



# **DECARBONIZING INFRASTRUCTURE: NAVIGATING LEGAL COMPLEXITIES**

From regulatory hurdles to land use conflicts, the path to decarbonizing infrastructure is complex. This article examines the legal barriers impacting infrastructure development and offers actionable solutions, illustrated by real-life examples, to enable a smoother transition to sustainable infrastructure.

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The global push toward achieving net-zero emissions by 2050 demands transformative changes in infrastructure development. Infrastructure is at the heart of the global decarbonization effort, but outdated regulations, jurisdictional fragmentation, and policy gaps create significant obstacles. This article focuses on the legal challenges faced by developers and governments and offers targeted solutions to overcome existing obstacles to achieve climate goals.

## 1. Regulatory Barriers to Decarbonization in Infrastructure Development

The global transition to decarbonized infrastructure is hindered by fragmented and evolving regulations. Overlapping jurisdictions, inconsistent standards, and frequent policy changes create significant challenges for infrastructure projects.

- A. **Fragmentation Across Jurisdictions:** Infrastructure projects often face significant delays and increased costs due to fragmented approval processes across multiple levels of authority. Developers must navigate a labyrinth of federal, regional, and local regulations, which often lack alignment or consistency. For instance, in Canada, renewable energy projects require separate approvals from federal, provincial, and municipal authorities. This fragmented system not only prolongs project timelines, but also increases administrative burdens and financial risks for developers. On an international level, regulatory fragmentation creates additional hurdles for cross-border infrastructure initiatives. For example, while the EU Green Deal enforces stringent emissions standards, non-EU countries often operate under less rigorous frameworks. This misalignment complicates compliance for projects operating in or exporting to multiple jurisdictions, limiting the scalability of decarbonized infrastructure initiatives.
- B. **Inconsistent Standards:** Industry-specific frameworks like ICAO's CORSIA (International Civil Aviation Organization's Carbon Offsetting and Reduction Scheme for International Aviation) for aviation, and IMO (International Maritime Organization) regulations for shipping, create alignment challenges for cross-sector infrastructure projects. Differing carbon accounting methods, such as the EU's comprehensive pricing mechanisms versus U.S. sector-specific guidelines, further complicate multinational operations.
- C. **Policy Changes:** Frequent updates to climate laws create significant uncertainty for infrastructure projects. Businesses must continuously adapt to evolving regulations, which can disrupt planning and increase compliance costs. For instance, California's Cap-and-Trade Program regularly revises emissions thresholds, requiring companies to closely monitor and adjust their strategies to avoid penalties. Similarly, in Germany, evolving energy efficiency

standards under the Energy Efficiency Act (Energieeffizienzgesetz) have increased compliance requirements for industrial and infrastructure projects, creating unexpected liabilities and implementation challenges for businesses.

- D. **Regulatory Gaps:** The absence of comprehensive decarbonization laws and weak enforcement mechanisms hinder infrastructure development, particularly in some developing countries. These gaps leave emissions targets unmet and projects delayed. In more developed economies like Australia, regulatory challenges emerge from unclear accountability, such as debates over whether the federal government or private sector should lead emissions reduction efforts. This uncertainty complicates planning and execution for infrastructure projects.

### ***Solutions to Address Regulatory Complexity***

Governments and businesses can adopt targeted strategies to address these legal barriers:

- A. **Harmonizing Regulations:** International agreements and regional initiatives play a critical role in reducing regulatory fragmentation and creating cohesive frameworks for infrastructure projects. By establishing uniform standards and aligning decarbonization goals across borders, these efforts simplify compliance for developers and stakeholders. They provide a consistent regulatory baseline that enables infrastructure projects to operate efficiently within diverse jurisdictions, reducing delays and uncertainties associated with conflicting rules. This harmonization not only enhances project feasibility but also fosters international collaboration, ensuring that infrastructure projects contribute effectively to global sustainability targets.
- B. **Clarity and Predictability:** Stabilization clauses in the contracts offer a critical safeguard for infrastructure projects by shielding investors and developers from abrupt policy changes that could impact project feasibility or financial viability. These clauses ensure that regulatory shifts, such as new emissions standards or changes in tax incentives, do not retroactively apply to ongoing projects, providing a stable environment for long-term investment. Meanwhile, sectoral roadmaps, like the UK's Net Zero Strategy, complement these protections by offering clear and detailed pathways for achieving emissions reductions. These roadmaps provide specific targets, timelines, and benchmarks, reducing uncertainty and enabling infrastructure projects to align with long-term policy objectives confidently. Together, stabilization clauses and roadmaps create a balanced framework that mitigates risks and promotes proactive planning.

