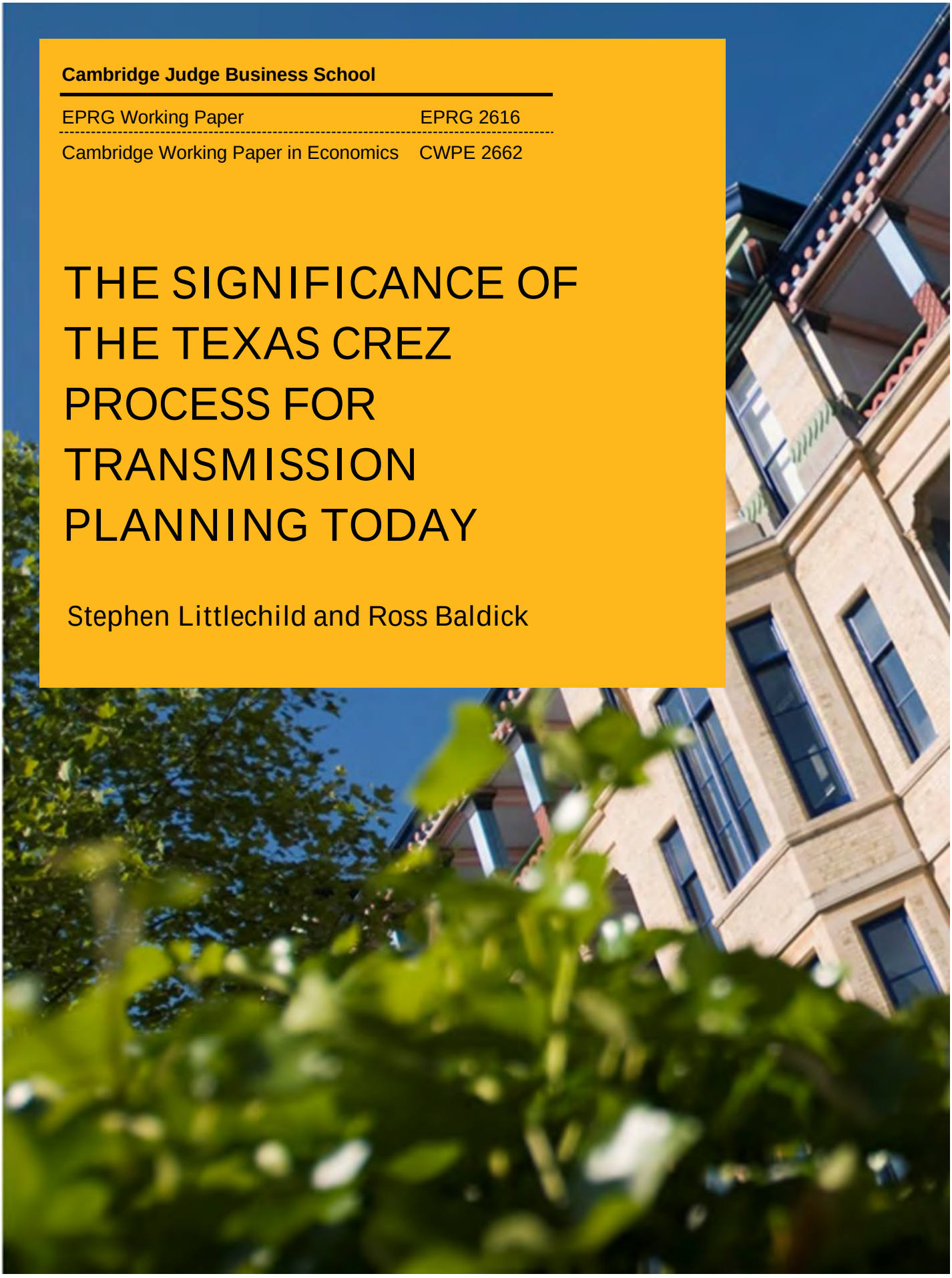

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THE SIGNIFICANCE OF THE TEXAS CREZ PROCESS FOR TRANSMISSION PLANNING TODAY

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Abstract : The Texas Competitive Renewable Energy Zones (CREZ) process remains highly relevant to current transmission planning. Its significance lies not in providing a template to be copied mechanically, but in showing how a regulator can address a transmission "chicken and egg" problem that ordinary incremental planning is poorly equipped to solve. Senate Bill 20 of 2005 required the Public Utility Commission of Texas (PUCT) to designate renewable zones and develop transmission to deliver their output "in a manner that is most beneficial and cost-effective to the customers." In 2008 the Commission approved a transmission plan capable of supporting about 18,500 MW of wind generation, and by early 2014 nearly 3,600 miles of new transmission had been built. The process may be understood as a hybrid institutional mechanism combining legislative mandate, regulatory planning and backstop, and negotiated implementation in provider selection and siting. The CREZ experience also illustrates the limits of anticipatory transmission planning: it relied on only partial ex ante cost-benefit discipline, imposed local burdens that were not always fully compensated, and used a competitive designation model that Texas later curtailed. Current transmission policy could recover the logic of CREZ, but improve the instruments: by using more explicit benefit tests, transparent cost allocation, better treatment of local burdens, safeguards against incumbent control, and deliberate use of negotiated-settlement techniques under a regulatory backstop.

