

Climate Protection through Energy Transitions: The Politics of Colorado's (USA) "New Energy Economy"¹

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Abstract

Addressing global climate change requires a shift to a low-carbon society, which in turn requires a fundamental transformation in the energy sector away from reliance on fossil fuels. This paper examines the political dynamics of energy transitions in a case study of the State of Colorado's efforts to create a "New Energy Economy" through a series of legislative and administrative actions between January 2007 and January 2011. We begin with the assumption that energy transitions have significant social components and that transitioning from one dominant energy system to another will involve political conflict and contestation among competing interests and stakeholders with beneficiaries of the dominant system pushing back against the transition process. At the same time, there may be contestation among stakeholders who are generally supportive of the transition process since its specific form may benefit some more than others. It is through this politics of transitions that societal goals are determined and decisions about allocating resources are made. We explore these dynamics in the case of Colorado's efforts to transition to an economy based on clean energy in order to understand how these political debates shape the nature and trajectory of the transition process. In particular, we are interested in the extent to which Colorado's energy transition serves the goal of moving to a low-carbon society.

1. Introduction

In recent years, the focus of global climate change governance has shifted away from a narrow focus on reducing greenhouse gas (GHG) emissions towards a broader goal of a low-carbon transition, involving a new model of economic development, significant lifestyle changes, as well as a transformation in the way society produces and uses energy (Jordan 2009; Newell and Paterson 2010; Princen 2005). In the energy sector, it is increasingly clear that addressing global climate change requires a shift away from a reliance on fossil fuel-based energy sources (e.g. coal) towards renewable sources (e.g. wind, solar and geothermal) and other low- and zero-emissions technologies (Jacobson and Lauber 2006; Peters et al. 2013). While in many jurisdictions, the energy sector has become a central means through which government authorities pursue climate protection goals, these efforts to date have fallen short in advancing the deployment of renewable energy at the level needed for a low-carbon transition. At the municipal level, officials have favored energy-efficiency measures, which have low upfront costs and

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result in immediate cost savings but do not necessarily require significant changes in energy production (Bulkeley and Betsill forthcoming). In the United States, state governments have relied heavily on renewable energy standards (RES), which mandate that a percentage of electricity consumed within the state be produced by renewable energy sources (Rabe 2008). While these have created incentives for investments in the renewables sector, in many cases, state authorities have found it difficult to go beyond these measures due to (perceived) conflicts between environmental goals and economic development needs (Rabe 2008).

This paper examines an effort by the State of Colorado to pursue climate protection by transitioning away from an energy economy based on the extraction of fossil fuels to one based on the production and use of clean energy technology. Between January 2007 and January 2011, the Administration of Governor Bill Ritter embarked on an ambitious program to create a “New Energy Economy” (NEE) through a comprehensive and coordinated series of legislative and administrative actions. In other words, the Ritter Administration’s activities can be viewed as an attempt to govern a low-carbon energy transition. We explore the political dynamics of the NEE and the role of politics in shaping the trajectory of the NEE program. Colorado’s efforts are seen by many as a model and there has been a great deal of interaction between Colorado officials and officials in other states and countries to learn from Colorado’s experience in attempting to steer the low-carbon energy transition.² We call attention to the politics that underlie many of the NEE policies in order to refine these lessons and understand the implications for pursuing climate protection through energy transitions.

Drawing on the literature on social-technical transitions, we assume that low-carbon energy transitions have a significant social component involving the practices of a variety of stakeholders. In the case of Colorado’s NEE, these included actors that are directly involved in the energy sector, such as energy producers, utilities, scientists and engineers, public and private consumers, and governmental regulators. It also involved stakeholders that are affected by the political economy of energy, such as, government agencies dealing with the implications of energy choices, labor organizations, and a wide array of societal groups and networks organized around particular energy sources. Thus, a low-carbon energy transition must involve significant social and political change in addition to developing and deploying new renewable energy technologies. We also assume that dominant socio-technical systems (e.g. fossil-based energy systems) tend to be self-reinforcing and resistant to change (Kemp and Loorbach 2003). Colorado’s energy economy has historically been dominated by fossil fuel-based energy sources; in 2011, the state received 66% of its electricity from coal, 20% from natural gas, and 14% from renewable sources (EIA 2012). A low-carbon energy transition, which involves replacing one energy system with another, inevitably involves political conflict among powerful interests and stakeholders with the beneficiaries of the dominant system pushing back against the transition process (Meadowcroft 2009; Shove and Walker 2007). At the same time, there may be contestation among those stakeholders who are generally supportive of moving away from the dominant socio-technical system since the specific form of the new system may benefit some more than others. Transitions involve establishing societal goals and allocating resources (Meadowcroft 2009). In other words, politics can be expected to shape whether a transition occurs and if so, what form it takes.

As discussed below, the NEE is part of a longer-term transition process that has been underway in Colorado since the 1970s involving actors and organizations originally mobilized around the solar industry and more recently around wind power and natural gas. For the present discussion, our analysis

² This is the focus of the Center for the New Energy Economy based at Colorado State University, which is directed by former Governor Bill Ritter (<http://cnee.colostate.edu>).

is largely focused on the Ritter Administration's NEE activities between January 2007 and January 2011, which can be seen as an effort to accelerate this process and move it in a particular direction. We begin with a review of the literature on socio-technical transitions, with specific attention on discussions about how transitions can be governed. We note that such discussions often downplay or omit political considerations from the analysis and argue that this limits our understanding of how transitions occur and the lessons we can draw for replicating transition processes across space and time. An important advantage of this approach is that it also allows us to explore reasons for the failure or redirection of transition efforts. We then turn to a detailed review of Colorado's NEE efforts, focusing on how politics created the conditions for the NEE and shaped the trajectory of the transition process. We first provide an overview of the NEE then focus our analysis on 1) the emergence and early institutionalization of the NEE agenda, 2) the development of renewable energy standards, and 3) the switch from coal to gas in the electricity sector. In each instance, our analysis reveals the political dynamics of transitions, particularly the ways in which they generate conflict and contestation by disrupting existing social and power relations and the present challenges for creating a shared vision to guide the process. As our case highlights, moreover, these contestations were not limited to the interactions between existing powers and challengers but, also, involved strategic choices within and across these groups. Thus, we demonstrate not only the ways in which the transition process has been contested but also how the strategies employed by the Ritter Administration as it sought to navigate through this contentious political terrain shaped the trajectory of the transition process. In order to advance the NEE agenda, the Administration had to create and manage fragile alliances and make a number of strategic compromises. We conclude by considering the implications of these developments in terms of accelerating a low-carbon energy transition in Colorado and advancing climate protection goals.