- C. **Centralized Oversight and Digital Tools:** Unified regulatory bodies and digital platforms improve coordination. The UK's Future System Operator integrates energy networks, while the EU tracks building efficiency through digital compliance tools.
- D. **Public-Private Collaboration:** Collaboration between public authorities and private stakeholders is pivotal in overcoming regulatory and financial barriers to infrastructure decarbonization. To incentivize private sector participation, governments can implement targeted financial mechanisms such as tax credits, grants, and procurement incentives. These incentives lower investment risks and encourage the private sector to develop innovative, sustainable solutions at scale (successful examples of PPP's in chapter 4 below).

Bodies like the UNFCCC, WTO, and OECD can promote alignment through shared frameworks, technical guidance, and dispute resolution mechanisms.

## **2. Legal Obstacles in Retrofitting Infrastructure for Net-Zero Goals**

Retrofitting older infrastructure to meet net-zero goals is complicated by outdated laws, complex ownership structures, cumbersome permitting, unclear cost allocations, and preservation-related litigation. Many facilities were built under legacy building codes that never considered sustainability, making upgrades like rooftop solar difficult.

- A. Multi-unit buildings face disputes over funding, as several stakeholders must agree on improvements. Securing approvals from energy, zoning, and safety authorities leads to permitting delays.
- B. At the same time, financial responsibility for retrofits is often unclear, and historical structures may be protected by laws that hinder necessary changes.
- C. Finally, retrofitting projects frequently encounter litigation risks, particularly when they involve heritage sites or historical buildings. Preservation laws may limit or entirely block modifications to these structures, even if such changes are essential for improving energy efficiency or reducing emissions. Stakeholders opposed to retrofitting may leverage these laws to challenge projects, further delaying or derailing their implementation.

### **Solutions to Consider**

Retrofitting infrastructure for net-zero goals can be simplified by updating building codes to require energy-efficient improvements and renewable energy integration.

- A. **Revising outdated building codes** is essential to mandate energy-efficient improvements and facilitate the integration of renewable energy systems. These updates should offer clear guidelines for modern retrofitting practices, such as

installing rooftop solar panels, energy storage systems, and heat pumps. National standards for net-zero retrofits can ensure consistency across jurisdictions, making it easier for developers and property owners to comply.

- B. **Financial incentives**, including grants, and low-interest loans, play a crucial role in encouraging voluntary retrofitting by private property owners. Large-scale retrofits can benefit from public funding programs (such as the U.S. Inflation Reduction Act). Governments should also prioritize retrofitting in public procurement by mandating the use of sustainable materials and technologies in contracts.
- C. Requiring regular **energy performance assessments** for buildings ensures ongoing compliance with decarbonization targets. These assessments establish clear benchmarks for improvement and provide a transparent foundation for planning and implementing retrofitting upgrades.
- D. AI-driven performance monitoring systems, digital twins for modeling retrofits, and automated permitting platforms can accelerate upgrades.

By integrating these tools into legal frameworks, governments can reduce costs and delays while ensuring compliance with decarbonization goals.

Consider the following existing regulation - The EU's Building Renovation Wave mandates retrofits across member states, offering faster permitting and incentives. Australia integrates embodied carbon assessments into public projects, embedding climate goals directly into retrofitting standards. In the U.S., California's Building Energy Efficiency Standards provide a transparent framework for older buildings to meet strict performance requirements.

### **3. Legal Challenges in Land Use for Infrastructure**

The development of renewable energy projects like solar farms, wind turbines, and hydrogen facilities often faces legal hurdles due to competing interests and complex regulations. These projects frequently require substantial land use, which can conflict with existing environmental, agricultural, and community priorities.

- A. **Regulatory fragmentation** is a key issue, as developers must navigate overlapping laws, environmental impact assessments, and public consultation processes at various jurisdictional levels. For instance, wind farm developments often face challenges when municipal rules permit construction, but regional or national wildlife conservation laws impose restrictions, as seen in projects across Europe where bird migration patterns have led to legal disputes.