Keywords : transmission planning; CREZ; ERCOT; renewable energy zones; negotiated settlements; cost allocation; anticipatory investment.

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The Significance of the Texas CREZ Process for Transmission Planning Today

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Abstract

The Texas Competitive Renewable Energy Zones (CREZ) process remains highly relevant to current transmission planning. Its significance lies not in providing a template to be copied mechanically, but in showing how a regulator can address a transmission "chicken and egg" problem that ordinary incremental planning is poorly equipped to solve. Senate Bill 20 of 2005 required the Public Utility Commission of Texas (PUCT) to designate renewable zones and develop transmission to deliver their output "in a manner that is most beneficial and cost-effective to the customers." In 2008 the Commission approved a transmission plan capable of supporting about 18,500 MW of wind generation, and by early 2014 nearly 3,600 miles of new transmission had been built. The process may be understood as a hybrid institutional mechanism combining legislative mandate, regulatory planning and backstop, and negotiated implementation in provider selection and siting. The CREZ experience also illustrates the limits of anticipatory transmission planning: it relied on only partial ex ante cost-benefit discipline, imposed local burdens that were not always fully compensated, and used a competitive designation model that Texas later curtailed. Current transmission policy could recover the logic of CREZ, but improve the instruments: by using more explicit benefit tests, transparent cost allocation, better treatment of local burdens, safeguards against incumbent control, and deliberate use of negotiated-settlement techniques under a regulatory backstop.

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1. Introduction

Transmission planning has returned to the centre of electricity policy. Power systems are being asked simultaneously to accommodate remote renewable generation, electrification, rapid load growth, storage, and greater concern with resilience. Yet the central institutional problem remains the one Texas confronted two decades ago: generation can often be built more quickly than transmission, but transmission is difficult to justify without confidence that generation or load will materialise. The Texas CREZ process remains one of the clearest practical demonstrations of how one jurisdiction addressed that impasse.

CREZ was born of a specific statutory intervention. Senate Bill 20 of 2005 required the Public Utility Commission of Texas (PUCT) to designate Competitive Renewable Energy Zones (CREZ) and to develop a transmission plan to deliver renewable output "in a manner that is most

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beneficial and cost-effective to the customers." Building transmission lines in advance of generation, and allowing new entrants to build them, was in stark contrast to the previous approach, whereby transmission lines needed to support new generation were planned and built by the incumbent utilities only after commercial power plants were under contract or under construction and had filed formal interconnection requests. In June 2007 the Commission passed "the CREZ rule" (§25.174), which designated five zones, largely in West Texas and the Panhandle (North Texas). In 2008 it approved a plan designed to increase wind capacity to about 18,500 MW, nearly double the Senate Bill 20 target for 2025 of 10,000 MW of renewable energy capacity. This plan envisaged nearly 3,000 miles of new transmission at an initial planning cost of nearly $5 billion. Construction was essentially complete by the end of January 2014, with nearly 3,600 miles ultimately built and a realized cost of over $7 billion.

Our central argument is that CREZ succeeded not only because Texas planned ahead, but because it combined strategic centralisation with decentralised and negotiated implementation. The legislature fixed the strategic objective. The regulator PUCT translated that objective into zone designation, a transmission plan, and a regulatory timetable. Yet crucial elements of implementation were shaped through bargaining and settlement among transmission providers, PUCT Staff, landowners, intervenors, and other interested parties. This hybrid of legislative mandate, regulatory backstop, and negotiated implementation is the main analytical theme of this paper.

Section 2 explains the Texas institutional setting, since CREZ cannot be understood without distinguishing the Electric Reliability Council of Texas (ERCOT) region, the ERCOT Independent System Operator (ISO), the PUCT, transmission service providers, and the Certificate of Convenience and Necessity CCN process. Section 3 reviews the literature and identifies the paper's contribution. Section 4 sets out the economic coordination problem. Section 5 compares CREZ with other renewable-zone or corridor-based transmission policies. Section 6 explains CREZ as an institutional solution. Section 7 analyses the negotiated implementation of proposed transmission lines. Section 8 considers later evidence and later policy. Section 9 draws implications for current transmission planning.

2. The Texas institutional setting

The CREZ process did not take place in a system with a single transmission owner or a single vertically integrated utility responsible for both generation and transmission expansion. The ERCOT ISO directs the operation of the transmission system and the wholesale market for the ERCOT region, which covers most of Texas. However, the ERCOT ISO does not own the transmission grid and did not itself build the CREZ lines. Before the CREZ process, most of the ERCOT high-voltage transmission grid (345 kV and 138 kV lines) was owned and operated by large Investor-Owned Utilities (IOUs), Municipally Owned Utilities (MOUs), and River Authorities.[3] The PUCT regulates these electric utilities and grants the regulatory approvals required for new transmission. Senate Bill 7 in 1999 had unbundled and deregulated the electric

