Western RTO Economic Impact Study

Colorado Results

Prepared for Advanced Energy United (previously Advanced Energy Economy)
by Energy Strategies, LLC, and Peterson & Associates
November 2022

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Executive Summary

In July 2022, Advanced Energy United (previously Advanced Energy Economy) released the *Western Regional Transmission Organization (RTO) Economic Impact Study: Region Wide Analysis*. That report provides a summary of the methodology and assumptions used to assess the non-energy economic impacts that might accrue to the West due to the development of a broad, West-wide organized electricity market or RTO. The report, prepared by Energy Strategies and Peterson & Associates, filled a research gap on the broader economic impacts that might result from the electricity cost savings and structural changes brought about by a potential RTO in the West. The region-wide analysis summarizes the total, combined economic impacts for the 11 Western states that were evaluated as part of the study effort.

This summary document provides the high-level economic impacts expected to accrue to Colorado, specifically, from the development of a West-wide RTO. It demonstrates that operation of a West-wide RTO can bring substantial economic growth, including new jobs, new indirect business taxes, and increases to Gross State Product (GSP) to Colorado.[1] This study focused on evaluating two broad categories of economic impacts that may occur in Colorado from an RTO:

1. The economic impacts to Colorado from **increased spending power for households** that would occur due to electricity prices being lower under an RTO than under the status quo for electricity markets in the region, and
2. The economic impacts from **new or expanded business activity** due to RTO development, including both:
    a. The impact of lower electricity prices for businesses, incentivizing them to expand in or locate to Colorado, and
    b. Structural changes to the electricity market enabling new renewable energy development contracts to meet corporate clean energy demand, which is currently taking place primarily in regions with RTOs.

Studying the potential impacts of an RTO resulted in a range of forecasted economic impacts to Colorado. This range reflects the uncertainty in how sensitive firms ultimately are to electricity prices and on how much additional clean electricity generating capacity would be built due to the new contracting structures enabled by the RTO. While the range of impacts is fairly wide, the results demonstrate that, even on the low-end, the economic benefits of an RTO to Colorado are expected to be substantial. The range of economic impacts to Colorado, in the 2030 timeframe, is illustrated below in Figure 1.

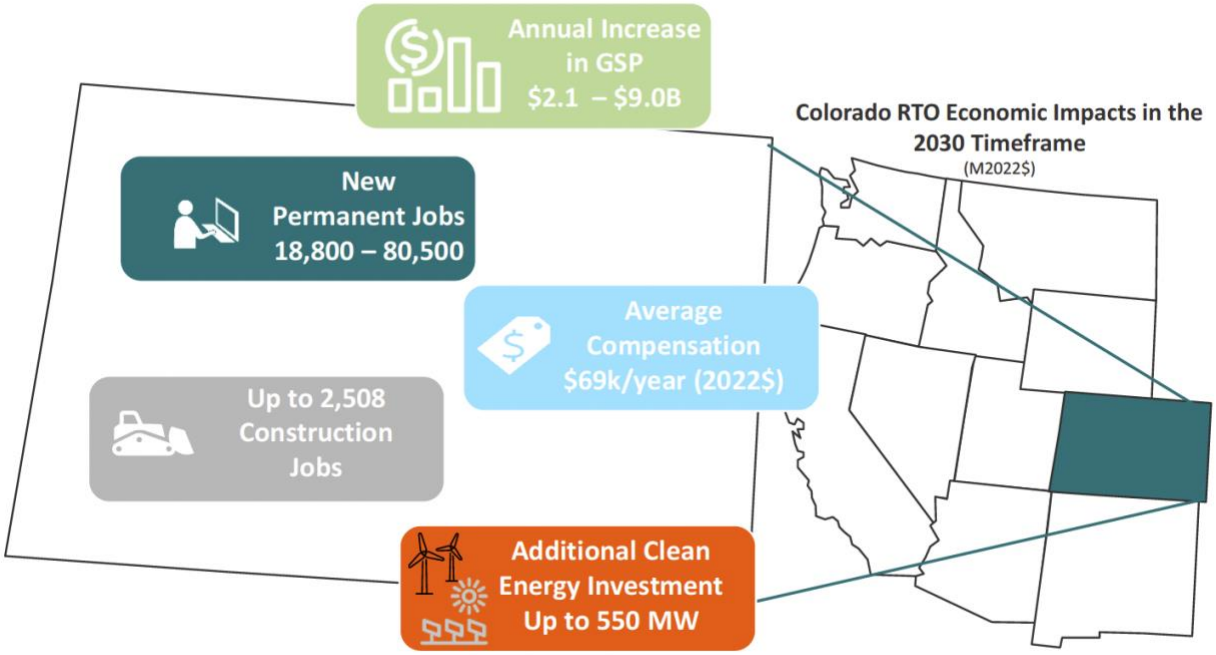
[1] All of the caveats, considerations, assumptions, and disclaimers discussed in the *Western RTO Economic Impact Study: Region Wide Analysis* also apply to this summary document. Readers looking for more detailed information, and to understand the qualifications of this study work, should refer to that report.

