⁷Immobilienwertermittlungsverordnung "Immobilienwertermittlungsverordnung vom 14. Juli 2021 (ImmoWertV).

⁸Allgemeines bürgerliches Gesetzbuch für die gesammten deutschen Erbländer der Oesterreichischen Monarchie (ABGB) in der aktuell gültigen Fassung.

⁹Vgl. Bienert (2014), S. 59 f.

¹⁰Vgl. Bienert (2014), S. 59f., vgl. § 1 LBG, ÖNORM B 1802 und § 285 ABGB.

As in Germany, there is no uniform definition of "Liegenschaft". Its essence, legally and technically, is comparable to the term "Grundstück" and "wesentlicher Bestandteil" or "Gebäude" according to § 94 BGB¹¹.

Wohnungseigentum (condominium) according to Wohnungseigentumsgesetz 2002

The Austrian term "Wohnungseigentum" according to the WEG 2002¹² is similar to the term „Wohnungseigentum“ according to the German Wohnungseigentumsgesetz (WEG)¹³.

Liegenschaftsanteil (real estate share)

The term "Liegenschaftsanteil" is comparable to the term "Miteigentumsanteil" according to. §§ 1008 BGB.

b) Buildings on third party land- Baurecht according to § 1 BauRG¹⁴ and Superädifikat according to § 435 ABGB

The Superädifikat and the Baurecht enable the

- use of a property for construction purposes for a limited period of time,
- the user of the real estate does not have to be the owner of the real estate, and
- the user of the real estate (owner of the construction) usually pays a regular compensation to the owner of the real estate.¹⁵

Together with the *Kellereigentum*, the Baurecht and the Superädifikat enable building or construction on third-party land and represent independent legal subjects.¹⁶ The Baurecht is comparable to the German Erbbaurecht according to the Erbbaurechtsgesetz¹⁷.

The Kellereigentum will not be discussed in detail with regard to the research object, floating home.

2 Basics of determination of the mortgage lending value of real estate according to LBG

In the following, the basics of the determination of the mortgage lending value of real estate according to the LBG are listed.

2.1 Essence of mortgage lending value and legal framework

Definitions of a mortgage lending value as a basis for assessing the value of the property in the lending context are available, among others, in the Bankwesengesetz

¹¹Bürgerliches Gesetzbuch (BGB) in der aktuell gültigen Fassung.

¹²Bundesgesetz über das Wohnungseigentum (Wohnungseigentumsgesetz 2002 – WEG 2002), zuletzt geändert am 30.12.2021.

¹³Gesetz über das Wohnungseigentum und das Dauerwohnrecht (Wohnungseigentumsgesetz - WEG) in der Fassung der Bekanntmachung vom 12. Januar 2021.

¹⁴Baurechtsgesetz (BauRG) vom 26. April 1912.

¹⁵Vgl. Bammer / Reithofer (2014), S. 552.

¹⁶Vgl. Kogler/Mayrhofer (2021), S. 191 f. i.V.m. § 1 BauRG, § 297 und 300 ABGB.

¹⁷Erbbaurechtsgesetz (Erbbaurechtsgesetz) in der aktuell gültigen Fassung.

(BWG), the Hypothekendarstellungsgesetz (HypBG)¹⁸ respectively in in the Pfandbriefgesetz (österreichisches PfandBG)¹⁹ in force from 08.07.2022.²⁰

Mortgage lending value according to §103 BWG 10. para. 2

„Als Beleihungswert gilt der Wert der Immobilie, der von einem Schätzer ermittelt wird, welcher eine sorgfältige Schätzung der künftigen Marktgängigkeit der Immobilie unter Berücksichtigung ihrer langfristig unveränderlichen Merkmale, der normalen und örtlichen Marktbedingungen, ihrer derzeitigen Nutzung sowie angemessener Alternativnutzungen vornimmt. In die Schätzung des Beleihungswertes dürfen keine spekulativen Gesichtspunkte einfließen. Der Beleihungswert ist in transparenter und eindeutiger Weise zu belegen.“

"Mortgage lending value" means the value of the property as determined by an appraiser who makes a careful estimate of the future marketability of the property, taking into account its long-term invariant characteristics, normal and local market conditions, its present use, and reasonable alternative uses. No speculative considerations shall be included in the estimate of the mortgage lending value. The mortgage lending value shall be substantiated in a transparent and unambiguous manner."

2.2 Basics of Mortgage Value Methodology and Procedure in Austria and in the International Context

Austrian regulations or legal texts are currently not available with regard to a concrete and binding methodology and procedure for the determination of the mortgage lending value for real estate.²¹

According to BIENERT (2006), common valuation practice at German and Austrian banks is to derive the mortgage lending value on the basis of a lump-sum markup from the determined market value, partly depending on the risk of the respective type of use, and on the other hand to determine the original mortgage lending value, where the mortgage lending value is determined in a separate procedure in accordance with the (German) PfandBG²² or the BelWertV^{23, 24}

In the international context, the EVS (European Valuation Standards) and EVA (European Valuation Applications) of the TEGoVA²⁵ and the BelWertV should be mentioned, which contain concrete specifications regarding the determination of the mortgage lending value. In this area, the BelWertV represents the only legal framework in Europe to date.²⁶

¹⁸Hypothekendarstellungsgesetz (HypBG) vom 13. Juli 1899, das teilweise am 08.07.2022 durch das (österreichische) Pfandbriefgesetz geändert und ersetzt wurde.

¹⁹(Österreichisches) Pfandbriefgesetz (PfandBG) vom 08.07.2022.

²⁰Vgl. Roth (2014b), S. 816 ff; vgl. Roth (2014a), S. 53.

²¹vgl. Bienert (2006), S. 8 ff.

²²Vgl. (Deutsches) Pfandbriefgesetz (PfandBG) in der aktuell gültigen Fassung.

²³Beleihungswertermittlungsverordnung (BelWertV) in der aktuell gültigen Fassung.

²⁴Vgl. Bienert (2006), S. 8 ff.

²⁵Siehe auch TeGoVA (Hrsg.): Europäische Bewertungsstandards 2012, deutsche Fassung, siebte Aufl., Deutschland 2014.

²⁶Vgl. Roth (2014b), S. 818.

3 Particularities of the market and mortgage lending value assessment of Baurecht and Superädifikaten

With regard to the determination of the market and mortgage lending value of Superädifikat and Baurecht there are differences compared to the valuation of Liegenschaften due to their special features (see below).

3.1 Details definition and essence of Superädifikat and Baurecht

Tab.1 Comparison Superädifikat and Baurecht

Source: Own illustration based on Bammer/Reithofer (2014), p. 558 f.; see BauRG.

Aspect	Superädifikat	Baurecht
Legal basis	§§ 435 ABGB	BauRG
Characteristic	Construction on another person's land, where the building is considered a movable object	Right to have a structure on or under another's ground surface
Origin	arises from construction with the intention of not leaving the structure steadily on the other person's land → „Grundbenützungsbereikommen“ or „Superädifikats(gestaltungs)vertrags“ arises	Notarization of the building lease contract in the land register and opening of the building lease deposit (Baurechtseinlage)
Charge - reference	Land use may also be permitted only on parts of the property	Establishment is only possible on the entire property. Multiple Baurechte cannot be established on one property (Grundbuchkörper).
Legal nature	Obligatory right, no recording possible by means of a separate land register sheet	Right in rem (dingliches Recht), formation of a separate land register sheet "Baurechtseinlage" is necessary.
Recognizability	1st stage original acquisition - limited recognizability in the construction file 2nd stage: derivative acquisition - deed in the building file (Bauwerkskartei) Entry in the C sheet of the encumbered property possible	Capital contribution: - Entry in the C sheet Building lease contribution: - Reference in the A sheet to the capital contribution
Transmission	Contract together with deposit of documents in the construction file - derivative	Contract with registration in the land register in the building lease deposit
Duration	Not in perpetuity, indefinite use relationships are possible, termination restrictions according to the tenancy law (Miterrechtsgesetz)	10 to 100 years
Lendability	Liens with limited publicity effect only by way of deposit of deeds	Liens recorded in the land register can be established

3.2 Security Content and Risks of Baurecht and Superädifikat as Loan Collateral

Currently, there is legal uncertainty regarding the classification of a subject as a Superädifikat and the demarcation from other legal subjects, especially from Baurecht or other movable property, which is why a reorganization of the legal subjects *Kellereigentum*, *Baurecht* und *Superädifikat* until the abolition or introduction of a uniform building property is demanded on the part of legal experts and is also being prepared with state subsidies.²⁷

The security in rem of the lien on the *Baurecht* allows the usability and value of the *Baurecht* to remain in full force as loan collateral.²⁸

In the case of the *super-pledged property (Superädifikat)*, on the other hand, the lack of in rem security for the lien, the legal uncertainty and the peculiarities of the land use relationship represent an increased to very high risk in such a way that the lien on the super-pledged property lapses or the economic realizability of the super-pledged property is not possible.²⁹

3.3 Basic Features of Credit Valuation of Baurecht and Superädifikat

There are currently no standardized and uniform credit valuation methods for determining the market value and mortgage lending value of Baurechte and Superädifikate. In practice, the value of the land is partly determined by means of the capitalized earnings value method due to the fact that experience has shown that there are fewer comparative prices. The value of the structure located on the land can be calculated using the asset value method, which takes into account the time limitation of the rights. In the case of the super-pledged property, additional (substantial) security discounts must be made when determining the value due to the unsecured economic realizability of the lien, or the super-pledged property is completely omitted as loan collateral.³⁰

III Examination of the financing and valuation possibilities of sH as real estate or movable property with real estate economic reference on the basis of concrete project developments

1 Definitions and demand for floating homes in Austria

Legal definitions and delimitations of floating residential buildings are currently not to be found in any legal system in Austria.³¹ In practice, there are also no uniform and unambiguous terms (such as houseboat (Hausboot), floating home (schwimmendes Haus or floating residential building) used for residential structures on water.³²

²⁷Vgl. Rechberger (2006), V bis IV; vgl. Kogler / Mayrhofer (2021), S. 191 ff.

²⁸ vgl. Schmidinger /Sereinig (2006), S. 68; vgl. §§ 4 Abs. 2 u. 8 BauRG.

²⁹ vgl. Schmidinger/Sereinig (2006), S. 70-72; vgl. §§ 23 u. 24 Insolvenzordnung

³⁰ Vgl. Schmidinger/Sereinig (2006), S. 81 f.

³¹ Vgl. Meingast (2018), S. 13 und ergänzende Recherchen der Autorin im Jahre 2022.

³² Vgl. Neuner (2017), S. 16 ff. und Recherchen der Autorin im Jahre 2022.

Scientific studies regarding the demand for sH in Austria are not known and the demand for sH in Austria is estimated to be low.³³

2 Overview of realized and planned project developments of floating buildings (schwimmende Gebäude) in Austria and surroundings

The following project developments in Fig. 3 are project developments of floating buildings in the sense of DINSPEC 80003 located in Austria and in surrounding countries, some of which are also designed as floating homes. The overview shows that so far project developments of floating homes have been realized or are planned at few locations in Austria.