[3] TXU Electric Delivery (Now Oncor Electric Delivery, the largest electric utility in the state), CenterPoint Energy (serving the Houston area), AEP Texas (Central Power and Light / West Texas Utilities), Texas New Mexico Power (TNMP), Lower Colorado River Authority (LCRA), CPS Energy (San Antonio's municipal utility), Austin Energy (Austin's municipal utility), Brazo Electric Power Cooperative, and South Texas Electric Cooperative (STEC).

market within the ERCOT region, and legally split these traditional, vertically integrated monopolies into separate entities, albeit still owned by the initial utilities. So transmission facilities were owned, built, operated and maintained by multiple Transmission Service Providers, or TSPs. But under CREZ, new entrant Transmission Service Providers were eventually allowed to propose and build transmission lines in the traditional TSP areas. (Specifically, in 2005 Senate Bill 20 authorised the concept of CREZ, in 2007 the PUCT allowed transmission-only companies to apply for operating permits, and in March 2009 the PUCT selected specific new providers including various new entrants.)

A TSP is not a merchant interconnector in, for example, the sense that some British interconnectors are, deriving their income from trading across international price differences. CREZ transmission was regulated network investment. TSPs built facilities approved through the regulatory process and recovered allowed costs through regulated transmission charges. Within ERCOT, transmission costs are recovered from the demand side, with an allocation mechanism based on consumption coincident with peak system demand, so the cost of major transmission additions was broadly shared across load rather than charged directly and exclusively to the renewable generators whose entry the lines facilitated.

This institutional structure matters. A simple model in which a single grid company identifies a windy zone, calculates whether a line would pay for itself, and charges renewable entrants accordingly does not describe the ERCOT case. The ERCOT region had competitive generation, multiple regulated transmission providers with adjacent but non-overlapping service areas, ERCOT ISO planning but not ownership, regulated cost recovery, and a route-specific certification process. Individual wind developers could not finance large backbone transmission lines on their own; nor could a TSP prudently build such lines without a credible regulatory commitment that costs would be recoverable. CREZ therefore had to solve not only a technical planning problem, but also an institutional commitment problem.

Could or should Texas have instead given the ERCOT ISO or the PUCT a duty to identify the welfare-maximising future transmission system by eliciting information about prospective renewable entry, estimating the value of that entry, and approving only those lines whose expected benefits exceeded expected costs? Elements of such an approach were certainly present but did not extend to explicitly optimizing costs and benefits.[4]

CREZ was not, and was not intended to be, a formal integrated resource planning exercise or a full welfare-maximising optimisation of generation and transmission. Texas had moved away from integrated resource planning and toward competitive generation, open access and postage-stamp transmission pricing. The ERCOT ISO could study and recommend transmission, but it was not a transmission owner or builder. The PUCT could approve regulated transmission and cost recovery, but its job was not to select the socially optimal generation portfolio. Senate Bill

[4] The CREZ rule required ERCOT to study statewide wind potential and transmission constraints; parties could nominate zones; the Commission was required to consider generator financial commitment; and earlier drafts considered open seasons, CRR deposits, and progressive financial commitments as ways of eliciting and disciplining information about future entry. ERCOT's later (misnamed) CREZ Transmission Optimization study also compared alternative capacity scenarios by reference to reliability, transfer capability, transmission costs and expected fuel savings, but without a formal optimization process for designing the transmission expansion.

20 also made a policy choice: it set renewable-capacity goals and instructed the Commission to designate CREZ zones and develop a transmission plan to deliver renewable output in a manner beneficial and cost-effective to customers. Within that framework, the Commission chose a pragmatic approach: identify high-quality resource zones with evidence of developer commitment, compare feasible transmission scenarios, and move quickly enough to break the generation-transmission impasse.

A more elaborate welfare-maximising process might have looked attractive in theory. But in practice it would have required more information, more controversial assumptions about future entry and fuel prices, development of novel software to perform the transmission expansion in an optimization framework, and more time than the Commission believed was compatible with the statutory mandate and the urgency of the wind-transmission problem.

One further term recurs throughout the paper. A CCN, or Certificate of Convenience and Necessity, is the regulatory approval required for specified transmission facilities. It authorises construction and, crucially, determines the actual route and other physical features of the line. The CCN process was therefore where statewide transmission planning met local landowner and community impacts. The importance of negotiated settlement in CREZ lies largely in this stage: it helped translate a statewide anticipatory plan into routes that could actually be built.

3. Literature and contribution

The earlier literature on CREZ was understandably mostly descriptive and institutional. Hurlbut (2008) explained the Texas renewable portfolio framework and the institutional conditions supporting renewable development. Diffen (2009) offered an early legal and industry account of how CREZ addressed the transmission "chicken and egg" problem. Kiesling and Kleit (2009) situated CREZ within the wider Texas restructuring story. Baldick (2012) provides an early estimate of the cost of using wind, including transmission costs, to mitigate greenhouse emissions. Galbraith and Price (2013) gave the broader political and journalistic history of the Texas wind boom, while Lasher (2014) provided an ERCOT insider's retrospective on the CREZ process.

