Icelandic Sustainable Constructions Roadmap to 2030

Part III

Summary: Emissions, Goals, and Actions

Byggjum grænni framtíð
Building a Greener Future

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Sky Lagoon, Kopavogur, Iceland.
Architect: T.ark Arkitektar.
Photo: Brynjar Gunnarsson.

Project management team of Byggjum grænni framtíð (Building a Greener Future) in May 2022:

- Jóhanna Klara Stefánsdóttir, Federation of Icelandic Industries
- Lárus M. K. Ólafsson, Federation of Icelandic Industries
- Áróra Árnadóttir, The Green Building Council Iceland
- Ragnar Ómarsson, The Green Building Council Iceland
- Eygerður Margrétardóttir, Icelandic Association of Local Authorities
- Páll Valdimar Kolka, Icelandic Road Administration
- Erna Bára Hreinsdóttir, Icelandic Road Administration
- Sigrún Dögg Kvaran, Ministry of Infrastructure
- Olga Árnadóttir, The Icelandic Housing and Construction Authorities
- Þóra Margrét Þorgeirsdóttir, The Icelandic Housing and Construction Authorities (Project Manager)

In September 2020 until June 2021 the following also took a seat in the project management team:

- Þórhildur Fjóla Kristjánsdóttir, The Green Building Council Iceland
- Birgitta Stefánsdóttir, Environment Agency of Iceland

Byggjum grænni framtíð (Building a Greener Future) is a public-private collaboration project rooted in Action C.3. in the Icelandic Climate Action Plan from June 2020. So far, more than 200 specialists from the whole value chain of the building industry have participated in the project. We would like to extend our gratitude to the following parties that funded the project in 2021:

- Ministry of Social Affairs (which oversaw construction affairs in Iceland, but at the time of publication that field has been moved to the Ministry of Infrastructure)
- The Icelandic Housing and Construction Authorities
- Federation of Icelandic Industries
- Ministry for the Environment and Natural Resources (at the time of publication, Ministry of the Environment, Energy and Climate)

The results of the work that was conducted by the public-private collaboration projet Byggjum grænni framtíð (Building a Greener Future) from September 2020 to May 2022 are published in Icelandic Sustainable Constructions - Roadmap to 2030, which is divided into three publications:

- Icelandic Sustainable Constructions - Roadmap to 2030. Part I. Evaluation of Carbon Emissions in Icelandic Building and Construction (pub. in Icelandic, February 2022)
- Icelandic Sustainable Constructions - Roadmap to 2030. Part II. Goals and Plans for Action (pub. in Icelandic, June, 2022)
- Icelandic Sustainable Constructions - Roadmap to 2030. Part III. Summary: Emissions, Goals and Actions (pub. in Icelandic, June, 2022).

This publication features a summary of carbon emissions in Icelandic building and construction, goals towards esustainable constructions 2030 and the actions needed to reach those goals.

Further information on carbon emissions in Icelandic building and construction can be found in the publication: Icelandic Sustainable Constructions - Roadmap to 2030. Part I. Evaluation of Carbon Emissions in Icelandic Building and Construction (pub. in Icelandic, February 2022). It's only available in Icelandic, the original title is Vegvísir að vistvænni mannvirkjagerð 2030. I. hluti: Mat á kolefnislosun frá íslenskum byggingariðnaði.

Further information on goals and actions can be found in the publication: Icelandic Sustainable Constructions - Roadmap to 2030. Part II. Goals and Plans for Action (pub. in Icelandic, June, 2022). It's only available in Icelandic, the original title is Vegvísir að vistvænni mannvirkjagerð 2030. II. hluti: Markmið og aðgerðaáætlun.

Emissions and Waste in Reference Year and Goals for 2030

Emissions in Reference Year and Goals for 2030
Expected yearly carbon emissions because of new constructions and operations of consisting buildings in Iceland are around 360,000 tonnes of CO_2e. In 2030 we assume that emissions have fallen by 43% from the reference year, as shown in Figure 1.

