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## The politics and dynamics of energy transitions: lessons from Colorado's (USA) "New Energy Economy"

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**Michele Betsill and Dimitris Stevis**

Department of Political Science, Colorado State University, USA;

e-mail: m.betsill@colostate.edu; dimitris.stevis@colostate.edu

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**Abstract.** This article examines the political dynamics of energy transitions in a case study of the State of Colorado's (USA) efforts to create a "New Energy Economy" through a series of legislative and administrative actions between January 2007 and January 2011. Drawing on an emerging literature on the politics of social-technical transitions, we argue that transitions involve contestation between and within coalitions of incumbents and challengers, which result in policies that benefit particular actors and a reconfiguration of the core values around which transition policies are articulated. We explore these dynamics through an analysis of the process that led to the adoption of Colorado's 30% Renewable Energy Standard in 2010, which is often held up as one of the crowning achievements of the New Energy Economy initiative, in order to illustrate how these political debates shape the nature and trajectory of the transition process.

**Keywords:** politics of socio-technical transitions, low-carbon energy transitions, Colorado's "New Energy Economy"

### Introduction

In recent years, the focus of global climate change governance has shifted from a narrow emphasis 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 (Jacobsson and Lauber, 2006; Jordan, 2009; Newell and Paterson, 2010; Peters et al., 2013; Princen, 2005; Unruh, 2000). In many jurisdictions, the energy sector has become a central means through which government authorities pursue climate protection goals. However, these efforts to date have fallen short in deploying renewable energy at the level needed for a low-carbon transition (Bulkeley and Betsill, 2013; Verbong and Geels, 2006; Verbong and Loorbach, 2012). These efforts are never solely about climate change but involve debates about economic development and the political economy, in general (Giannakouros and Stevis, 2014; Hess, 2012).

This article examines an ambitious effort by the State of Colorado (USA) (Figure 1) to transition from an energy economy based on fossil fuels to one based on clean energy. Between January 2007 and January 2011, Democratic Governor Bill Ritter led a comprehensive scheme to create a "New Energy Economy" (NEE) through a coordinated series of legislative and administrative actions. In all, the NEE involved 57 pieces of legislation, organizational, and administrative changes in state government, and various initiatives developed and funded by the State. By the end of 2013, electricity generation from renewables, largely wind, had increased to 17% of the state's total and as of 2012, Colorado had the fifth largest installed photovoltaic capacity (300 MW) in the nation (EIA, 2014). The state is on track to meet its 30% Renewable Energy Standard (RES), which requires investor-owned utilities to supply at least 30% of their electricity from renewable sources by 2020.

### BASIC FACTS

- **Population** (2013): 5.3 million
- **Civilian Labor Force** (2014): 2.8 million
- **Area:** 103,642 sq. miles
- **Registered voters** (2014):
 

<i>Republicans</i>	949,029
<i>Democrats</i>	894,332
<i>Unaffiliated</i>	1,032,290

### ENERGY

- **Energy Production** (2012; trillion BTUs): 2,921
 

<i>Natural gas</i>	1902
<i>Coal</i>	629
<i>Crude Oil</i>	286
<i>Renewables</i>	104
- **Energy Consumption** by Sector (2012; trillion BTUs)
 

<i>Industrial</i>	425.1
<i>Transport</i>	413.9
<i>Residential</i>	336.8
<i>Commercial</i>	276.8
- **Electricity Generation** (2014):
 

<i>Coal</i>	59.9%
<i>Natural Gas</i>	27.3%
<i>Renewables</i>	17.8%



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### ECONOMY

- **GDP** (2012): US\$274 billion; US\$19.9 million from manufacturing
- **Median Household Income** (2012): US\$57,685
- **State expenditures** (including federal funds; 2013): US\$28.5 billion
- **Unemployment** (2014): 6.4%

**Figure 1.** Profile of the State of Colorado.

In this paper, we analyze Colorado's NEE through the lens of socio-technical transitions (Geels, 2011; Karn, 2011; Kemp and Rothmans, 2005; Markard et al., 2012; Rip and Kemp, 1998). We view the NEE as an instance of transition management; it was an explicit attempt by the Colorado government to re-orient the state's energy economy away from fossil fuels and towards clean energy technologies through a coherent set of policy initiatives designed to put pressure on the existing energy system (Kern and Smith, 2008). While there are debates about the depth and breadth of the ongoing energy transition in Colorado, its accomplishments are formidable by many US and global measures. As pointed out by Hess (2012: 183), amongst US states Colorado is second only to California in terms of green transition policy. This is all the more noteworthy because Mountain West states, such as Colorado, along with Southeastern states, are considered laggards in terms of green transition policies. Our case of a sub-national transition process in the United States provides an opportunity to explore socio-technical transitions in a new context. The existing literature is dominated by case studies of national-level transition processes in Europe (e.g. Grin, 2012; Jacobson and Lauber, 2006; Kern and Smith, 2008).

