

# **New Mexico Energy Transition Act – An Economic Opportunity**

## **Technology Development and Brokering for A Strong New Mexico Economy**

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The COVID-19 pandemic has created unprecedented health and economic difficulties, and it has also heightened awareness of other critical challenges the world faces. Some of these challenges command a sense of urgency that if ignored or delayed could potentially have far-reaching, adverse consequences. However, one of the challenges, a recognized climate crisis, presents a unique opportunity for New Mexico to develop and commercialize advanced technology required to successfully achieve a near-zero carbon environment and grow New Mexico's economy.

New Mexico, accustomed to embracing difficult technology challenges, now has an opportunity to lead the charge to develop or broker<sup>1</sup> new technology, with the same sense of urgency and focus as has been given the COVID health crisis. Toward that end the Advanced Technology Cooperative (ATC), a program of the NM Energy Manufacturing Consortium (NEMCon) seeks to identify and develop technology in support of all facets of the energy sector. The ATC, executed through the collaborative work of Sandia National Laboratories, Los Alamos National Laboratory, University of NM, NM Tech, and NM State University, and private business, is led by Dr. Robert Balch, Director of the Petroleum Recovery Center at NM Tech, Socorro, NM. This group of collaborators has accepted the charge to support the NM Energy Transition Act by considering technologies that enable the economic growth of the state (e.g., businesses that make products, manufactured for the energy sector).

### **What is Energy Transition?**

A move **from** an excessive reliance upon and use of fossil-based energy sources **to** an energy system comprised of clean energy resources is called the energy transition. The transition includes myriad sources of energy such as solar, wind, geothermal, and etc. It also includes battery and non-battery energy storage along with innovative and advanced technology tools to support growing consumer control of their energy use and management. While the increased sourcing of power from renewable resources are key drivers in the energy transition, governing policies and regulations have been less accommodating of the move. However, since the public, investors, and world economies view the transition with such great priority, the needed regulatory and policy changes are seen as imminent.

While regulations and policies have not caught up with the technical and societal demand, the costs have fallen so dramatically that according to the S&P in some regions of the US and Europe, energy sources such as wind power have actually become cheaper than traditional fossil-based sources. So, even with the continued demonstration of cost-effectiveness of renewables the needle may be unable to move as dramatically as needed without supportive policies and regulations.

Reducing or eliminating reliance on fossil-based energy sources and widening the use of renewable sources along with the increasing demand for sustainability has made the reconstitution of the global energy system a necessity. The system which includes clean energy sources, associated networks, power and mobility patterns, and battery and non-battery storage solutions, must be configured in a manner to assure energy reliability, resilience, and stability. Attention to both areas will be necessary to achieve net -zero carbon status. In parallel with meeting the needs of an energy system, there is mounting concern for the environment, which

is driving efforts to drastically reduce greenhouse gas emissions through a variety of decarbonization efforts - carbon capture, usage and storage.

Increasing energy access, reliability and resilience while addressing greenhouse gas emissions, and building the economy are all motivations for making the energy transition. Energy Transitions with similar focus have occurred in the past. In fact, The World Economic Forum (WEF) published a report, **Energy Transition 101: Getting back to basics for transitioning to a low-carbon economy.**<sup>2</sup> The report noted that “the current energy transition – from fossil fuels to low-carbon energy – is not the first energy transition the world has experienced. In fact, this is the fourth major transition to different energy sources. The first (1830-1950) was the shift from traditional biofuels (primarily wood) to coal, the second (1950-1980) consisted of the development and adoption of refined oil products, and the third (1980-2020) involved an increased reliance on natural gas.<sup>3,4</sup>” In summary, the objective of the current transition is like those of the past. The objective continues to be to strengthen an economy and improve the quality of human life.

### **What is the New Mexico Energy Transition Act (ETA)?**

The New Mexico Energy Transition Act is a breakthrough piece of legislation, passed by Governor Lujan-Grisham of New Mexico in 2019. It encompasses the objectives of the global, energy transition and has established New Mexico as a leader in moving toward a clean energy economy by setting the standard with a goal of 100% carbon neutrality by 2045. This legislation, endorsed by the Conservation Voters in New Mexico<sup>5</sup>, is noted as equitable and just legislation “...will save rate-payers money, improve our environment and provide important economic relief to communities impacted by coal plant closures.” NM Energy Manufacturing maintains that it can also be the basis of creating an energy manufacturing industry in the state that will stabilize the state’s economy and provide high-paying, secure jobs.