Figure 2 shows how emissions in reference year and goals on reduction in emissions is divided into phases during the lifetime of buildings.

Total emissions of Icelandic buildings (without waste) in reference year and emission goal of 2030.

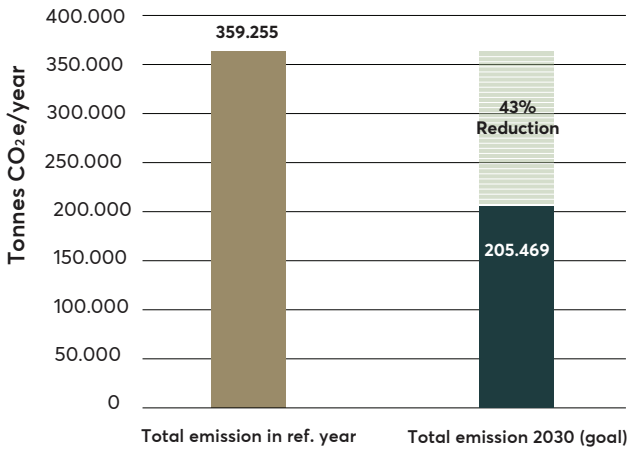


Figure 1: Total emissions of Icelandic buildings (without waste) in reference year and emission goal of 2030.

Emissions of Icelandic buildings by phases in reference year and emission goal of 2030.

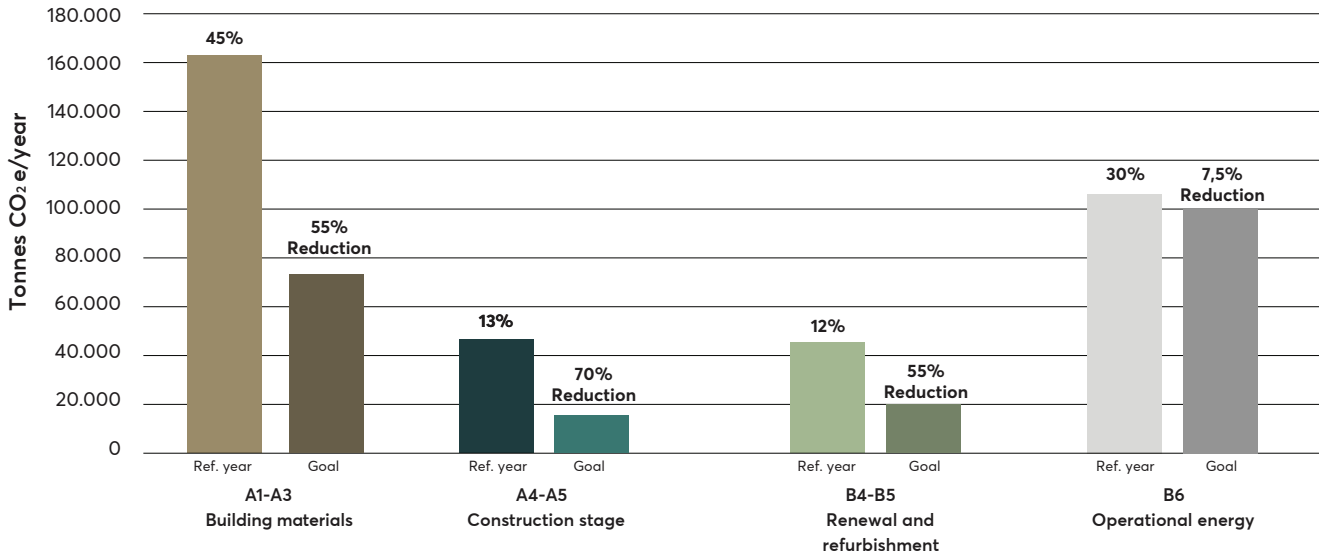


Figure 2: Emissions of Icelandic buildings by phases in reference year and emission goal of 2030.

