

Global Essay Competition 2026

Title: From Compensation to Co-Ownership: Rebuilding Poland's Energy Regions in the Age of Technological and Demographic Disruption

Essay:

I. Introduction: When Three Disruptions Collide

The global energy transition is accelerating as renewable costs plummet and grid technologies advance. Yet in coal-dependent regions, this technological momentum collides with political resistance and demographic decline. Nowhere is this collision more evident than in Poland.

Poland remains Europe's most coal-reliant economy, with coal supplying 56% of electricity in 2024 [1]. While Poland used to be an exporter of coal, the economic case has collapsed: domestic coal costs \$243 per tonne compared to \$40 internationally [1]. Despite this, the government spends \$2.4 billion annually subsidizing coal mining – largely due to electoral influence of the nearly 100,000 people working in coal-linked jobs in Upper Silesia [1-2]. These numbers remain significant, but far cry from the nearly 400,000 workers in 1990 [3] and they are on an inevitable decline: Silesia is expected to lose a large number of young people who are leaving for large cities because they do not see future in heavy industries [4].

Current policy responses rely on compensation: severance packages, early retirement, temporary job programs. These measures treat workers as liabilities rather than stakeholders, preserving decline rather than enabling renewal. Poland's challenge is not financial scarcity – it receives \$61.2 billion in EU funds (2021-2027), \$4.5 billion annually from EU ETS revenues, and has \$5.6 billion in national tools [1] – but the absence of mechanisms converting workers into owners of the clean energy economy.

When technological disruption meets political inertia and demographic decline, only a shift from compensation to co-ownership can succeed. The proposed Coal-to-Clean Transition Compact transforms declining fossil assets into regionally owned clean energy wealth. With financing from a coal conversion bond, new assets governed by the Regional Energy Commons Platform can be used to produce a clean energy dividend. Poland's coal regions can thus move from symbols of industrial decline to laboratories of democratic climate capitalism.

II. The Structural Trap: Why Poland's Coal Model Is Unsustainable

Poland's coal dependency is sustained by three interlocking forces that together create a structural trap resistant to conventional policy interventions.

Technological disruption has fundamentally altered coal's economic viability. Renewables now undercut coal on cost, while technological solutions like advanced grid and battery storage allow for replacing fossil-powered baseload with variable power. Poland's hard coal mining is increasingly uncompetitive, with domestic extraction costs six times higher than international benchmarks [1]. Poland has already successfully deployed massive renewable capacity – solar and wind installations grew from negligible shares to 29% of generation in just five years [1] – yet this success paradoxically intensifies resistance in coal regions.

Automation compounds the pressure on coal employment independently of climate policy. Studies project that 40-80% of mining jobs could be automated over the next decade [5], as autonomous vehicles, remote-operated machinery, and AI-driven logistics reduce labor requirements. Even if Poland were to maintain coal production, the workforce would shrink dramatically. Coal companies in Australia and the United States have already demonstrated that automated mines can operate with 30-40% fewer workers while increasing output [6]. The result is that workers face displacement regardless of climate action, making the case for proactive transition planning overwhelming.

Political lock-in prevents rational adjustment. Coal symbolizes national sovereignty, a legacy of post-communist reconstruction when miners were celebrated as heroes of economic revival. Mining unions retain formidable organizational capacity, and Upper Silesia's electoral importance ensures political parties compete to protect coal jobs. The result is policy paralysis: Poland has no formal coal phase-out date, and the government negotiated a social agreement extending mining operations until 2049 [7]. Meanwhile, \$11.7 billion in coal subsidies committed between 2021-2031 prop up production that loses money on every tonne extracted [1].

Demographic erosion is dismantling the workforce organically. By 2038, when the Bełchatów plant closes – the single largest CO2 emitting facility in all the EU, 73% of current workers will be eligible for retirement [8]. While young people should not be expected to enter jobs that are about to be phased out, the greater risk is that coal regions are associated exclusively with heavy industry, pushing younger generations out to other cities. This organic decline creates perverse incentives: unions resist closure to preserve benefits for aging members, while the absence of young workforce is a double whammy for regions that need to sustain social welfare payments.

Current approaches – severance packages, early retirement, temporary job programs – fail because they treat workers as costs to be managed, rather than engaging workers as assets capable of co-creating the post-coal economy. Compensation is short-term, stigmatizing, and dependent on continued political commitment. Poland's 2022 social agreement with mining unions illustrates these shortcomings. The agreement provides severance payments for approximately direct mine employees but excludes contractors in related sectors, such as truck drivers, equipment maintenance workers, and supply chain personnel. Workers will receive one-time payments averaging \$30,000, equivalent to roughly three years of wages, but no ongoing income security. For a 45-year-old miner with two decades left before retirement age, this compensation covers only a fraction of lost lifetime earnings. Moreover, retraining programs have achieved limited success: only a small share of participants in Germany's Ruhr Valley transition programs found comparable employment, with most experiencing considerable income declines [10]. The fundamental problem is structural: compensation treats the transition as a one-time shock requiring temporary relief, when in reality, coal regions face decades of economic restructuring. Without ownership stakes in replacement industries, workers rationally resist closure, prolonging the agony of managed decline.