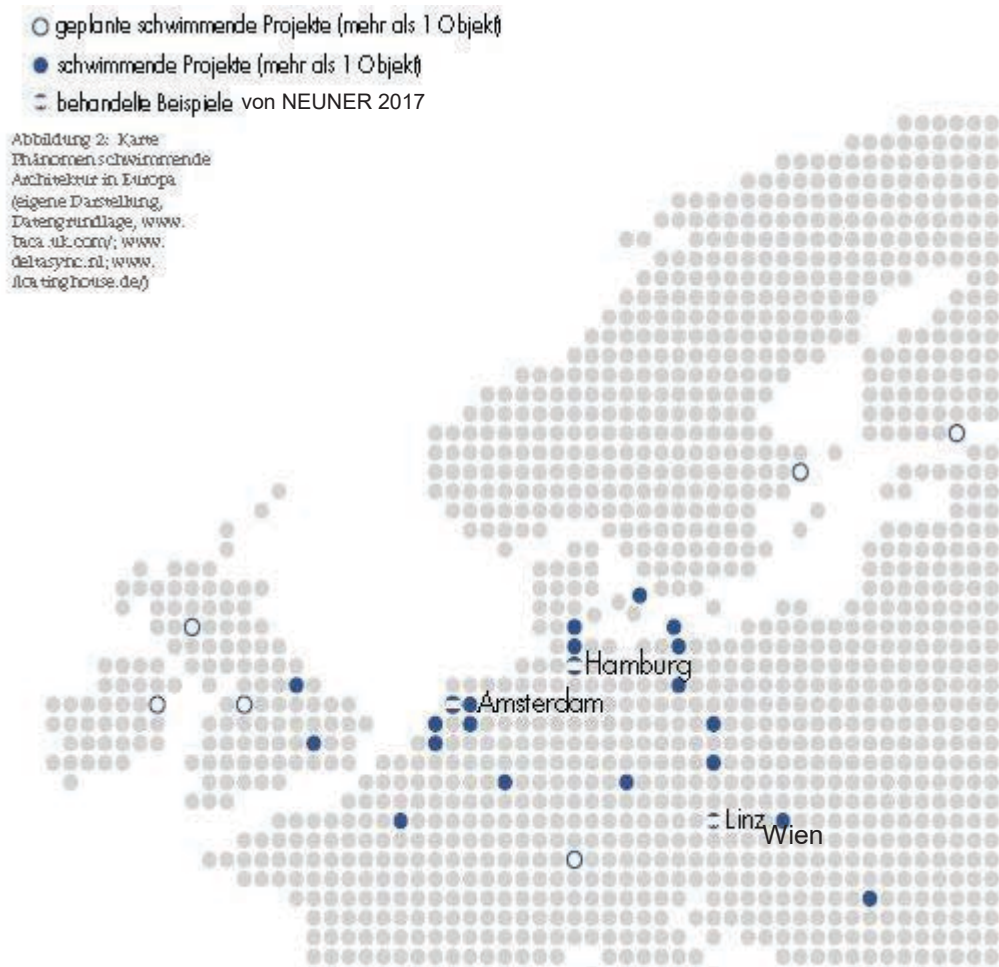


Fig.3 Overview of realized and planned project developments of floating buildings in Austria and surrounding countries

Source: Own illustration, map basis: Neuner (2017), p. 22, data basis: www.baca.uk.com, www.deltasyn.nl, www.floatinghouse.de; supplemented by data from Redl (2016), Fertighauszentrum "Blaue Lagune" Verwaltungs GmbH & Co. KG (ed.) (2016).

³³ Vgl. Redl (2016); vgl. Hörtler (2016).

3 Examination of selected project developments of floating homes in Austria with regard to their financeability and assessability as valuation objects according to the LBG

In the following, by means of two project developments of floating houses already realized in Austria, it is examined to what extent sH can be evaluated and financed as an object of evaluation according to the LBG.

3.1 Project Waterside Living, Linz

The following is an examination of the financing and valuation feasibility of the residential properties designated by the project developer as floating homes in Linz's Winter Harbor (Linz Winterhafen).

3.1.1 Foreword

For a clearer and better examination of the sH, an extract from the land register for the above project development and the associated water parcel 1425/2 has been obtained and evaluated. At the present time, even after consultation with several lawyers and the responsible land registry office, it has not been clearly clarified to what extent the resulting information may also be used for this contribution. Therefore, the information from the land register excerpt is not included in this technical paper.

3.1.2 Overview Projekt Waterside Living, Linz



Fig. 4 Floating Home Waterside Living
Source: ©GSA Wohnbau (Ed.) (2022)

Tab. 2 Project participants Waterside Living
Source: Own representation, data basis: cf. City of Linz (ed.) (2014); cf. Zoidl (2018); cf. Meingast (2018), p. 46.

Owner water parcel with sH (parcel 1425/2)	Via Donau (Company for the fulfillment of the federal waterway administration)
Deposit number parcel 1425/2	141
Parcels belonging to deposit number 141 = 1 Land registry body	1423/4, 1423/5 und 1425/2
Owner and builder of the sH	Österreichisches Siedlungswerk (ÖSW)

Tab. 3 Basic data Project development Waterside Living

Source: Own representation, Data material: cf. Zoidl (2018); cf. Holz/Holzleitner (2017).

Location	Am Winterhafen 12 bis 12 c Linz, Federal State: Upper Austria
Number of objects	4 objects, called „schwimmende Häuser“ (floating homes) by the builder
Year of construction	2017
Living space	111 m ²
Floating body	Fixed anchored steel pontoon
Structure	Construction of solid wood panels
Supply and waste disposal	Electricity and water supply and -disposal: via connections with the mainland Heating: self-sufficient by means of photovoltaic system and air heat pump
Energy efficiency	low-energy house
Use	Three of the four properties are rented out for year-round living, one serves as a show property (as of 2018)



Fig. 5 and 6 Aerial photograph and real estate map
Source: ©DORIS/BEV (eds.) (2021b) and (2021a).

According to the object description, the four residential properties in the Winter Garden Linz are to be described as a *floating building (schwimmendes Gebäude)* according to DIN SPEC 80003 and fall into the subcategory of *floating home* in the sense of these explanations, in which the heating is self-sufficient by means of an air-source heat pump and photovoltaic system.

3.1.3 Relevant public law approvals for the four sH

Publicly available information regarding permits issued under public law for the four sH in Linz was almost non-existent. Therefore, the Building and District Administration, Municipality of the Provincial Capital Linz (abbreviated: Building and District Administration of Linz) was interviewed.

Explicitly regarding the permits issued for the four floating homes at Winterhafen in Linz, the Linz building and district administration was not allowed to provide any feedback for data protection reasons.³⁴

Definition and delimitation of the term *floating home (sH)* and *houseboat (HB)* in the sense of the building and district administration of Linz

For the classification of a structure built on the water as sH or HB, a case-by-case examination on the basis of the concrete submission project by an authorized plan drafter with the help of an official expert is necessary. It would depend primarily on what the structure would be used for, whether as a residence permanently or temporarily.³⁵

Overview necessary approvals

The building and district administration of Linz classifies the 4 sH in Linz in the category of „schwimmende Anlagen Häuser“. With regard to sH and HB in general, it is said that

³⁴ Vgl. schriftliche Rückmeldung vom 08.09.2022 und 05.10.2022 sowie telefonische Rückmeldung vom 14.09.2022 der Bau- und Bezirksverwaltung, Magistrat der Landeshauptstadt Linz.

³⁵ Vgl. telefonische Rückmeldung der Bau- und Bezirksverwaltung, Magistrat der Landeshauptstadt Linz am 14.09.2022 und schriftliche Rückmeldung der Bau- und Bezirksverwaltung Linz vom 05.10.2022.

sH and HB are generally not subject to the Building Code for Upper Austria (Oö BauO 1994), because a sH and a HB is a „schwimmende Anlage“ (floating installation) for which, as a rule, a permit under water law and a permit under navigation law are required. Depending on the location of the sH and HB, other permits (usually nature conservation permits) may also be required.

Planning law principles such as zoning plans, which designate water, or a development plan (which does not exist for bodies of water) are not relevant for the approval of floating homes. Furthermore, Linz does not yet have a development plan for rivers or harbors. A permit guideline with fixed guidelines for the approval of floating homes does not exist at the building and district administration of Linz.³⁶

Details water law permit

A *water law permit* for a sH and HB is explicitly necessary in the limits of the flood discharge of flowing waters designated according to § 38 par. 1 and 3 WRG (*Water Law Act 1959*) (*Wasserrechtsgesetz 1959*), i.e. in the area flooded at 30-year floods, which in Upper Austria includes the Upper Austrian Danube (see also doris.at), on which the four sH in Linz are also located.³⁷

Which permit is required for floating homes and houseboats in which Article 38 WRG does not apply, i.e. for water bodies that are not located in the area flooded by 30-year floods, must be examined individually on the basis of the respective project development and the respective location.³⁸

According to statements of the building and district administration of Linz, there would be nothing against the use of a sH or houseboat for permanent living from the point of view of water law. However, the approval under water law would not state for which use, i.e. whether for permanent living or another use, the sH/HB would be permissible. This would not be the subject of a water law permit, but rather the statement as to whether the structure under consideration is suitable and does not harm anyone, especially with regard to its statics and, above all, in consideration of the current and any fishing rights at hand. Above all, in the case of an accident, no further damage should be caused by construction and operation (such as loss of drainage space, increase in the level of an accident, change in currents, entanglement, silting up, washing away of substances hazardous to water, etc.). This is assessed on the basis of the design, statics, intended use and taking into account the flow. In addition, in such a procedure, the fishing rights holders can demand measures to protect the fishery. The water law permit is limited in time; the duration is not known.³⁹

For a possible approval under public law, which proves a suitability for permanent housing, other determinations, in particular the registration system, are also to be reviewed. Furthermore, according to the opinion of the building and district

³⁶ Vgl. schriftliche Rückmeldung vom 08.09.2022 und 05.10.2022 sowie telefonische Rückmeldung vom 14.09.2022 der Bau- und Bezirksverwaltung Linz.

³⁷ Vgl. schriftliche Rückmeldung vom 08.09.2022 und 05.10.2022 sowie telefonische Rückmeldung vom 14.09.2022 der Bau- und Bezirksverwaltung Linz.

³⁸ Vgl. schriftliche Rückmeldung der Bau- und Bezirksverwaltung Linz vom 05.10.2022.

³⁹ Vgl. telefonische Rückmeldung der Bau- und Bezirksverwaltung, Magistrat der Landeshauptstadt Linz am 14.09.2022 und schriftliche Rückmeldung der Bau- und Bezirksverwaltung Linz vom 05.10.2022.

administration of Linz, a suitable residence address is fundamentally necessary for permanent housing.⁴⁰

Notes or conclusion for the approvals of the four sH in Linz

Even though, according to the author, it could not be clearly clarified with the Linz Building and District Administration whether the Linz Building and District Administration classifies the four sH in the Winter Harbor as a „schwimmende Anlage“ (floating facility) or sH or HB according to the definition of this administration, it can be assumed, based on the designation of the 4 sH in Linz as "schwimmnde Anlagen Häuser", that the four sH in the Winter Harbor can be considered as a schwimmende Anlage (floating facility) and floating home or houseboat according to the definition of the Linz Building and District Administration. Thus, it can be concluded that the four floating homes in Linz do not receive or do not have a building permit or a building plan approved by the building authorities and require or already have a permit under water and navigation law.