Waste in Reference Year and Goals of 2030
During the years 2015-2020 the yearly recycling ratio for building and demolition waste was on average 88% and the disposal ratio 12%. The goal for 2030 is to decrease the disposal ratio to 5% and at the same time reach a 95% recycling ratio, as shown in Figure 3.

However, it is not enough to reduce the disposal ratio of building waste. It is also important to reduce waste in general and the amount that is generally accumulated during construction, whether it is for disposal or recycling.

Average annual management of building and demolition waste from 2015-2020 and goals for 2030

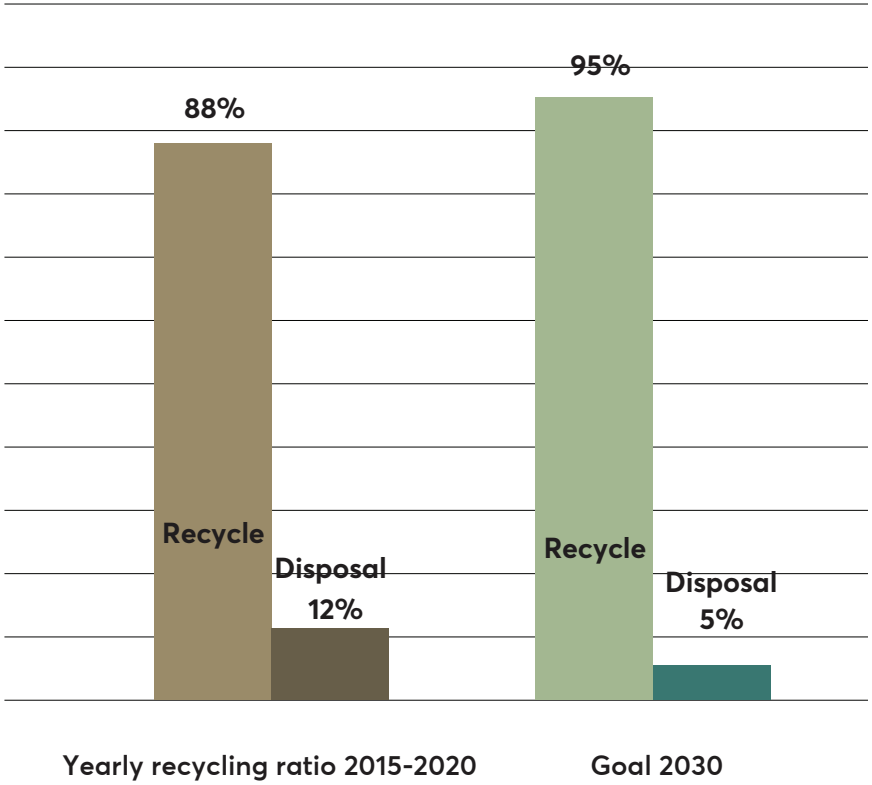


Figure 3: Average annual management of building and demolition waste from 2015-2020 and goals for 2030.

During the years 2015-2020 the annual average of building and demolition waste, excluding asphalt, was 54 kg per square metre for every new building. The goal for 2030 is to decrease the disposal ratio by 30%, as shown in Figure 4.

Average amount of building and demolition waste per square metre from 2015-2020 and goals for 2030.