2. The Politics of Transitions

Research on socio-technical transitions provides insights on how transitions take place. This literature highlights the ways in which technologies are embedded in a broader social context consisting of the knowledge and practices of scientists and engineers, infrastructure investments, public policies, social networks, market forces, and consumer preferences, all of which serve to maintain and stabilize the prevailing socio-technical systems (Rip and Kemp 1998). A low-carbon energy transition thus requires "large-scale transformations within society or important subsystems during which the structure of the societal system fundamentally changes" (Verbong and Loorbach 2012: 6). Scholars working in this area have developed a "multi-level perspective" as a framework for analyzing the dynamics of socio-technical transitions which involves "the interplay of developments at three analytical levels: niches (the locus for radical innovations), socio-technical regimes (the locus of established practices and associated rules that stabilize existing systems), and an exogenous socio-technical landscape" (Geels 2011: 26; see also Verbong and Loorbach 2012). Despite critiques that these levels are difficult to operationalize, the key point is that transitions should be understood as non-linear processes with multiple and interacting drivers operating at different levels of social and political organization. This multi-level perspective allows for multiple transition patterns and pathways and recognizes that each transition process is unique (Geels 2011; Smith et al. 2005;).

There is also an important temporal dimension to socio-technical transitions, which are assumed to take place over a long period of time (typically at least one generation) and are characterized by periods of slow and fast changes (Geels 2011; Rotmans et al. 2001). Scholars refer to a multi-phase process that involves (when successful):

- 1) a *pre-development stage* where there is stability in the dominant socio-technical regime;
- 2) a *take-off phase* where developments at the niche and/or landscape level open up opportunities for change in the regime;

- 3) an *acceleration phase* “where visible structural changes take place through an accumulation of socio-cultural, economic, ecological and institutional changes that react to each other” (Rotmans et al. 2001: 17);
- 4) a *stabilization phase* which may involve the replacement of one socio-technical system by another as well as a transformation or reconfiguration of existing systems.

In the discussion below, we contend that the NEE can be thought of as an effort to move the Colorado’s transition process into the acceleration phase.

Research on socio-technical transitions, and in particular the multi-level perspective, has been criticized for a lack of attention to issues of agency. Such transitions are often seen to emerge organically leaving questions about whether or how they might be governed or steered in a particular direction (e.g. towards a low-carbon society). Geels (2011: 25) recognizes that low-carbon or sustainability transitions differ from other historical transitions in that they are “goal-oriented” and thus are likely to require greater intervention from public authorities and civil society to “address public goods, internalize negative externalities, to change economic frame conditions, and to support ‘green’ niches.” This has led to a growing body of research on the governance of transitions (Smith et al. 2005; Jacobsson and Lauber 2006).³ Recognizing their non-linear and multi-level dynamics, Verbong and Loorbach (2012: 10) argue, “while it is impossible to predict or direct transitions, it should be possible to influence ongoing transition dynamics in terms of speed and direction.” One strand of this research emphasizes a process of “transition management” which refers to a “deliberate attempt to bring structural change in a stepwise manner” (Kemp and Rotmans 2005: 42). Much of this literature is based on the Dutch experience and provides a technical toolbox including visioning exercises and transition experiments. Jordan (2009) notes that these discussions are often “managerialist” in tone and overlook broader governance questions related to who will guide transitions in new directions and through what kinds of interventions?

A number of scholars have argued that the literatures on socio-technical transitions as well as some of the literature on transition management/governance have failed to fully appreciate the political nature of transitions and have tended to downplay or omit political variables from their analyses (Meadowcroft 2009, 2011; Shove and Walker 2007; Jordan 2009; Grin 2012; Smith et al. 2005). “Politics is the constant companion of socio-technical transitions, serving alternatively (and often simultaneously) as context, arena, obstacle, enabler, arbiter, and manager of repercussions” (Meadowcroft 2011: 71). From this perspective, the omission of political variables from analyses of socio-technical transitions is problematic because it ignores a central feature of the transition process. The literature highlights several ways in which socio-technical transitions are inherently political, but here we focus on two aspects in particular that are especially relevant in our analysis of the NEE. First, transitions threaten to disrupt and potentially reconfigure existing power relations (Smith et al. 2005; Grin 2012; Jordan 2009). Attempts to set priorities for public and private investment and to allocate resources will inevitably generate conflict and contestation by creating (perceived) winners and losers. Actors whose interests are served by the dominant socio-technical regime and who enjoy a position of power can be expected to resist transition efforts that disrupt the status quo. It thus is essential to develop “informed expectations” about how powerful actors will respond to proposed policy interventions and to develop strategies to overcome opposition through compromise or coalition building (Smith et al. 2005).

Second, socio-technical transitions, particularly those related to sustainability, involve normative debates about what is to be transformed and for what/whose purpose (Meadowcroft 2009). In other

³ For a response to this critique, see Geels 2011.

words, they require articulating a shared vision of an alternative future, which often can be represented in different ways. For example, an energy transition for climate protection could be characterized as a shift from 1) a fossil-based system to a non-fossil based system; 2) a carbon intensive to a low-carbon or carbon neutral system; 3) a system based on non-renewable sources to one based on renewables and could be linked to other goals related to energy security and/or economic development (Meadowcroft 2009). While developing a shared vision for the transition process is important for enrolling and mobilizing key actors and directing attention and resources to particular solutions, the process can be expected to be contentious since each vision implies distinct development paths and may privilege different energy technologies (and the social systems organized around those technologies) (Meadowcroft 2009; Smith et al. 2005). Moreover, shared visions may be contested and re-articulated in new ways over the course of the transition process.

The thrust of our paper is not simply that politics matters, although this is something that the transitions literature needs to address more fully. We also argue that the politics of transitions are multidimensional. Most evidently they disrupt existing social and power relations and generate conflicts between those who benefit from the status quo and the challengers, but they also involve competition within each of these groups. Among status quo interests, different sectors may respond differently to the challengers, with some seeing unique opportunities for themselves under a new socio-technical regime (e.g., gas may see an opportunity to corner electricity generation). Similarly, challengers may have divergent preferences (e.g. solar power may be concerned about wind power dominating the renewables market). These areas of conflict and contestation often produce unexpected strategies and alliances, which in turn shape the transition trajectory. And this brings us to the normative dimension. Because the politics is complex the end result is rarely a shared vision that is produced equally by all supporters. Rather, it is better to speak of hegemonic visions, which actors join for a variety of strategic reasons.