What was largely missing from that earlier literature was an integrated account of the process from legislation to rulemaking, to zone designation, to transmission planning, to TSP selection, to route approval, to construction, and subsequent developments. That is the gap our earlier Working Papers (Littlechild and Baldick 2019/2026), first drafted around 2017-2019, sought to fill. Those papers, now recast as chapters of a potential monograph, document the process in detail: chapter 1 explains why CREZ emerged; chapter 2 examines the regulatory and legislative process leading to Senate Bill 20; chapter 3 analyses zone designation and transmission planning; chapter 4 examines TSP selection; chapter 5 studies the CCN and routing process; and chapter 6 considers construction and subsequent developments.

The later literature has moved beyond description. Dorsey-Palmateer (2020) estimates the fuel-cost and emissions implications of the additional wind generation enabled by CREZ. Du and Rubin (2018) examine price convergence and market integration in ERCOT associated with the CREZ project. Jang (2020) analyses market impacts of the CREZ transmission expansion,

including effects on wholesale price levels, volatility, and interregional price differences. LaRiviere and Lyu (2022) estimate welfare gains from the Texas transmission expansion in a system with growing intermittent renewables, and Harleman (2024) examines local burdens by estimating housing-value effects near CREZ lines. More on these estimates in Section 8 below. CREZ can therefore no longer be said to lack systematic appraisal. The remaining gap is to connect those observed outcomes to the regulatory process that made the investment possible.

A further body of literature has become relevant because other jurisdictions have now adopted renewable-energy-zone or corridor-based transmission policies. Recent work on Renewable Energy Zones (REZs) in Australia's National Electricity Market is especially important. Simshauser (2021) argues that Australia's "long and stringy" network and the 2016–2020 renewable investment supercycle exposed limits in transmission hosting capacity, and that REZ policy emerged as a response to that constraint. Simshauser and Shellshear (2025/6) examine generator cost allocation under uncertainty in Australian REZs, including the challenges of recovering transmission costs from connecting generators as zones become more remote from the transmission backbone.

The present paper contributes by interpreting CREZ not simply as a successful transmission build-out, but as a regulatory mechanism for anticipatory infrastructure commitment under uncertainty. It asks what current transmission planning can learn from that mechanism.

4. A conceptual framework: anticipatory transmission under coordination failure

The economic problem is simple to state. Transmission investment is typically large, lumpy, and slow. Renewable generation investment can be modular and comparatively fast. A generator considering entry will hesitate if transmission access is uncertain. A transmission provider will hesitate if generation has not yet materialised and if cost recovery is uncertain. The result is a coordination failure: socially valuable combinations of generation and transmission may both be delayed because each depends on the other.

Several features intensify this problem. First, there are congestion externalities: when transmission is insufficient, prices diverge across locations and existing generators at higher priced locations may receive rents that do not reflect long-run efficiency. Second, there is option value: building transmission in advance may create room for future entry, learning, and competition that cannot easily be captured by a narrow ex post project-by-project test. Third, there are local siting externalities: the benefits of transmission are often diffuse, while the burdens are concentrated geographically. Fourth, there is a regulatory commitment problem: if investors suspect that transmission policy will change after they commit, they may not invest even when the aggregate case is strong.

Ordinary incremental planning often performs poorly in such settings. It is well adapted to relatively small additions justified by already-realised or specifically-anticipated demand or generation. It is less well adapted to strategic, forward-looking transmission investment designed to unlock new resource areas. In such circumstances a public authority may need to make an

anticipatory commitment: to identify areas of likely value, to share or allocate costs in some broader fashion, and to create a credible expectation that transmission will in fact be built.

Yet anticipatory planning alone is not enough. Once a broad commitment has been made, implementation still requires provider selection, route approval, local accommodation, and eventual cost recovery. If these stages are treated as wholly separate adversarial contests, the original strategic commitment can still unravel. A workable solution therefore requires not only anticipatory planning but also a mechanism for negotiated implementation under a regulatory backstop.

5. International analogues and comparison

The Texas CREZ process was not unique in confronting the problem of remote renewable resources and inadequate transmission. Other jurisdictions have since adopted policies similar in spirit, though not identical in institutional form. The common feature is that public authorities identify areas with strong renewable potential, or otherwise identify strategic transmission needs associated with renewable development, and then move beyond ordinary incremental planning to accelerate the transmission needed to bring that power to market.