In summary, the creation of a West-wide RTO is expected to:

- Result in about **$139 million per year in electricity cost savings for Colorado** compared to operation of the electrical grid without a West-wide RTO (after taking into account likely RTO operational costs for Colorado)[2]
- Provide between **18,800 and 80,500** permanent jobs across the state, with those jobs averaging total compensation (payroll plus benefits) of roughly $69,000 per year
- Generate **between $2.1 billion and $9 billion in additional, ongoing/permanent GSP** per year across the state (equivalent to 0.5% to 2.4% of Colorado's current GSP)
- Produce incremental state and local tax contributions ranging between **$52 million and $216 million per year**
- Create up to **2,500 temporary construction jobs in 2030** from the development of additional clean energy resources to meet corporate demand, resulting in an additional up to **$215 million in GSP and $4 million in taxes** on a temporary basis; and
- If an RTO were to locate in Colorado, the incremental direct investments (in the form of hardware/software, office space and staffing to support the RTO's operations), **would result in additional economic benefits to the state**, the range of which is summarized in Appendix A of the Western RTO Economic Impact Study: Region Wide Analysis.

[2] This calculation of electricity cost savings does not account for ***all*** potential benefits or costs of RTO formation/operation that might affect individual utilities or states. The quantified RTO benefits include only a subset of potential benefit categories and do not account for, for instance, the benefits of centralized transmission planning or enhanced reliability offered by an RTO. The RTO operational costs also do not account for all cost impacts from RTOs. For instance, utility-level investments and staffing costs that may be required to participate in an RTO are highly dependent on the specifics of a utility's situation and have not been analyzed and netted from gross benefits in this study. Additionally, transmission cost shifts that may occur due to RTO formation (eliminating the need for one utility to pay another utility to utilize their transmission system) have not been evaluated in the context of this study.

Figure 1 – Summary of Range of Colorado's Non-Energy Economic Impacts Associated with RTO Formation



These benefits to the Colorado economy would be driven by lower electricity prices (in comparison to a case without an RTO) for households and businesses, additional clean energy development across the state, and expansion of existing or attraction of new businesses to Colorado, which may decide to locate or expand in the state from the competitive advantage gained from lower electricity prices. The industries affected by this advantage include those crucial to the state's long-term economic strategy, including the potential to expand building construction and various manufacturing activities. The direct growth that may occur in various industries will also have indirect and induced effects (also called "multiplier effects") as the increased direct economic activity flows through the Colorado economy.

Electricity Price Benefits Net of RTO Operational Costs for Colorado

Table 1 illustrates the assumed gross RTO benefits for Colorado,[3] the estimated RTO operational costs for Colorado, and the benefits of RTO operation net of RTO operational costs. The assumed levels of savings associated with RTO operation were a key input into this study's economic impact analysis.

Table 1 – Calculation of RTO Benefits Net of Operational Costs for Colorado

Colorado (Millions 2022$)	2025	2030	2035
Gross RTO Benefits	$139	$174	$174
RTO Administrative Costs	$33	$35	$37
Benefits of RTO Operation Net of RTO Operational Costs	$106	$139	$137

Economic Impact to Colorado from Increased Spending Power for Households

Table 2 presents the economic impacts to Colorado from increased spending power for households due to lower electricity prices afforded by an RTO. These results factor in the "leakage" that is expected out of the economy,[4] as well as the impact of the direct and multiplier effects attributed to an increase in household expenditures that can occur when electricity prices in Colorado are lower with an RTO than they otherwise would have been.