The NEE case provides important insights into the *politics* of transitions, which are often overlooked or downplayed in much of the socio-technical transitions literature (Grin, 2012; Jordan, 2009; Meadowcroft, 2007, 2009; Shove and Walker, 2007; Smith et al., 2005). We address this gap by exploring the process that led to the adoption of Colorado's 30% RES in 2010, which is often held up as one of the crowning achievements of the NEE and provides a window into the political dynamics of transitions. Our analysis pays close attention to agency and the power dynamics that shape transition trajectories (Markard et al., 2012; Smith and Sterling, 2010). In general terms, we argue that transitions involve contestation between coalitions of incumbents and challengers (Hess, 2012, 2014). Rather than fixed positions, however, power and strategy make these coalitions fluid, a fluidity that is reinforced by strategic considerations *within* alliances. The end results are not simply policies that benefit one or another of the various actors but, also, the reconfiguration of the core values around which such policies are articulated.

We start by examining debates about the politics of socio-technical transitions, especially those aiming at environmental or sustainability goals. We then trace the trajectory of

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Colorado's 30% RES. We seek to reveal whether the incumbent and challenger alliances changed over time and if so, how and why. In addition, we explore whether, how, and why the goals and discourses of each alliance shifted as alliances were reconfigured over time. We close by considering the implications of these changes in terms of Colorado's ongoing energy transition and discussing the contributions of the NEE case to the study of socio-technical transitions, particularly political dynamics of sustainability transitions.

### **The politics of socio-technical transitions**

The socio-technical transitions literature provides useful insights on the ingredients of energy transitions by highlighting 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 frequently analyze the dynamics of socio-technical transitions through a "multi-level perspective" that emphasizes "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 Farla et al., 2012; Markard et al., 2012; Verbong and Loorbach, 2012).

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) recognizes that low-carbon or sustainability transitions differ from other historical transitions in that they are oriented toward achieving broader societal goals and thus are likely to require greater intervention from public authorities and civil society. In response, a growing body of research on the governance of transitions has emerged (Geels et al., 2004; Jacobsson and Lauber, 2006; Kemp et al., 2007; Kern, 2012; Ngar-yin Mah, 2012; Rotmans et al., 2001; Smith et al., 2005). Recognizing the nonlinear and multi-level dynamics of transitions, 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) by coalitions of public, private and civil society actors with common visions. 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 and through what kinds of interventions, as well as whose interests will be represented in decision-making and through what kinds of participatory processes.

This critique has produced a call for greater attention to the *politics* of socio-technical transitions (Baker et al., 2014; Grin, 2012; Jordan, 2009; Meadowcroft, 2009, 2011; Newell, 2013; Shove and Walker, 2007; Smith et al., 2005). As Meadowcroft (2011: 71) argues, "Politics is the constant companion of socio-technical transitions, serving alternatively (and often simultaneously) as context, arena, obstacle, enabler, arbiter, and manager of repercussions". Markard et al. (2012: 962) contend that closer attention to the politics of transitions is necessary in order to better understand transition policies, the location of power,

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the agency of actors, and “how system and regime structures are created and changed through the strategic interplay of different kinds of actors”.

This emerging literature highlights several ways in which socio-technical transitions are inherently political, but here we focus on two mutually constituted aspects of transition politics: (1) alliance formation and change and (2) the discourses or goals that bring these alliances together (Hess, 2012, 2014). Because transitions threaten to disrupt and potentially reconfigure existing power relations (Grin, 2012; Jordan, 2009; Smith et al., 2005), actors whose interests are served by the dominant socio-technical system and who enjoy a position of power can be expected to resist transition efforts that disrupt their privileged position or redirect the transition towards changes that enhance their position. Meanwhile, challengers can be expected to craft countervailing alliances. It thus is essential for those who seek to govern transitions to develop “informed expectations” about how powerful incumbent actors as well as key challengers will respond to proposed policy interventions and to develop strategies to preempt or overcome opposition as well as attract support. Such strategies may include putting pressure on the incumbents by redirecting investments and political commitments towards promising technical and policy innovations or taking advantage of opportunities that may help to destabilize the incumbent regime (e.g. government restrictions on pollution from coal-fired plants) (Hess, 2014; Smith and Stirling, 2010; Smith et al., 2005). Challenger strategies may include mobilizing a powerful countervailing coalition as well as enrolling key incumbents into the transition alliance in order to capitalize on their resources and power (Smith and Sterling, 2010).