If transition processes are inherently political, it is reasonable to expect that political dynamics will shape the trajectory of the transition process (Grin 2012). Meadowcroft (2009: 327) argues, "...it is important to remember that depending on how the process actually unfolds society could end up in a very different place. And the 'selective pressures' that will settle things include the conscious intervention of many social actors who have relatively clear ideas about where *they* want (or do not want) the process to go." In other words, transitions take on a dynamic as key decisions are made, which could work against broader transition goals, for example by producing "lock-in," although politics need not necessarily work against transition (Grin 2012; Unruh 2000). It is therefore important to look not only at the particular types of policy interventions that have been used to steer transitions but also to understand the conditions under which agents are able to change the rules in desirable directions and the strategies that may be used to create these conditions. Scholars must examine the political dynamics of transitions by analyzing the role of ideas, interests, institutions, and power in transition processes (Meadowcroft 2011; Smith et al. 2005; Grin 2012; Jacobsson and Lauber 2006; Kern 2011). In the next section, we analyze the politics of the NEE, focusing on 1) the emergence and early institutionalization of the NEE agenda, 2) the development of a renewable energy standard, and 3) the switch from coal to gas in the electricity sector.

3. Colorado's Transition to a "New Energy Economy"

The NEE refers to a coordinated agenda pursued by Colorado Governor Bill Ritter and his Administration between January 2007 and January 2011 through a series of legislative and administrative actions designed to facilitate the state's transition to an economy based on clean energy. In all, the NEE involved 57 pieces of legislation, a number of organizational and administrative changes in state government, and

various initiatives developed and funded by the state in order to further the goals of the NEE, such as training workers and attracting “green jobs” as a core part of the State’s economic development strategy. Today, Colorado has a large social network of researchers, activists, and economic interests with a political platform and capacity to challenge the dominant fossil-fuel based energy system. The NEE has helped attract a significant number of “clean-sector” jobs, most of them in the highly populated and urbanized “Front Range” area of the state (Lyng 2010). In March 2007, Vestas, the world’s largest wind turbine manufacturer, committed to an investment of over \$1 billion in four plants in Colorado, which helped attract other companies to establish a home base in Colorado, such as the German solar company Wirsol and suppliers such as Bach Composite and Hexcel Energy (Hartman 2011; Zaffos 2011). By 2010 renewable energy use had increased to 10.1% of the state’s total energy generation, largely from wind power (EIA 2011). Installed solar generation increased from 1MW to 103MW between 2005 and 2010 (Hartman 2011). Rural landowners throughout the state have benefitted from lease payments for wind turbines.

Our analysis of the politics of the NEE is based on a review of publicly available documents (e.g. news reports, press releases, meeting minutes, legislative enactments) as well as 17 semi-structured interviews with key stakeholders conducted in the summer and fall of 2011. Interview subjects were selected to maximize the range of viewpoints and interests involved in the NEE and included officials from the Ritter Administration as well as representatives from the energy sector (both renewable and fossil-based),⁴ the environmental community and labor organizations. We used NVivo software to analyze these qualitative data using both open and axial coding to identify key actors and events in the history of the NEE as well as to characterize the nature of the political conflicts that arose and to elucidate causal and intervening variables that shaped the NEE’s trajectory (Strauss and Corbin 1990). In this section, we seek to reveal areas of political contestation and the normative dimensions of Colorado’s energy transition and to explore how the Ritter Administration navigated this political landscape. Collectively, we seek to understand how politics shaped the trajectory of Colorado’s energy transition in the period 2006-2011.

3.1 Emergence and Early Institutionalization of the NEE Agenda

Ritter’s vision for the NEE was originally articulated in the context of the 2006 campaign for governor as he and his staff were looking for a way to deflect attention from critiques of Ritter’s record as a District Attorney in Denver. Rather than taking on these attacks directly, Ritter wanted to emphasize his vision for Colorado’s energy future. He told his staff, “I want my first ad to be about turning wheat fields into wind farms” (quoted in Hartman 2011). Melody Harris, one of his energy advisors, coined the term “New Energy Economy” in order to highlight that the goal was not simply the use of clean energy but a new economy based on clean energy. Ritter perceived the opportunity link clean energy with job creation and environmental concerns to help bridge differences between environmentalists and economic interests in the state as well as between urban and rural concerns. Ritter and his cabinet members often referred to the NEE as an “ecosystem” guided by four principles: diversifying energy, protecting the environment, promoting economic development, and promoting equity, each of which had to be balanced carefully to provide hospitable environment for the creation of Colorado’s new energy future (e.g. Madden 2010). In his campaign document “The Colorado Promise,” Ritter presented a seven-point plan to reshape Colorado’s energy future by creating incentives for new business investments and leveraging the state’s natural assets. He argued, “This opportunity comes at a critical crossroads for

⁴ Despite repeated attempts, we were not able to secure interviews with someone representing the coal and mining sectors or an official from Xcel energy, the state’s largest electricity supplier. We sought to represent their perspectives in the analysis through a review of documents and statements from other stakeholders.

Colorado and the nation. The demand for energy is pushing against diminishing supplies. The costs of all types of energy-fuel for our vehicles, natural gas for heating our homes, electricity for keeping the lights on-is skyrocketing higher and higher. The realities of global warming are becoming apparent as our forests burn and our snow pack and tree lines retreat even higher” (Ritter 2006: 23). Climate change figured prominently in early public discourse around the NEE. As a candidate, Ritter routinely highlighted concerns about climate change as a driving force behind the NEE. Notably, the November 2007 Climate Action Plan was the first official statement of the NEE goals post-election. In other words, in 2006 and 2007, the NEE was explicitly linked to broader climate protection goals. As discussed below, it became more difficult to balance environmental concerns with other aspects of the NEE overtime.