[3] These data points were generally taken from the "*State-Led Market Study*" (*Exploring Western Organized Market Configurations: A Western State's Study of Coordinated Market Options to Advance State Energy Polices*) dated July 30, 2021 which includes two companion reports: Technical Report, Market and Regulatory Review.

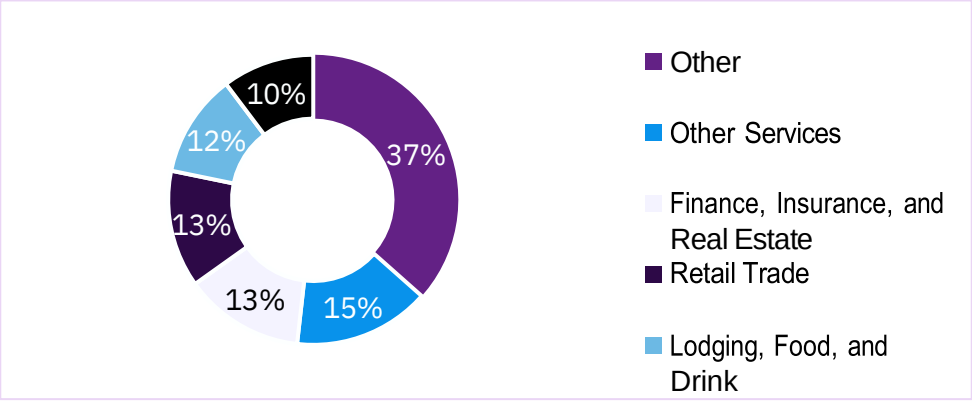
[4] Leakage accounts for the fact that some of the increased spending for goods and services will leave the economy and will not recirculate within it (for instance, it may be spent on goods overseas).

Table 2 – Annual Economic Impact to Colorado from Increased Spending Power for Households due to an RTO

Colorado Economic Impacts from Increased Spending Power for Households	2025	2030	2035
Pre-Leakage Electricity Cost Savings (Millions 2022$)	$106	$139	$137
Post-Leakage Electricity Cost Savings (Millions 2022$)	$79	$104	$102
Gross State Product (Millions 2022$)	$102	$135	$133
Total Compensation (Millions 2022$)	$61	$81	$80
Total New Ongoing Jobs (FTEs)	1,077	1,419	1,398
Total Indirect Taxes (Millions 2022$)	$4.7	$6.3	$6.2

Figure 2 shows the top industries in Colorado that are expected to be affected by increased spending power for households and which see new employment created in the state.[5]

Figure 2 – Jobs Created in Colorado (2030) from Increased Spending Power for Households due to an RTO



[5] Industry names are reflective of the North American Industry Classification System (NAICS) two- and three-digit codes.

Economic Impact to Colorado Associated with Expanded Business Activity and Clean Energy Investment

New and Expanded Business Activity from Lower Electricity Prices

The *Western RTO Economic Impact Study: Region Wide Analysis* discussed the potential for increased economic activity from additional and expanded business activity associated with the competitive advantages offered by lower electricity costs. Figure 3 and Table 3 illustrate the range of potential direct employment impacts in Colorado, by industry, from the RTO's ability to lower electricity prices from what they otherwise would be which, in turn, can increase business formation and business growth within Colorado. Table 3 includes both low-end and high-end bookend values for 2030, along with the current employment and compensation by industry for context.

Figure 3 – Composition of Direct Job Growth in Colorado, by Industry, from Additional Business Activity

