

epa Research

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A Value-centric Approach for Circular Businesses to Reduce Virgin Material in the Construction Sector

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What did the research aim to address?

Ireland faces increasing demand for construction materials due to population growth, housing delivery objectives and major infrastructure plans, strengthening the need to retain the value of construction and demolition materials and reduce extraction of primary aggregates.

The Value-centric Approach for Circular Businesses to Reduce Virgin Material in the Construction Sector (VISION) project identified practical, value-centric pathways to reduce Ireland's reliance on virgin construction materials by increasing value-preserving reuse and high-quality recycling in the construction sector.

The project combined international best-practice analysis, capability maturity assessment, stakeholder engagement and system dynamics modelling. This integrated approach examined material flows and barriers across policy, market, data, infrastructure and technical dimensions, and assessed the potential effects of selected interventions on virgin material demand and emissions.

What did the research find?

The study identified major gaps in reuse markets, recycling infrastructure, data systems and policy implementation. Stakeholder engagement through interviews confirmed inconsistent guidance, limited enforcement and weak market signals as key barriers.

The project developed two major outputs: (1) a set of best-practice guidelines tailored to Ireland and (2) a system dynamics simulation model demonstrating how interventions such as higher recycled concrete aggregate limits and increased soil reuse can significantly reduce virgin material demand and associated emissions.

The findings advance current evidence by providing an integrated, value-centric approach that links policy, market and technical levers. Limitations include data gaps on high-value recycling and assumptions within the modelling scenarios, which may evolve as new national datasets become available.

How can the research findings be used?

The findings provide an evidence base for coordinated action by policymakers, local authorities and industry. The best-practice guidelines can inform circular construction policy and implementation, while the system dynamics model can support testing of policy options and assessment of their potential effects on material demand and emissions. Priority actions include strengthening reuse and recycling markets and infrastructure, improving data collection, consistent policy implementation, and reviewing technical and regulatory conditions that affect the use of secondary materials, including recycled concrete aggregate.

The research can directly influence environmental outcomes by enabling higher-value recovery of construction and demolition materials, reducing demand for virgin aggregates, lowering waste generation and supporting national climate targets. Current opportunities include aligning public procurement with circular requirements, scaling up pilot deconstruction and reuse projects, and embedding material passports in forthcoming digital construction initiatives.

Further work is needed to improve national data on high-value recycling, assess economic incentives for reuse markets and refine regulatory pathways for secondary materials. Continued stakeholder collaboration will be essential to ensure consistent implementation and long-term sectoral transformation.

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