- B. **Land acquisition and compensation disputes** are among the most significant legal hurdles in renewable energy projects. Governments often use mechanisms such as eminent domain to secure land for large-scale projects, which can lead to disputes over fairness, transparency, and inadequate consultation. In the United Kingdom, large-scale solar farms and wind projects have faced challenges related to landowner compensation and community opposition. For example, the Cleve Hill Solar Park project, intended to be one of the largest solar installations in the UK, encountered significant resistance from local communities and environmental groups over land use and the perceived lack of fair compensation to landowners. These disputes are further compounded when projects are planned on traditional lands of Indigenous or local communities.
- C. **Environmental and biodiversity conflicts** often emerge when infrastructure projects are located near protected areas or sensitive habitats. These conflicts typically involve lawsuits filed by environmental groups citing violations of conservation laws. Such legal actions aim to protect ecosystems and biodiversity from potential harm caused by infrastructure developments. For example, in the United Kingdom, the case of Royal Society for the Protection of Birds (RSPB) v. Scottish Ministers highlights the challenges of balancing wind farm development with ecological preservation. The court was asked to consider the impact of proposed wind farms on protected bird species, underlining the critical role of environmental assessments in project planning.
- D. Additionally, conflicts arise between infrastructure development and **competing land-use priorities**, such as agriculture or urban expansion. For instance, legal battles over farmland conversion for renewable energy projects have become a common issue. Rezoning requests for solar and wind farms often face opposition from agricultural communities concerned about food security and land preservation.

These challenges highlight the urgent need for cohesive legal frameworks to balance renewable energy development with environmental protection and community rights.

### **Proposed Solutions**

- A. **Fair Compensation and Land Rights:** Transparent frameworks for land acquisition ensure equitable treatment. Recognizing Indigenous rights builds trust and avoids disputes.
- B. **Community Engagement:** Early, inclusive consultations with affected stakeholders, such as farmers and Indigenous groups, prevent conflicts.

- C. **Alternative Dispute Resolution (ADR):** Mediation and arbitration provide efficient solutions to resolve land-use disputes without lengthy litigation, ensuring projects progress without delays.
- D. **Environmental Safeguards:** Strengthened environmental assessments and proactive biodiversity measures mitigate ecological risks associated with renewable energy projects.
- E. **Strategic Zoning:** Designating renewable energy zones minimizes land-use conflicts by aligning projects with suitable locations, as demonstrated in Australia.

#### Examples of Success:

Norway's Sámi Land Rights Framework demonstrates how integrating Indigenous rights into planning, supports renewable energy goals while respecting cultural priorities. By providing a legal framework for consultation and collaboration, it ensures projects move forward without undermining Indigenous livelihoods.

Australia's Renewable Energy Zones: These zones provide a strategic model for aligning renewable energy projects with land-use priorities. By pre-designating areas with minimal environmental and community conflicts, the initiative reduces permitting delays and litigation risks, creating a smoother pathway for project execution.

## 4. **Legal Barriers to Financing Decarbonization in Infrastructure Projects**

Achieving global decarbonization targets requires unprecedented levels of investment across infrastructure, energy, and industrial sectors. However, the flow of capital needed to fund these ambitious efforts is often obstructed by legal and regulatory challenges.

- A. **Regulatory uncertainty** is a major challenge, as shifting policies on subsidies and tariffs deter long-term investments. For example, abrupt changes to renewable energy subsidies in Spain during the 2010s led to the cancellation of numerous solar projects and significant financial losses for investors. Additionally, varying legal standards across jurisdictions complicate cross-border investments, with the EU Taxonomy for Sustainable Finance providing clarity in Europe, but no equivalent frameworks elsewhere.
- B. **Inadequate legal instruments for green finance:** The absence of standardized legal frameworks for green financial instruments, such as green bonds and loans, poses a significant barrier to financing decarbonization projects. Without clear and uniform definitions or benchmarks, disputes frequently arise over what constitutes a "green" project, creating confusion and reducing investor confidence. For instance, while the EU has established robust guidelines like the



Green Bond Standard to classify and validate sustainable projects, other regions lack comparable frameworks, leading to inconsistencies in global financial markets. This regulatory gap undermines the credibility of green financial instruments, deterring both institutional and private investors. The issue is particularly acute in emerging markets, where regulatory oversight is less developed, further compounding investor uncertainty and slowing the flow of capital into decarbonization projects.

- C. **Restrictive financial regulations:** In many developing regions, legal constraints on foreign investments, such as caps on equity ownership or restrictive tax policies, hinder access to international capital. Furthermore, traditional banking systems often classify decarbonization projects as high-risk due to their reliance on emerging technologies or long-term payback periods. This risk perception discourages lending institutions from financing sustainable infrastructure initiatives, particularly in regions where government-backed guarantees or insurance mechanisms are insufficient. Combined with trade barriers, these regulatory constraints slow the pace of decarbonization, especially in areas where investment is needed most.

### ***Solutions to Legal Barriers in Financing Decarbonization***

Addressing the legal challenges in financing decarbonization requires creating stable, predictable environments for investment. Governments must commit to long-term decarbonization policies (such as the UK Climate Change Act 2008), which give investors confidence in the reliability of green finance projects.

