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Strategies, concepts and measures for decarbonising the building stock by 2045/50

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Background



- Since the Paris Agreement entered into force in 2015, Japan and Germany have been working on legislation and various initiatives to achieve carbon neutrality.
- In particular, the decarbonization of buildings with their relatively high final energy consumption and CO₂ emissions contribute significantly to achieving the carbon neutral goal of both countries.
- This study compared the decarbonization policies and issues of buildings in both countries and explored the possibilities of using these policies to support each other's policies.

	Japan	Germany
Share of final energy consumption for Buildings	32.1%	35.0%
CO ₂ Emissions for buildings	36.0%	30.0%
Share of residential building amount whole buildings	74.3%	90.7%

Japan

Major policies related to the improvement of the energy performance of buildings: transition of policies



1970s Oil Shock

1979 Energy Conservation Law

1997 Kyoto Protocol

1998 Top Runner Programme

Starting with 11 items incl. cars, AC. Now 32 items covered

2015 Paris Agreement

2015 Building Energy Conservation Act

Obligation to comply with energy conservation standards for large-scale non-residential buildings

2020 Declaration of CN by FY2050

2021 46% reduction by FY2030

2021 Roadmap for buildings

FY 2030 : Aim to ensure ZEB/ZEH level energy efficiency for new buildings

FY 2050 : Aim to ensure ZEB/ZEH level of energy efficiency and conservation performance on a stock average

2022 Revision of housing-related legislation

- Expansion of obligation to comply with energy conservation standards
- Expansion of the scope of the Residential Top Runner Program
- Promotion of renewable energy - Expanding the use of wood
- a low-interest loan program for energy-efficient home improvements