III. Reframing the Transition: Energy as a Shared Asset

The conceptual breakthrough required is simple: coal infrastructure and human capital represent latent wealth, not sunk costs. The assets available for conversion are substantial. Poland's coal regions possess not just physical infrastructure but institutional capacity that took decades to build. Grid connections at coal sites can handle multi-gigawatt capacity, eliminating years of permitting delays that plague greenfield renewable projects. Industrial land is already zoned for energy production, bypassing regulatory barriers. The existing workforce has expertise in operating complex energy systems at scale – skills directly transferable to managing large solar arrays, wind farms, and battery installations. Moreover, Poland's manufacturing capacity positions it uniquely for this transition: the country has emerged as Europe's battery production hub, with €40 billion in announced investments by LG Energy Solution, Northvolt, and others [11]. Coal regions could host battery gigafactories that store the

renewable energy they produce, creating integrated clean energy clusters. These assets should generate long-term income, regional wealth, and intergenerational security rather than being liquidated in managed decline. The process should incorporate union co-governance to ensure worker voice shapes investment decisions from the outset.

This reframing shifts from extraction to endowment. Under the old model, workers receive wages for labor. Under the new model, they hold assets generating dividends. Compensation creates dependency; ownership enables participation. This is not merely distributive – it is a governance innovation that aligns worker incentives with decarbonization. Rather than compensating workers for what they lose, Poland should involve them in these new developments.

IV. The Coal-to-Clean Transition Compact (CCTC)

The CCTC is a national framework that converts declining fossil assets into regionally owned clean energy wealth through three pillars.

The first step will be for the government to issue a **hybrid green-social pension bond** backed by decommissioned coal assets, renewable revenue streams, and carbon receipts from the EU ETS. This bond would finance mine closures, fund renewable infrastructure on former coal sites, and capitalize dividend payments to workers. Former coal sector workers would participate in converting the coal sites with support from training programs. Critically, the bond reduces fiscal burden of transition and mobilizes private investment by linking clean energy returns to social obligations. Poland's experience issuing the world's first sovereign green bond in 2016 demonstrates capacity for this innovation.

Once financing is closed and conversion of the sites is complete, each coal worker would receive a **lifetime revenue share** linked to renewable output from projects built on former mining sites. Shares are transferable to spouses, ensuring intergenerational security and political buy-in. By converting extraction rights into endowment rights, workers gain material interest in renewable deployment. A miner who can obtain a dividend from the solar farm has clear rationale to support the transition.

Considering high level of mistrust from workers who fear being displaced, **transparent governance** will be required to build credibility. A digital registry would track asset valuations, renewable revenues, and dividend distributions. This platform would enable community oversight, prevent corruption, and facilitate worker participation in investment decisions. Unions would have co-governance rights, ensuring worker voice without bureaucratic capture. The platform makes ownership real and accountable.

V. Implementation Pathway

The CCTC would unfold in three phases aligned with Poland's energy transition timeline. In the first phase (2026-2030), the government will map coal assets and revalue them as transition capital, beginning the process of raising capital with the coal conversion bonds and piloting development of renewable energy projects on one or two decommissioned sites.

The second phase (2030-2038) will focus on implementing the labor-to-ownership model, where workers are enrolled in the dividend program and participate in retraining focuses on renewable operations, grid management, and industrial electrification. By 2038, when many of current coal power plants are scheduled to close, Silesia will have a stable middle class of energy asset owners, not displaced coal workers.

The third phase (2038+) focuses on achieving regional sovereignty through mature asset management. Revenue from established renewable projects would capitalize local investment funds managed by

commons boards with worker representation. These funds would finance industrial clusters that leverage Poland's position in European battery manufacturing – by 2030, Poland is projected to host 20% of Europe's battery production capacity [12]. Former coal sites could house battery gigafactories, creating vertically integrated clean energy value chains where the same regions that generate renewable power also manufacture the storage systems that stabilize it. This builds on Poland's existing technical expertise: the country graduates tens of thousands of engineering students annually [13], providing a pipeline of talent that could anchor high-value manufacturing in energy transition regions. Additionally, abandoned mine shafts can be converted into gravity batteries, using existing vertical infrastructure to store renewable energy by lowering and raising weighted masses – turning former sites of extraction into pillars of grid stability. The goal is not merely to replace mining jobs with renewable energy jobs, but to position Silesia as a clean energy innovation hub that younger generations choose to stay in rather than flee from. Regional autonomy emerges not through government subsidies but through ownership of productive assets that generate wealth for decades.