**The Trajectory Of The Transition:
1977 - 2012**

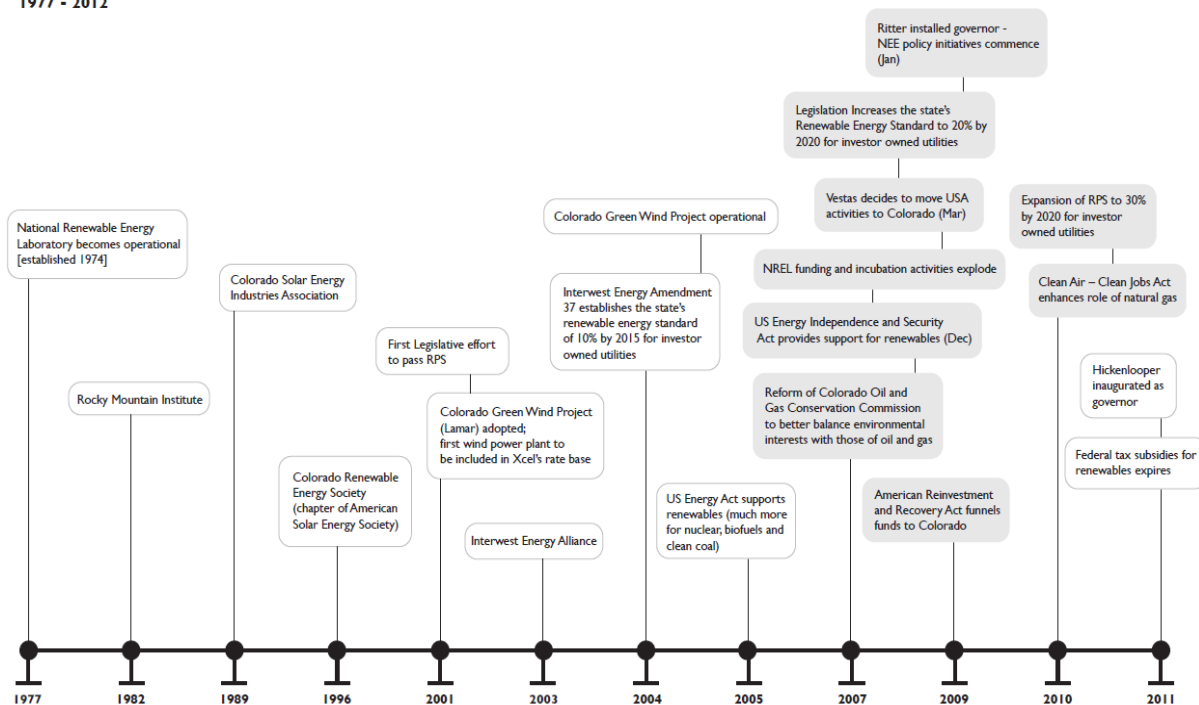


Figure 1. Colorado’s Energy Transition (shaded boxes indicate developments during the Ritter Administration, which could be viewed as the “acceleration phase” of the transition process)

Ritter’s NEE vision resonated with Colorado voters in large part because it built on a broader transition process that has been underway in Colorado since the 1970s involving actors and institutions originally organized around the solar energy (e.g. the Colorado Renewable Energy Society) and more recently around wind power and natural gas. A number of observers and interviewees emphasized that the passage of Amendment 37 in 2004 was particularly important in creating a window of opportunity for the NEE. Amendment 37 was a successful ballot initiative that established a state-wide Renewable Energy Standard (RES) requiring investor-owned utilities to produce 10% of their electricity from renewable sources (discussed in greater detail below). This was the first voter-approved RES in the country (Rabe 2008) and signaled that Colorado voters were already receptive to Ritter’s ideas about creating a new energy future in the state. In addition, many of the individuals and organizations that were actively involved in the Amendment 37 campaign went on to play key roles in the Ritter Administration and/or became important political allies in the implementation of the NEE.

In other words, one could argue that Colorado's energy transition was already in the "take-off" phase and that these developments laid a foundation for Ritter's NEE agenda (Figure 1). To underscore this point another important development that took place during the same general period was the increase in renewable energy investments as a result of the Federal Energy Act in 2005 (even though these were only a small portion of the Act's expenditures). The National Renewable Energy Lab (NREL) located in Golden, Colorado was a major beneficiary of this change with its annual funding jumping from \$209.6 million in 2006 (around where it had been since 2000) to \$378.4 in 2007 (and \$536.5 in 2010). As noted to us, the NREL became much more engaged at the state level during that period. This observation is consistent with a number of developments. In January 2005, for example, Dan Arvizu became its Director and Chief Executive. Arvizu has played a leading role in turning Sandia laboratories into an incubator (see Schrank 2011). During 2006 the Colorado Renewable Energy Collaboratory, a research consortium between NREL and the state's three largest universities, was established by federal law and started its operations in 2007 with federal start up support. The Ritter campaign recognized that the NEE would capitalize on these existing and emerging research networks.

Once elected, Ritter made several organizational and administrative changes in state government that proved essential in institutionalizing the NEE agenda. First, he established the Governor's Energy Office (GEO) by renaming the Office of Energy Conservation and Management and redefining its mission "to lead Colorado to a new energy economy by advancing energy efficiency and renewable, clean energy resources" (CO Exec. Order No. D0010 07). This raised the profile of the state's energy initiatives. According to one source, "establishing an office co-equal with economic development and charging them to work cooperatively made it possible and much easier to speak to clean energy and clean tech companies." GEO also became a key facilitator in the development and adoption of the collection of policies and programs associated with the NEE. Tom Plant, a former state legislator who introduced the first RES bill in 2001, and was active in the Amendment 37 campaign, was appointed Director of GEO. Second, Ritter appointed three new members to the Public Utilities Commission (PUC), which regulates rates and services provided by gas, electric, and telecommunications utilities like Xcel Energy. In 2007 Ritter named Ron Binz, a renewable energy and consumer advocate, as the chairman of the PUC, and in 2008 appointed attorney James Tarpey, who had a background in energy, utility, and regulatory experience (McGhee 2007, Vuong 2008). The appointment of Binz was crucial in sending the message that the administration wanted to keep energy prices low (Barge 2008). In 2008 he also appointed Matt Baker, Executive Director of Environment Colorado, who had spearheaded the Amendment 37 campaign. Ritter made this appointment despite objections that Baker lacked experience and was anti-coal (Barge 2008). The third, and most contentious change, was the reorganization of the Colorado Oil and Gas Conservation Commission (COGCC), which provides permits for oil and gas drilling in the state, to accommodate wildlife, public health, and environmental concerns that would cater to NEE goals. As discussed below, this move proved instrumental in setting the stage for a shift from coal to gas in the state's electricity sector. It is also one of the most profound reforms as changes in the composition of the Commission are not mere personnel matters but require legislation action. These organizational changes, along with the appointment of supportive individuals to head up each of the state's agencies, embedded the NEE agenda in the routine practices of state government.