NM may have a lifetime opportunity to experience a paradigm shift in the economic verve of the state. The international priority to ensure the earth’s temperature does not approach or exceed an increase of 2<sup>0</sup> C positions NM as a major player in the high-tech solutions space. NM can provide supporting technology and system design features to address a variety of functional challenges in global power systems as system redesigns occur. The ability to assume this important role in global problem solving is due in part to the state’s valuable assets and collateral elements – national/federal laboratories, research universities, far-reaching networks of technical expertise, growing capability in advanced additive and 3D manufacturing, and in the state’s commitment to develop and retain a talented and emerging next-generation workforce.

Also, these strong intellectual assets and collateral elements can be viewed as capital available for investment in the national effort to “build back better”. New Mexico should and can sew locally and reap globally. The technical knowledge and experience inherent in New Mexico’s intellectual assets can be exploited by building a manufacturing economy around energy. This will meet the objectives of the transition and enable the production of valuable, manufactured products to serve both the energy sector and the environment. However, the path to success is not free of obstacles. There are and will be some difficulties along the way such as 1) restrictive business policy and regulations, 2) few options for new and existing businesses to access financial capital, 3) state education/training institutions’ aversion to taking necessary risks to develop career skills for nonspecific, high-tech jobs, and 4) a dearth of medium-sized and/or large private businesses to provide the needed infrastructure for business growth and sustainability.

But these difficulties can be mitigated by 1) Innovative technology development or brokering, 2) NM business policy/regulatory revisions, 3) strategic and inclusive business funding

opportunities and practices, 4) well-developed education and training curricula to establish a framework for lifelong learning, and 5) an innovative and well-planned infrastructure to meticulously groom energy-manufacturing businesses. These are all levers to pull across public and private sectors to achieve a stable, prosperous, value-creating state economy.

### **What is the Current Demographic and Economic Picture in New Mexico?**

The 2020 Census lists New Mexico as the fifth largest state in the nation by land mass, with a population of approximately 2.12 million people, largely concentrated in four counties—Bernalillo, Sandoval, Valencia, and Tarrant counties plus the municipalities/cities of Santa Fe and Las Cruces. Additionally, New Mexico has a sizeable and widely dispersed rural population.

New Mexico's population is very diverse, having the largest Hispanic and Latino population in the nation - 49.3%. NM's Native American's make up 11.0% of the overall population and represent 23 Federally Recognized Tribes. Of the remaining population, African Americans make up 2.6% and Asians, Native Hawaiians plus other Pacific Islanders make up 2.0%.<sup>6</sup>

New Mexico also has a large immigrant population, and when combined with the other areas of diversity, can provide a rich mixture of talent to generate vast amounts of creativity and innovation within the state.

However, if the population decreases, all bets may be off. According to an April 29, 2021, AP article, New Mexico's population may dramatically decrease.<sup>7</sup>

Please see some quotes from the article below:

"... New Mexico is likely to watch its population count plateau in the aftermath of the Coronavirus pandemic and then slowly decline with a pronounced drop in school and working-aged residents and a drain on rural areas... At the same time, an increase in the number of elderly residents will place a greater financial strain on programs such as Medicaid and Medicare...In about a decade, New Mexico is projected to start seeing overall declines in population..."

"Hope still abounds that the pandemic and a shift to remote work will bring new interest in New Mexico."

Currently, the New Mexico economy is highly dependent on federal and state government dollars and on the severance industry of oil and gas. However, industry in New Mexico has a fairly diversified job market in health care, tourism, film, and retail, with health care and film on steep trajectories for growth. Currently, only 3.3% of the state's industrial presence is manufacturing. Manufacturing in New Mexico includes food, textiles, jewelry, etc., and a very small amount of energy manufacturing. NM Energy Manufacturing continues to emphatically maintain that by increasing the manufacture of hardware/software products to support the global energy transition, the state's economic strength will increase tremendously.