3.1.4 Classification of the sH in Linz as immovable objects and movable property with real estate economic connection

3.1.4.1 Checking the sH as Zugehör (belonging) to the Liegenschaft (property) und Wohnungseigentum (condominium ownership)

Due to the fact that the owner of the sH is not is the same as the owner of the water area on which the sH are located, the four sH cannot be part of the Liegenschaft and cannot be Wohnungseigentum.

3.1.4.2 Checking the sH as (belonging) Bauwerk to the Baurecht (building rights)⁴¹

§ 1 para. 1 Building Law Act (BauRG)

„Ein Grundstück kann mit dem dinglichen, veräußerlichen und vererblichen Rechten, auf oder unter der Bodenfläche ein Bauwerk zu haben, belastet werden (Baurecht).“

"A parcel of land may be encumbered with rights in rem, alienable and heritable, to have a structure on or under the ground surface (building rights/Baurecht)."

Fundamental examination

The building right always encumbers the whole body of the land register (Grundbuchkörper)⁴², in this case the plots 1423/4, 12423/5 and 1425/2.

Since a land register body can only be encumbered with a building right,⁴³ this means that only one overall building right can exist for all four sH and all other "buildings" located on the three parcels should not exist in the form of a Baurecht. At this point, as

⁴⁰ Vgl. schriftliche Rückmeldung der Bau- und Bezirksverwaltung Linz vom 05.10.2022.

⁴¹ Inkl. Bauwerkswohnungseigentum gem. § 6a BauRG

⁴² Source see note

⁴³ Source see note

a result of the lack of further information, it would be fundamentally possible to establish a Baurecht for the four sH.

A) Testing by means of test criteria according to one- to three-part definition of a Bauwerk

It is examined whether the sH can represent a Bauwerk in the sense of the BauRG; this law does not contain a definition of a building.⁴⁴ The definitions and opinions of various experts/legal opinions on the examination are presented, which KOGLER/MAYRHOFER (2021) list and compared with the characteristics and framework conditions of the sH in Linz. Conclusions and comments are written in italics.

Meaning of the symbols used for evaluation:

✓ : Criterion is fulfilled / - : Criterion is not fulfilled / ? : unclear situation

Tri-part definition for the evaluation⁴⁵

- ✓ Bauwerke must have been created using labor and materials
- Bauwerke must be in a (firm) connection with the ground:
 - *due to the fixed anchoring of the reinforced concrete pontoon of the sH, the sH are connected to the bottom of the water plot*
 - *according to ZOIDL 2018, it is easy to relocate the sH by shipping it or dismantling it and reassembling it at another location*
- ✓ Must be immobile in their typical purpose: *cannot be moved of their own accord*

Two-part definition a)⁴⁶

- ✓ Bauwerke must have been created using labor and materials
- ✓ They must be in a (firm) connection with the ground

Two-part definition b)⁴⁷

- ✓ Bauwerke must have been created using labor and materials
- There is no economically meaningful separability: *can be easily shipped-shipped and can be rebuilt somewhere else*

Single-member definition⁴⁸

- ✓ The building was made using labor and material

B) Opinion MEINGAST 2018

MEINGAST 2018 classifies a sH as a movable object within the meaning of §293 ABGB.⁴⁹

⁴⁴ Vgl. Kogler/Mayrhofer (2021), S. 6.

⁴⁵ Source see note

⁴⁶ Source see note

⁴⁷ Source see note

⁴⁸ Source see note

⁴⁹ Vgl. Meingast (2018), S. 13 f.

Definition of movable object according to § 293 ABGB

[...] all jene, die ohne Verletzung ihrer Substanz von einer Stelle zur anderen versetzt werden können.

[...] all those that can be moved from one place to another without violating their substance.

She reasons that sH "[...] are moved from one location to another without damage to substance, such as by towing to another berth.[...]"⁵⁰ One possibility to erect a sH on the basis of a Baurecht is that this is erected grounded; however, she initially sees this as not compatible with the definition of "floating" and for a sH. In further explanations of her master thesis, however, MEINGAST 2018 sees a ground-fixed connection by means of a ground-fixed anchorage in relation to a Bauwerk belonging to a Baurecht and also in relation to a sH as given.⁵¹

C) Summary

In sum, the construction of the sH in Linz is considered possible as a Bauwerk belonging to the Baurecht, even if this has not been clarified unambiguously or uniformly in legal terms.

3.1.4.3 Checking the sH as Bauwerk belonging to the Superädifikat

§ 435 ABGB (Superädifikat)

„Dasselbe gilt auch für die Übertragung des Eigentums an Bauwerken, **die auf fremdem Grund** in der Absicht (vorhanden) sind, daß **sie nicht stets darauf bleiben sollen**, sofern sie nicht Zugehör eines Baurechtes sind.“

"The same shall apply to the transfer of ownership of Bauwerke that are (present) on another's land with the intention that they shall not always remain thereon, unless they are part of a Baurecht (Zugehör)."

As already described, there are different views regarding the legal definition and necessary criteria of a Superädifikat. The assessment and comments regarding the sH in Linz are again written in italics.

A) Check based on the criteria of KOGLER and MAYRHOFER 2021⁵²

✓ : Criterion ist fulfilled / - : criterion is not fulfilled / ? : unclear situation

1 Superädifikats-Sache (Superädifikats thing)

a) On or under the surface⁵³: fulfilled

b) Bauwerk

⁵⁰ Meingast (2018), S. 14.

⁵¹ Vgl. Meingast (2018), S. 13/23. Fußnote und S. 56.

⁵² Vgl. Kogler/Mayrhofer (2021), S. 86 ff.

⁵³ Source see note

Doctrine 1⁵⁴

Necessary for the existence of a Bauwerk are:

- ✓ Use of labor and material
- ✓ More or less fixed connection of the Bauwerk to the ground: *are firmly anchored*
- ✓ Are destined fundamentally (in the normal case) not to leave their place:
 - *cannot be moved under their own power*
 - *can only be relocated by shipping or dismantling and reassembling at a different site*
 - *do not have an independent water supply and drainage system*⁵⁵

Doctrine 2⁵⁶

Necessary for the existence of a Bauwerk are:

- ✓ Use of labor and material
- ? Lack of economically meaningful separability (of land) (dependent component):
 - *sH can be easily erected and dismantled,*
 - *but approval at other site is described as not secure and lengthy*⁵⁷
 - *sH are reliant on mainland for water removal and supply, and may require costly redevelopment if relocated*

Doctrine 3⁵⁸

Superädifikate are Bauwerke, which

- ✓ are erected on a fixed base
- ✓ are not intended to be moved to another location in their usual purpose:
 - *cannot be moved under their own power*
 - *change of location only possible by shipping or dismantling and reassembly at another location*⁵⁹

Doctrine 4⁶⁰

Bauwerke are

- ✓ something solidly built
- ? are injured in their substance by removal (see doctrine 2)

Doctrine 5⁶¹

- ✓ Superädifikate are movable Bauwerke (see doctrine 3).

⁵⁴ Source see note

⁵⁵ Vgl. Zoidl (2018).

⁵⁶ Source see note

⁵⁷ Vgl. Zoidl (2018).

⁵⁸ Source see note

⁵⁹ Vgl. Zoidl (2018).

⁶⁰ Source see note

⁶¹ Source see note

Case law, mainly of the Supreme Court (OGH)⁶²

Bauwerke of Superädifikat are characterized by the fact that

- ✓ they are built on the ground and are firmly connected with it,

this means,

- ✓ that they are not intended to be moved, a firm anchoring to the ground is not absolutely necessary (cf. doctrine 3)
- ✓ they should not be moved for their intended purpose (see above)
- ✓ they do not necessarily have to suffer a loss of substance when separated from the ground
- ✓ the separation of the structure from the ground does not necessarily require a great deal of effort and expense
- ✓ they can be built of different materials

⁶² Source see note

2 Lack of intention to leave⁶³

a) Purpose, construction and/or other circumstances

? Purpose of the Bauwerk: to remain on the property for a limited period of time

? Nature or construction of the structure

- *can be shipped and taken apart and reassembled somewhere else,*
 - *but no independent drive available*
- ✓ Other circumstances, especially the legal relationship between owner of the land plot and the owner of the Superädifikat (e.g. lease, rental, loan or easement): *temporary water law permit*

b) No subsequent Superädifikat: *fulfilled*

Summary

According to the examination on the basis of the doctrines and case law pointed out by KOGLER/MAYRHOFER 2021, the existence of the Superädifikats-thing can be considered as clearly existing with the sH. With regard to the lack of intention to leave, however, this seems to be ambiguous.

The legal classification of the sH in Linz into the legal subject Superädifikat according to § 435 ABGB (Austrian Civil Code) is evaluated as not clearly possible on the basis of the explanations of KOGLER/MAYRHOFER 2021.

B) Check against the legal audit of MEINGAST⁶⁴

MEINGAST generally lists the following test criteria as the test for the existence of a Superädifikat for floating homes:

- a) Fixed structure
- b) Absence of intention to leave⁶⁵

With regard to a), it refers to your comments on the structure in relation to Bauwerke in the case of Baurechte and thus considers this to be initially not possible in the case of floating homes and then in the comments on the examination of a Baurecht for floating homes as fundamentally possible (see above)⁶⁶. **Thus, in the opinion of MEINGAST 2018, a foundation-built structure seems to be possible for a floating home, in particular also for the sH in Linz, but not clearly possible from a legal point of view.**

⁶³ Source see note

⁶⁴ Vgl. Meingast (2018), S. 57.

⁶⁵ Vgl. Meingast (2018), S. 56 f.

⁶⁶ Vgl. Meingast (2018), S. 13/23. Fußnote, S. 14; S. 56 f.

C) Summary

In sum, the construction of the sH in Linz as a Bauwerk belonging to the Superädifikat is considered possible, even if this does not appear to be legally clear or uniformly clarified.

3.1.4.4 Conclusion

In summary, it can be stated that the sH in Linz cannot be a Liegenschaft or an Zugehör belonging to the Liegenschaft nor can it be a Wohnungseigentum. In sum, the author considers the construction of the sH in Linz to be possible as a Bauwerk belonging to the Baurecht or to a Superädifikat, even if there is a certain legal uncertainty in this respect.

3.1.5 State housing subsidies for sH in Linz

This is followed by an examination of whether the sH in Linz can be financed by means of a state housing subsidy.

3.1.5.1 Fundamentals of state housing subsidies in the province of Upper Austria

The basis for the promotion of residential properties in the province of Upper Austria is the Upper Austrian Housing Promotion Act 1993 (Oberösterreichisches Wohnbauförderungsgesetz 1993 - Oö. WFG 1993) and the Ordinance of the Government of the Province of Upper Austria on the Promotion of the Construction of Owner-Occupied Homes (Oö. Eigenheim-Verordnung 2018) issued on the basis of this Act.

In addition to personal prerequisites (citizenship, net income, see §§ 7, 26), the Upper Austrian Housing Promotion Act 1993 stipulates that building-related prerequisites must be met and public-law provisions must be observed or permits must be presented. Individual essential basic requirements for claiming a state housing subsidy in the province of Upper Austria are presented below.

