Clean Power Plan: New Jersey Rate-Based and Mass-Based Compliance Scenarios

The following three charts illustrate two key Clean Power Plan (CPP) compliance pathways for New Jersey: a rate-based program, in which Emission Rate Credits (ERCS) would be required for compliance; and a mass-based program for existing facilities, in which allowances would be required for compliance. The charts estimate the cumulative ERC and allowance needs for the 24 fossil generation facilities in NJ that would be regulated under the CPP, as well as the net compliance surplus or deficit throughout the compliance phase-in period from 2022 to 2030. The charts are followed by a data table showing all data used to generate the charts.

1. **Rate-based Program – New Jersey ERC Demand and Generation**. This chart estimates the cumulative generation of ERCs assuming that energy efficiency (EE) increases at 0.5% per year and CPP-creditable renewable energy (RE) remains constant at 10%. The chart also shows the estimated cumulative projected demand for ERCs, as well as the resulting cumulative net surplus of ERCs through the end of the compliance period. The EE and RE assumptions are reasonable assumptions that we characterize as in the "most likely range" in chart #2 based on EPA's adopted and proposed CPP rules. These estimates may be affected by review of the CPP rules by the courts, and revision and finalization of CPP rules by the EPA.

2. **Rate-based Program – New Jersey Cumulative Net ERCs for Different Energy Efficiency and Renewable Energy Scenarios**. This chart estimates the cumulative net ERC surpluses for six different combinations of EE and RE generation scenarios. Even the lowest ERC generation estimate (0.5% EE and 5% RE) would result in a surplus of ERCs. That means NJ's existing EE and RE programs are likely to generate more ERCs than will be required for the CPP-regulated power plants to comply with the CPP. The higher EE and RE generation scenarios indicate that the surplus could be very large. New Jersey's 2030 ERC need is estimated to be about 12 million ERCs per year. This analysis indicates that NJ is likely to have 37 million excess ERCs in 2030, and may have as many as 87 million excess ERCs in 2030, contingent on the performance of NJ's EE and RE programs and the final EPA rules.