Table 1. Selective comparison of renewable-zone and corridor-based transmission approaches

Jurisdiction	Planning unit	Transmission approach	Delivery style	Problem addressed
Texas, USA	CREZ zones	State-led anticipatory plan	Legislative mandate, PUCT planning, TSP designation, negotiated siting	Generation/transmission coordination
New South Wales, Australia	Renewable Energy Zones	Network built ahead of full entry; access schemes	Public coordination through EnergyCo; staged delivery; network operator selected	Renewable entry, coal replacement, hosting capacity
South Africa	Renewable Energy Development zones and strategic transmission corridors	Zones plus transmission corridors	Spatial planning and streamlined authorisation	Environmental authorisation and grid access

Jurisdiction	Planning unit	Transmission approach	Delivery style	Problem addressed
India	Green Energy Corridors	Renewable evacuation backbone	State-led inter-state and intra-state corridor development	Capacity to export renewable power from renewable rich areas
Germany	Energiewende corridors	Nationally prioritised north-south transmission	Federal corridor planning and approval	Moving renewable power from north to load centres
Queensland, Australia, and NEM literature	REZs and hosting-capacity expansion	Consumer-funded or generator-funded models	REZ cost allocation and access design under uncertainty	Hosting capacity, generator cost allocation, investment timing

The renewable energy zones in New South Wales, Australia, are probably the closest modern analogue to CREZ. The Central-West Orana REZ is designed initially to deliver 4.5 GW of network capacity from solar, wind, and storage projects, with capacity to increase to 6 GW by 2038, and EnergyCo's access scheme is described as the first of its kind in the National Electricity Market.

South Africa's Renewable Energy Development Zones are also CREZ-like, though with greater emphasis on spatial planning and environmental authorisation (Retief et al 2016). South Africa formally identified geographic areas of strategic importance for large-scale wind and solar photovoltaic facilities as REDZs, and related them to strategic transmission corridors.

India's Green Energy Corridor is less zone-based in formal legal design, but similar in function. The Ministry of New and Renewable Energy explains that a 2012 study found that transmission infrastructure near potential renewable sites was inadequate, leading to dedicated transmission infrastructure for large-scale solar and wind plants. The Ministry of Power describes the Green Energy Corridor as comprising inter-state and intra-state transmission systems, renewable energy management centres, and associated control infrastructure (Sinha and Goyal 2026).Germany provides an example where public opposition to new (overhead) transmission lines has been so strong that underground high-voltage direct current (HVDC) cables were adopted as possibly the only way forward to ease public resistance (Rapple et al. 2023). The German case is also complicated by extensive so-called "loop flows" through other countries interconnected with Germany. HVDC also provides capabilities to control loop flows.

The international lesson is not that other countries have copied Texas. It is that several jurisdictions have converged on a common response to the same basic problem: where renewable resources are geographically concentrated but away from demand centres, and transmission expansion is large, lumpy, and slow, ordinary project-by-project planning is often inadequate. What varies is the precise combination of commitment, coordination, cost allocation, competitive procurement, and local implementation.

6. CREZ as an institutional solution

The distinctiveness of CREZ lay not only in its scale, but in its institutional logic. Texas had already experienced the difficulty of developing remote wind resources in a competitive generation market. Wind farms could be built quickly, but major transmission lines requiring new right-of-way took much longer. This mismatch created the familiar impasse. It was difficult to know whether a line would be needed if generation did not yet exist, but a wind farm was difficult to finance if sufficient transmission was uncertain.

Senate Bill 20 was the legislative answer to that coordination failure. It did not wait for the market to resolve the impasse. It authorised a strategic commitment to transmission in advance of fully realised generation.

The statute did two things of lasting importance. First, it required the Commission to designate zones "in areas in which renewable energy resources and suitable land areas are sufficient" for development. Second, it required the Commission to "develop a plan to construct transmission capacity necessary to deliver to electric customers, in a manner that is most beneficial and cost-effective to the customers, the electric output" from those zones. The statute also allowed the Commission, in considering applications for CREZ transmission projects, not to consider some of the usual certificate factors relating to adequacy of existing service and need for additional service.

This combination—a spatial development concept, a transmission mandate, broad sharing of transmission costs[5], and relief from part of the ordinary project-by-project process—is the institutional core of CREZ. It addressed the coordination failure by legislative commitment and zone designation, and it reduced the regulatory-commitment problem by creating a pathway from planning to certification and thereby cost recovery.

Texas also recognised, albeit imperfectly, that planning alone would not suffice. The process had to move from zone designation, to a transmission optimisation study, to TSP selection, to CCNs, and then to actual construction. The CREZ rule §25.174 required selected transmission providers to file the relevant certificate applications within one year of the CREZ designation order, and the Commission established schedules and reporting requirements to keep the process moving.

This integrated sequencing is one reason for the successful implementation of CREZ. It was also a response to the regulatory-commitment problem: once Texas had chosen to build ahead of realised generation, it needed institutions that would make that commitment credible to developers, TSPs, consumers, and financiers.

[5] Before CREZ, ERCOT already used a grid-wide model where transmission costs were shared based on each utility's coincident share of summer peak demand. The CREZ project did not change this mechanism; it simply applied this existing cost-recovery process to a massive regional expansion.

7. Negotiated implementation in provider selection and siting

The negotiated-settlement dimension of CREZ deserves more emphasis than it has usually received. By negotiated settlement we do not mean only the classic North American rate-case settlement. We mean a broader regulatory approach in which the legislature sets a strategic principle, the regulator sets the framework and provides a backstop, but the content of the eventual outcome is shaped materially by bargaining among interested parties rather than imposed wholly by litigated administrative determination. This multi-level approach is embedded broadly in Texas electricity regulation (Baldick et al, 2021), although the specifics were novel to the CREZ process.