- A. **Harmonizing international standards**, like the EU Green Bond Standard and ICMA's (International Capital Market Association) Green Bond Principles, aligns global investment criteria.
- B. **Standardizing green financial instruments**, such as green bonds and loans, enhances investor trust. For example, the ASEAN (Association of Southeast Asian Nations) Green Bond Standards unify criteria, while tax credits and subsidies, like those in the U.S. Inflation Reduction Act, encourage private-sector participation. Additionally, robust legal mechanisms to de-risk investments, including government-backed guarantees and insurance, attract capital. The World Bank's MIGA (Multilateral Investment Guarantee Agency) and carbon pricing tools like the EU Emissions Trading System create predictable revenue streams and mitigate investment risks.
- C. **Facilitating public-private partnerships (PPPs)** is vital for advancing decarbonization by combining public oversight with private resources. Effective PPP frameworks clarify risk-sharing and financial structures, enabling large-scale

projects. The EU's Green Finance Taxonomy provides clear criteria for classifying environmentally sustainable projects, aligning investments with net-zero goals and preventing greenwashing. By defining benchmarks for renewable energy, sustainable transport, and energy-efficient buildings, it de-risks projects and attracts private capital through transparency and predictability. In Israel, PPPs have driven the development of the largest renewable energy installations globally and greatly modernized country's critical infrastructure. In the United States, the Long Island Solar Farm (LISF) serves as a notable example of a PPP advancing renewable energy goals. Developed through a partnership between the U.S. Department of Energy, Brookhaven National Laboratory, and private stakeholders, the project delivers 37 megawatts of clean energy, making it one of the largest solar farms in the eastern U.S. In the United Kingdom, the Thames Tideway Tunnel is an excellent example. This large-scale sewer upgrade project integrates public funding and private investments to improve water quality in the River Thames. The PPP model provided the financial and operational framework to execute the project efficiently while ensuring compliance with stringent environmental standards.

## **5. *Legal Challenges in Advancing Decarbonized Transportation Infrastructure***

Transportation infrastructure accounts for approximately 25% of global carbon emissions. Decarbonizing transportation networks, such as railways, highways, and urban transit systems, is critical to achieving global net-zero goals. However, this transition faces some unique legal and regulatory challenges, in addition to misaligned policies, permitting delays, funding gaps, and community opposition, discussed in foregoing chapters.

- A. Legal frameworks for supporting electrification of transportation, such as EV (Electric Vehicle) charging networks and electrified rail systems, are often fragmented. Experience shows that unclear regulations on land use for charging stations, or integration of renewable energy into rail systems, can create significant delays in implementation.
- B. Legal uncertainties around standards and certifications for low-carbon fuels, such as green hydrogen or biofuels, hinder adoption. Transportation operators may face liability risks or disputes over fuel performance and emissions reduction claims.
- C. Decarbonizing urban transport, such as introducing low-emission zones or transitioning bus fleets to electric or hydrogen fuel, often faces public resistance and legal challenges over accessibility, affordability, and equity.

- D. The aviation and maritime industries require unique decarbonization strategies. International frameworks like ICAO's CORSIA for aviation, or IMO's decarbonization targets for shipping, can conflict with national or regional policies.
- E. Many existing transportation infrastructures, such as old rail systems or highways, are not designed for low-carbon technologies. Retrofitting these systems faces challenges like navigating historical preservation laws or integrating them with new, cleaner technologies.
- F. Smart transportation infrastructure, such as autonomous electric vehicles or IoT-enabled traffic systems, requires robust data-sharing frameworks. Legal disputes over data privacy, cybersecurity, and ownership can hinder implementation.

### **Proposed Solutions**

- A. Harmonize regulatory standards across jurisdictions for emissions, safety, and environmental assessments. **Establish regional agreements** to manage cross-border infrastructure projects more efficiently. The Brenner Base Tunnel between Austria and Italy showcases successful cross-border collaboration. This major rail project aligns emissions standards and environmental assessments under EU guidelines, facilitating an effective approval process.
- B. **Develop clear certification systems** for low-carbon fuels like green hydrogen and biofuels. Governments should introduce incentives for adoption, such as tax credits, and mandate the use of certified fuels for certain transportation sectors. In Germany, the National Hydrogen Strategy supports the adoption of green hydrogen in transportation through funding and legal frameworks for fuel certification. Similarly, the Port of Rotterdam has initiated partnerships to scale biofuel and hydrogen adoption in shipping.
- C. **Integrate international frameworks** like ICAO's CORSIA and IMO's decarbonization targets into national legislation to ensure consistency. EU's Fit for 55 package illustrates robust frameworks for maritime and aviation decarbonization.
- D. **Enforce standardized data-sharing regulations** while safeguarding user privacy through robust legal frameworks. Incentivize smart infrastructure projects that utilize data for carbon reduction strategies, such as optimizing traffic flow.