Recommendations for the further improvement of the policies

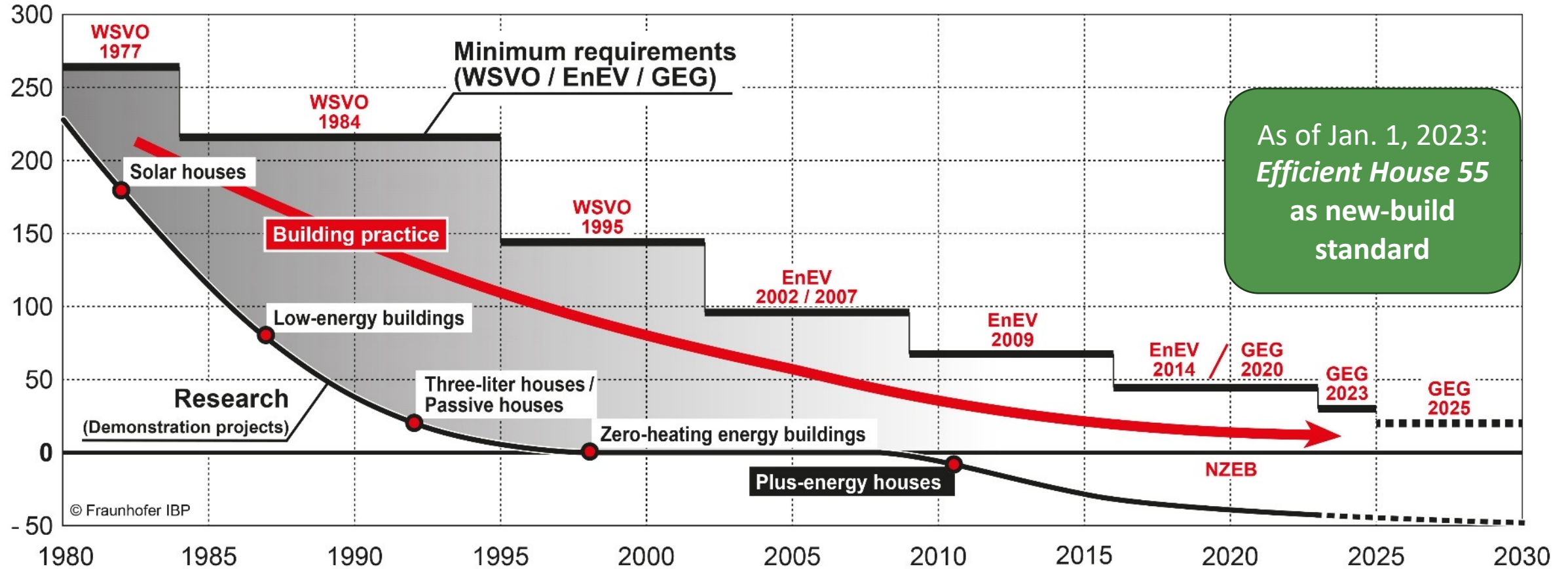


- **Target setting and continuous monitoring by the government for the introduction of renewable energy in building**
 - Setting clear reduction targets for the installation of renewables in buildings by 2030 and 2050.
 - Monitoring the progress by each municipality and identifying obstacles for further promotion.
- **Reinforcement of retrofit policies for existing buildings**
 - Limited private house owners who willingly implement energy-saving measures, due to no evaluation for the retrofit cost which can not be recovered at the time of resale.
 - Encouraging businesses to implement energy-saving retrofits, by regulating the allocation of the number of new construction sales based on the results of energy-saving retrofits.

Germany

Development Of Energy-saving construction in Germany

Primary energy need semi-detached house – Heating [kWh/m²a]









Source: Hans Erhorn, Head of Department of Energy Efficiency and Indoor Climate, Fraunhofer IBP

Building policies

to increase energy efficiency standards and renovation



	Energy performance requirements	<i>Building Energy Act (2020):</i> for (a) new buildings and (b) existing buildings undergoing major renovation integration of renewable energies
	Energy performance certificates	ranging from A ⁺ -H for residential buildings obligation to present to interested parties at sale or lease highlights deficiencies of the building and offers recommendations for energy renovation
	Performance standards for appliances	necessity to ensure energy efficiency and recyclability inform about possible environmental externalities analyze product lifecycle
	Financial incentives	since 2005: loans and grants for energy efficiency renovation and integration of renewable energies federal funding for efficient buildings including renewable energies: in 2022, 5 billion € → 2023-26 raised to up to 12-14 billion €
	Energy advice	Professional energy consulting (subsidized as well) as prerequisite for financial incentives for renovation measures iSFP: individual energy renovation passports to guide stepwise implementation towards nearly-zero energy buildings, subsidized with 80%
	Lifecycle assessment	Increase the use of wooden material and assessing embedded emissions during constructions.

For further Improvement of the Policy Package in Germany

- need of clear **market signals** following the so-called „Putin-shock“ to push investments
- increase the numbers and ambition level with regard to **energy renovation** → ensure use of funds for grants and loans through, e.g.: one-stop-shops, project bundling and serial construction/pre-fabrication, digitalization, municipal heat planning and renovation roadmaps for building types and individual buildings
- enhance **requirements for new build** (building shell, PV obligation)
- **reduce demolition rate** by setting clear priority on renovation over new built
- set **sustainable constructions** as standard (integrate LCA-standards into the Building Energy Act)

Conclusion and outlook

Learnings

<p><u>Germany/EU can learn from Japan:</u> Tighter standards on energy efficiency and labelling for some appliances, particularly heat pumps/air conditioners</p>	<p><u>Japan can learn from Germany:</u> Tighter standards on insulation, heat recovery ventilation, and renewable energy integration towards ZEH/ZEB.</p>
<p><u>Both countries need improvements:</u></p> <ul style="list-style-type: none">- The target volume of deployment (annual rate of retrofits, phase out fossil fuel boiler, heat pump...)- A better retrofit market: a transparent certificate (Energy Passport), One-Stop-Shop service- Management of building floor spaces and embedded carbon emissions	

Possible further Research Areas

- Connecting German knowledge on **building envelope efficiency** and Japanese knowledge on **heat pumps and BEMS/HEMS**
- A **cost-effective building retrofit technique** by connecting German knowledge on building envelope energy efficiency and Japanese experience in serial refabrication housing
- Combining knowledge from Japan and Germany on the subject of **“Building with Wood”**



Thank you for your attention

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