Doucet and Littlechild (2006) describe negotiated settlements as an alternative or complement to the conventional hearing-and-decision process. In later work on FERC in the United States and the National Energy Board in Canada (Doucet and Littlechild 2009), they emphasise that settlements can reduce cost and delay, improve acceptability, and allow more tailored outcomes than litigation alone, provided that the process is adequate and the regulator remains available as a backstop.

That way of thinking is directly relevant to CREZ. The legislation settled the strategic principle. The Commission settled the basic zones and the transmission plan. But at the stages of TSP selection, route approval, and local implementation, the process relied heavily on bargaining, accommodation, and agreed outcomes.

In TSP selection, the Commission did not simply allocate all projects to incumbents. Nor did it run a pure lowest-price auction. Instead, it used a hybrid process involving expressions of interest, selection criteria, settlement proposals, and Commission judgement. The outcome combined incumbents and new entrants. This was not competition in the strict tendering sense, but it introduced contestability and avoided making incumbency the sole organising principle.

In siting, the negotiated-settlement approach was even more significant. Of the 44 CCNs ultimately issued for the 46 new CREZ transmission lines, a formal settlement was achieved in 32 cases, and in a further 3 cases there was agreement or near-agreement among the parties. Thus, in about 80 per cent of the cases, parties were able to agree on route and structure type. The settlements were typically unanimous, signed by the TSP, Staff, and intervenors. In some cases, the settlement modified the route preferred by the TSP or Staff; in others, the parties appear to have fashioned a new route acceptable to all concerned. This contrasts with the example of Germany described above where opposition to overhead transmission resulted in expensive underground transmission as the only way forward (Rapple et al. 2023).

This point about negotiated settlements matters for current transmission policy. Large transmission programmes often fail not because the strategic case is absent, but because implementation is treated as a sequence of adversarial contests in which each stage reopens too much of the previous one. CREZ shows another possibility. Legislation can settle the strategic objective; regulation can structure the field; and negotiated accommodation can help determine the workable route, structure, timing, and provider allocation.

This was neither pure bargaining nor pure command. It was a hybrid, and its success depended precisely on that hybrid character. It also helped address the regulatory-commitment problem identified above: once parties can see a credible path from statewide plan to locally workable outcome, anticipatory investment becomes more implementable.

8. What later evidence and later policy imply

The later empirical literature has made CREZ more interesting, not less. Dorsey-Palmateer (2020) finds that the added transmission increased wind generation both by reducing curtailment of existing turbines and by enabling new development, with economically important emissions reductions. Du and Rubin (2018) find evidence that CREZ contributed to wholesale price convergence across ERCOT as major sections of the expansion were completed. Jang (2020) similarly identifies effects on wholesale price levels, volatility, and interregional price differences. These studies show why anticipatory transmission can matter economically: it can reduce congestion externalities, improve market integration, and realise the option value of building ahead of fully realised generation.

LaRiviere and Lyu (2022) provide a particularly useful quantitative estimate. Their paper reports annual wholesale electricity market benefits from CREZ of roughly $170 million per year conditional on wind generation capacity that existed before CREZ began, and an upper-bound estimate of about $330 million per year when allowing for increased capacity over the sample; another summary of the work describes a payback period of roughly 14 years. These estimates give more content to the claim that CREZ produced material market benefits, while also showing that the measured gains (and, moreover, estimates of the impact on greenhouse emissions) depend significantly on assumptions about how much renewable investment would have occurred without the transmission expansion.

A newer strand of work concerns the local distribution of burdens. Harleman (2024) finds that households near CREZ transmission lines bore up to $240.88 million in costs associated with visual impacts, buzzing lines, and concerns about health and safety, and that the vast majority of these costs were uncompensated. This is a useful corrective to celebratory accounts. CREZ did not merely build socially beneficial infrastructure; it imposed concentrated local burdens in order to generate broader system-wide gains. That does not undermine the case for CREZ, but it does show that siting externalities were addressed only imperfectly.

The policy context has also changed materially. Texas later curtailed an important aspect of the original CREZ model. Senate Bill 1938 in 2019 restricted the ability of non-incumbents to obtain certificates for new transmission facilities directly interconnecting with existing utility facilities, thereby limiting the more open-ended competitive designation approach used in CREZ.

Yet Texas also returned to anticipatory transmission planning in another form. The PUCT’s Permian Basin Reliability Plan, adopted in September 2024, was developed to meet increasing regional demand associated with population growth and the electrification of the oil and gas industry. This is not CREZ repeated, but it is unmistakably another example of Texas turning to anticipatory transmission planning when ordinary incremental approaches are inadequate.

At the federal level, FERC Order No. 1920, issued in 2024 and modified in rehearing orders, requires transmission providers to conduct long-term regional transmission planning and to develop associated cost-allocation methods for selected facilities. FERC describes the Order as requiring a process to identify, evaluate, and select more efficient or cost-effective regional transmission solutions and allocate the costs of those facilities. The Order also involves a stronger role for states in cost allocation.