3.2 Renewable Energy Standards

We have noted that Colorado has a long history with renewable energy. From its creation in 1974, NREL helped to keep clean energy on the agenda, but it was not until the later 1990s that renewables gained political traction. One of the key accomplishments of the NEE was the creation of a 30% RES which requires the state's utility companies to supply at least 30% of their electricity from renewable sources. The adoption of RES is a prominent climate protection strategy among US states (Rabe 2008), and

Colorado's RES has been identified as central to the state's ability to attract clean energy investments. However, the story of the 30% RES begins prior to the Ritter Administration, with the passage of Amendment 37 in 2004, which established a 10% RES. The coalition building and compromises made in the course of the Amendment 37 campaign made it possible for the Ritter Administration to successfully increase the RES twice.

In order to understand the political dynamics of RES in Colorado, it is necessary to recognize that there are three types of electricity providers in the state, each with its unique interests, opportunities and concerns. Two "investor-owned utilities" (IOUs) provide nearly 63% of the electricity in the state (GEO 2010). IOUs are regulated by the Colorado Public Utilities Commission and are accountable to their shareholders. Xcel Energy, the largest IOU in the state serving more than 1.4 million electricity customers, produces nearly half of its own energy and purchases the rest from independent power producers and wholesale power providers. Twenty-six Rural Electric Associations (REAs) provide nearly 22% of the state's electricity. REAs purchase power from wholesale providers; the majority rely on coal-generated energy from one company, Tri-State. REAs are owned by (and thus accountable to) their customers; if there are extra revenues at the end of the year, customers receive a credit. Member-elected boards, rather than the PUC, determine utility rates. Finally, Colorado has 29 municipally-owned utilities, which provide approximately 15% of the state's electricity. The largest are in Colorado Springs and Fort Collins. Municipal utilities are overseen by local boards and/or city councils, which ensure that rates cover the costs to produce and distribute electricity and reinvest any remaining revenue in community development projects.

3.2.1 Amendment 37

In 2001, state legislators, including Tom Plant (director of GEO in the Ritter Administration), introduced a bill to establish a RES. Xcel, the REAs as well as most Republicans were opposed to this initiative. After three failed attempts to pass an RES in the legislature, a coalition emerged to present the issue directly to voters as a ballot initiative which passed 53%-47% in 2004. Amendment 37 required IOUs and municipal utilities with 40,000 or more customers (Fort Collins and Colorado Springs) to produce 10% of their electricity from renewable sources by 2015. The Amendment allowed the other municipal utilities and REAs to opt out of compliance, with most of them doing so. There was a 2% rate cap, meaning they would have to meet the 10% mandate without raising rates any more than 2%. The Amendment also included a solar "carve out," which required that utilities meet a portion of the 10% mandate with solar sources and was important for gaining political support from the solar industry. Without the carve out, the utility companies could have met the 10% RES through large wind projects, such as the Colorado Green Wind Farm in Lamar, with no change in the photovoltaic market. Here, therefore, we see not only negotiations between the existing powers and the challengers but, also, amongst the challengers.

Amendment 37 faced opposition from various quarters, perhaps most significantly from Xcel Energy, which spent at least \$1 million campaigning against the amendment (Hartman, 2011). According to several sources Xcel's opposition was based in part on technical concerns that wind power, the major source of the RES, would not fit into their system in terms of production and capacity. The company argued that the initiative would be "a \$2 billion mistake." Early in 2004, in an attempt to stall Amendment 37, Xcel reportedly went to the Public Utilities Commission (PUC) and offered to install 400 megawatts of wind if the PUC agreed not to support legislation that would establish a mandate. This the company could well do given the fact that the Colorado Green Wind Farm with 162Mws came on line in 2004. Other opponents included a number of municipal utilities and the Municipal Utilities Association (CAMU), the REAs (especially Intermountain, the largest amongst them), the coal industry through the Colorado Mining Association, the Colorado Association of Commerce and Industry, and the steel

industry in Pueblo. Municipal utilities desired local control and choice of energy use, and the REAs spent money toward defeating the Amendment, even though it included an opt-out for associations with less than 40,000 members including, at the time, InterMountain, Holy Cross, and United Power.⁵ Colorado Springs Utilities was also opposed because it had a lot of hydropower, which was excluded from Amendment 37.⁶ Finally, concerns that Amendment 37 would result in reduced coal consumption caused a split within the International Brotherhood of Electrical Workers (IBEW). While Local IBEW-68 saw the potential for job creation in the solar sector and thus supported Amendment 37, Local IBEW-111 represented workers in the energy production industry and was concerned about jobs for their members. Several sources suggested that InterMountain's management played an important role in aggravating these fears.

Supporters were able to overcome this opposition by framing Amendment 37 in terms of environmental protection, rural economic development, and job creation, which made it possible to bring together often competing interests. Congressman Mark Udall (Democrat) highlighted the environmental benefits of the RES while Speaker of the House Lola Spradley (Republican) highlighted the economic benefits in order to appeal to the rural parts of the state and its struggling agricultural regions. Importantly, this framing allowed Spradley, a very conservative Republican, to cosponsor and campaign for the Amendment, despite her opposition to climate policy. Agricultural constituencies in depressed areas in eastern Colorado were supportive because of the significant rents accruing to individual land owners as well as the tax benefits to local governments, largely from wind projects. The main regional supporters came from about six Front Range counties, the ones most likely to benefit from new jobs in the renewables sector. The campaign for Amendment 37 provided important lessons about coalition building and issue framing for many of the individuals who would go on to work on the NEE, either as appointees in the Ritter Administration or as supporters of the NEE agenda: as long as different groups supported the NEE, it really didn't matter what their motivations were.