3.1.5.1.1 Essential building-related eligibility requirements according to Oö WFG 1993

Basically, according to §§1-2 Oö WFG 1993, buildings with apartments or individual apartments within a building are subsidized.

Sections 1 and 2 of the Oö WFG 1993 essentially state that every eligible property *must consist of at least one dwelling and that the property or dwelling must be intended for year-round habitation and must constitute a suitable structural unit of a building.*

It is not clear from the definitions pursuant to § 1 and 2 of the Upper Austrian Housing Promotion Act 1993 which evidence must be provided by the applicant in order for the apartment to be considered as intended for year-round habitation and a suitable structural unit of a building. Based on the wording of the law alone, it is not clear whether a building permit for permanent habitation must be available for this purpose. Furthermore, with regard to the definition of a dwelling and also a building in

accordance with § 2 points 1 and 2, the question arises as to what is to be understood by a building or what proof must be provided in this regard.

3.1.5.1.2 Details on the necessary approval of the housing subsidy

According to the PDF form "Application form for housing subsidies for new construction" provided by the Upper Austrian government, the following must be submitted with the application in accordance with point 6: current excerpt from the land register, legally binding building permit notice, energetic findings of the Upper Austrian Energy Saving Association, colored copy of the building plan approved by the building authorities, proof of income, confirmation from the tax office of receipt of family allowance. Applicants who are not from EEA countries must fulfill additional requirements.⁶⁷

From the description of the above necessary documents and in combination with the definition of a dwelling listed in § 1 and 2 WFG 1993, it is clear that the eligible object requires a building permit (legally binding building permit notice) and an approved building plan from the building authority⁶⁸, which has the content that the apartment or object is suitable for year-round habitation and represents a structural unit.

3.1.5.1.3 Eligible legal entities

Pursuant to Section 7 (3) of the Upper Austrian WFG and supplementary information provided by the Province of Upper Austria on the submission of applications, it is clear that, as a rule, only those persons who are listed in the land register as the owner of the subsidized property are eligible to apply for subsidies⁶⁹. This means that funding under the Upper Austrian Housing Promotion Act 1993 or the Upper Austrian Home Ownership Ordinance 2018 - Amendment 2021 is only possible for applicants who own the object to be funded as full ownership of a property or an Zugehör/Gebäude, as Wohnungseigentum or as a Bauwerk belonging to a Baurecht and are entered in the land register as owners or building beneficiaries. Accordingly, super-predominiums are not eligible, as the ownership of a super-predominium or the name of the owner of the super-predominium cannot be entered in the land register.

3.1.5.2 Examination of state housing subsidies according to Oö. WFG 1993 for sH in Linz

3.1.5.2.1 Examination of sH in Linz as an eligible legal entity

According to the Upper Austrian WFG 1993, the legal entities eligible for subsidies are basically Liegenschaft or a Zugehör (accessory) belonging to the Liegenschaft, Wohnungseigentum or a Bauwerk belonging to a Baurecht. As described above, the sH in Linz cannot be a Liegenschaft or a Zugehör, nor can it be a Wohnungseigentum.

⁶⁷ Vgl. Land Oberösterreich (Hrsg.) (2022a).

⁶⁸ Vgl. Land Oberösterreich (Hrsg.) (2022a).

⁶⁹ Vgl. Land Oberösterreich (Hrsg.) (2022b).

It is concluded that the construction of the sH in Linz as a Bauwerk belonging to a Baurecht is possible, even if there is a certain legal uncertainty in this respect.

Thus, the sH in Linz, if erected as a Bauwerk belonging to the Baurecht, fundamentally represent a legal entity eligible for financing under the Upper Austrian WFG 1993.

3.1.5.1.2 Examination of the necessary approvals of the sH in Linz for housing subsidies

As a necessary prerequisite for subsidies under the WFG 1993, a property eligible for subsidies must have a building plan approved by the building authorities and a building permit (legally binding building permit notice), which states that the property is a dwelling or consists of at least one dwelling that is suitable for year-round habitation and constitutes a structural unit.⁷⁰

As explained, according to statements by the building and district administration of Linz, „schwimmende Anlagen (floating facilities)“, which also include the so-called "sH and houseboats", are generally not subject to the building regulations for Upper Austria (Oö BauO 1994) and consequently do not generally receive a building plan approved by the building authorities or a building permit.⁷¹

It could not be clarified quite clearly with the Building and District Administration Linz whether the four sH in the Winter Harbour are classified as a "schwimmende Anlage (floating facility)" or „sH“ or „HB“ according to the definition of this administration. However, based on the designation of the four sH in Linz as "schwimmende Anlagen Häuser" (floating facility houses), it may be assumed that the four sH in Winterhafen can be considered as a „schwimmende Anlage“ and „floating home“ or „houseboat“ as defined by the Building and District Administration Linz. Thus, they will generally not receive a building permit or a building plan approved by the building authorities.

3.1.5.3 Conclusion

The sH in Linz, as a Bauwerk belonging to the Baurecht, can represent a basic eligible legal entity for public housing funding in the sense of the Oö. WFG 1993. However, it is likely that, as sH or houseboat, they will not receive building law approval or an approved building plan from the building authorities, which means that public housing subsidies under the Oö. WFG 1993 are neither possible for the sH in Linz nor for other sH in the province of Upper Austria - at least with the same type of construction.

IV References

In order to enable a better reading flow of the specialist article, the secondary sources used under point III 3.1.4 and the associated primary sources, which have a very long character length, are not written down in the respective footnotes. The corresponding source references for the respective footnotes (short reference) as well as the

⁷⁰ Vgl. § 1 und 2 WFG 1993; vgl. Land Oberösterreich (Hrsg.) (2022a).

⁷¹ Vgl. schriftliche Rückmeldung vom 08.09.2022 und 05.10.2022 sowie telefonische Rückmeldung vom 14.09.2022 der Bau- und Bezirksverwaltung Linz.

bibliography (full reference) are available on request from the Institute for Floating Structures of the Faculty of Architecture-Civil Engineering-Urban Planning of the Brandenburg Technical University.

Solution approaches to secure individual mobility within large floating settlements

Frank Höfler

Deutscher Vorspann

Lösungsansätze zur Sicherung der individuellen Mobilität innerhalb weiträumiger schwimmender Siedlungen

Zunächst wird der aktuelle Trend des Meeresspiegelanstiegs allgemein dokumentiert, auch mit Grafiken und Bildmaterial untermauert und deren Auswirkungen für zukünftige Generationen dargestellt. Auch wenn diese Szenarien erst längerfristig eintreten, sind sie letztlich nicht aufzuhalten und erfordern vorausschauende Strategien für ein geordnetes, sozial- u. wirtschaftlich verträgliches Vorgehen. Die Anpassung an Veränderungen in der Natur ist unerlässlich. Gefragt sind daher Konzepte von Regierungen und Kommunen sowie aus der Wissenschaft, die frühzeitig tragfähige Lösungen mit hoher Akzeptanz für Siedlungen und Infrastrukturen aufzeigen. Verschiedene Ansätze für einen Rückzug aus Küstengebieten und der damit verknüpfte Aufwand werden diskutiert und in ihren Auswirkungen dargestellt. Letztlich führt nichts an dauerhaft schwimmenden Siedlungen, d.h. an einem Leben am und auf dem Wasser vorbei. Zwei Ansätze werden unterschieden:

- Seasteading als ein Konzept zur Schaffung von Stätten dauerhaften Wohn- und Lebensraums auf dem Meer, außerhalb der von den Regierungen jedweder Nation beanspruchten Gebiete.
- Floating Cities als eine Adaption, bei der Menschen auf dem Wasser im Rahmen vorhandener nationaler Infrastruktur leben.

Die Realisierung erster größerer Siedlungen ist absehbar. Aktuelle Beispiele bilden die Entwicklung der „Maldives Floating City“ und ein schwimmendes Stadtviertel von Busan, der zweitgrößten Stadt in Südkorea. Beide Standorte schmücken sich derzeit mit dem Zusatz als erste schwimmende Stadt auf unserem Planeten. Die Entwicklung lässt sich nicht mehr aufhalten und entsprechende Mobilitätskonzepte sind vonnöten. Eine Siedlung auf dem Wasser, die klassisch allen Bereichen des alltäglichen Lebens dient, erfordert eine differenzierte Erschließung. Innerhalb der Quartiere zu den zentralen Einrichtungen übernehmen bei Bedarf Shuttle-Systeme die Transportaufgaben. Die Systeme eignen sich gleichermaßen zum Transport von Personen, wie auch zum Waren- und Gütertransport. Für Fußgängerverkehr auf linear ausgerichteten Verbindungen über kürzere Entfernungen mit hoher Verkehrsnachfrage und frequentierten Start- und Endpunkten ist der Einsatz von Rollsteigen denkbar. Für weite Entfernungen zwischen einer schwimmenden Siedlung und der Landseite eignen sich Umlaufseilbahnen. Das gesamte Mobilitätsangebot auf und innerhalb einer schwimmenden Siedlung soll ausnahmslos als integriertes Angebot im Sinne von „Mobility as a Service (MaaS)“ konzipiert sein. Die landseitige Anbindung ist dabei als Übergabepunkt zwischen der vorhandenen Landinfrastruktur und der neu konzipierten schwimmenden Infrastruktur zu sehen. Ab diesem Zugangspunkt ist das Mobilitätsangebot siedlungsbezogen und einheitlich organisiert. Alle erforderlichen Mobilitätsangebote sind untereinander verknüpft.

Solution approaches to secure individual mobility within large floating settlements

Frank Höfler

Rising sea levels due to warming of the oceans and melting of the ice sheets as well as subsidence due to groundwater extraction and massive development in coastal regions are threatening people and land areas. A study by the Deltares Institute in Delft [Hooijer, 2021] shows the distribution of land areas that are less than two meters above sea level. Already 267 million people live in this danger zone of 1.05 million square kilometers, by the year of 2100 it could be 410 million people due to a shift in the coastline. Residents in the coastal regions of the tropics are predominantly affected.