Importantly, incumbents and challengers do not all stand to benefit or lose equally from the transition; strategic choices by policy makers can modify the calculus of various actors leading to more fluid coalitions. Incumbents may respond differently to the challengers, with some seeing unique opportunities for themselves under a new socio-technical system (e.g. the natural gas industry may see an opportunity to corner electricity generation). Similarly, challengers may have divergent preferences (e.g. solar power producers may be concerned about wind power dominating the renewables market). These areas of conflict and contestation often produce unexpected alliances.

It is also important to recognize that incumbent and challenger alliances are formed around negotiated goals and visions, some more tactical and ephemeral and some more strategic and long-lasting. Socio-technical transitions, particularly those related to sustainability, involve strong normative debates about what is to be transformed and for what/whose purpose (Meadowcroft, 2009). In other words, they require that challengers articulate a shared vision of an alternative future in order to enroll and mobilize key actors and direct attention and resources to particular solutions. Negotiating a shared vision, however, is likely to be contentious even amongst actors within the same broad camp 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). As a result, shared visions may be contested and re-articulated in new ways over the course of the transition process. The ways in which these visions are articulated may in turn have implications for the ability of transition managers to mobilize key actors in support of the transition.

The politics of alliances, in short, are interwoven with the politics of goals or discourses. A key question is whether these are tactical coalitions centering around instrumental priorities or longer term coalitions articulated around strategic priorities, as far as the professed overall goals of the alliance are concerned. We must be sensitive to the possibility that while strategic coalitions may be “green” they may not necessarily be committed to sustainability. As Hess (2012) has argued, if the most powerful elements within a winning challenger coalition are more interested in green products and technologies, as would be the case with finance and

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green industry, it is very likely that the transition will shift away from sustainability and in the direction of green developmentalism. In that sense the priorities of the green industry can be considered instrumental, as far as climate change is concerned, while those of the environmentalists are more strategic. As a result, their alliances may be more fragile. In the following discussion, we explore these political dynamics through the case of Colorado's energy transition.

### **Colorado's energy transition**

Our case study of the NEE and the politics of the 30% RES 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.<sup>(1)</sup> 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),<sup>(2)</sup> the environmental community and labor organizations. We analyzed these qualitative data using both open coding, which allows the analyst to discover important themes within the data, and axial coding, where the analyst reassembles the data around these themes (Strauss and Corbin, 1990). This process allowed us 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 between incumbents and challengers and the goals and discourses around which these alliances mobilized in order to identify factors that shaped the NEE's trajectory.

Before turning to the 30% RES story, we briefly outline the broad contours of Colorado's dominant fossil-fuel based energy economy and identify some of the key incumbent actors as well as their challengers (Table 1). In general terms, actors supporting the incumbent regime include the mining sector, the fossil-fuel industrial sector, utilities, conservative members of the State Legislature and some labor groups. Colorado has significant coal, oil, and gas resources; the mining sector accounts for about 4.8% of the state's gross domestic product and just over 1% of its direct employment (Adams, 2009). In 2009, the Colorado coal industry—represented by the Colorado Mining Association—employed 2392 people and produced more than 28 million tons of coal valued at \$1 billion (Colorado Mining Association, 2009). The oil and gas sector—represented by the Colorado Oil and Gas Association—employed 26,167 Coloradans in 2010 and had a production value of approximately \$400 million in late 2009 (down from a high of \$1 billion in July 2008) (Headwaters Economics, 2012). Oil and gas drilling permits are handled by the Colorado Oil and Gas Conservation Commission, which has long seen its role as a facilitator rather than regulator of the oil and gas industry. Coal is the primary electricity source in Colorado; in 2013, the state received 64% of its electricity from coal, 20% from natural gas, and 17% from renewable sources (EIA, 2014). Renewable electricity generation has grown from practically none in 2000 to its current status, largely due to the RES and at the expense of coal.