3.2.2 20% RES

Shortly after the passage of Amendment 37, Xcel issued a Request for Proposals to get bids on renewable electricity. These bids came in lower than expected and the performance level, or capacity factor, was much higher than anticipated. By the beginning of 2007 it was evident that the company was going to meet the 2015 target of a 10% RES by the end of 2007. Xcel began to view renewable energy generation as a way to hedge against fluctuations and variability in the cost of coal and natural gas. Two additional factors led to this change of heart for Xcel. First, polls taken after passage of Amendment 37 indicated people within their service territory were supportive of renewable energy. Second, through another bill (HB 07-1281) Xcel was able to build and own their own renewable energy generation facilities to earn a rate of return when their older infrastructure went off line. This was especially important for Xcel because of legal requirements for them to deliver power reliably and affordably, and also earn a rate of return for their shareholders. During the 2007 legislative session, Governor Ritter took advantage of this shift in Xcel's position and successfully proposed an increase in the RES to 20% by 2020 while still maintaining the 2% rate cap (HB 07-1281). In addition to raising the RES for IOUs, this legislation also instituted a 10% standard for REAs, which most of the REAs accepted in return for not having to meet the 20% requirement. While the opt-out provision for small municipal utilities stayed in place that was not the case for REAs. We were told that may have been a form of punishment in

⁵ Both InterMountain and United Power opted out, while Holy Cross decided to meet and exceed Amendment 37 requirements.

⁶ This was eventually resolved through a legislative fix made after Amendment 37 passed to allow Colorado Springs Utilities to count its hydroelectric power towards the 10% renewable electricity requirement.

response to the intransigence of some REAs. Here, therefore, we see differences emerging not only between IOUs and non-profit utilities (REAs and municipal utilities) but, also, amongst the latter.

3.2.3 30% RES

In 2010, the Ritter Administration successfully increased the RES to 30%, however, the process was more contentious than had been the case with the 20% increase and required some strategic compromise and issue linkage on the part of the Administration. Specifically, this increase has to be viewed as part of a broader compromise that allowed the passage of the Clean Air Clean Jobs Act (discussed below) that same year, which initiated a shift from coal to gas in the electricity sector and brought natural gas into the NEE alliance (Hartman 2011, Ritter 2010, Zaffos 2011). The natural gas industry focused its resources on gaining support for Clean Air Clean Jobs and largely stayed silent on the 30% increase. Xcel decided to support the increase, presumably with the understanding that the Clean Air Clean Jobs Act would guarantee a long-term profit on its investments to replace older coal plants and in renewables. In order to satisfy small renewables producers the new RES required Xcel Energy to get 3% of its energy supply from “distributed generation,” including rooftop solar, small hydro and wind, and other systems not currently used (Hartman 2011). Additionally, solar standards were increased, and there was more opportunity to put Coloradans to work on these projects. It was estimated these changes would create 33,500 new jobs and generate \$4.3 billion in total economic output (Hartman 2011). The REAs were again strategically exempted from the 30% RES increase because when asked by the Ritter Administration whether they would support an increase, they strongly expressed their opposition due to concerns about passing along costs to their customers (owners) associated with purchasing clean energy. Environmentalists were eager to increase the RES both because of long-term commitments to renewables and the environment and because they were aware of the shifting relations between the Ritter Administration and the gas industry. Labor groups were again split along the lines of IBEW-68 and IBEW-111 in terms of concerns about job creation but both groups were supportive of provisions to require certification for solar installers.

In sum, the politics of Colorado’s RES demonstrate the possibility of unexpected alliances and shifts due to learning and strategic considerations as the transition process moves forward. Xcel, for instance, moved from a committed opponent to a strong supporter. However, its inclusion into the renewables alliance required certain concessions while also making the existence of REAs –its erstwhile allies- precarious. During the 2007-2008 period the relations between the Ritter Administration and the coal and gas industries were very contentious. Bringing Xcel on board provided the NEE alliance with an important player in an otherwise hostile terrain. Because Xcel is regulated by the PUC the Administration certainly had some leverage. However, Xcel’s ‘price’ was also significant, as becomes more apparent below.

3.3 From Coal to Gas

By some accounts, one of the crowing achievements of the NEE was the passage of HB 10-1365 also known as the Clean Air Clean Jobs Act (CACJ) in 2010, which requires major utilities to replace, retrofit or retire 900 MW of coal-fired power generation with natural gas or lower or non-emitting fuel by 2018. As noted above, this was the culmination of a series of events that resulted in a strategic partnership between the Ritter Administration and the state’s oil and gas industry. While his early articulation of the NEE vision emphasized renewable energy, Ritter acknowledged that the state’s fossil-fuel resources would part of the mix but advocated for “measured and responsible development” to protect the environment (Ritter 2006: 26). In 2009, Ritter declared natural gas as “mission critical” in the NEE. This section documents the process by which the Administration and the oil and gas industry went from being strong adversaries to becoming allies in promoting a new energy future.

3.3.1 COGCC and Environmental Rule-making

As we noted above, the most contentious administrative change that the Ritter Administration put in place during 2007-2008, was the reorganization of the Colorado Oil and Gas Conservation Commission (COGCC) to accommodate a more diverse group of members with concerns about wildlife, public health, and the environment that would cater to NEE goals. COGCC is a state agency housed in the Department of Natural Resources, which oversees permitting for oil and gas development. Prior to the NEE, the Commission consisted of seven individuals – a majority of which represented the oil and gas industry, consistent with the agency’s mission to promote the development of the state’s natural resources to generate revenue. As we were told “the first big fight with the oil and gas industry wasn’t the 20% renewable energy standard bill. The first big fight was the change in the make-up [of the COGCC]. So we went to nine people including public health, natural resources, division of wildlife, and royalty owners; there were still three from industry. It was a really big fight.” The significance of this reform is evident that at present (late 2012) industry (or at least its supporters) would like to undo these organizational changes and return the Commission to its original role. The politics of organizational change were and remain central and involve contestation over the organization of the state itself.

The reorganization of the COGCC allowed the Ritter Administration to write rules in 2008 for oil and gas drilling that were more responsive to environmentalist concerns. The oil and gas industry believed the new regulations would be “job killers,” forcing companies to leave Colorado’s gas fields for other more favorable locations (Hartman 2011). These were empty threats but provided the narrative that allowed the gas industry to weaken the proposed rules through a state-wide mobilization during 2008. According to Gilman (2008) “In June and July, as the Colorado Oil and Gas Conservation Commission considered requiring stronger wildlife habitat safeguards, higher bonding amounts, more thorough notification of landowners, and setting new gas wells back from streams and public water sources, industry trade associations launched at least three rounds of full-page ads in daily newspapers around the state, as well as a spate of radio spots and at least three direct mailings to active voters.” According to close observers the problem were not the rules themselves but, rather, the position of gas in the state’s economy. The campaign did inflict a significant cost on the NEE alliance leading the COGCC to modify some of the contentious rules (Yates 2008).