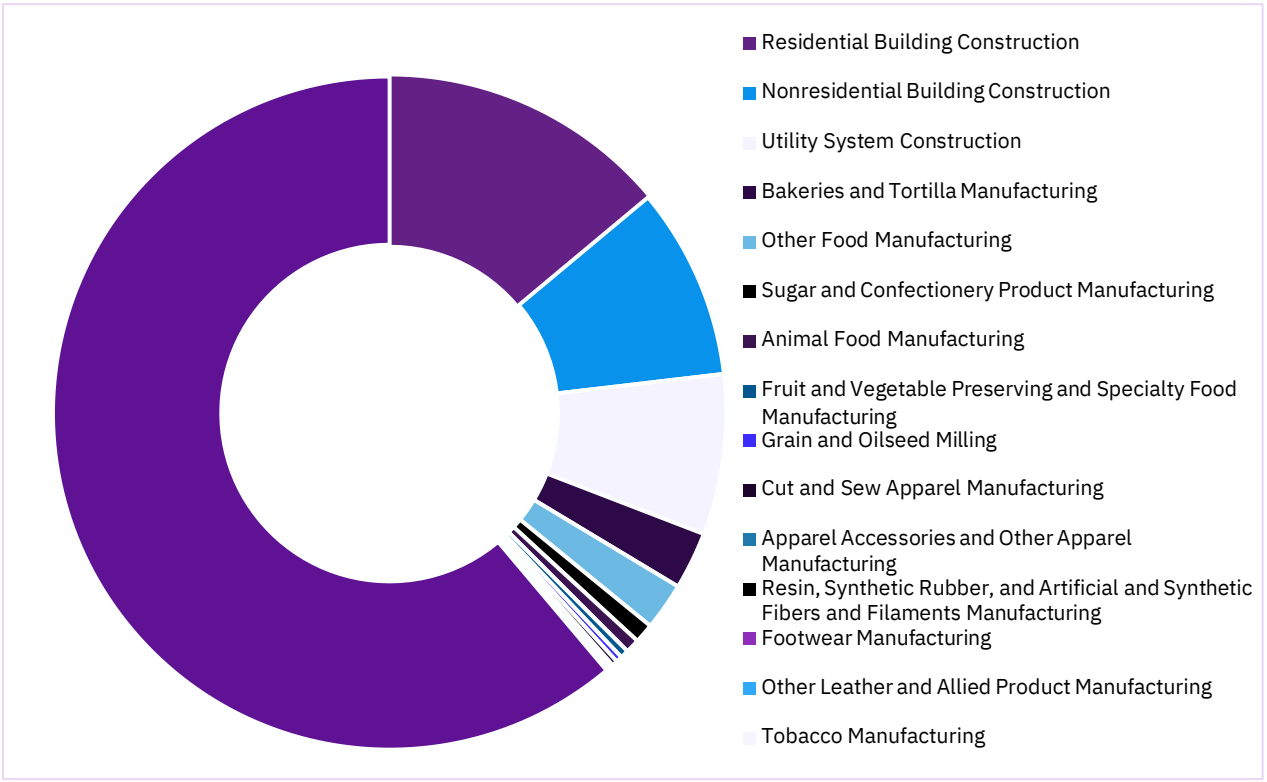


Table 3 – Key Industries Expected to Grow or Locate in Colorado Due to Lower Electricity Prices from an RTO

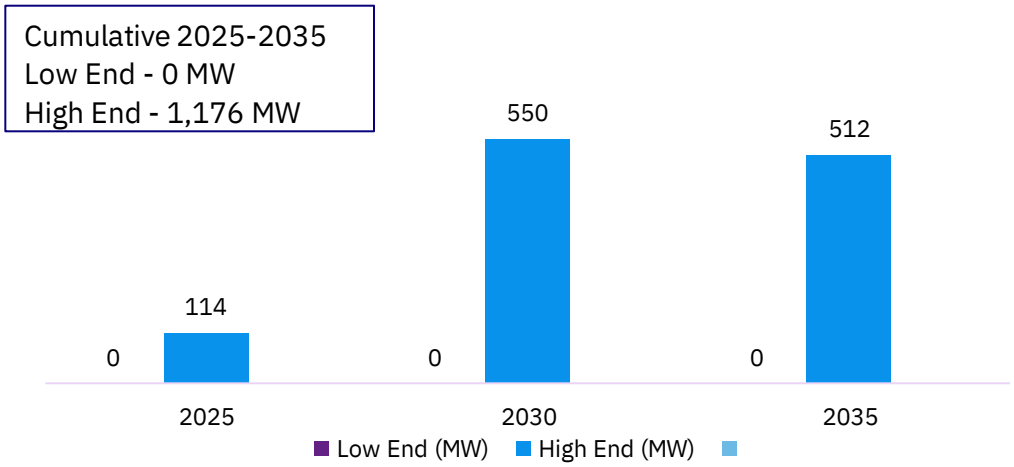
	Industry	Low Direct Growth FTE (2030)	High Direct Growth FTE (2030)	Current Employment (2022)	Average Annual Payroll and Benefits
1	Residential Building Construction	830	3,770	27,231	$77,212
2	Nonresidential Building Construction	549	2,495	17,832	$101,952
3	Utility System Construction	459	2,086	14,737	$93,761
4	Bakeries and Tortilla Manufacturing	165	750	5,439	$51,229
5	Other Food Manufacturing	136	617	4,206	$67,195
6	Sugar and Confectionery Product Manufacturing	56	252	1,829	$63,413
7	Animal Food Manufacturing	40	184	1,317	$82,049
8	Fruit and Vegetable Preserving and Specialty Food Manufacturing	24	108	766	$64,321
9	Grain and Oilseed Milling	18	82	572	$67,492
10	Cut and Sew Apparel Manufacturing	16	71	535	$44,192
11	Apparel Accessories and Other Apparel Manufacturing	7	30	216	$45,688
12	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	6	25	175	$89,500