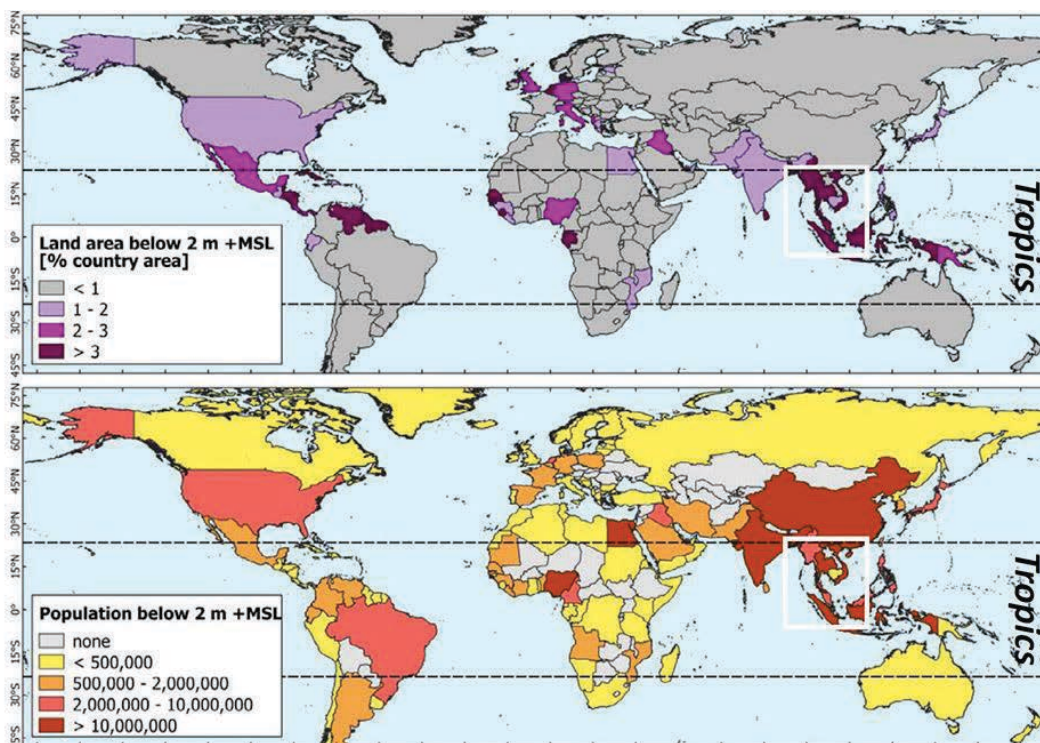


Fig. 1 : Percentage of land areas and population at altitudes below two meters above sea level [Hooijer et al., 2021]

In general, the inhabitants on the coasts of the world's oceans are particularly at risk. Roughly estimated, more than 200 million people worldwide currently live there below five meters above sea level. This number is estimated to increase to between 400 and 500 million by the end of the 21st century [Maribus, 2010]. The graphic (Fig. 2) shows that there is a strong correlation between the population figures and the low altitude of the place of residence above sea level. The proportion of the affected population at sea level is significantly higher than at higher altitudes.

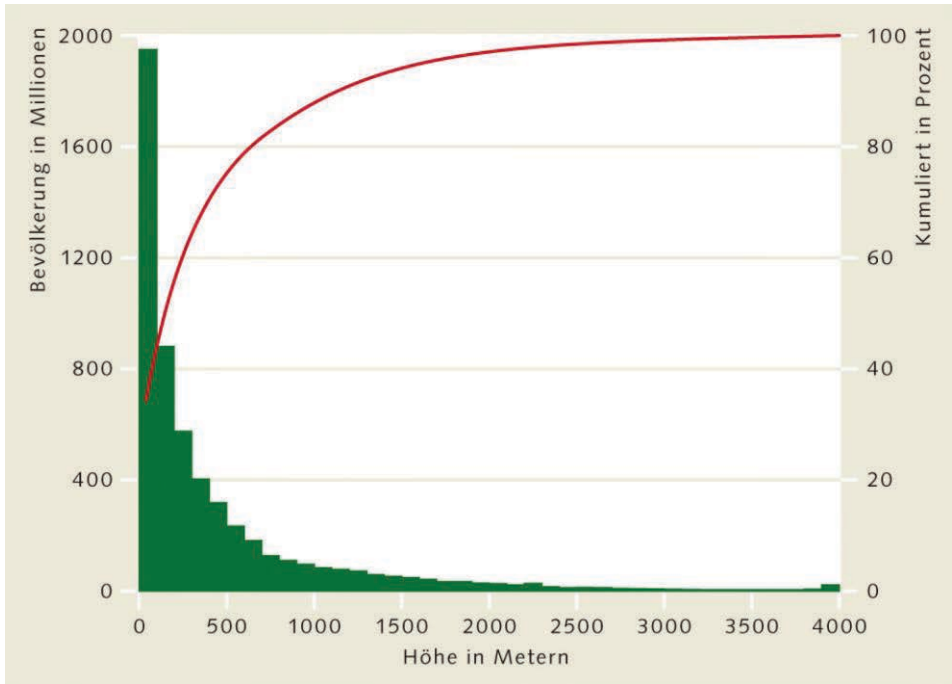


Fig. 2: Percentage of the population in correlation to the altitude at which they live [Maribus, 2010]

However, it should not be neglected that European coastal areas are also directly threatened by rising sea levels. Significant loss of usable land affects human habitation as well as valuable agricultural land with prime arable and grazing land. A rise of up to five meters within the next 300 years is not unrealistic. A theme map for rising sea levels is available based on data from GoogleMaps and on published NASA elevation information [Flood Maps (firetree.net)]. This interactive map shows the flooded areas worldwide for various selectable climbs. The coast line on the North Sea coast would also shift far inland (Fig. 3).



Fig. 3: Flood plains on the North Sea coast for a five meter rise in sea level [Flood Maps, flood.firetree.net]

Even if these scenarios will only materialize in the longer term, they are ultimately unstoppable and require forward-looking strategies for an orderly, socially and economically compatible approach. Adaptation to changes in nature is essential. Thus, concepts from governments and municipalities as well as from science are in demand, which show viable solutions with high acceptance for settlements and infrastructures at an early stage.

An orderly withdrawal and resettlement from the affected areas would be conceivable. "Fighting the ocean is a wasted effort. The only way to win against the water is not to fight it. With global warming, rising sea levels and intensifying extreme weather, the question is no longer whether some communities will need to pull back, but when, where and how that will happen" [Siders, 2019]. This gives rise to ideas as to how a strategic retreat can be organized and how future opportunities can be offered to the affected residents (Fig. 4).

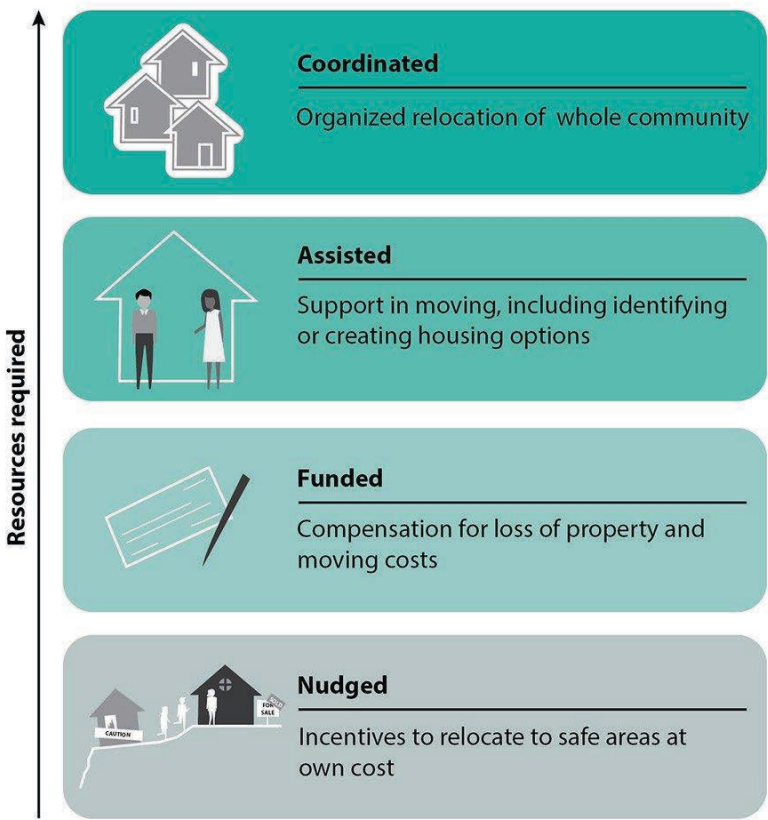


Fig. 4: Different approaches to withdrawing from coastal areas and the associated effort [Mach, 2019]

But the argument against moving is that it will be difficult to find new places that meet social, cultural and financial requirements. It would be a difficult step to give up ancestral coastal areas, which for their inhabitants also represent a homeland closely linked to traditions. Another option remains to create new settlement areas on and near the water, both as a habitat for people and as farmland and pasture for flora and fauna that can adapt to the rising sea level. Floating settlements provide these opportunities. Here, too, forward-looking concepts and long-term strategies are required in order to

adapt the existing tradition and experience with settlements in and on the water to the requirements of sustainable development.

Two different approaches should be distinguished:

- Seasteading as a concept of creating sites for permanent habitation at sea, outside the areas claimed by the governments of any nation.
- Floating Cities as an adaptation where people live on water. The cities are tied to one place, but can float, i.e. rise with the water level and are therefore armed against a flood.

The clear statement of the United Nations Human Settlements Program (UN-Habitat) on this subject also shows that this is not utopian: “We support the idea of a sustainable floating city to ensure that developments in this new area benefits all people” [Sharif, 2022]. The use of the water surfaces is therefore of great importance. Here, future settlement areas can be developed as living space for people and for use as agricultural land.

The realization of the first larger settlements is foreseeable. A recent example is the development of the "Maldives Floating City" as the first floating city to be integrated into the state of Maldives, which will also provide a legal framework for future residents and enable the issuance of title deeds. At a ceremony held in Male, the capital of the Maldives, the last necessary documents were signed in 2022 to start the realization of the planned floating city.

A floating city requires access for residents and visitors to easily reach destinations in the urban area. A large number of canals should enable access via the water. Further development is via a network of paths between the buildings. This somewhat unusual development of a city from the surrounding area naturally arises from its position in the water as a floating island-like structure.

This development can be a good attempt for a small-scale settlement that is strongly geared towards leisure-oriented and decelerated living in a pleasant environment and is clearly oriented towards a corresponding social asset structure.



Fig. 5: Maldives Floating City [2021]

A settlement on the water that takes on the classic tasks of a city, i.e. serves all areas of everyday life, will require a more differentiated development. A floating city as a vision of life on the water depicts the activities of living, working, production, supply, education and leisure in equal measure. There will be central areas that are linked together and have a radial or pincer-shaped internal development. These forms of network structure are well suited for being equipped with central functions and for clearly defining a network hierarchy. As a rule, a landside connection will be required, which is to be established via an external development that is as efficient and permanently usable as possible and is aligned with the location of the central areas.

- Landside access: Landside access must be guaranteed, starting from a public path. In the access areas, the lines (water, waste water, gas, electricity, possibly telephone) of the users end in transfer stations.
- Paths to internal development: development of a network hierarchy to connect individual districts to central areas (services, communication) and main axes.

The new settlement form of a floating city opens up the possibility of establishing alternative forms of mobility. Due to the special feature of a self-contained structure, foot-paths are ideal for access in the neighborhood. Public shuttle systems take over the transport tasks for slightly longer distances. With this, the internal paths of an inner development can be well covered. For external development, i.e. for land-side connection, efficient transport systems for people and goods are required between the central areas of the floating settlement and a connection point. This is where the connection and transition to land-based transport systems is established.



Fig. 6: Flexible Floating: Marine Urbanisation with FlexBase [Joe Quirk, The Seasteading Institute. 2021]

The basic approach to development in the neighborhood of a floating city is “active mobility” for private transport. In addition, public offers are set up with a high degree of

flexibility in terms of time and space. The aim is to personalize public transport as much as possible. This means that a high level of acceptance by users can be achieved and motorized individual transport is therefore completely dispensable.

Mobility on foot	Mobility with a means of transport
<p style="text-align: center;">Basic approach:</p> <ul style="list-style-type: none"> ➤ Public offer for individual use. ➤ Mobility should be based on sharing models and “active mobility”, i.e. on methods of locomotion in which people move using their own physical strength. ➤ The transport offer is supplemented by shuttle systems. 	