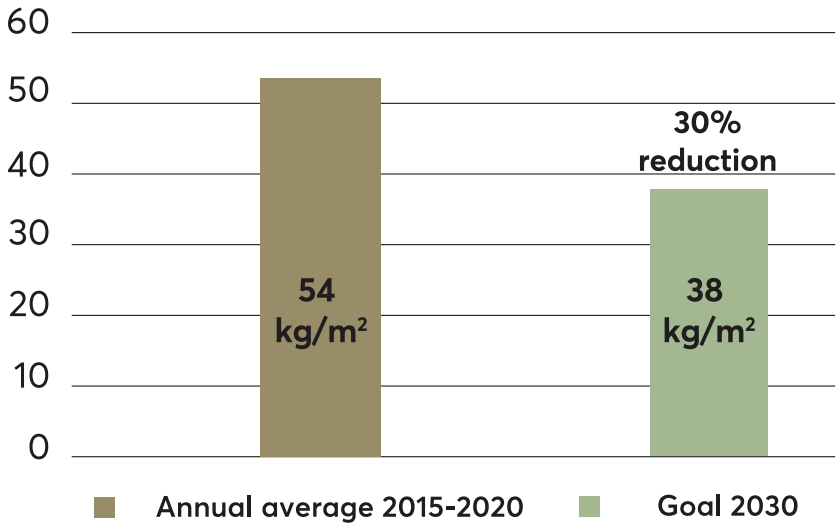


Figure 4: Average amount of building and demolition waste per square metre from 2015-2020 and goals for 2030.