In addition to the energy and electricity producers, there are three types of electricity providers in the state, each with its unique interests, opportunities and concerns related to the

<sup>(1)</sup>This research was funded by the Clean Energy Supercluster at Colorado State University. We gratefully acknowledge research assistance from Linse Anderson, Jonathan Fisk, Stratis Giannakouros, and Samantha McGraw. Interviewees have not been identified by name or affiliation in order to ensure anonymity and confidentiality.

<sup>(2)</sup>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.

**Table 1.** Key actors in the politics of the NEE.

<b>Incumbents</b>	<b>Challengers</b>
<i>Industry-related groups</i>	
Xcel Energy (until 2007)	Xcel Energy (since 2007)
Tri-State Generation and Transmission Association	Vestas
Rural Electric Associations	Abound Solar
Municipal utilities	GE Solar
Coal mining companies	Various small solar companies
International Brotherhood of Electrical Workers (utility workers)	Installers (some large home improvement stores)
	International Brotherhood of Electrical Workers (electricians)
<i>Advocacy groups</i>	
Colorado Mining Association	Colorado Renewable Energy Society
Colorado Oil and Gas Association	Colorado Solar Energy Industries Association
	Environment Colorado
	San Luis Valley Renewable Communities Alliance
<i>Public authorities and entities</i>	
Colorado Municipal League	Various Legislators
Colorado Oil and Gas Conservation Commission	Ritter Administration
Public Utilities Commission	National Renewable Energy Laboratory
	Colorado Renewable Energy Collaboratory

transition. 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 (PUC) and are accountable to their shareholders. Xcel Energy, the state’s largest IOU, serves 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 a single 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 production and distribution costs and reinvest any remaining revenue in community development projects.

The array of challengers is more diverse (and fluid) both in terms of economic and environmental priorities. A small solar industry has been around since the 1970s led by groups such as the Colorado Renewable Energy Society, but wind power has been on the ascent during the last 15 years. In addition to the installation of wind farms, some by European companies, Vestas’s 2007 decision to invest \$1 billion to manufacture wind turbines in Colorado has had a significant effect both at the state level and nationally (NREL, 2009). Throughout this period, the solar industry has been concerned about being overwhelmed by wind power. In recent years, it appeared solar was catching up with the growth of Abound Solar and GE’s move into Colorado. However, Abound Solar’s bankruptcy and GE’s retrenchment have diminished the solar industry’s presence although this does not seem to have affected the installation of residential solar. Xcel’s recent decision to buy significant amounts of solar energy from a company now owned by Sun Edison suggests that large scale solar is likely to grow (Community Energy Solar, 2014). There are presently no significant utilities that

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concentrate completely on renewable energy. Rather, renewables depends on existing utilities (and distribution systems), which remain largely dependent on nonrenewables. What is important to note here, then, is that significant components of the challenger alliance—green manufacturers, like Vestas and utility companies, like Xcel—are primarily economic and secondarily environmental actors. Green product manufacturers, for instance, are likely to focus on “green” products more than “green” processes and long-term environmental goals.

In addition to these industry elements, the challengers also include environmentalists and researchers.<sup>(3)</sup> Some of the more mainstream environmental organizations such as Environment Colorado were active participants in the main countervailing coalitions as the NEE unfolded. Others, such as the San Luis Valley Renewable Communities Alliance, remained more skeptical and supported smaller, distributed energy practices rather than large-scale wind and solar power (Smith, 2010). From its creation in 1974 (as the Solar Energy Research Institute), the National Renewable Energy Laboratory (NREL), located in Golden, Colorado, has helped to keep clean energy on the agenda, but it was not until the late 1990s that renewables gained political traction. Colorado saw an 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) and NREL was a major beneficiary of this change. The Colorado Renewable Energy Collaboratory, a research consortium between NREL and the state’s three largest universities, was established in 2006 by federal law and started its operations in 2007 with federal start-up support. While these organizations did not carry the weight of state administrators, producers and utilities, they have and continue to play an important role in promoting renewables in Colorado.