FERC Order No. 1920 also reflects the same broad lesson that CREZ had already illustrated: short-horizon, project-specific planning is not enough where large changes in resources, demand, and system needs are foreseeable. Transmission providers must use a longer-term planning horizon; summaries of the Order describe a 20-year planning horizon and periodic long-term planning obligations.

9. Design principles for current policy

If one strips away the Texas-specific details, the broader lesson of CREZ is that successful transmission planning today needs four institutional elements.

First, it needs a mechanism for anticipating needs that are too important, systematic, or large-scale to wait upon ordinary project triggers. Where transmission is large and lumpy, and where the absence of transmission itself suppresses efficient generation or load development, waiting for conventional evidence of need may be self-defeating.

Second, it needs a process that can move from high-level planning to concrete implementation without reopening the entire strategic question at every step. CREZ achieved this through legislation, Commission rulemaking, ERCOT technical studies, PUCT orders, TSP designation, CCN scheduling, and reporting requirements.

Third, it needs credible ways of handling distributional conflicts. These may include compensation, mitigation, routing flexibility, community benefit mechanisms, and negotiated settlements under a regulatory backstop. CREZ had this third element only imperfectly. Its siting settlements were impressive, but the later evidence on uncompensated local property-value losses suggests that routing agreement alone is not a complete answer to local burden-sharing.

Fourth, it needs protection against both paralysis and capture. A process that is too reactive may wait forever for evidence that only transmission itself can produce. But a process dominated by incumbents or shielded from cost discipline may overbuild, under-explore alternatives, or impose costs without adequate scrutiny. CREZ's hybrid provider-selection process was therefore important, even if not a model of pure competition. It introduced some contestability while preserving regulatory oversight.

For that reason, the right contemporary slogan is not "copy CREZ." The better slogan is "recover the logic of CREZ, but improve the instruments." The logic was sound: when transmission is strategically necessary and ordinary incremental planning fails, regulators may need a more directive process. But today's instruments should be better. They should include more explicit ex ante benefit tests, more transparent cost allocation, stronger compensation or mitigation

arrangements for affected communities, and more deliberate safeguards against incumbent control of the planning process. They should also make more conscious use of negotiated-settlement techniques.

The lesson of the settlement literature is that, subject to an adequate process, bargaining among informed parties can produce more workable and sometimes more innovative outcomes than a wholly litigated process, while preserving a regulatory backstop for cases where agreement fails. CREZ suggests that transmission planning can benefit from that insight too.

10. Conclusion

The significance of the Texas CREZ process for transmission planning today is not historical nostalgia. It is analytical and practical. CREZ remains one of the clearest modern examples of solving a transmission coordination failure by replacing reactive planning with a legislatively authorised, zone-based, anticipatory programme. It also remains a warning that such programmes require discipline if they are to retain legitimacy: discipline in cost justification, in provider selection, in siting, and in the treatment of local burdens.

The article's main claim is that CREZ succeeded not only because Texas planned ahead, but also because it combined strategic centralisation with decentralised negotiated implementation. Legislation fixed the strategic objective, regulation structured the field, ERCOT provided technical planning, TSPs built regulated assets, and bargaining among interested parties helped determine workable outcomes. CREZ was therefore not merely a transmission construction programme. It was an institutional solution to a coordination problem.

Current policy can learn from both sides of the experience. The CREZ process shows that bold anticipatory planning can unlock large-scale renewable development and improve market integration. But it also shows that such planning must be accompanied by explicit cost discipline, transparent cost allocation, better mechanisms for addressing local burdens, and institutional arrangements that allow negotiation without surrendering regulatory responsibility. Today's policy world—with FERC Order No. 1920, Texas's Permian planning, and international use of zone-based or corridor-based renewable transmission policy—has come remarkably close to the world that CREZ anticipated. The task now is not simply to admire Texas for having once been bold. It is to understand what kind of boldness is still required, and what kind of institutional restraint and negotiated accommodation must accompany it.

References

Baldick, R. 2012. "Wind and Energy Markets: A Case Study of Texas." *IEEE Systems Journal* 6(1): 27–34.

Baldick, R, S. S. Oren, E. S. Schubert and K. Anderson, "ERCOT: Success (so far) and lessons learned," In J-M Glachant, P L. Joskow, and M G. Pollitt, Editors, *Handbook on Electricity Markets*, pages 205—241, Edward Elgar, 2021.

Diffen, B.H. 2009. “Competitive Renewable Energy Zones: How the Texas Wind Industry is Cracking the Chicken & Egg Problem.” *Rocky Mountain Mineral Law Foundation Journal* 46(1): 47–98.

Dorsey-Palmateer, R. 2020. “Transmission Costs and the Value of Wind Generation for the CREZ Project.” *Energy Policy* 138: 111248.

Doucet, J., and S.C. Littlechild. 2006. “Negotiated Settlements: The Development of Legal and Economic Thinking.” *Utilities Policy* 14(4): 266–277.

Doucet, J., and S.C. Littlechild. 2009. “Negotiated Settlements and the National Energy Board in Canada.” *Energy Policy* 37(11): 4633–4644.

Du, X., and O.D. Rubin. 2018. “Transition and Integration of the ERCOT Market with the Competitive Renewable Energy Zone Project.” *The Energy Journal* 39(4): 235–260.