During 2008, therefore, the gas industry sought to reclaim its position, very much motivated by concerns about falling prices. Its goal was facilitated by the Fall 2008 elections that shifted the state House of Representatives towards the Republicans and by longer term prospects for the 2010 elections. With the new rules in place and in light of the above political dynamics, there was a notable shift in the balance between renewables and fossil fuels in the Ritter Administration’s articulation of the NEE vision. In a July 2009 speech to the Colorado Oil and Gas Association (the trade group representing the oil and gas industry), Ritter declared that natural gas was “mission critical” to the NEE, signalling a new strategic alliance between the Administration and the industry that took many environmentalists and renewable energy advocates by surprise. Representatives of the oil and gas industry argued that the “switch” reflected a learning process that had occurred in the course of the 2008 rule-making debates whereby Ritter came to understand the important economic role (especially related to jobs) played by the oil and gas industry in the state, which became particularly important in light of the global financial crisis. Members of the Ritter Administration suggest this was a strategic move linked to their goal of reducing dependence on coal as the state’s major electricity source (Ashby 2009).

3.3.2 Clean Air Clean Jobs

With strong environmental regulations in place, the oil and gas industry became a key ally in supporting CACJ. The oil and gas industry proposed to transition a gigawatt of power from coal to natural gas in a major push to find new markets for natural gas whose price was very low at the time. Their proposal also came at a time when the existing coal plants were in violation of the federal Clean Air Act and there were concerns about potential regulation from the Environmental Protection Agency, which shaped the position of different groups in the CACJ debate. For example, the Department of Health and the PUC had to try and predict what the new regulations would look like. Xcel Energy also had to stay apprised to the regulations because they did not want the federal government to impose a plan on them that would impact their costs. Therefore, there was incentive to exceed potential federal regulations in a preemptive fashion.

The negotiations that resulted in the CACJ took place quickly and out of the public eye. The Administration was motivated by the looming 2010 elections. Ritter announced in early January 2010 that he would not run for reelection so he had a short time within which to put in place the key policies on RES and conversion to gas, which were in the making since 2009. In order to achieve these goals he kept the coal industry and related utilities largely in the dark and constructed an alliance that included the main environmentalist groups, the renewables industry, Xcel, and the gas industry. Labor unions were partly members of that alliance, as well. As in the case of Amendment 37 the members of the NEE alliance were disparate in their priorities.

Mainstream environmentalists felt some pressure from more radical groups which felt that the drilling rules were not sufficient and, in fact, had been weakened. In this they were joined by some local groups who had long felt that the gas industry was not sensitive to local issues and property rights. Environment Colorado played an important role in keeping Democrats and the broader liberal forces together and behind the 30% RES (discussed above) and gas conversion compromises. The renewables industry was concerned about the move to gas but was brought along as a result of the RES compromise as well as a host of provisions within and outside these two major policies that provided some protection for the various elements of the industry, as had Amendment 37 and the increase of the RES to 20%.

Xcel became a strong supporter for both reactive and proactive reasons. Reactively, it was concerned about the impacts of EPA Clean Air regulations and their implications for its old coal plants. Hedging its bets by converting some of them to gas was not unreasonable, particularly since they could build and own any new plants. In addition to this gain the company was able to negotiate long-term prices for gas, ensuring against its wild fluctuations, as well as a long-term rate of return on its investments. These gains by Xcel were significant and will shape Colorado's energy economy during the next several decades. Industry participants strongly objected to these precedents but were not able to stop them – largely because, coal, the main opponent did not have time to react.

The gas industry brought along the more conservative elements of Colorado's political landscape. Interviewees told us this largely occurred behind the scenes, allowing the Administration and environmentalists to do most of the public work. According to the gas industry, gas is a legitimate component of the NEE. More broadly, they argue that a wide variety of energy sources should be part of the energy mix. The conversion of coal plants into gas plants was an important opportunity for the gas industry, which was suffering by low prices and uncertainty about the future. As a result they were eager to replace all coal plants with gas plants. Moreover, the economic crisis that had been unfolding in

Colorado since late 2008 provided credence to their argument that the gas industry could be a source of jobs and economic activity.

The coal industry and the related utilities were not happy with the process and outcomes of the negotiations. The utilities were less affected since municipal utilities and REAs –and their provider Tri-State- were exempted from the 30% RES increase and were not affected by the gas conversion pressures felt by Xcel at the time. Moreover, Tri-State, felt that the guaranteed rate of return for Xcel as well as the higher cost of renewables –in their view- would provide this non-profit entity with a long term advantage. In any event, Tri-state has now moved into renewables, which suggests a change of strategy (Tri-State 2012).

There are some important political lessons emerging from the Colorado's shift from coal to gas. First, supporters of the NEE did not necessarily share the same priorities. On one hand some more 'radical' environmental elements were left out of the broad umbrella of the NEE coalition. On the other, the support of Xcel and the gas industry came at a price. In the case of Xcel it helped the company solve its coal problem at the cost for a significant lock-in in terms of the state's energy policy (long term rate of return, ownership of plants, stable gas prices). In the case of gas we see the entrance into the alliance of an industry that operates very much like any conventional extractive energy industry and could very well prevent the use of more renewables in the future. In that vein the recent renewal of the production tax credit for wind power may have a beneficial impact on the industry as it applies to all farms started during 2013 (Schwartz and Wald, 2013). However, increased gas production comes with potential adverse impacts on the climate, limited backward and forward innovation linkages, and is likely to aggravate local boom and bust cycles, as do most extractive industries. In light of the above it is fair to say that the normative narrative of the NEE has shifted from one in which the transition to a low-carbon energy system is now more of collateral benefit than a central goal.

4. The NEE and the Politics of Transitions

Our analysis of the NEE reinforces the idea that socio-technical transitions are long-term processes involving interacting forces operating at multiple levels. Colorado's NEE must be understood in the context of a transition process that had been underway since the 1970s, which then created important institutional and political foundations for many of the NEE initiatives. Our analysis also reveals the ways in which federal laws and developments in the global economy interacted with these local conditions to shape the trajectory of the NEE. In addition, our analysis highlights the political dynamics of transition processes as well as the ways in which politics shapes transition processes. We conclude by revisiting some of the debates about the political nature of socio-technical transitions and discuss how this case speaks to those debates. In addition, we consider whether the NEE has steered Colorado towards a low-carbon energy transition.