#### **Amendment 37 (2004): Rural development tips the balance**

The RES story (Table 2) begins prior to the Ritter Administration, with the passage of Amendment 37 in 2004, a ballot initiative which established a 10% RES. Several interviewees emphasized the importance of Amendment 37 in creating a window of opportunity for Ritter’s NEE agenda by signaling that Colorado voters were receptive to the idea of creating a new energy future in the state. The Amendment 37 coalition emerged after three failed legislative attempts to adopt a RES in the early 2000s, and in 2004, the initiative resulted in the country’s first voter-approved RES (Rabe, 2008). 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 without raising rates by 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, a provision intended to gain the political support of the solar industry. Otherwise, the utility companies could have met the 10% RES through existing large wind projects. Here, we see contestation amongst the challengers to the incumbent energy regime.

Amendment 37 faced opposition from various quarters, perhaps most significantly from Xcel Energy, which spent at least \$1 million campaigning against it (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 major mistake. Other opponents included the Colorado Municipal Utilities Association, 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. Municipal utilities desired local control and choice of energy use. The REAs argued that

<sup>(3)</sup>We don’t mean to suggest that the incumbent regime does not enjoy popular support or does not have its own researchers. Rather, the power within the incumbent regime is much more centralized in producers and utilities while in the case of the countervailing alliance the balances are still fluid.

**Table 2.** Timeline of Colorado's 30% RES.

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Early 2000s	3 failed attempts to pass an RES in state legislature
2004	Voters passed Amendment 37 ballot initiative
2006	Ritter's gubernatorial campaign introduced the idea of building a "new energy economy"
2007	Ritter entered office and reorganized state government to pursue the NEE agenda State Legislature increased the RES to 20% Vestas invested \$1 billion to manufacture wind turbines in Colorado
2008	Colorado Oil and Gas Conservation commission passed new rules to address environmental and public health concerns related to oil and gas drilling
2009	Ritter declared the oil and gas industry "mission critical" to building the NEE
2010	State Legislature increased RES to 30% and passed the Clean Air Clean Jobs act requiring electricity providers to retire 900 MW of coal-fired electricity by 2020

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the Amendment would disadvantage smaller utilities, even though it allowed an opt-out for associations with less than 40,000 members. Finally, concerns that Amendment 37 would result in reduced coal consumption caused a split within the International Brotherhood of Electrical Workers (IBEW). While one IBEW Local saw the potential for job creation in the solar sector and thus supported Amendment 37, another Local was concerned about their members in the coal energy production industry.

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 normally competing interests. US Congressman Mark Udall (Democrat) highlighted the environmental benefits of the RES while Speaker of the Colorado House of Representatives Lola Spradley (Republican) highlighted the economic benefits in order to appeal to agricultural constituencies in depressed areas in eastern Colorado who 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. This framing allowed Spradley, a very conservative Republican, to cosponsor and campaign for the Amendment, despite her opposition to climate policy. In addition to environmental and rural development constituencies, the pro-Amendment alliance also included the renewables industry and voters in the six Front Range counties most likely to benefit from new jobs and innovation initiatives in the renewables sector (Giannakouros and Stevis, 2014).

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. According to one of the central participants:

"If there's one thing that campaign I think taught us and taught the rest of the country – it was the first initiative of its kind to pass in the country – that regardless of the reasons why you get involved in the NEE, as long as the end result is in common it doesn't really matter. (Interview 12)

Yet, the alliance behind Amendment 37 was partly an instrumental alliance. While environmentalists envisioned a more environmentally sustainable future, others saw opportunities for green development, and still others were interested in any economic benefits they could get.

"Up until Amendment 37, renewable energy was really about the environment and global warming, and it was kind of a fringe element. When Amendment 37 passed, you had a coalition of rural land owners, farmers and ranchers, rural interests, rural bankers, people



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out on the Eastern Plains of Colorado who worried about their town's economic futures, so you had that group. You had environmentalists coming in from the clean energy side. You had a number of renewable energy businesses, mainly wind developers who were looking to establish a market for, and all of these things together, and I think that was really the first time that we really started, .....talking about new energy not simply as an environmental good thing, or in a straight energy context, but it really became an economic development case. (Interview 13)

These priorities were embedded within fundamentally different worldviews which informed the ways in which the various parties joined the alliance and framed its narrative. As the subsequent story demonstrates, sustainability transitions take a long time and powerful forces that join the alliance for tactical reasons are likely to drop out or modify the trajectory of the transition in different directions. Given deepening polarization in US politics, forming such instrumental alliances across partisan divides may be more challenging but not impossible, particularly as the renewables industry becomes more entrenched and mainstreamed.

