California Management Review

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# Through the Red Tape: AI's Role in Speeding Sustainability

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*Treat compliance as a strategic capability rather than a back-office burden.*

INSIGHT | PERSPECTIVE 03 Dec 2025

*The saying goes: 'The U.S. innovates, the EU regulates'. This familiar leitmotif has circulated for years, often used to mock Europe's emphasis on safety and compliance in contrast to the risk-taking culture of Silicon Valley. Most practitioners would agree that regulatory burdens can slow innovation, adding layers of tedious documentation work for engineers tasked with demonstrating compliance. Yet in cleantech, where products often involve high-voltage systems that can endanger human life or operate within critical infrastructures such as grids and vehicles, regulation is essential to ensure a safe and orderly transition to a green economy.*

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# A Scale Problem, Not a Technology Problem

The energy transition is often framed as a problem of technological readiness. Yet cost-competitive solar, wind, batteries, and heat pumps are already available. The bottleneck is no longer invention—it is scale. Proven solutions exist but are being deployed too slowly to meet the 1.5 °C climate target. A positive example is California, the world's fourth-largest economy, which in 2023 generated 67% of its electricity from renewable and zero-carbon sources[1]. This shows that where enabling conditions are present, technology can already deliver at scale.

Outside California, however, the reality is more challenging. Cleantech companies often face fragmented and outdated regulatory frameworks that lag behind technological progress. Instead of accelerating deployment, regulation becomes a patchwork of barriers —delaying approvals, raising costs, and discouraging investment.

The compliance burden is not just a bureaucratic inconvenience, it represents a significant share of firms' resources. In the United States, estimates suggest that organizations spend between 1.3% and 3.3% of their total wage bill on regulatory compliance tasks, including engineering, documentation, and administrative work. Notably, this figure excludes capital or outsourced costs, which can be considerable[2]. In specialized and highly regulated industries, the costs can rise even further. For example, one autonomous driving company reported spending 42% of its budget on compliance, underscoring how variable and burdensome these expenses can become[3].

The scale of this compliance burden makes it an obvious candidate for innovation itself. If engineering teams are dedicating such large portions of their time and budgets to navigating fragmented and repetitive certification tasks, then any tool that can reduce this load becomes a lever for accelerating the clean transition. Artificial intelligence (AI), when applied thoughtfully, offers such a tool. Not by removing regulatory guardrails, but by helping organizations move through them faster and with greater confidence.

# Compliance through Human-AI Collaboration

To understand how AI can meaningfully contribute, it is useful to view it not as a substitute for engineers but as a partner in organizational intelligence. Research on human–AI collaboration highlights six principles that can guide this partnership—addition, relevance, substitution, diversity, collaboration, and explanation[4]. Applied to cleantech regulation, these principles reposition AI as an intelligence multiplier, supporting rather than replacing the expertise of engineers:

- **Addition**: AI expands organizational capacity by handling repetitive, voluminous tasks such as parsing legal texts or auto-filling certification documents.
- **Relevance**: AI focuses on regulatory bottlenecks (e.g., flagging anomalies in complex safety test data), ensuring engineers spend effort where it matters most.
- **Substitution**: For clearly defined, low-risk elements of compliance, AI can take over (like standardized form filling), allowing engineers to invest their skills in nuanced, ambiguous tasks.
- **Diversity**: Engineers with product expertise can benefit from AI systems trained on regulatory frameworks. This pairing combines technical know-how with regulatory intelligence, enabling faster, more accurate certification than either could achieve alone.
- **Collaboration**: AI should act as a regulatory aide, guiding engineers who are already familiar with specific markets, enabling self-directed navigation of local certification workflows.
- **Explanation**: AI must produce transparent, interpretable outputs-so that engineers, compliance officers, and regulators understand the reasoning behind decisions, preserving trust and legitimacy.

# Lessons for Cleantech Startups

Startups are engines of innovation, but if they cannot scale quickly, they risk disappearing just as fast. Software companies in Silicon Valley thrived because they could reach global markets rapidly, delivering fast returns on investment. Cleantech startups, in contrast,

face a tougher road. Fragmented and inconsistent regulatory frameworks slow their ability to scale across borders, draining resources and momentum.

This is where smart use of technology can help. In legal services, for example, AI tools such as Harvey are already assisting companies by scanning contracts and flagging risks before human review, cutting costs and saving time[5]. Cleantech startups could benefit in a similar way: AI systems supporting engineers through certification processes, organizing documentation, and identifying regulatory hurdles early.

The guardrails of regulation will—and must—remain. Engineers will still sign off, but with AI providing structured support, those signatures can come faster and with greater confidence. For resource-constrained startups, this could make the difference between stalling in red tape and breaking through to scale.

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