Although, New Mexico's unemployment rate was 8.2% as of April 2021, it is anticipated that with the announcement of one large manufacturing company and a large distribution center immigrating to the Albuquerque area, unemployment will ease over time. In concert, it is hoped that the legalization of marijuana will help the state's economy. However, experience in other states suggests there are a number of tradeoffs that might reduce the projected revenue from the growth and sale of marijuana products. NM's current government administration states that it is taking proactive steps to control potential challenges that could occur with the legalization of marijuana. While the state has promised enormous value and economic success in all of this business activity, it will take quite a while for the economy to completely recover and stabilize from the effects of the COVID-19 pandemic and economic downturn. However, without a well-

tended and secure industrial base, the ebbs and flows of the New Mexico economy may continue as they have always.

However, lucrative energy manufacturing businesses and rewarding high-tech jobs may help reverse this expected trend. For as it will certainly help counteract the brain drain that New Mexico continues to experience among its college graduates, it will also enable improvements in public education overall – early childhood through high school. A strong tax base and businesses with vested interests will demand nothing less. Therefore, if New Mexico will pull the levers of its thriving entrepreneurial ecosystem, competitive universities, exceptional training institutions among its community colleges, then creating and growing new businesses, sustained by a highly trained, next-generation workforce can be well within reach.

### **How Can the Energy Transition Help The New Mexico Economy?**

It is non-debatable that New Mexico needs to increase the number of good-paying, secure jobs to help stabilize the state's employment condition, reduce disparities in labor market participation and wage gaps, and give underemployed workers opportunities for full integration in the labor force.

NM Energy Manufacturing is certain that a perfect opportunity has arisen to ensure all of the above. As transformation and growth take place in energy markets around the globe, opportunities will abound from the growing demand for advanced energy products and other power and mobility enabling technology. New Mexico can take advantage of this increased demand and build products for export around the world.

According to the International Energy Agency (IEA), in its report, Net Zero by 2050 – A roadmap for the Global Energy Sector [8](#), roughly 40M people today work directly in the oil, gas, coal, renewables, bioenergy and energy network industries. 14M of those jobs are new and have been created as a result of the work being done to achieve Net-Zero Emissions (NZE).

Additionally, the jobs needed to support consumer markets, resulting from the need and desire for more efficient appliances, electric and fuel cell vehicles, and retrofits for buildings along with energy-efficient construction, will further require 16M new employees. This growth suggests that 30M additional jobs are projected that will directly or indirectly create or support clean energy, energy efficient, and low-emissions technologies by 2030.

Investment in electricity generation, electricity networks, energy storage, energy efficiency, carbon abatement, and EV manufacturing will enable tremendous employment growth. Businesses (OEMs) can be established (start-ups) to directly manufacture end products for the energy sector, and businesses can also be started that are suppliers within the supply chain for OEMs.

The task of transitioning to a net-zero emissions environment will certainly bring some challenges – those for which we are prepared, those we anticipate, and those that we don't. However, those challenges can be counterbalanced by purposeful economic growth in the nation and specifically in New Mexico.

### **Some Potentially Overlooked Topics:**

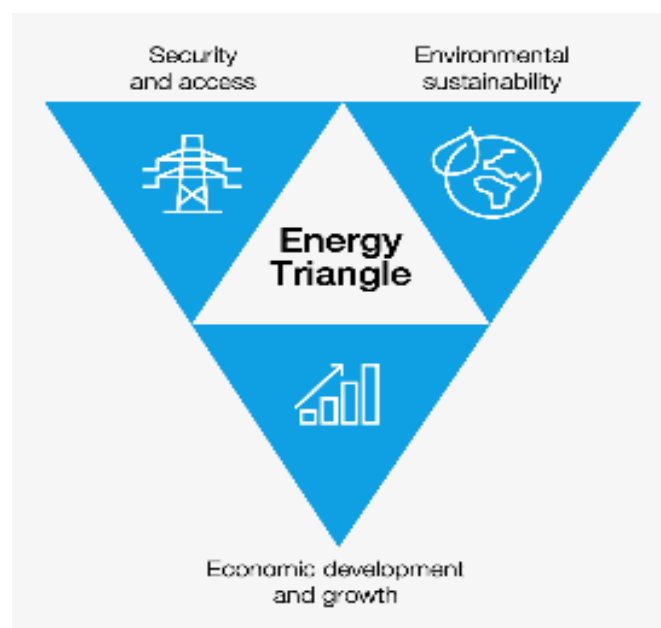
1. Carbon neutrality is complex. If we only consider the components in an energy system, such as source/generation, transmission, distribution, storage, and consumer behavior or usage, the success of the transition journey will be, incomplete, insufficient and disappointing. We need to further consider industries that are among the excessive carbon users and contributors, such as cement, steel, heavy duty road transport, aviation, shipping, plastics, build heating and cooling, etc. These industries require advanced technology to achieve net-zero emissions. And

products from that advanced technology can be manufactured in New Mexico for export around the world.