#### **Ritter's push for a sustainability transition (2006)**

Shortly after the passage of Amendment 37, Ritter launched his campaign for governor and articulated his vision for the NEE. Throughout the 2006 campaign, he emphasized a new image for Colorado's energy future (Ritter, 2006). His campaign team used the term "New Energy Economy" to make clear that the goal was not simply to promote the use of clean energy but to build a new economy based on clean energy. By highlighting the links between clean energy, job creation, and environmental concerns, Ritter sought to maintain and expand the alliance between Democratic constituencies—environmentalists, the emergent renewables industry and urban communities in the Front Range—and more Republican rural concerns that had been instrumental in passing Amendment 37.

Throughout his tenure in office, Ritter and his cabinet members referred to the NEE as an "ecosystem" guided by four principles: diversifying energy, protecting the environment, promoting economic development, and ensuring equity, each of which had to be balanced carefully to provide a hospitable environment for the creation of Colorado's new energy future (e.g. Madden, 2010). 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 and the November 2007 Climate Action Plan was the first official statement of the NEE goals post-election. One campaign insider told us:

"...we wanted our energy policy to be integrated in places with climate policy. You can talk about it in terms of environmental policy or climate policy. That's why it was the "new" energy economy, because we were going to develop jobs being aggressive about energy resources. It was new because it was this integration between these two things, something I believe we lacked at the federal level and that we could do at the state level. (Interview 1)

Ritter's campaign statements clearly demonstrate that he saw Colorado's move to renewables as a means for securing a better environment and a more sustainable future. The challenge was maintaining this vision.

#### **20% RES (2007): Xcel changes camps**

One of Ritter's first legislative proposals was to raise the RES to 20% by 2020, which was relatively easy because Xcel chose not to oppose the measure. Shortly after the passage of Amendment 37 in 2004, the company had issued a Request for Proposals for 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 10% RES 8 years early, and Xcel reportedly began to view

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renewable energy generation as a way to hedge against variability in the cost of coal and natural gas. There is reason to believe that Xcel's switch reflected a change of heart within its upper management, however it also was a pragmatic stance at a time when its older coal fired plants were in violation of federal emission standards.

Xcel's change of policy made it easy to increase the RES, again with the 2% rate cap (HB 07-1281). The opt-out provision for small municipal utilities remained but REAs were now required to meet a 10% standard which, we were told, may have been a form of punishment in response to the intransigence of some REAs. Here, therefore, we see differences emerging not only between IOUs and nonprofit utilities (REAs and municipal utilities) but, also, amongst the latter.

Xcel's shift during this period shows that the politics of transition do not necessarily involve an irreconcilable divide between all incumbents and all challengers. Rather, actors can change camps and, in the process, modify the discourse and goals of the alliance that they join. While Xcel may have become more committed to renewables, it remained fundamentally a nonrenewables company. In joining the challengers, it subsequently shaped the parameters within which challengers would operate in the future and the types of transition policies that would be acceptable.

### **30% RES (2010): Natural gas helps marginalize coal**

In 2010, the Ritter Administration successfully increased the RES to 30% in a much more contentious process that required even more profound compromise and issue linkage. Specifically, this increase was part of a broader compromise connected to the Clean Air Clean Jobs Act (CACJ), which was passed that same year, and requires major utilities to replace, retrofit or retire 900 MW of coal-fired power generation with natural gas or lower or nonemitting fuel by 2018 (Hartman, 2011; Ritter, 2010; Zaffos, 2011). CACJ 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, which in turn further altered the trajectory of Colorado's energy transition (Betsill et al., 2012).

In his early articulation of the NEE vision, Ritter emphasized renewable energy and acknowledged that the state's fossil-fuel resources would be part of the mix but advocated for "measured and responsible development" to protect the environment (Ritter, 2006: 26). In the first two years, the Ritter Administration had an extremely contentious relationship with the oil and gas industry (Barge, 2008). The first major conflict centered around the reorganization of the Colorado Oil and Gas Conservation Commission (COGCC), the state agency that oversees permitting for oil and gas development. When Ritter came to office, the COGCC consisted of seven individuals—a majority of whom 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. In 2007, the legislature passed a bill increasing membership to nine to accommodate wildlife, public health and environmental interests, which then allowed the Ritter Administration to write new rules in 2008 to address drilling-related environmental and wildlife concerns (Davis, 2012). 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 oil and gas industry to weaken the proposed rules through a state-wide mobilization during 2008 (Gilman, 2008; Yates, 2008). The whole process created bad feelings between the Ritter Administration and the oil and gas sector.