Fig. 7: OCEANIX Busan (Republic of

In the urban environment with nearby centers, ninety percent of the routes are within a distance of less than one kilometer. These short distances within a neighborhood and to local amenities are covered on foot or alternatively by bicycle or scooter.

Within the districts to the central facilities, on the main axes for connecting the quarters to each other and for the accessibility of the connection points to the landside connection, shuttle systems take over the transport tasks over longer distances if necessary. The systems are equally suitable for the transport of people as well as for the transport of goods and merchandise. Application scenarios can also be mapped on shorter neighborhood routes and for local development, such as an offer for people with limited mobility, senior citizens or travelers with luggage. In a further development, conventional vehicles will be replaced by autonomously driving shuttles in the future. From today's perspective, this development is already realistic and can be implemented relatively easily, since it is a question of defined routes that do not confront the autonomous vehicle with unusual situations on its journey.



Fig. 8: Shuttle-Systems (conventional und autonomous)

The use of moving walkways or autowalks is conceivable for pedestrian traffic on linear connections over shorter distances with high traffic demand and frequented start and end points. These offer a comfortable and quick way (speed up to about 7 km/h) of locomotion. Such systems have a long tradition and can often be found at airports and large traffic stations. Differences in height can also be overcome with a slight incline. They can be adapted for radial connections within floating settlements, for example to link the district centers with each other. Its suitability for people with limited mobility is an advantage. For shorter distances, the landside connection can also be implemented using a moving walkway within a bridge construction or in a tunnel. Autowalks can be used equally for the transport of goods in adapted logistics boxes.



Fig. 9: Entry point on a moving walkway

Circulating cable cars are suitable for long distances between a floating settlement and the land side. They have a high transport capacity (up to 35 people per gondola and a transport capacity of up to 6,000 people/h) with good energy efficiency, can be flexibly adapted to demand by threading the cabins in and out and are independent of water levels.



Fig. 10: Vinpearl Cable Car, Vietnam, Na Trang

Circulating cable cars are mainly operated as a point-to-point connection. The drive technology is concentrated in one of the terminal stations. If necessary, large differences in height can be overcome. Changes in direction in the course are only possible with small angle deviations at the cable car masts. Boarding and alighting as well as a major change of direction of the route is possible at intermediate stations. For example, a cable car could form a continuous line next to the land connection, which in its extension connects several points within the floating settlement. However, line branches for network formation and area development cannot be implemented without changing between several systems. Cable cars are suitable for relatively fast (up to 8.5 m/s) passenger transport. Use for the transport of goods is less common, but would be quite conceivable for smaller transport tasks (load 2-3 tons) to supply a settlement and also to be set up in mixed operation with passenger transport.

The connection of a floating settlement to a landside delivery infrastructure is comparable to logistics concepts for the "last mile" at district level in cities. Accordingly, the supply takes place from a central storage location (hub, onshore) to quarter-related interim storage facilities within the floating settlement at central points (local centers as micro hubs). Small vehicles (autonomous shuttles or delivery robots) take care of the fine distribution to the recipient address or to a locker (PO box system). The tasks are assigned to a central service provider. This avoids parallel travel orders and the overlapping of different logistics concepts.

Transport and logistics for the “last mile”:

- to address or Central delivery (landside hub)
- Distribution centers (micro hub in the district)
- Delivery to address or locker

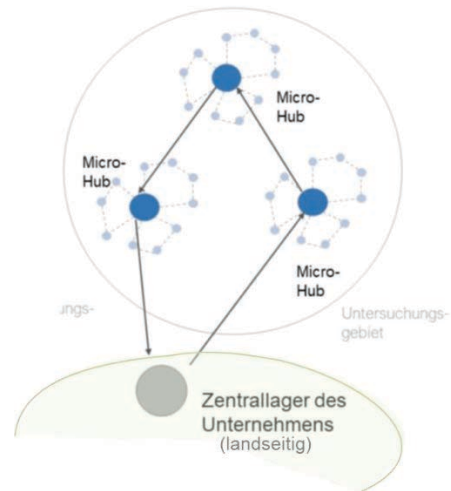


Fig. 11: Logistics concept „Last Mile“, [Southco MM Logistik, 2022]

The entire mobility offer on and within a floating settlement should be designed without exception as an integrated offer in the sense of "Mobility as a Service (MaaS)". The landside connection is to be seen as a transfer point between the existing landside infrastructure and the newly designed floating infrastructure. From this access portal, the mobility offer is settlement-related and unified organized. All necessary mobility offers are linked to each other. This results in an integration of the most diverse traffic modes in seamlessly connected route chains with integrated booking and payment functions for the entire route chain. The available mobility solutions are based on the individual requirements of users and provide them with the right offer from flexible mobility and service solutions. "Mobility as a Service" (MaaS) is not limited to individual mobility, but is equally suitable for freight and delivery traffic. It is precisely the self-contained structure of a floating settlement that makes it possible to design an integrated system in an excellent way.

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The elephant in the climate shop

Hans Joachim Schellnhuber, Gitta Köllner

Deutscher Vorspann

Der Elefant im Klimaladen

Den Lesern der Broschüre, die weniger mit den Begriffen Yetstream, Kippelementen usw. vertraut sind, werden verständlich und trotzdem fachlich kompetent ein komplexes Bild der Zusammenhänge des aktuellen Klimawandels sowie die Erfordernisse, die daraus resultieren, vermittelt. Die Folgen des global voranschreitenden Klimawandels und der damit verbundenen Umweltveränderungen schlagen sich in vielen Bereichen nieder und erfordern eine neue Art zu denken, zu planen und zu wirtschaften.

Warum das Bremsen bzw. Stoppen der Klimaerwärmung grundlegend notwendig ist, wird deutlich, wenn die sogenannten Kippelemente im Erdsystem betrachtet werden. Ein solches Element zeichnet sich vor allem dadurch aus, dass es bei einer bestimmten Erhöhung der globalen bzw. regionalen Durchschnittstemperatur recht abrupt in einen anderen Zustand wechselt und in den meisten Fällen dieser Vorgang für lange Zeit unumkehrbar bleibt.

Ein Sonderbericht des Intergovernmental Panel on Climate Change (IPCC) von 2018 stellt fest, dass Klimaneutralität bis zur Mitte des Jahrhunderts wahrscheinlich nicht ausreichen wird, um die Leitplanke von 1,5° C einzuhalten: Es braucht zusätzlich negative Emissionen. Natürliche Kohlenstoffsenken wie Moore und Wälder spielen dabei eine bedeutende Rolle. Was den Wald betrifft, ist deshalb ein großangelegter nachhaltiger Waldumbau unabdingbar. Diese Herausforderung kann zugleich eine große Chance darstellen, denn der Wald als natürliche Kohlenstoffsenke hat viele Vorteile. Eine klimagerechte Bewirtschaftung sichert die dauerhafte Bereitstellung von Bioressourcen, fördert die Resilienz des Bestandes und ermöglicht zusätzlich eine dauerhafte Speicherung von atmosphärischem CO₂ in langlebigen Holzprodukten und Gebäuden. Die Bauweise mit Holz, Bambus oder Schilf entspricht in vielen Ländern der Erde der Tradition, nachwachsende Ressourcen vor Ort zu nutzen. Zu diesem Prinzip lohnt es sich zurückzukehren, jedoch mit wirksamen Auf- und Verbesserungen mittels innovativer Techniken. Die Lösungen über CCS (carbon capture and storage) oder BECCS (bioenergy with carbon capture and storage) werden hinterfragt. Es wird für naturbasierte Lösungen und fortschrittlichste Lösungen geworben.

Neben den biobasierten Materialien im eigentlichen Bauwesen muss auch eine zukunftsfähige Vision des Planens und Siedelns im Raum entwickelt und diskutiert werden. Wie schon in der Antike sollte man Zentrum und Peripherie zusammen denken. Das explosionsartige Städtewachstum und die Landflucht weltweit machen einen neuen Ansatz unumgänglich. Die Entwürfe für schwimmende Siedlungen und aufschwimmende Bauten, die sich auf und mit dem Wasserstand (Meeresspiegel oder Gewässerhorizont) bewegen sind kühn gedacht. Um erste Ansätze weiter zu entwickeln und global als allgemeine Vision praktisch zu realisieren bedarf es allerdings erheblicher technischer, institutioneller und ökologischer Neuerungen.

Für eine Weiterentwicklung sowie rasche Umsetzung dieser Vision müssen Bauverordnungen und Brandschutzvorschriften im europäischen Rahmen schneller an den aktuellen wissenschaftlichen und technischen Stand angepasst werden und föderale Verordnungen in Deutschland stärker harmonisiert werden. Für dieses Unterfangen ist wiederum ein starker politischer Wille erforderlich, damit sich klimagerechtes Bauen lohnt. Ein Narrativ für die Bewältigung multipler Krisen im Bausektor entwickelt die neu gegründete Bauhaus Erde gGmbH. Basierend auf den Vorstellungen der Bauhaus-Bewegung der 1920iger Jahre in Weimar stößt sie einen gesellschaftlichen Diskurs an, der in einem ganzheitlichen Konzept die Ziele *Nachhaltigkeit*, *Teilhabe* und *Schönheit* vereinen und so eine überzeugende Entwicklungsperspektive für die gebaute Umwelt innerhalb der planetaren Grenzen entwerfen soll.

The elephant in the climate shop

Hans Joachim Schellnhuber, Gitta Köllner

The fact that global climate change is progressing rapidly can no longer be denied. In Europe, too, we often have to contend with extreme weather events that threaten our everyday life, usual processes, economic practices and sometimes our security. The continent has warmed by an average of about 2°C compared to 1850. Long periods of drought occur in many places, alternating with extreme rainstorms or hailstorms. The consequences of such environmental changes are reflected in all areas and require a new way of thinking, planning and managing.

Why it is fundamentally necessary to slow down or stop global warming becomes clear when we consider the so-called tipping elements in the Earth system. Such important large-scale subsystems of the planetary environment can be circulation patterns in the atmosphere or oceans, or elements of the cryosphere such as glaciers and ice sheets, or elements of the biosphere such as the Amazon rainforest. A tipping element is characterized above all by the fact that it changes to another state quite abruptly at a certain increase in the global or regional average temperature. In most cases, this process is irreversible for a long time.

This can be illustrated with a spectacular example: When the temperature in the tropical ocean rises, "coral bleaching" occurs, which initiates the death of entire reef systems (such as the Great Barrier Reef off Australia). Corals are cnidarians that often form calcareous formations and live in symbiosis with certain algae. The latter are important for the metabolism of the corals, but also give them the well-known bright colors. If the algae get too warm, they leave the reef and the hosts die pale. In addition, the seas are becoming more and more acidic due to the increased CO₂ input from the atmosphere, which can ultimately even lead to the dissolution of dead reef structures. The tipping element "tropical coral system" is therefore endangered in two ways. It is obvious that this system does not regenerate itself easily – the tipping is irreversible.