2. Recently we observed a reduction in GHGs, albeit under very dire and painful conditions. Greenhouse gas emissions declined by 8% in 2020 per the International Energy Agency (IEA), their lowest level since 2010. However, this was not caused by structural or regulatory changes but by the COVID health crisis and the subsequent economic setback. But none the less we got to see how the environment can improve with widespread effort and dedication to the Energy Transition.

Now, post-health crisis, the nation must recommit to providing efficient structural and progressive regulatory interventions. The energy transition will require the same focus and intensity as the response to COVID with support from federal and state government, consumers, industry, and a variety of institutions.

3. The World Economic Forum (WEF) report<sup>2</sup> notes that “economic prosperity is deeply dependent on energy access and consumption.” In summary this report suggests that although the current energy transition is mainly driven by environmental sustainability concerns, it will only succeed if it simultaneously provides energy security and access and directs economic growth and development. See the diagram below from the WEF report as it serves as an illustration of the balance of previously mentioned outcomes.



### **Summary:**

The Energy Triangle is an effective means of depicting and understanding the complexity of the task at hand. The nexus of the environment, people, and the economy must achieve an equitable, yet fluid balance to successfully achieve the hoped-for outcomes in the energy transition, especially the New Mexico energy transition. It will take deliberate political, financial, and social will to make meaningful and lasting change in the state, and that will be difficult for the state of New Mexico. Executing a plan to develop an economy from internal strengths has not been a part of the state's history, so the challenge of developing an executable, economic development plan for and by the people of New Mexico is unprecedented. All in all, we will just

have to wait and see if the goals of the New Mexico energy transition are achieved in the best interest of the state's residents and if they are met within the appointed time.

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1. The concept of **technology brokering** is to consider multiple, otherwise disconnected technologies, and then see how these existing technologies could be used to create breakthrough innovations in a focused market.

2. **Energy Transition 101: Getting back to basics for transitioning to a low-carbon economy**, [http://www3.weforum.org/docs/WEF\\_Energy\\_Transition\\_101\\_2020.pdf](http://www3.weforum.org/docs/WEF_Energy_Transition_101_2020.pdf)

3. Smil, Vaclav, "Energy (r)evolutions take time", World Energy, 44:10-14, 2019. Note that Smil also mentioned a revolution with the invention of electricity, however, this article focuses on transitions of energy sources instead of distribution

4. Ritchie, Hannah and Max Roser, "Energy", Our World in Data, July 2018, <https://ourworldindata.org/energy>; Underlying sources: Smil, Vaclav, "Energy Transitions: Global and National Perspectives", BP Statistical Review of World Energy, 2017.

5. [https://cvnm.org/the-energy-transition-act-eta-myths-facts/#:~:text=The%20Energy%20Transition%20Act%20\(ETA\)%20is%20a%20keystone%20piece%20of,100%25%20carbon%20neutral%20by%202045](https://cvnm.org/the-energy-transition-act-eta-myths-facts/#:~:text=The%20Energy%20Transition%20Act%20(ETA)%20is%20a%20keystone%20piece%20of,100%25%20carbon%20neutral%20by%202045)

6. **Quick Facts for New Mexico, from the United States Census Bureau**, <https://www.census.gov/quickfacts/fact/table/NM/POP010220#POP010220>

7. <https://apnews.com/article/nm-state-wire-new-mexico-health-coronavirus-census-2020-245e6a215c1e45f5463beb5c7b7604f7>

8. <https://iea.blob.core.windows.net/assets/0716bb9a-6138-4918-8023-cb24caa47794/NetZeroby2050-ARoadmapfortheGlobalEnergySector.pdf>