13	Footwear Manufacturing	5	22	132	$26,762
14	Other Leather and Allied Product Manufacturing	4	20	150	$48,516
15	Tobacco Manufacturing	1	6	60	$46,213
	All Other Directly Affected Industries	3,643	16,553	116,368	$106,879
	Total Employment in Directly Affected Industries	**5,958**	**27,072**	**191,563**	**$100,849**

Incremental Clean Electricity Resource Investment

Development of an RTO may also result in increased clean electricity resource development in the West, including in Colorado. This analysis assumed that the additional demand would be driven by voluntary corporate clean energy contracting, which is currently taking place primarily in regions with RTOs. Figure 4 shows the new clean electricity investments (in MW) in Colorado for the low end and high-end cases by year. In the low-end it was assumed that Colorado does not see any incremental clean energy development due to the formation of a West-wide RTO. On the high-end, Colorado could see up to 1,176 MW of incremental clean energy development over the 2025-2035 timeframe.

Figure 4 – Additional Clean Electricity Construction Estimated in Colorado with an RTO



Combined Results from New/Expanded Business Activity and Incremental Clean Electricity Investments

Tables 4 and 5 report the economic impacts from the new business activity and new clean energy investments broken out by year and by permanent or temporary construction impacts. Note that Tables 4 and 5 do *not* include the impacts from lower electricity prices on households, which are included later in the document (in Tables 6 and 7).

Table 4 – Low-End Economic Impact from New/Expanded Business Activity and Clean Electricity Investments in Colorado

Colorado Low-End New Business Economic Impacts	Type	2025	2030	2035
Gross State Product (Million 2022$)	Permanent	$1,636	$1,945	$1,840
	Construction/Temporary	$0	$0	$0
Total Compensation (Million 2022$)	Permanent	$1,016	$1,209	$1,143
	Construction/Temporary	$0	$0	$0
Total Jobs (FTE)	Permanent	14,606	17,369	16,434
	Construction/Temporary	0	0	0
Total Indirect Taxes (Million 2022$)	Permanent	$38	$45	$43
	Construction/Temporary	$0	$0	$0

Table 5 – High-End Economic Impact from New/Expanded Business Activity and Clean Electricity Investments in Colorado

Colorado High-End New Business Economic Impacts	Type	2025	2030	2035
Gross State Product (Million 2022$)	Permanent	$7,438	$8,864	$8,407
	Construction/Temporary	$59	$215	$190
Total Compensation (Million 2022$)	Permanent	$4,620	$5,501	$5,212
	Construction/Temporary	$44	$160	$142
Total Jobs (FTEs)	Permanent	66,390	79,032	74,860
	Construction/Temporary	685	2,508	2,218
Total Indirect Taxes (Million 2022$)	Permanent	$174	$209	$201
	Construction/Temporary	$1.1	$4.0	$3.6

Range of Total Economic Impacts for Colorado

This section provides the total range of anticipated economic impacts, including impacts from increased household spending power and impacts to businesses (both new/expanded business activity from more competitive electricity prices and new clean electricity resource development). Table 6 illustrates the low-end total economic impacts, by year and Table 7 illustrates the high-end impacts.