If we take a closer look at the tipping elements, we quickly realize that everything in the earth system is linked. Research speaks of tipping cascades, where one tipping element can knock over another like a domino. A well-known example (which we can already experience) is the connection between the Arctic sea ice and the jet stream. This is a strong wind band in our temperate latitudes at about 11 km altitude that separates the cold polar air from the warmer air in the south and is driven by this temperature difference. Due to global warming, the ice on the Arctic Sea is melting much faster and to a greater extent in summer than before. Because the dark water absorbs more sunlight, the air in the northern polar region heats up even more - a dangerous feedback loop begins. As a result, the temperature difference between the polar and temperate air masses decreases rapidly. This, in turn, slows the jet stream and causes it to wobble. We feel the enlarged loops (Rossby waves) in the jet stream directly in the northern hemisphere. The drought summers in Europe, for example,

are due to stationary Rossby waves arching up from the subtropics. On the other hand, torrential rain often falls on the back of the waves. These examples are just a small part of the consequences of global warming. Others, even more ominous, are yet to be guessed at, making decarbonizing the global economy a top priority

The acute climate crisis is making many people aware that the conventional industrial model of prosperity is reaching the planetary limits. This model relies on continued growth through the extraction of mineral resources and near-free waste disposal into our common environment. But our natural resources are finite, and synthetically manufactured compounds accumulate in ecosystems. When the Paris climate agreement was signed in 2015 to keep the average global temperature below 1.5°C as far as possible, it was the result of intensive negotiations. The decarbonization of the entire economy alone represents an enormous challenge for individual nations such as China or the USA and communities of states such as the EU. Decarbonization is unavoidable, there must be a rethinking away from fossil fuels and exhaustible raw materials towards renewable energy sources and renewable or recyclable materials take place. The built environment takes on the role of the elephant in the climate shop, because the construction, operation and demolition of buildings and infrastructures account for around 40% of the greenhouse gases emitted (mainly CO₂). Not least because of the high CO₂ emissions associated with the production of concrete, steel, aluminum and glass.

However, a special report by the Intergovernmental Panel on Climate Change (IPCC) from 2018 finds that being carbon neutral by mid-century will probably not be enough to meet the 1.5°C guard rail: it needs additional negative emissions – i.e. planned removal from greenhouse gases from the atmosphere - in the next 100 years to achieve the ambitious goals of the Paris Agreement. But how can negative emissions be achieved on the necessary scale if a number of technical requirements are not yet in place?

Reforest the Planet, Retimber the City!

In order to realize negative emissions on the required scale, we should literally go back to the roots. Evolutionary history has filtered out the most efficient processes for this purpose for millions of years; now we make use of them in times of crisis. Natural carbon sinks such as moors and forests play an important role and must be given special attention because they are already suffering from the climate crisis. As far as the forest is concerned, large-scale sustainable forest conversion is therefore essential in order to be prepared for the future environmental changes that have become unavoidable.

This challenge can also represent a great opportunity, because the forest as a natural carbon sink has many advantages. Climate-friendly management ensures the permanent provision of bioresources, promotes the resilience of the stock and also enables permanent storage of atmospheric CO₂ in durable wood products and buildings. Careful felling is a critical requirement in Europe for replanting and carbon sequestration through forest regrowth.

In other parts of the world, reforestation of degraded areas can be a significant solution. There is no question that tropical and boreal primary forests must not be used because their biodiversity and ecosystem services are unique and worthy of protection. On the other hand, ailing spruce or pine plantations, as we often find them in Brandenburg, suffer from heat stress, storms and increased pest infestation. Without question, these plantations must be converted into mixed forests in order to be sustainable. Sustainable care represents a way of counteracting the consequences of global warming, at the same time supplying timber and even moderately increasing biodiversity. Houses built from sustainably produced wood, if possible even from the region, would therefore not only reduce the greenhouse gas emissions of the construction industry and at the same time alleviate the shortage of building materials a little, but also form a long-lasting carbon sink on a natural basis. Of course, the temporal component must not be ignored, because good wood usually needs a long period of maturity.

In any case, the formula "photosynthesis + organic architecture" shows a silver bullet to negative emissions, which allows us to forgo expensive and dangerous experiments in the context of so-called geoengineering. In addition, this nature-based solution is significantly more practical, economical and, above all, more tried and tested than the recovery of atmospheric CO₂ through CCS (carbon capture and storage) or BECCS (bioenergy with carbon capture and storage). Blocks of houses, neighborhoods, maybe even entire cities can become carbon sinks. Due to the increased demand, this would also promote the expansion of sustainably managed and climate-resilient forests as well as regional value chains. Larger cities in particular will play an important role in the fight against climate change in the future. Demographic change, rural exodus and environmentally driven migration must be carefully considered in planning and design. The hinterland of a city, the rural area e.g. should not only be a supplier for the city and otherwise be neglected. Wooden buildings in Germany, Austria and Switzerland are traditionally more common in rural areas than in cities. Why not turn the city into a built carbon store now?

Combining nature-based solutions with the most advanced technologies

In many countries around the world, building with wood, bamboo or reed corresponds to the tradition of using renewable resources locally. It is worth returning to this principle, but with effective upgrades and improvements from the innovative technology box. Advanced methods such as 3D printing, laser cutting and the modeling of buildings by digital twins make it possible to bring proven methods into the 21st century. Organic architecture connects these elements and builds a bridge between past, present and future generations, because the positive climate effect ensures a good life in the long term. However, sustainable forest (re)construction is a task with a time horizon of many decades and must be planned far ahead.

In addition to the bio-based materials in the actual building industry, a sustainable vision of planning and settlement in space must also be developed and discussed. As in antiquity, the center and periphery should be thought of together. The explosive urban growth and rural exodus worldwide make a new approach inevitable. Polycentric is probably the concept for a better built and structured modernity. An almost

trivial advantage would be the reduction of the still increasing commuter traffic, which causes enormous climate-damaging emissions. Polycentric approaches for general mobility, energy supply and adaptation to the consequences of unavoidable climate change are essential for the transformation and require cross-sector urban and spatial planning. Inclusion and social compatibility are - especially in the megacities of the Global South, but also in our latitudes - the basic requirements for sustainable settlements. City green as a source of shade, evaporation cooler and drainage area will play a major role in the future. In China, for example, progress is being made with the development of so-called sponge cities ("sponge cities") with floodable parks, similar to our recreational green spaces on dismantled rivers, and thus adapting to heavy rain events. In this way, rainwater is reused and flooding is mitigated. The designs for floating settlements that move with the water level (sea level or water horizon) are even bolder. In order to realize in general this vision in practice, however, considerable technical, institutional and ecological innovations are required.

There are many similar ideas at the German level, but on a rather small scale. To speed up development, new public buildings could be built with a minimum percentage of wood, as is already being done in France. In this way, the state can set a good example and compensate for emissions in its properties in the long term. Impressive examples for Berlin and the surrounding area are listed in a digital timber construction atlas, which attempts to catalog all of the relevant structures together with a detailed description. It clearly shows that sustainable architecture is possible and practicable and that building with cross-laminated timber (or cross-laminated timber) is on the rise alongside solid timber construction. The plywood balances the anisotropic properties of wood and ensures sufficient stability, hardness and resilience, even when building at great heights. Insulating materials are also being looked at from a new perspective. Instead of highly processed synthetic materials, which are difficult to dispose of and usually cannot be reused, renewable insulating materials such as hemp fibers or seaweed are used.

Other examples of nature-oriented design in architecture are ventilation and cooling systems that do not require any energy to function. An older version are the Persian wind towers ("Badgire"), which are modeled on the chimney structures of termite mounds. The renowned architect Diébédo Francis Kéré built a modern institute in Burkina Faso, also based on this model. In Germany it seems to be mainly small and medium-sized companies that plan and realize innovative wooden buildings, often with the help of further developed traditional knowledge from their industry. These companies should definitely be supported with research collaborations so that promising ideas can be made scalable. So high-tech meets traditional no-tech solutions and forms novel "cyborgan" systems. In this way, mixed forms can arise, from a single building to a complete settlement, where the best options of natural evolution and artificial design combine to form functional units.

However, if this vision is to be implemented quickly, building regulations and fire protection regulations must be adapted more quickly to the current state of science and technology, and federal regulations must be harmonized to a greater extent. This undertaking, in turn, requires a strong political will so that climate-friendly construction is worthwhile and even attractive. Research also has some catching up to do.

Innovations must be examined and tested more extensively and better in research and development projects - this applies in particular to the EU programs as part of the Green Deal.

The Bauhaus Earth and the way to the future

The newly founded Bauhaus Erde gGmbH is developing a narrative for overcoming multiple crises in the construction sector. Based on the ideas of the Bauhaus movement of the 1920s, she initiates a social discourse that aims to combine the goals of sustainability, participation and beauty in a holistic concept and thus design a convincing development perspective for the built environment within the planetary boundaries. All trades of this total work of art in the original Weimar sense are viewed together in order to advance the transformation towards bio-based, circular, climate-positive planning, building and housing. Unlike in the 1920s, digital processes and other high-tech instruments are now available for this holistic approach. Using such tools, the Bauhaus Erde already runs a hybrid design lab in Berlin as a place for generating and exchanging innovative ideas and concrete designs. The founding of a new Bauhaus Academy is also planned.

Fortunately, the EU Commission took up the idea of a modern Bauhaus movement in 2020 and launched the New European Bauhaus (NEB) initiative. Thus, the settlement-related transformation idea is raised to the continental and hopefully soon to the global level. With flagship projects in various EU member states, the idea of the NEB is to be brought to the attention of the general public and made tangible. In this way, the European Green Deal to achieve CO₂ neutrality in the EU by 2050 will also be filled with life. The transformation to a digital, bio-based circular economy follows the NEB motto: sustainable, inclusive, beautiful. Together, the European Green Deal and the New European Bauhaus can make a crucial contribution to this great historic transition.

Summery and Outlook

H. Stopp

Deutscher Vorspann

Zusammenfassung und Ausblick

Auf der der 6. Tagung zu schwimmenden Bauten, die nunmehr wieder in Präsenz im IBA Studierhaus Großräschen stattfinden konnte, stand der regionale Strukturwandel zur Schaffung neuer, zukunftssicherer Arbeitsplätze unter Beachtung der globalen Situation des klimatischen und gesellschaftlichen Wandels im Vordergrund. Dabei zeigt die Themenvielfalt die Komplexität der Aufgabe. Sie umfasst das Erarbeiten von spezifischen Regelwerken, das Erfassen wasserchemischer, wassermechanischer und klimatischer Randbedingungen genauso wie Besonderheiten schwimmender Photovoltaikanlagen, den Iststand des Lausitzer Seenlandes sowie Fragen zur Finanzierung und Mobilität Schwimmender Architektur.

Alle Referate einschließlich der Diskussionen demonstrieren deutlich die Chancen, die für die Region mit der Thematik verbunden sind, aber neben dem Potenzial auch den Arbeitsumfang, den es zeitnah zu bewältigen gilt. Letztlich umfasst das Siedeln am und auf dem Wasser alle Disziplinen des klassischen Bauwesens, aber mit der Besonderheit einer dauerhaften oder zumindest zeitweisen Wasserbasis. Dabei bedingen letztere, die sog. aufschwimmenden Bauten (z.B. zur wirtschaftlichen Aufwertung lt. EU-Vorgabe vorzuhaltender Retentionsflächen für den Hochwasserschutz) noch zusätzliche Schwierigkeiten. Sie betreffen die Anbindung an die Infrastruktur sowie das störungsfreie Wiederholen von Vertikalbewegungen bei Hochwasser und dessen Abfluss.