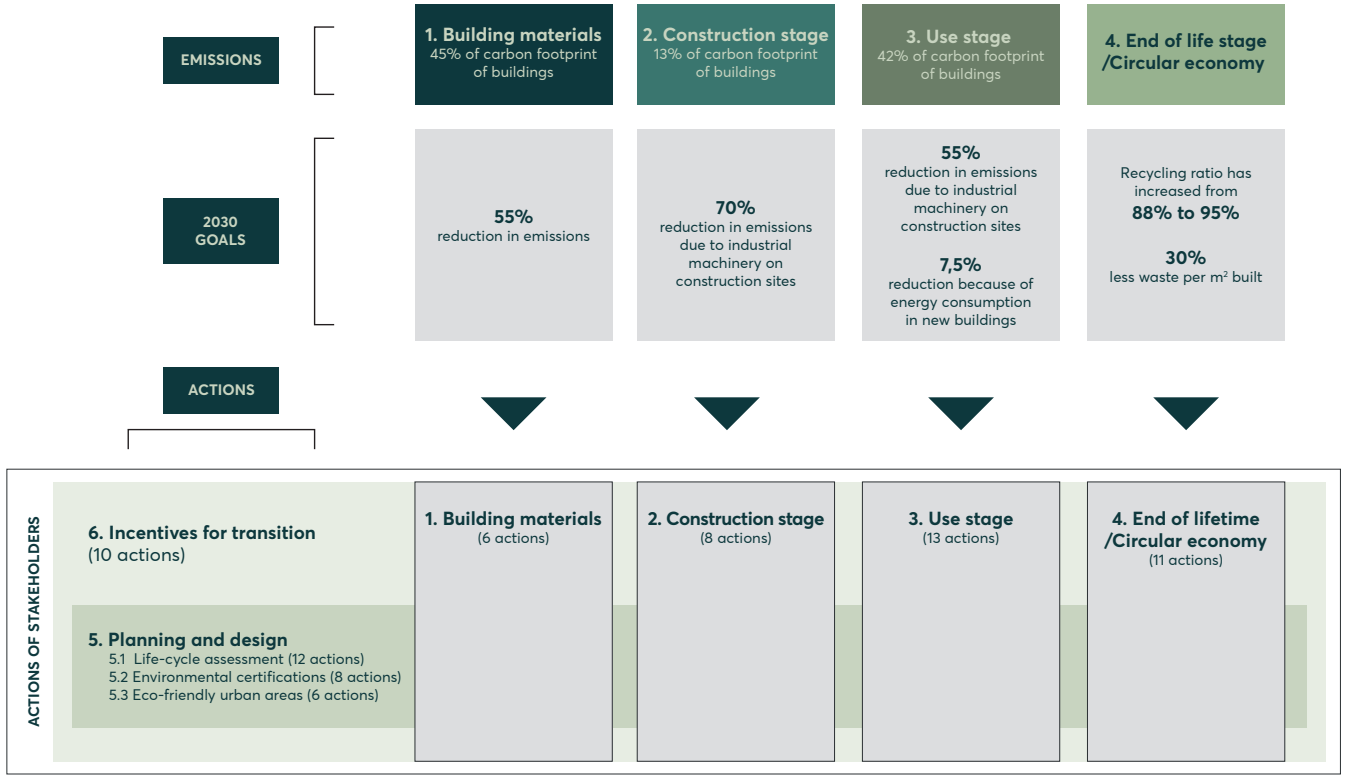


Figure 5: Overview of emissions during reference year, goals for 2030 and actions to reach those goals.

Summary: Overview of emissions during reference year, goals for 2030 and actions to reach those goals

Emissions: There exists an evaluation of emissions during reference year due to 1. Building materials, 2. Construction stage, and 3. Use stage (i.e. because of renewal, renovations, and energy use operating the buildings).

2030 Goals: Goals are set for emission reduction because of 1. Building materials, 2. Construction stage, and 3. Use stage. Goals are also set for 4. End of life stage / Circular economy, i.e. of increased recycling ratio of building and demolition waste. Furthermore, goals are set for decreasing the amount of building and demolition waste per built square metre.

Actions: 74 actions are defined in six action categories to reach set goals, thereof 23 were already in progress or finished in May 2022. The system boundaries of the actions are broader than the framework for the goals of the evaluation of emissions at this time. In other words, many of the action items apply to construction in general while the emission evaluation and goals refer only to buildings. The idea is that actions in category 5 - Planning and design - support actions in categories 1-4. Also that actions in category 6 - Incentives for transition - support actions in categories 1-5. Furthermore, it is worth noting that it is indeed clear that goals for eco-friendly building and construction will not be reached solely with the 74 actions; it is assumed that stakeholders within the construction sector will hop on the eco-friendly train by implementing their own actions. The 74 actions are shortly described on the next page. Further information on each action can be found in the action plan which was issued in Part II of Icelandic Sustainable Constructions - Roadmap to 2030 and on www.byggjumgraenniframtid.is.

The evaluation, emissions, actions are up for review before the end of 2024.

74 actions that support more sustainable constructions

In May 2022: 21 action items in preparation or under way | 2 actions completed | Not started