EnergyCo NSW. 2024–2026. “Central-West Orana Renewable Energy Zone Access Scheme.”

Federal Energy Regulatory Commission. 2024. *Order No. 1920: Building for the Future Through Electric Regional Transmission Planning and Cost Allocation*. Washington, DC: FERC.

Federal Energy Regulatory Commission. 2024–2025. *Orders No. 1920-A and 1920-B.* Washington, DC: FERC.

Galbraith, K., and A. Price. 2013. *The Great Texas Wind Rush*. Austin: University of Texas Press.

Government of India, Ministry of Power. 2026. “Green Energy Corridor.”

Government of India, Ministry of New and Renewable Energy. 2022–2026. “Green Energy Corridor Overview.”

Government of South Africa. 2018, 2021. Notices identifying Renewable Energy Development Zones and strategic transmission corridors.

Harleman, M. 2024. “Who Bears the Cost of Renewable Power Transmission Lines? Evidence from Housing Values.” *Energy Policy* 191.

Hurlbut, D. 2008. “A Look Behind the Texas Renewable Portfolio Standard: A Case Study.” *Natural Resources Journal* 48: 289–330.

Jang, H. 2020. “Market Impacts of a Transmission Investment: Evidence from the ERCOT Competitive Renewable Energy Zones Project.” *Energies* 13(12): 3199.

Kiesling, L., and A.N. Kleit, eds. 2009. *Electricity Restructuring: The Texas Story*. Washington, DC: AEI Press.

LaRiviere, J., and X. Lyu. 2022. "Transmission Constraints, Intermittent Renewables and Welfare." *Journal of Environmental Economics and Management* 112: 102618.

Lasher, W. 2014. "The Competitive Renewable Energy Zones Process." ERCOT presentation, 11 August.

Littlechild, S.C. 2012. "The Process of Negotiating Settlements at FERC." *Energy Policy* 50: 174–191.

Littlechild, S.C., and R. Baldick. 2019a. "The Texas Competitive Renewable Energy Zone (CREZ) Transmission Expansion Project: Chapter 1 (formerly Part I) Why CREZ?" Working Paper 22 December 2019, revised May 2026.

Littlechild, S.C., and R. Baldick. 2019b. "The Texas Competitive Renewable Energy Zone (CREZ) Transmission Expansion Project: Chapter 2 (formerly Part IA) The Regulatory and Legislative Process 2002–2005 Leading up to Senate Bill 20." Working Paper 22 December 2019, revised May 2026.

Littlechild, S.C., and R. Baldick. 2026a. "The Texas Competitive Renewable Energy Zone (CREZ) Transmission Expansion Project: Chapter 3 (formerly Part II) Establishing the CREZ Process, CREZ Zones and the Transmission Plan 2006–2008." Working Paper 17 March 2018, revised May 2026.

Littlechild, S.C., and R. Baldick. 2026b. "The Texas Competitive Renewable Energy Zone (CREZ) Transmission Expansion Project: Chapter 4 (formerly Part III) The Selection of Transmission Service Providers 2007–2008." Working Paper 17 April 2017, revised May 2026.

Littlechild, S.C., and R. Baldick. 2026c. "The Texas Competitive Renewable Energy Zone (CREZ) Transmission Expansion Project: Chapter 5 (formerly Part IV) The Transmission Line Approval Process 2009–2011." Working Paper 17 April 2017, revised May 2026.

Littlechild, S.C., and R. Baldick. 2026d. "The Texas Competitive Renewable Energy Zone (CREZ) Transmission Expansion Project: Chapter 6 (formerly Part V) Construction 2009–2014 and Beyond." Working Paper in process 17 April 2017, revised May 2026.

Public Utility Commission of Texas. 2024. *Permian Basin Reliability Plan*. Austin, TX: PUCT.

Rappl, F., Schuette, S., & Buhr, S. (2023). German Corridor Project SuedOstLink: Challenges and technical solutions for 525 kV HVDC underground cable systems. *Proceedings of Jicable 2023*. https://www.jicable.org

Retief, F., Alberts, R., & Lochner, P. (2016). "Strategic environmental assessment (SEA) in South Africa: A review of 25 years of practice." *South African Geographical Journal*, 98(3), 435-450.

Simshauser, P. 2021. “Renewable Energy Zones in Australia’s National Electricity Market.” *Energy Economics* 101: 105446.

Simshauser, P., and E. Shellshear. 2025/2026. “Renewable Energy Zones: Generator Cost Allocation Under Uncertainty.” EPRG Working Paper 2506 / Cambridge Working Paper in Economics 2524.

Sinha, A., & Goyal, M. (2026). Financing India's Green Grid. In *Financing Climate Action in Emerging Economies* (pp. 302–318). Springer Nature.

Texas Legislature. 2005. *Senate Bill 20*, 79th Legislature, Regular Session.

Texas Legislature. 2019. *Senate Bill 1938*, 86th Legislature, Regular Session.

Texas Legislature. 2021. *Senate Bill 1281*, 87th Legislature, Regular Session.

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