Table 6 – Low-End Total Economic Impacts Results for Colorado Attributed to RTO Formation

Colorado Low-End TOTAL Economic Impacts	Type	2025	2030	2035
Gross State Product (Millions 2022$)	Permanent	$1,738	$2,080	$1,973
	Construction/Temporary	$0	$0	$0
Total Compensation (Millions 2022$)	Permanent	$1,078	$1,289	$1,223
	Construction/Temporary	$0	$0	$0
Total Jobs (FTEs)	Permanent	15,683	18,788	17,832
	Construction/Temporary	0	0	0
Total Indirect Taxes (Millions 2022$)	Permanent	$43	$52	$49
	Construction/Temporary	$0	$0	$0

Table 7 – High-End Total Economic Impact Results for Colorado Attributed to RTO Formation

Colorado High-End TOTAL Economic Impacts	Type	2025	2030	2035
Gross State Product (Millions 2022$)	Permanent	$7,540	$8,999	$8,540
	Construction/Temporary	$59	$215	$190
Total Compensation (Millions 2022$)	Permanent	$4,681	$5,582	$5,292
	Construction/Temporary	$44	$160	$142
Total Jobs (FTEs)	Permanent	67,466	80,451	76,259
	Construction/Temporary	685	2,508	2,218
Total Indirect Taxes (Millions 2022$)	Permanent	$178	$216	$207
	Construction/Temporary	$1.1	$4.0	$3.6

The charts below (Figures 5, 6, and 7) illustrate the range of economic impacts that might be expected to accrue to Colorado based on the low-end and high-end cases assessed in the study. They represent, in chart format, the same information that can be found in Tables 6 and 7. Figure 5 illustrates, by representative year, the expected increases in **ongoing** GSP, total compensation (payroll and benefits,) and indirect business taxes that could be added in the state due to the existence of an RTO. Figure 6 illustrates the **construction/temporary** economic impacts, based on the year in which the construction is expected to take place. And Figure 7 shows the range of both **permanent and temporary jobs** that could be created in the state.