Die Gründung eines Fördervereins IfSB e.V. stimmt hoffnungsfroh. Er hat sich nicht nur die Beratung von Kommunen, Verwaltungen und Investoren zum Ziel gesetzt, sondern will ein Anlaufpunkt sowohl für bereits vorhandene einschlägige Unternehmen, aber auch für Startup-Gründungen sein. Das Ziel ist die Bildung eines Nationalen Zentrums für Schwimmende und Aufschwimmende Bauten. Außenstellen des Zentrums sind sowohl am Bergheider See im Autartec-Freilichthaus des Fraunhoferinstituts IVI Dresden als auch am Cottbuser Ostsee geplant.

Anwesende polnische Kollegen der Universität Warschau haben nach der Wahrnehmung aller Vorträge vorgeschlagen, die 4. Internationale Conference on Amphibious and Floating Architecture, Design and Engineering (ICADE) an der Brandenburgischen Technischen Universität durchzuführen. Durch eine Exkursion am Folgetag durch das Lausitzer Seenland mit der Besichtigung einiger Standorte und Messplätze zu Schwimmender Architektur ist dieses Ansinnen noch erhärtet worden. Mit dem verantwortlichen Unternehmen für die Marina am Geierswalder See und der Zusage des Fraunhoferinstituts IVI Dresden für eine Führung auf dem schwimmenden Freilichthaus-Laboratorium auf dem Bergheider See nahe der F60 stehen fachlich kompetente Unterstützer zur Verfügung. Nach Recherchen zu verfügbaren Räumlichkeiten sowie personeller Unterstützung ist der Termin der Tagung einschließlich der ganztägigen Exkursion auf den 9.-11. Oktober 2023 festgelegt worden. Der Aufruf und die Anmeldung lassen sich elektronisch über die Netzadresse icaade.org erreichen.

6th Meeting Floating Architecture-November 2022

Summery and Outlook

What, How, Why ?

- Regional structure change, supported by
- Creation of new, future-proof jobs, by means of
- Considering the global situation

Examples of processed topics:

- * Rules and regulations
- * Aquatic ecology
- * Climatic boundary conditions
- * Mechanical water attack
- * Floating photovoltaics
- * Lusatian Lake District
- * Financing options
- * Mobility approaches

Summary

Demonstration of complex topics

Excerpts of human coexistence on the water

Promising

use alternative energies, space resource, etc.

Risky

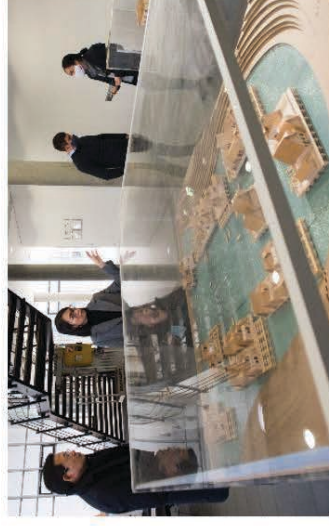
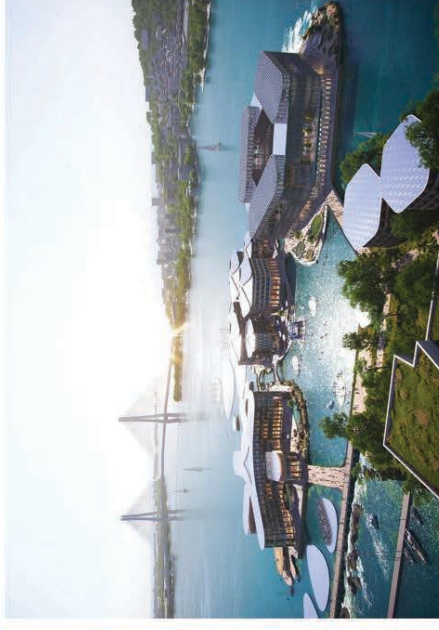
User safety, environmental protection, etc.

The region's economic/scientific “bargaining chip”

(deposit) for municipalities, companies including start-ups, universities and institutes

Outlook

- ▶ Build and settle on new building land
- ▶ Pay attention to global developments (e.g. Busan)
- ▶ Expand collaborations
- ▶ Strengthen structural change (networking, transfer)
- ▶ Involve companies/municipalities
- ▶ Support startups



Outlook: Structural Change in Lusatia

Development and expansion of an international innovation and technology center

by means of

Utilization of created opencast mining landscapes
to create future-proof jobs through climate and social change
adapted export goods for the colonization of water surfaces in globally different areas

Objectives:

- Use of existing, created resources
- Utilization and implementation of research results
- Involving and promoting companies
- Founding of new companies with long term secured jobs
- Development and maintenance of science tourism Floating architecture
- Support: General education, training, further education, University plans (FEP and HEP of the BTU Cottbus-Senftenberg)

Outlook: Founding of the IfSB e.V.

start-up activities
including founding assembly: II./III. quarter of 2022

Objective:

Promotion of building and settlement activities on and by the water,
including floating structures (only when water is coming by floods)

Activities 2022/23:

- Support for the biennial cycle of scientific Conference "Floating Structures" including the publication of the Brochure "Floating Architecture"
- Initiatives to apply for research funding projects involving regional companies and corporations
- Member recruitment, partner search at home and abroad, non-profit organization

Outlook: Current funding applications

European research funding

Activities 2022

Water4all

Management of water resources: resilience, adaptation and mitigation to hydroclimatic extreme events and management tools.

- Proposal:

**FCP - FLOOD COMMUNITY PAVILION –
an example of floating structures
and their use and investigations for flood control**

Outlook: Current funding applications

Ideas competition of the BBSR

Objective:

Promotion of building and settlement activities on and by the water, including floating structures

Submitted topics:

- Long-term measurements of water waves and water chemistry in open-cast mine lakes
- Lake District:
Amphibious vehicles as a tourist attraction and efficient means of transport in open pit landscapes
- Floating buildings for the economic upgrading of EU-legally given retention areas
- Lusatia is calling – the lake district is beckoning

Floating Architecture Vol. 4

Title:
Floating Architecture 4 –
Construction on and near water

Order address data:
LIT Verlag Dr. Wilhelm Hopf
48159 Münster – Berlin-Wien-Zürich
vertrieb@lit-verlag.de



Floating Architecture Vol. 4

Authors and Contributions

- Draeger, Susan: Building in the tropics in times of climate change
- Höfler, Frank: Approaches to securing individual mobility within large floating settlements
- Jentsch Juliane: Legal requirements for floating architecture
- Kramer, Thomas: Aspects of approval of a floating photovoltaic field from a municipal perspective
- Leßmamm, Dieter: Water ecological requirements for floating Buildings using the example of photovoltaic systems
- N.N.: Financing of floating structures abroad using Austria as an example
- Richter, Gerd: Remedial measures of the LMBV for further development of the Lusatian Lake District
- Stopp, Horst: summary and outlook
- Stopp, Horst; Strangfeld, Peter: Editorial
- Weyrauch, Bernhard: Opening remarks

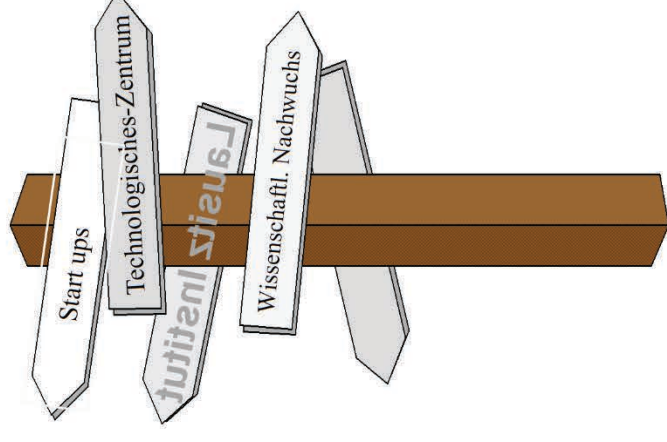


Thanks for listening and recognizing and future cooperation

Sufficient light + courage on the numerous
paths and ways to

7th session: November 2024
Floating Structures –
Building near and on the water

In presence and healthy: **good luck !**



Der Neustart schwimmender Häuser am Geierswalder See ist gelungen

Mit frischem Wind startete das

OPEN-WATER-RESORT

Lausitz

bei vollem Erfolg sein Comeback.



Einfach den Alltag hinter sich lassen und genießen. Das Saunaboot ankert am Privatsteg direkt im Resort und verspricht für die Gäste der schwimmenden Häuser Wellness direkt auf dem Geierswalder See.



Die Wärme der Sauna und der einzigartige Ausblick lassen Ihren Alltagsstress in weite Ferne rücken. Der Sprung ins kühle Nass sorgt für den entsprechenden Sauna-Effekt. Das Saunaboot bietet Platz für 4-6 Personen. Über die Panoramafenster haben Sie einen einmaligen Blick auf den See. Lassen Sie sich von der Energie des Wassers verzaubern. Wir versprechen das Urlaubserlebnis der etwas anderen Art. Besuchen Sie das Open-Water-Resort Lausitz und profitieren Sie von den Spezials rund um die schwimmenden Ferienhäuser und den Apartments in unseren Strandhaus.



Für alle, die lieber festen Boden unter den Füßen haben, bieten die verschiedenen Apartments an Land die optimale Alternative, unsere Resort Lounge bietet zudem Platz für Feierlichkeiten jeglicher Art.

**Wohnhafen Scado,
02979 Elsterheide
Sie erreichen uns von
Montag - Freitag : 8.00 -16.00 Uhr**

Tel: +49 35722 95770

E-Mail: open.water.resort@gmail.com

Schwimmende Architektur – Bauen am und auf dem Wasser Bauten / Floating Architecture – Constructions on and near water

hrsg. vom /edited by Institut für Schwimmende Bauten, Brandenburgische
Technische Universität Cottbus-Senftenberg

Horst Stopp; Peter Strangfeld (Eds.)

Floating Architecture 3

Construction on and near water

Floating architecture is not only an issue for luxurious tourism but with the climatic change the building of floating structures becomes relevant for many areas in the world. In regions with rising sea levels, frequent flooding, or thawing permafrost, floating structures can be a solution to adapt existing settlement areas to these new conditions.

The self-sufficient energy and supply systems required for floating settlements can also be used in rural areas with a lot of migration.

The collection presents papers of conferences organized by the Faculty of Architecture and Urban Planning at Brandenburg University of Technology Cottbus-Senftenberg (BTU).

vol. 3, 2021, 120 pp., 29,90 €, pb., ISBN-CH 978-3-643-91415-6

Horst Stopp; Peter Strangfeld (Eds.)

Floating Architecture 2

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vol. 2, 2019, 130 pp., 29,90 €, pb., ISBN-CH 978-3-643-91067-7

Horst Stopp; Peter Strangfeld (Eds.)

Floating Architecture

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vol. 1, 2017, 136 pp., 29,90 €, pb., ISBN-CH 978-3-643-90910-7

LIT Verlag Berlin – Münster – Wien – Zürich – London

Auslieferung Deutschland / Österreich / Schweiz: siehe Impressumseite

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