1. Building materials	**1.1.** Chapter on concrete in building regulation reviewed	**1.2.** Research of eco-friendly building materials	**1.3.** Initiative on correct storing and handling of building materials	**1.4.** Databank for ecological and climatic effects of building materials	**1.5.** Development of process of wood products	**1.6.** Development in eco-friendly concrete	
2. Construction stage	**2.1.** Composition analysis of industrial machinery fleet for constructions	**2.2.** Further information gathered on industrial machinery fleet	**2.3.** Discussions about energy transition in industrial machinery	**2.4.** Reward system in Reykjavik for eco-friendly energy sources on construction sites	**2.5.** Concepts about environmental impact at construction sites defined	**2.6.** Conversation on secure energy infra-structure from the beg. of constructions	**2.7.** Show-case: Zero-emission construction site	**2.8.** Check new registration of industrial machinery fuelled by oil
3. Use stage	**3.1.** Information on actual consumption of heat, electricity and water	**3.2.** Coordinated energy calculations published and classification of energy efficiency	**3.3.** Requirement of energy calculations	**3.4.** Education on energy savings in buildings	**3.5.** Requirement of atmospheric density tests activated	**3.6.** Instructions on the design of heating, cooling and air conditioning systems	**3.7.** Research of energy utilisation of older buildings	
	3.8. Coordinated calculations of heat- and moisture fluctuation published	**3.9.** Check requirements* for controlled ventilation systems with heat recycling	**3.10.** Requirement of energy efficiency of new buildings	**3.11.** Policy on eco-friendly maintenance of public buildings	**3.12.** Activate the "House Manual" in the Building registry	**3.13.** Instructions for eco-friendly maintenance	
4. End of lifetime / Circular economy	**4.1.** Marketplace for soil and mineral products (Mölundur)	**4.2.** Research and instruction on utilisation of building waste	**4.3.** Promotional effort for new recycling requirements for building waste	**4.4.** Accessible areas for used building materials	**4.5.** Report of designers on maximum utilisation of building materials	**4.6.** Permits for demolition registered in the Building registry	
	4.7. Actual figures on building waste returned	**4.8.** Regulatory framework for construction reviewed with regards to circular economy	**4.9.** Instructions for recycling and reusing building materials	**4.10.** Instructions for responsible demolition	**4.11.** Emphasis on construction in the project Together against waste		
5.1. Life-cycle assessment	**5.1.1.** Emissions of The Icelandic Road Administration constructions evaluated with source analysis	**5.1.2.** LCA on BREEAM-certified new buildings of Reykjavík Municipality	**5.1.3.** Coordinated LCA-methodology of buildings published	**5.1.4.** Educational materials on LCA for buildings	**5.1.5.** Requirements for carbon footprint calculations (LCA) in public projects	**5.1.6.** Baseline criteria for carbon footprint of different building categories defined	
	5.1.7. Carbon neutral building for Icelandic conditions defined	**5.1.8.** Baseline criteria for carbon footprint of different building categories updated	**5.1.9.** Requirements for carbon footprint calculations (LCA) in general market	**5.1.10.** Requirement that the carbon footprint of public projects is 30% lower than the baseline (limit value)	**5.1.11.** Requirement that the carbon footprint of general projects is 30% lower than the baseline (limit value).	**5.1.12.** Baseline criteria for carbon footprint of all projects updated and lowered	
5.2. Environmental certifications	**5.2.1.** Financial and environmental benefits of environmental certifications	**5.2.2.** Instructions on Nordic Swan Ecolabel criteria	**5.2.3.** Environmentally certified buildings in the Building registry	**5.2.4.** More environmentally certified buildings in Reykjavík	**5.2.5.** Professional courses on certification systems	**5.2.6.** Education for municipalities about certifications	**5.2.7.** Education for suppliers about certifications	**5.2.8.** Adjust certification systems to Icelandic conditions
5.3. Eco-friendly urban areas	**5.3.1.** Existing infrastructure in Reykjavík used together	**5.3.2.** Instructions on planning of 20 minute towns and neighbourhoods	**5.3.3.** Manual on organisation and design around the circular economy	**5.3.4.** National Planning Strategy 2015–2026 reviewed	**5.3.5.** Legislation on planning revised with respect to climate issues	**5.3.6.** Instructions and databank about climate-focused planning	
6. Incentives for transition	**6.1.** Proposal for the Ministry of Finance on public incentives for eco-friendly construction	**6.2.** Discussion within municipalities and others about green financial incentives	**6.3.** The green housing of the future in the City of Reykjavik	**6.4.** Instructions and samples of environmental criteria for public tenders	**6.5.** Environmentally friendly requirements and selection criteria for tenders conducted by the Government Property Agency		
	6.6. Loan supply of public financial institutions for eco-friendly building	**6.7.** Check coordinated criteria for green financing	**6.8.** Competition fund for construction industry (Askur)	**6.9.** Awards for eco-friendly construction (Græna skóflan)	**6.10.** Initiatives for eco-friendly steps within the construction industry		