Figure 5 – Permanent Economic Impacts to Colorado from an RTO

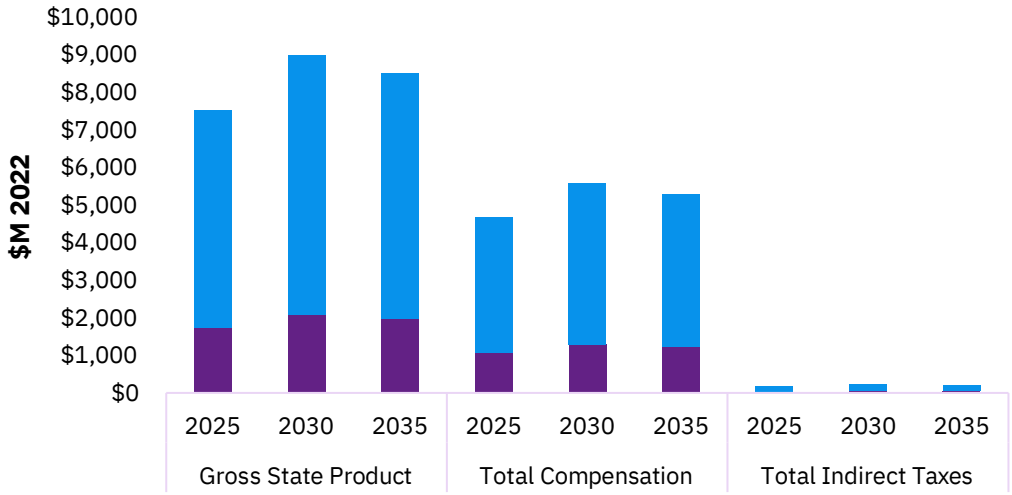


Figure 6 – Construction/Temporary Economic Impacts to Colorado from an RTO

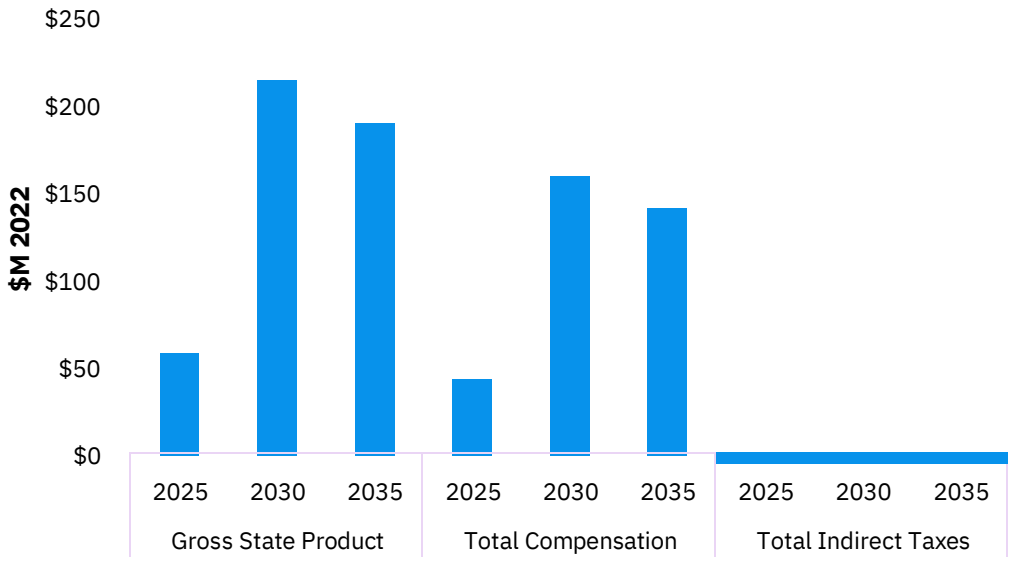
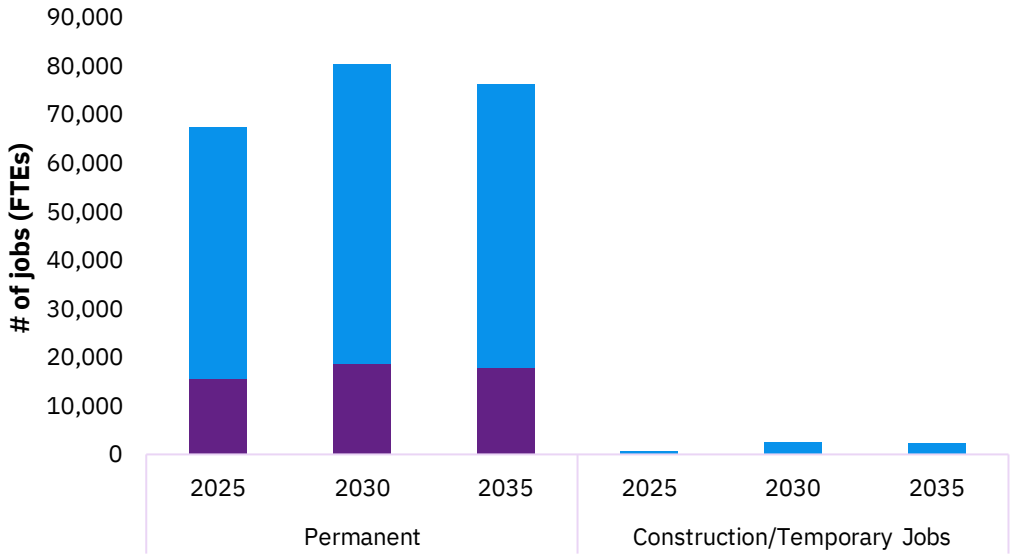


Figure 7 – Permanent and Temporary Colorado Jobs (FTEs) Created by an RTO



Additional Impacts from Direct RTO Investments

Additional, positive economic impacts could also result if incremental RTO investments were to take place in Colorado. While no attempt was made to identify in which state(s) these investments would occur, the West-wide report provides a general range for the magnitude and types of impacts that a state such as Colorado might expect if the incremental RTO investments needed for a West-wide RTO were to occur in the state.

Conclusion

Based on the results of this study work, the State of Colorado can expect significant economic benefits from a West-wide RTO. Benefits to the economy are anticipated to be driven by:

- Electricity cost savings providing higher levels of disposable income for households than they would have in a continuation of the current electricity market structure;
- Expansion of existing or attraction of new businesses to the Western states, including Colorado; and
- The potential for additional clean electricity resource development in the state to meet corporate demand.

The sooner RTO development occurs, the sooner Colorado can begin to realize these economic benefits.