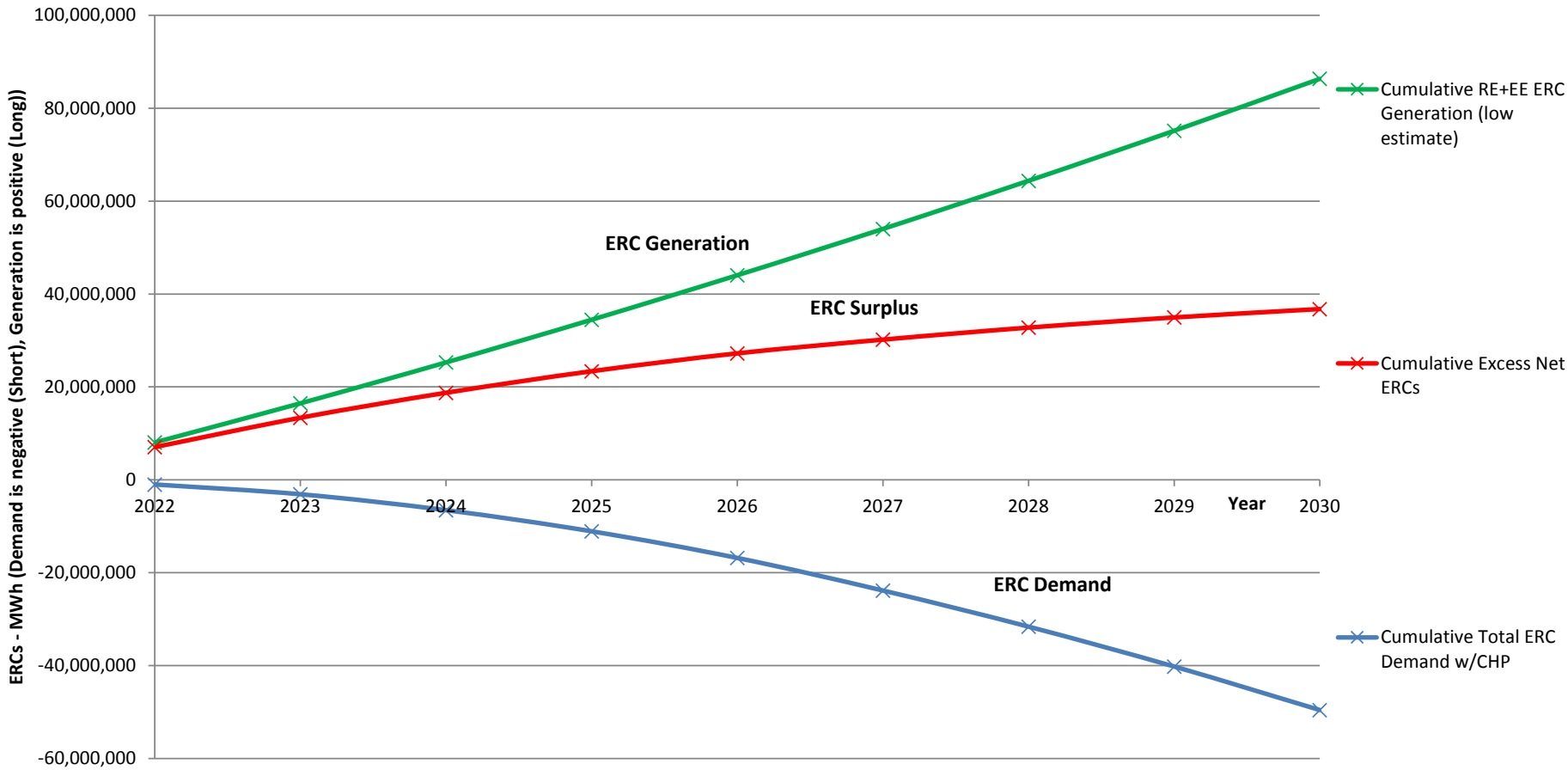
3. **Mass-based Program (Existing Facilities) – New Jersey Cumulative Allowance Demand and Allocation**. This chart estimates allowance deficits throughout the CPP compliance period. Allowance deficits occur because EPA's allowance allocations to NJ are not sufficient to cover the estimated CO_2 emissions from the CPP-regulated units, based on discussions with each company that would be regulated under the CPP. By 2030, the allowance deficit is estimated to be about 55 million tons. We estimate an allowance need in 2030 to be about 24 million allowances.

Acronyms Used

CHP	Combined heat and power
CPP	Clean Power Plan
EE	Energy efficiency
ERC	Emission rate credit
GS-ERC	Gas-shift emission rate credit
MWh	Megawatt hour
RE	Renewable energy
RPS	New Jersey Renewable Portfolio Standard

Source: New Jersey Department of Environmental Protection, September 14, 2016

CPP - New Jersey ERC Demand and Generation
w/CHP Credit for 3 Facilities with Existing CHP, w/o GS-ERCs
Rate-Based Program (0.5% annual EE increase, 10% constant RE)



Notes:

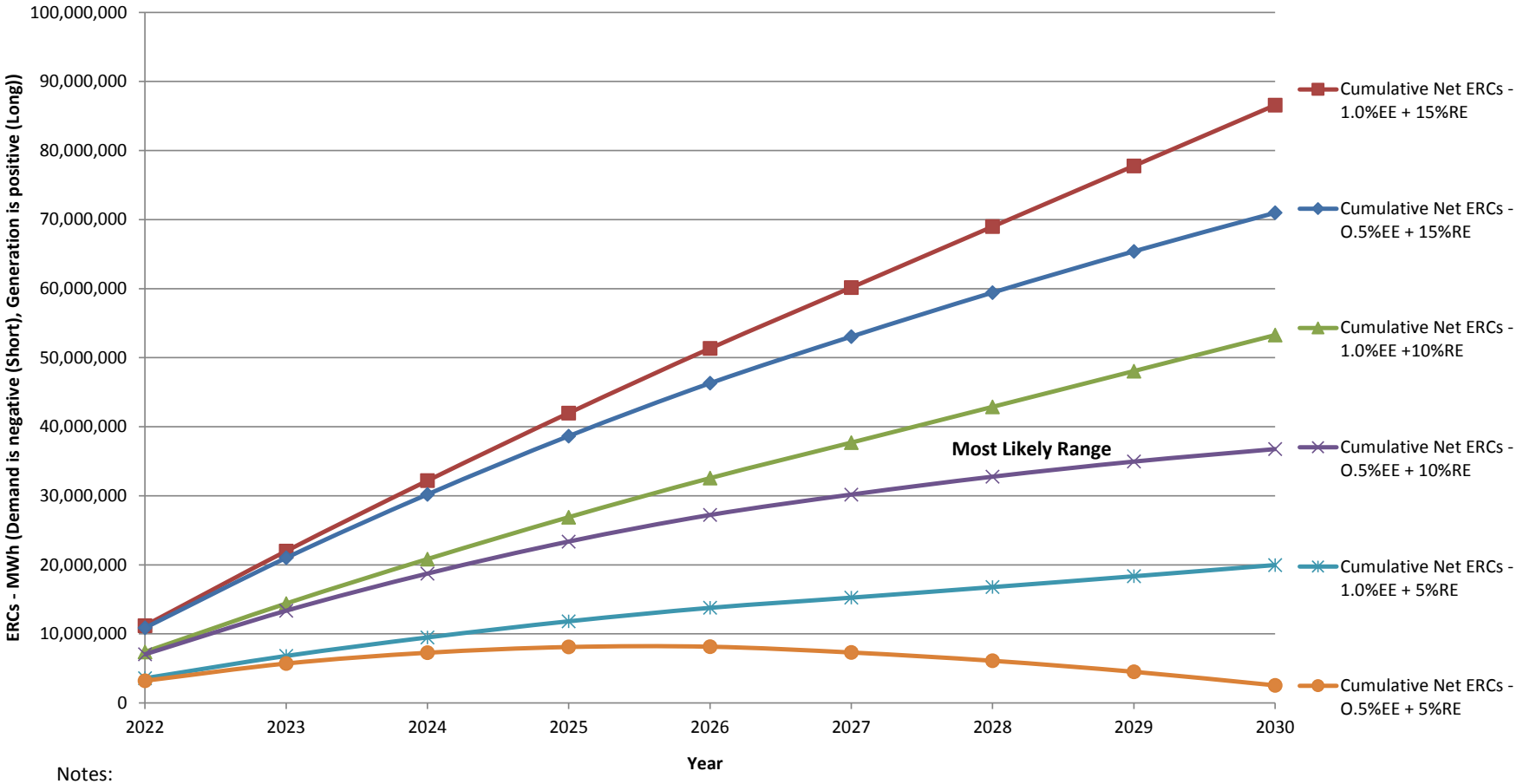
1. Future operations of affected facilities based on 2016 owner rough estimates. ERC demand is based on: 40M MWh/yr NGCC and 3-4M MWh/yr coal boiler generation, shutdown of 5 affected facilities and existing CHP "credit' of 4M MWh/yr.
2. EE ERCs assumed to be generated from EE at 0.5% increase per year and RE ERCs assumed to be generated from a constant RE level of 10% (of NJ electric demand) throughout the compliance period. This is a low estimate. EE levels could achieve 1.0% per year and ERC-eligible post 2012 RE could produce 15% RE by 2022 based on NJ's 24% RPS requirement; of which 9% occured prior to 2013.
3. GS-ERCs are generated, but not assumed to be used because ERC demand for NJ steam units are small due to CHP credits. GS-ERCs are not shown in this chart which makes the regular ERC demand somewhat higher than would occur because steam units could use GS-ERCs.