## 6. *Balancing Climate Policies and Investor Protections: International Disputes*

As governments accelerate decarbonization efforts, valuable lessons can be drawn from prominent European case law. Cases such as **Charanne v. Spain**, **Rockhopper v. Italy**, and **Vattenfall v. Germany** illustrate the tension between pursuing ambitious climate goals and upholding commitments to private investors under international treaties. These disputes not only provide critical insights into the challenges of balancing environmental objectives with investor protections, but also reinforce the relevance of the solutions proposed throughout this article.

Main takeaways -

**Policy Stability and Predictability:** In *Charanne v. Spain*, Spain's retroactive changes to renewable energy incentives undermined investor confidence, illustrating the risks of abrupt policy shifts. Similarly, *Rockhopper v. Italy* demonstrated how sudden regulatory changes—such as banning offshore drilling—can disrupt infrastructure investments. In *Vattenfall v. Germany*, Germany's abrupt decision to phase out nuclear energy resulted in a significant investor dispute, where Vattenfall claimed compensation for financial losses incurred by the policy shift. These emphasize the need for clear, predictable, and stable regulatory frameworks when implementing climate policies, particularly those impacting long-term infrastructure projects.

**Balancing Climate Goals with Investor Rights:** These cases reveal the legal tension between national climate actions and international investor protections under treaties like the Energy Charter Treaty (ECT). While governments have the sovereign right to pursue decarbonization and environmental protection, such policies must consider legitimate investor expectations and ensure compliance with treaty obligations. A failure to balance these priorities can lead to costly disputes and compensation awards, delaying climate initiatives.

**The Importance of Transition Mechanisms:** The rulings underscore the need for well-designed transition mechanisms when implementing decarbonization policies. Gradual, transparent approaches that involve consultation with affected stakeholders can mitigate legal risks. For instance, phasing out fossil fuel investments, restructuring renewable energy incentives, or providing financial support for impacted sectors over time can help avoid abrupt disruptions.

**Arbitration as a Tool for Resolution:** These cases illustrate both the utility and limitations of international arbitration in resolving disputes stemming from climate-related policy changes. Arbitration under treaties like the Energy Charter Treaty

(ECT) can provide a neutral forum to address investor grievances while upholding procedural fairness. For instance, in *Vattenfall v. Germany*, arbitration enabled Vattenfall to seek compensation for financial losses caused by Germany's abrupt nuclear phase-out. This case highlights how arbitration can hold governments accountable for sudden policy shifts that affect investors. However, the outcomes of these cases also underscore the potential risks of arbitration. If investor claims consistently lead to large compensation awards, there is a danger that arbitration mechanisms might inadvertently discourage governments from implementing bold climate measures.

### **Closing Remarks:**

Achieving global decarbonization goals hinges on the transformation of infrastructure development and operations. However, the legal challenges explored throughout this article, from regulatory fragmentation and financing barriers to land-use conflicts, industrial decarbonization hurdles, and investor-state disputes, underscore the complexity of this transition. Infrastructure projects must navigate evolving laws, jurisdictional overlaps, and competing priorities while ensuring compliance, stakeholder collaboration, and investor confidence.

Addressing these challenges requires proactive, well-designed legal frameworks that provide stability, clarity, and harmonization across jurisdictions. Streamlined permitting processes, robust public-private partnerships, targeted financial incentives, and tailored sector-specific regulations can unlock opportunities for sustainable infrastructure.

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## How Yossi Levy & Co. Can Help

At **Yossi Levy & Co.**, we are committed to supporting businesses and governments in navigating the legal complexities of decarbonization. Our expertise includes:

- **Policy Advisory:** Crafting strategies to align with global standards and compliance frameworks.
- **Tender Support:** Guiding tender processes and ensuring legal and sustainability criteria are met.
- **Project Development and Support:** Addressing legal risks, facilitating project execution, and ensuring smooth implementation.
- **Technology Integration:** Supporting the deployment of cutting-edge solutions like green ammonia, carbon capture, and renewable energy systems.
- **Project Financing:** Facilitating green bonds and public-private partnerships.
- **Stakeholder Collaboration:** Mediating between public and private entities to ensure equitable outcomes.

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