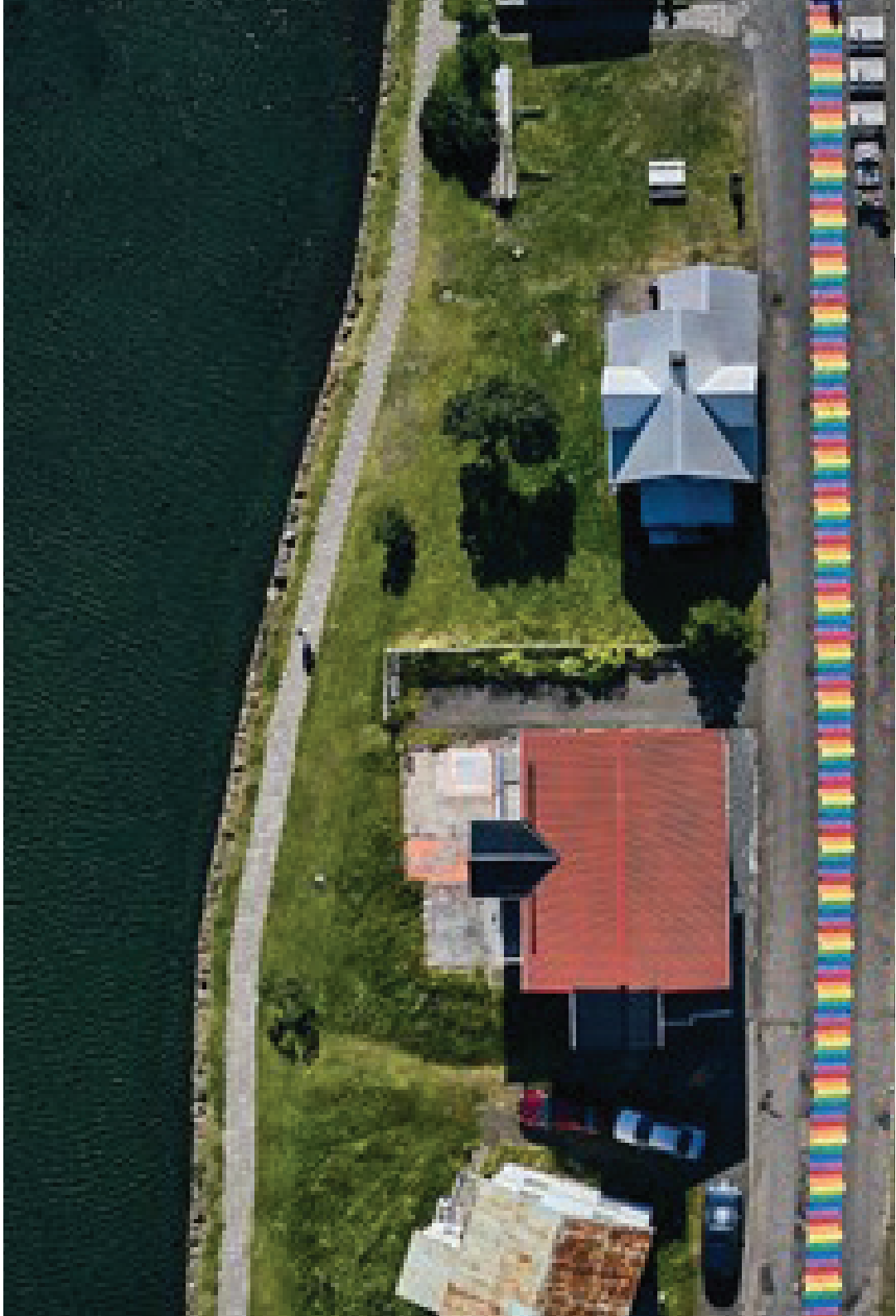
What can I do?

The action plan details 74 actions in six categories, as shown in Figure 5.

On their own, the 74 actions do not suffice in achieving more sustainable constructions. It is necessary that all companies and institutions within the value chain of construction identify the many opportunities that they face in this respect. If we all jump on board at the same time the development will be much faster and the benefits for the environment, economy and society as a whole, will be apparent.

Part II of the Icelandic Sustainable Constructions - Roadmap to 2030 features sub-sections with the title "What can I do?" There you will find many examples of actions within each action category that single parties within the construction sector can apply to support our goal of more sustainable constructions.

Figure 6: Main stakeholders in building and construction.

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