Source: New Jersey Department of Environmental Protection, September 14, 2016

CPP - New Jersey Cumulative Net ERCs for Different EE and RE

w/CHP Credit for 3 Facilities With Existing CHP, w/o GS-ERCs

Rate-Based Program (0.5% or 1.0% annual EE increase, 5%, 10% or 15% constant RE)

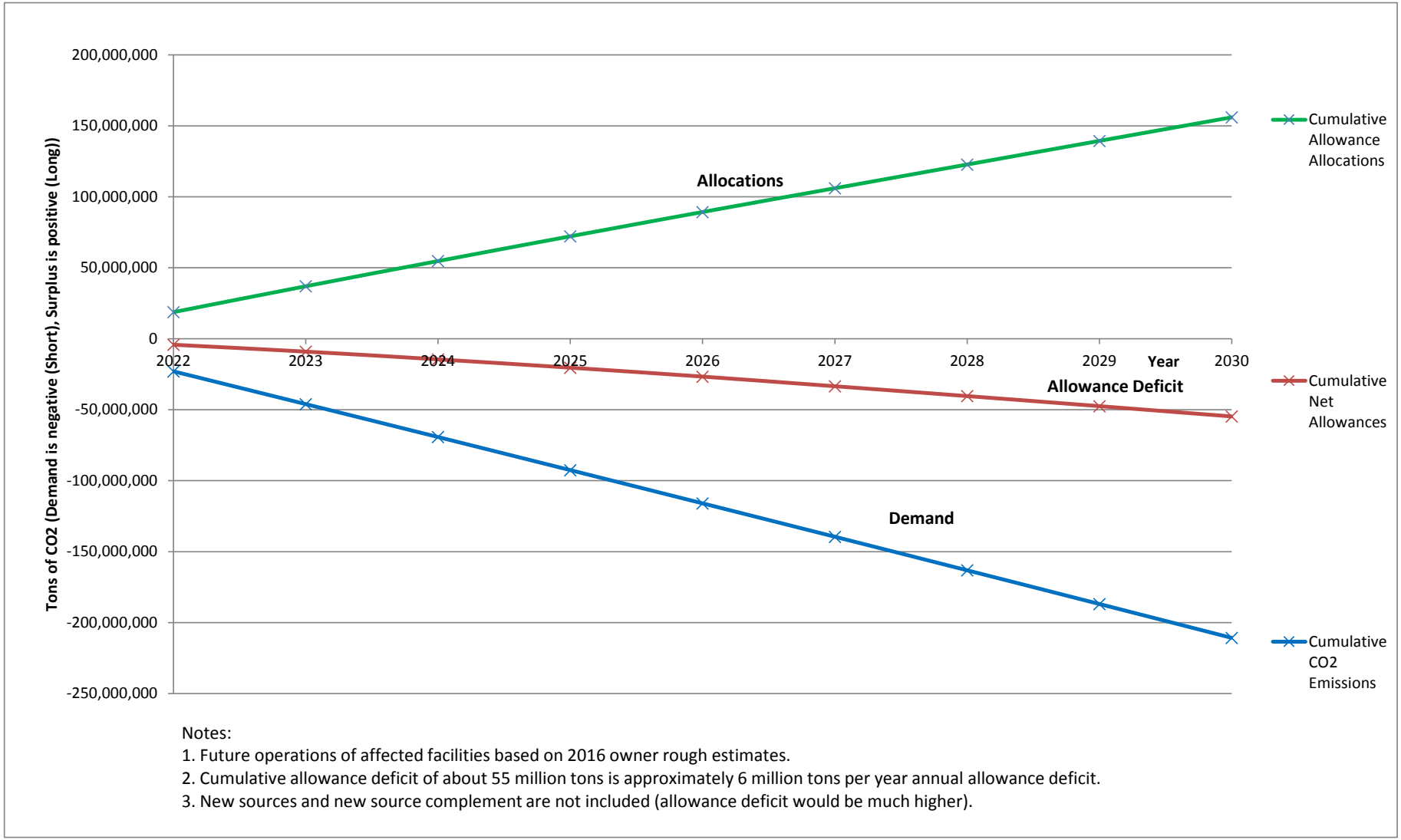


Notes:

1. EE ERCs assumed to be generated from EE at 0.5% or 1.0% per year (compounded). 0.5% annual EE increase is approximate current rate of increase. 1.0% annual EE increase is USEPA assumed rate of EE increase from the Regulatory Impact Analysis for the Clean Power Plan Final Rule, EPA-452/R-15-003, August 2015, p. 3-13.
2. RE ERCs assumed to be generated from constant RE levels of 5%, 10% or 15% throughout the compliance period. 5% assumes RE primarily from NJ sources. 10% assumes half of RE is from sources located in other states. 15% assumes all post 2012 RE from NJ RPS program receives ERCs.
3. GS-ERCs are generated, but not assumed to be used because ERC demand for NJ steam units are small due to CHP credits. GS-ERCs are not shown in this chart which makes the regular ERC demand somewhat higher than would occur because steam units could use GS-ERCs.