In our earlier discussion of the politics of socio-technical transitions, we noted that transitions may generate conflict and contestation because they disrupt and potentially reconfigure existing social and power relations (Smith et al. 2005; Grin 2012; Jordan 2009). Attempts to set priorities for public and private investment and to allocate resources will inevitably create (perceived) winners and losers. Any attempts to draw lessons from the NEE about how to govern energy transitions must take these political dynamics into account and anticipate sources of opposition. As might be expected, from the original articulation of the NEE during the 2006 campaign through efforts to enact the NEE through legislative and administrative actions, the Ritter Administration faced opposition from interests who benefited from the dominant, fossil-fuel based energy economy. The gas industry's massive opposition to the new drilling rules during the summer of 2008 is a strong example. What is perhaps unexpected, however, is

the way in which these dynamics changed over time, particularly the dramatic shift in the oil and gas sector. As we noted, Governor Ritter declared gas to be “mission-critical” during 2009, leading gas to join the NEE alliance, albeit for the same tactical reasons that rural interests had joined the Amendment 37 campaign. It is important to acknowledge that interests and preferences can change over time and that opponents can potentially become allies in advancing a transition agenda as demonstrated by Xcel –which had been opposed to Amendment 37- and the gas industry. As our accounts of the politics of RES and conversion to gas suggest such shifts require compromises in order to build and hold together fragile alliances. It is important to try to understand the nature of these compromises and of the forces behind them in order to better anticipate their consequences on the long-term transition trajectory.

Our analysis also reveals that political conflict and contestation is multidimensional. In addition to the divisions between “old” (fossil-based) and “new” (renewables) energy, we also saw conflict and contestation within each of these camps over different components of the transition agenda. Environmentalists were not of one mind, leading to the marginalization of some of them towards the end of the period examined. Wind power and solar power face different challenges, leading solar to require a “carve out” in Amendment 37 and the 20% RES in exchange for political support. Gas did not see coal as an ally but, rather, sought to replace it in the state’s energy mix through the Clean Air Clean Jobs Act. This suggests the need to avoid making simplistic assumptions about where support and opposition to transitions can be found and opens up a wide range of possibilities in terms of coalition building. At the same time, and as we noted above, there are potential costs to building coalitions amongst entities with disparate interests, not least of which is the redirection of the whole transition trajectory.

As we noted in our theoretical discussion, energy transitions require the articulation of a new vision for the future. It is important to ask not only whether there is a shared vision but also, and more importantly, what are the hegemonic elements within that vision. Our case has shown that there have been significant shifts in the NEE vision as alliances were reconfigured and different elements of the transition process put into place. A key question here is whether the Ritter Administration was able to hold to its original vision of the NEE and to keep those that joined the NEE for tactical reasons from replacing it with a new vision or whether it managed to adjust the vision without abandoning some core values. In our interviews, we asked stakeholders to answer the question “what is the NEE” in their own words and found considerable variation suggesting there remains disagreement in what is being transitioned and for what/whose purpose. For some, it was an economic development strategy focused on bringing new jobs to the state. For others, it was an indirect way at addressing climate change, given opposition to explicit climate policy. For others it was an innovation and green manufacturing strategy rather than a simple economic development strategy. Perhaps most strikingly for the current analysis, the environmental/climate aspect of the NEE was not very prominent in these responses. Initially, the NEE was explicitly linked to climate protection goals, both in the rhetoric of the NEE and in official documents such as the 2007 Climate Action Plan. From 2009, the environment was much less prominent in the public rhetoric around the NEE, reflecting a general trend in the US where the public was much more focused on economic issues and jobs in the face of the global financial crisis.

These observations support the assertion that another way in which transitions are political is that they involve normative debates about what is to be transformed and for what/whose purpose (Meadowcroft 2009). In other words, they require articulating a shared vision of an alternative future, which often can be represented in different ways. In our analysis of the NEE, we see how the articulation of what a new energy future entails was contested and transformed over time. In particular, what many initially saw as a project to advance the deployment of renewable energy for climate protection turned into a program

to move away from coal. In that sense there was a dual movement. First, there was a movement away from the environment as a central goal of a tightly articulated combination of economic and environmental strategies. On that view, economic policies would also serve environmental goals. Second, the move towards gas, combined with some uncertainty in the wind industry, also suggests a shift from the renewables industry, and its implications for green production and consumption, to a more conventional form of extractive energy economy.

The NEE also raises questions about pursuing climate protection through energy transitions. At the sub-national level, the energy sector has become a primary means through which climate change is governed. Energy efficiency measures figure prominently in state and municipal climate action plans and many observers refer to energy policy as “indirect” climate action under the assumption that any changes in the production and consumption of energy will generate “co-benefits” in terms of reduced GHG emissions. Has the NEE as it played out during the Ritter administration steered Colorado toward a low-carbon energy transition pathway that is sufficient to address the issue of climate change? In particular, the rise of natural gas to a position of “mission critical” within the NEE raises some issues. Proponents argue that natural gas is climate-friendly in that it emits fewer GHG emissions than coal when burned for electricity. In addition, natural gas can serve as a “bridge fuel” in the shift from fossil-fuels to renewables because it allows for renewables to be integrated more easily into the electrical grid and is thus an important part of the a low-carbon transition pathway (Udall 2009). In the case of the NEE, however, natural gas has become central to the energy transition (rather than a bridge fuel), raising the possibility of carbon “lock-in” and path dependency which could make large-scale deployment of renewables more difficult in the future (Jones 2012; Unruh 2000). Peters et al. (2013: 5) argue that substituting coal with natural gas “can help initiate a transition toward trajectories consistent with keeping temperatures below 2° C, but further mitigation measures are needed to complete and sustain the reductions.” Opponents have concerns about the long-term effects on renewable energy investments. Some argue that increased oil and gas development will displace investment in renewables, both because of the industry’s power and because gas can be much cheaper, partly due to current tax laws. Opponents also argue that the extraction of natural gas, particularly through the process of hydraulic fracturing (or “fracking”), is detrimental to the climate because of methane leakage, while supporters contend that strong environmental regulations, such as those passed by the COGCC, can minimize the environmental impacts of extraction (Ritter 2011). While there remains a great deal of uncertainty about the implications of a “clean energy” transition with a central role for natural gas in advancing long-term climate protection goals, the case of the NEE highlights the role of political dynamics in shaping the trajectory of energy transitions and that the trajectory can shift in the course of the transition process. Ensuring that energy transitions serve long-term climate protection goals may require that climate protection goals not be secondary to other considerations and/or the presence of strong coalitions organized around climate change.

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