VI. Broader Implications: A Model for Global Transitions

Poland's coal regions face a choice: liquidate assets through chaotic collapse or convert them into long-term wealth through institutional redesign. The Coal-to-Clean Transition Compact offers a pathway where workers become co-owners of energy systems, transforming the transition from sacrifice to investment.

Transition of coal regions is a transnational problem, and Poland has the potential to design a model that will scale beyond borders, from Germany's lignite regions to Appalachia in the US and South Africa's coal belt. Each has aging workforces, political resistance, uncompetitive coal, and inadequate compensation schemes. Germany's Coal Commission secured a 2038 phase-out but relied on €40 billion in government spending for infrastructure and retraining, which digs a bottomless hole in government's budget for the next generation [14].

An ownership-based approach offers three advantages. First, it reduces political resistance by converting workers from opponents to beneficiaries. Second, it stabilizes democratic institutions by addressing economic grievances that fuel populism. Third, it accelerates decarbonization by aligning material interests with climate goals. Poland, as a pioneer, could export this institutional innovation to other coal-dependent democracies, positioning itself as a leader in just transition design.

The broader lesson extends beyond energy. When technological disruption collides with political inertia and demographic decline, traditional welfare solutions fail. What is required is structural innovation that realigns incentives, distributes ownership, and builds capacity. Poland's coal miners, once symbols of industrial might, can become pioneers of democratic climate capitalism – not through charity, but through co-ownership of the productive assets that will power Europe's future. The future of decarbonization will not be decided by technology alone, but by who is allowed to own it.

Reference List / Bibliography / Sources:

[1] Forum Energii (2025). Energy Transition in Poland. Edition 2025. Retrieved from <https://www.forum-energii.eu/en/transformacja-energetyczna-polski-edycja-2025>

[2] World Bank (2022). Towards A Just Coal Transition: A Labor Perspective. Retrieved from <https://documents1.worldbank.org/curated/en/099052323122529721/pdf/P1730790d1fc10080b5490f3449781af92.pdf>.

- [3] Resources for the Future (2022). Just Transition in Poland: A Review of Public Policies to Assist Polish Coal Communities in Transition. Retrieved from <https://www.rff.org/publications/reports/just-transition-in-poland-a-review-of-public-policies-to-assist-polish-coal-communities-in-transition/>
- [4] European Commission (2022). Case Study: Regional Observatory Of The Transition Process In Silesia. Retrieved from https://ec.europa.eu/regional_policy/sources/funding/just-transition-fund/case-study-regional-observatory-transition-process-silesia.pdf
- [5] IISD (2024). Automation At Mines Will Have Significant Impact On Jobs, Tax Revenues, Study. Retrieved from <https://www.iisd.org/articles/press-release/automation-mines-will-have-significant-impact-jobs-tax-revenues-study>
- [6] Loreto Codoceo-Contreras, Nikodem Rybak, and Maureen Hassall (2025). Exploring The Impacts Of Automation In The Mining Industry: A Systematic Review Using Natural Language Processing. Retrieved from https://www.researchgate.net/publication/383573815_Exploring_the_impacts_of_automation_in_the_mining_industry_A_systematic_review_using_natural_language_processing
- [7] Reuters (2024). Poland Plans To Set End Date For Coal Power. Retrieved from <https://www.reuters.com/sustainability/poland-plans-set-end-date-coal-power-2024-01-15/>.
- [8] Mining (2024). Workers At Europe's Dirtiest Power Plant Wary Of Life After Coal. MINING.com. Retrieved from <https://www.mining.com/web/workers-at-europes-dirtiest-power-plant-wary-of-life-after-coal/>
- [10] OECD (2024). Reskilling Coal Industry Workers For The Renewables Energy Sector. Retrieved from https://www.oecd.org/en/publications/providing-local-actors-with-case-studies-evidence-and-solutions-places_eb108047-en/reskilling-coal-industry-workers-for-the-renewables-energy-sector_9f6d4498-en.html
- [11] Government of Poland (2023). Poland Recharges Its Batteries. Retrieved from <https://www.trade.gov.pl/en/news/poland-recharges-its-batteries/>
- [12] McKinsey (2020). Carbon-Neutral Poland 2050: Turning A Challenge Into An Opportunity. Retrieved from <https://www.mckinsey.com/~media/mckinsey/industries/electric%20power%20and%20natural%20gas/our%20insights/carbon%20neutral%20poland%202050%20turning%20a%20challenge%20into%20an%20opportunity/carbon-neutral-poland-2050.pdf>
- [13] Statistics Poland (2025). Higher Education In The 2024/2025 Academic Year. Retrieved from <https://stat.gov.pl/en/topics/education/education/higher-education-in-the-20242025-academic-year%2C10%2C11.html>
- [14] Agora Energiewende (2019). German Coal Commission. Retrieved from https://www.agora-energiewende.org/fileadmin/Projekte/2019/Kohlekommission_Ergebnisse/168_Kohlekommission_EN.pdf

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