Source: New Jersey Department of Environmental Protection, September 14, 2016

CPP - New Jersey Cumulative Allowance Demand and Allocation
Mass-Based Program (Existing Facilities)



Notes:
1. Future operations of affected facilities based on 2016 owner rough estimates.
2. Cumulative allowance deficit of about 55 million tons is approximately 6 million tons per year annual allowance deficit.
3. New sources and new source complement are not included (allowance deficit would be much higher).

Source: New Jersey Department of Environmental Protection, September 14, 2016

DATA TABLE FOR CHARTS

Rate-based Program – New Jersey ERC Demand and Generation. With CHP Credit for 3 Facilities with Existing CHP, w/o GS-ERCs (0.5% annual EE increase, 10% constant RE)

Year	Cumulative Total ERC Demand w/CHP	Cumulative Excess Net ERCs	Cumulative RE+EE ERC Generation (low estimate)
2022	-1,001,253	7,041,808	8,043,062
2023	-3,109,196	13,358,867	16,468,063
2024	-6,534,094	18,736,451	25,270,544
2025	-11,085,676	23,374,306	34,459,982
2026	-16,817,583	27,221,332	44,038,915
2027	-23,830,254	30,179,642	54,009,897
2028	-31,608,275	32,767,215	64,375,490
2029	-40,190,850	34,954,519	75,145,369
2030	-49,558,830	36,763,341	86,322,171

Rate-based Program – New Jersey Cumulative Net ERCs for Different Energy Efficiency and Renewable Energy Scenarios. With CHP Credit for 3 Facilities With Existing CHP, w/o GS-ERCs

Year	Cumulative Net ERCs - O.5%EE + 5%RE	Cumulative Net ERCs - O.5%EE + 10%RE	Cumulative Net ERCs - O.5%EE + 15%RE	Cumulative Net ERCs - 1.0%EE + 5%RE	Cumulative Net ERCs - 1.0%EE +10%RE	Cumulative Net ERCs - 1.0%EE + 15%RE
2022	3,212,695	7,041,808	10,870,922	3,578,289	7,388,160	11,198,032
2023	5,707,264	13,358,867	21,010,470	6,806,541	14,400,287	21,994,034
2024	7,268,683	18,736,451	30,204,219	9,486,965	20,837,982	32,188,998
2025	8,097,174	23,374,306	38,651,437	11,822,406	26,903,473	41,984,540
2026	8,141,730	27,221,332	46,300,934	13,771,903	32,555,181	51,338,458
2027	7,304,553	30,179,642	53,054,731	15,247,797	37,704,821	60,161,844
2028	6,103,716	32,767,215	59,430,714	16,778,386	42,880,060	68,981,735
2029	4,510,172	34,954,519	65,398,865	18,344,941	48,061,143	77,777,344
2030	2,545,805	36,763,341	70,980,878	19,972,243	53,272,598	86,572,953

DATA TABLE FOR CHARTS

Mass-based Program (Existing Facilities) – New Jersey Cumulative Allowance Demand and Allocation.

Year	Cumulative Allowance Allocations	Cumulative CO2 Emissions	Cumulative Net Allowances
2022	18,749,719	-22,970,423	-4,220,704
2023	36,987,010	-46,065,126	-9,078,116
2024	54,724,504	-69,255,650	-14,531,147
2025	72,171,033	-92,570,455	-20,399,421
2026	89,305,593	-115,981,080	-26,675,486
2027	106,047,148	-139,515,985	-33,468,837
2028	122,751,084	-163,146,711	-40,395,627
2029	139,411,044	-186,901,717	-47,490,673
2030	156,010,789	-210,752,544	-54,741,756