"So it was done really quickly, it was done with a Commission that was perceived as hostile to industry and it was a really contentious process, very destructive to many relationships, we're still bearing the brunt of getting over that, there's still hard feelings out there on every side. (Interview 11)

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In 2009, there was a notable shift in how natural gas was portrayed 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, signaling a new alliance between the Administration and the industry that took many environmentalists and renewable energy advocates by surprise (Ashby, 2009). Representatives of the oil and gas industry argued that the switch reflected a learning process facilitated by the 2008 rule-making debates whereby Ritter came to understand the industry's central role in the state's economy (especially related to jobs), which became politically important in light of the global financial crisis. Members of the Ritter Administration suggest this was a tactical move linked to their goal of reducing dependence on coal as the state's major electricity source and that they were never strategically opposed to natural gas (Ashby, 2009).

The 30% RES and CACJ negotiations took place quickly and out of the public eye. The Administration kept the coal industry and REAs in the dark and used parallel negotiations to craft a fragile alliance and dilute political opposition. For example, the oil and gas industry focused its resources on gaining support for CACJ, which they saw as a way to establish new markets for natural gas at a time when prices were very low, and largely stayed silent on the 30% increase. According to a leader of the natural gas industry:

"The Clean Air Clean Jobs Act was the key moment that we were involved and we were welcomed to the party basically..... so to have the Clean Air Clean Jobs Act put us all on the same team was a really watershed moment, and a really exciting opportunity to transition what had been a very emotional debate.... between the groups, gave us an opportunity to work together, and did the same for Republicans and Democrats too. (Interview 11)

Xcel supported the RES increase, for the same reasons discussed above and because it could shift some of its electricity generation away from coal and into natural gas. In the words of a CACJ opponent:

"So Xcel they get.... what's called a 10.5% rate of return on their invested capital.... So if you build a billion dollars of worth of assets you can earn..... 10.5%..... And so it's a really smart move on Xcel's part because if you think about it they'd be the good guys, they say they're targeting all these coal assets, because coal is bad, and we're gonna replace it with natural gas, and with wind and whatever, as long as we get to build those assets and earn that rate of return. Now because, if the PUC or others had said no you don't get to build them somebody else gets to build them, then Xcel wouldn't have gone along with that deal. (Interview 10)

The renewables industry was concerned about the move to gas but was brought along as a result of the 30% RES as well as a host of other provisions. The wind power industry was positioned to provide most of the renewable energy while the wind manufacturing industry saw potential for growth. In order to satisfy small renewables producers, the new RES required Xcel to get 3% of its energy supply from "distributed generation", including rooftop solar, small hydro and wind (Hartman, 2011). Environmentalists were eager to increase the RES both because of long-term commitments to renewables and because they were aware of the shifting relations between the Ritter Administration and the gas industry. In that process "... some far left environmental groups... weren't part of the conversation....cause they really don't like gas" (Interview 6). Labor groups were again split in terms of concerns about job creation but both groups supported provisions to require certification for solar installers, thus softening labor's opposition. A key environmentalist summarized the coalition dynamics:

"....we basically created you know just a little bit of smoke and mirrors, where we're negotiating with Xcel over here, pretending that we've got this whole coalition behind us, but the coalition was fighting amongst each other until really the last day of the whole

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thing.... So that's way more complicated than I just laid out to you, but that's like sort of another example of how sometimes you've got a really messy internal coalition and you all don't want the same thing.... (Interview 6)

### **The NEE and the politics of transitions**

The NEE case highlights that transitions can be expected to generate conflict and contestation because they disrupt and potentially reconfigure existing social and power relations (Grin, 2012; Jordan, 2009; Smith et al., 2005). 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 and support. 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 (e.g. the oil and gas industry's opposition to the 2008 drilling rules).

Perhaps unexpectedly, these dynamics changed over time. It is important to acknowledge that preferences can change and that opponents can potentially become allies due to learning and instrumental considerations. The dramatic shifts by the oil and gas sector and Xcel are good examples. Once Ritter declared gas to be "mission-critical" in 2009, gas joined the NEE alliance, albeit for the same tactical reasons that rural interests had joined the Amendment 37 campaign (Udall, 2009). Similarly, Xcel moved from a committed opponent to the state's energy transition to a strong supporter, although it continues to straddle (and reconfigure) the fossil fuel-renewables divide (Community Solar Energy, 2014; Jafee, 2013). As our account of the politics of RES suggests, such shifts require compromises in order to build and hold together fragile alliances. Scholars and policy makers must try to better understand the nature of these compromises and the forces behind them in order to better anticipate their consequences for 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 saw conflict and contestation within each of these camps over different components of the transition agenda. Environmentalists were not of one mind when it came to CACJ. According to our interviews, some of the more radical groups opposed CACJ because they felt the COGCC rules were too weak to protect public health and the environment in the face of increased drilling. They were joined by community groups who had long felt that the oil and gas industry was not sensitive to local concerns and property rights. Meanwhile more mainstream groups like Environment Colorado saw CACJ as the price to pay for the 30% RES, even though they too were concerned about the shift in the relations between the Administration and the oil and gas industry. The solar industry argued that it faced different challenges than wind and successfully received a "carve out" in each iteration of the RES in exchange for political support. In 2009–2010, the oil and gas industry no longer viewed coal as an ally but, rather, sought to replace it in the state's energy mix through CACJ. This suggests the need to avoid assuming 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, the NEE case suggests there are potential costs to building coalitions amongst entities with disparate interests, not least of which is the redirection of the whole transition trajectory (Jones, 2012; Smith and Sterling, 2010). Our analysis reveals that 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 (Udall, 2009). 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

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environment was much less prominent in the public rhetoric around the NEE, reflecting a general trend in the United States where the public was much more focused on economic issues and jobs in the face of the global financial crisis.

In that sense, there was a dual movement in the trajectory of Colorado's energy transition as it unfolded. First, there was a movement away from the environment as a central goal of a tightly articulated combination of economic and environmental strategies. With this move, economic policies were assumed to serve environmental goals. Second, the move towards gas, combined with some uncertainty in the wind industry during the recession, also suggests a shift from the earlier focus on the renewables industry, and its implications for green production and consumption, to a more conventional form of extractive energy economy, with potential adverse impacts on the climate, limited backward and forward innovation linkages, and aggravated local boom and bust cycles. Like many US states and countries around the world, Colorado is now embroiled in the politics of horizontal hydraulic fracturing (Davis, 2012). Although renewables, particularly wind power, have become an integral component of Colorado's energy economy, the move away from climate policy and the rise in natural gas makes it difficult to say that increasing wind power serves, however indirectly, environmental goals rather than conventional economic development goals. It is fair to say that the normative narrative of the NEE has shifted to one in which the transition to a low-carbon energy system is now more of collateral benefit than a central goal (Giannakouros and Stevis, 2014).

### **Conclusion**

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. In particular, it demonstrates that these dynamics cut across the broad categories of opponents and supporters as members in both groups see opportunities and risks requiring shorter instrumental or longer-term strategic alliances. Our case, therefore, highlights the fluidity of alliances (both in terms of membership and discourses) albeit within some parameters. There is no evidence, for example, of any of the actors changing dramatically. The shifts in the positions of Xcel or the gas industry are more incremental than transformational. Relatedly, while there were major differences within and even more so across alliances, the incumbents who joined the Ritter-led alliance did so for largely instrumental reasons. One important question that emerges is whether such alliances are still possible given the 2014 shift of the state towards the Republican Party. This shift, in fact, brings the state's politics back to the early 2000s. During that period three RES bills were rejected by the Republican Legislature leading to Amendment 37. One can imagine a similar run by an alliance of green business and mainstream environmentalists. Moreover, as green industry has grown in the state it is very likely that such an alliance will tilt more towards green developmentalism than sustainability.

It is worth noting that the politics of these alliances were not solely about the adoption of particular technologies but, mostly, over policy innovations that deployed these technologies in particular ways in an effort to change the energy regime. It is possible, of course, to frame the politics of the NEE transition as a struggle between renewable and nonrenewable technologies. It would, however, skew our understanding of transitions significantly. What we see here is a political struggle over the energy regime largely played out at the level of policy innovations such as the RES, changes to the COGCC, carve outs for solar power, and so on. The literature on socio-technical transitions owes a great deal to efforts at understanding how technological changes were embedded in and intertwined with social forces (Rip and Kemp, 1998). Our case suggests that transition analysis needs to pay closer attention to policy innovation both as part of a socio-technical whole and as a primary driver

of transitions (Hess, 2012; Jordan and Huitema, 2014). Such a move, in our view, is more consistent with the views that transitions are deeply political.

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