ONYX
STRATEGIC INSIGHTS

US Industrial Policy
CHIPS Act and IRA

Analysis of Impacts and Election Risks

July 2024

Executive Summary

CHIPS Act will be moderately successful	▪ CHIPS Act funding will lower the cost and increase production of semiconductors ranging from legacy to advanced chips in the US ▪ Announced investment projects are equivalent to 7-11 million wafers annually ▪ Labor force shortages, high construction costs, and persistent struggles to diversify supply chains will hinder US attempts to gain global market share
IRA likely not sufficient to meet emissions targets	▪ EV sales are increasing rapidly despite restrictions on consumer tax credits; are on track to meet market share goals by 2030 ▪ Battery production investments are focused in a new “battery belt” stretching across the former industrial heartland; funding will peak in 2024 but production will take time to ramp up
2024 election poses risks to existing industrial policy	▪ CHIPS Act likely to remain in place due to bipartisan support and large chunks of funding already out the door ▪ IRA provisions likely to be directly targeted if Trump wins in November; repeal will result in delayed green energy transition, rollback of corporate tax credit programs and decreased consumer and business confidence

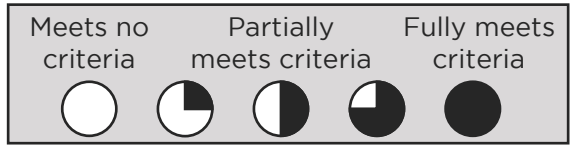
Source: Onyx

SECTION I

CHIPS and Science Act of 2022

Outlook: CHIPS not a silver bullet, will be moderately successful

US will likely require further public spending to maintain effectiveness



CHIPS POLICY ANALYSIS – ABILITY TO MEET CRITERIA BY 2030

POLICY OBJECTIVE	SCORE	EVALUATION
Reduce risk of semiconductor supply chain shocks		▪ CHIPS will expand US chip production, but US will gain limited market share as other global players are making similar investments ▪ US production will contribute to an industry glut, reducing supply chain risks in the near-term ▪ Slower/limited investments across the entire value chain will force US chip manufacturers to ship to Asia for testing and packaging and then to China for assembly into some final products
Improve US economic competitiveness		▪ New fabs bring significant new jobs, but ramp-up of labor force availability will take time despite strong local availability of training programs ▪ US faces a chronic shortage of STEM workers; CHIPS funding unlikely to fully resolve this long-standing challenge ▪ R&D funding is most at-risk piece of the legislation - Congress has chronically under-funded STEM R&D in recent budgets
Protect semiconductors from international interference		▪ Expanded domestic production will result in a greater availability of trustworthy chips, but significant Chinese investment in key raw materials mean developing a fully risk-free supply chain is extremely difficult ▪ Allied nations (Netherlands, Japan) with companies that control key bottlenecks have so far been aligned with US restrictions intended to hinder Chinese tech development

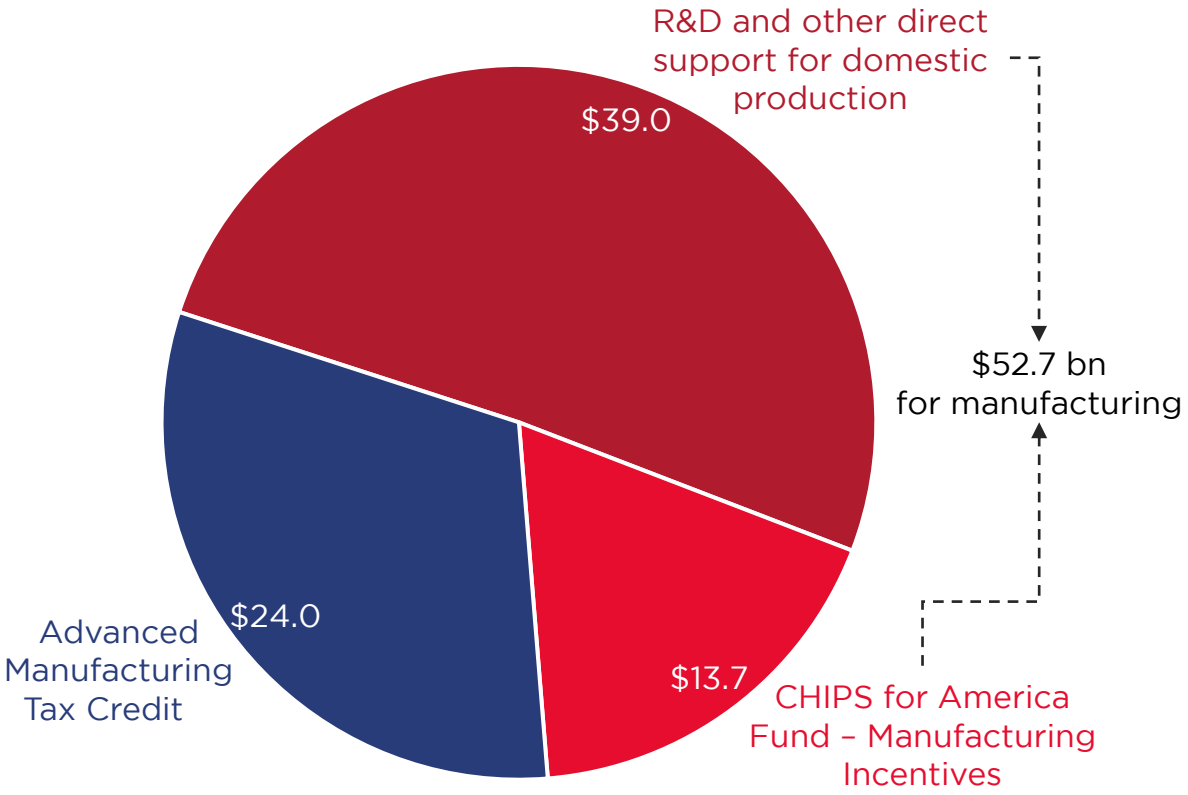
Source: Carnegie Endowment Brookings, Politico, Onyx

CHIPS Act incentivizes new domestic production capacity

$52.7 bn in grants plus tax credits for chip manufacturing

$77 BN IN MANUFACTURING SPENDING AND TAX CREDITS

$ BN



MAIN POLICY OBJECTIVES

- Reduce risk of semiconductor supply chain shocks
- Improve America's economic competitiveness
- Protect semiconductors from international interference

SAMPLE OF KEY METRICS

- Increase in overall domestic chip production
- Grow domestic production for leading edge chips (e.g., for advanced computing and AI) from zero to 20% global market share by 2030
- Invest in workforce development according to NIST guidelines across construction, manufacturing, engineering, and R&D
- Nearshore critical components of the chip value chain, not limited to manufacturing

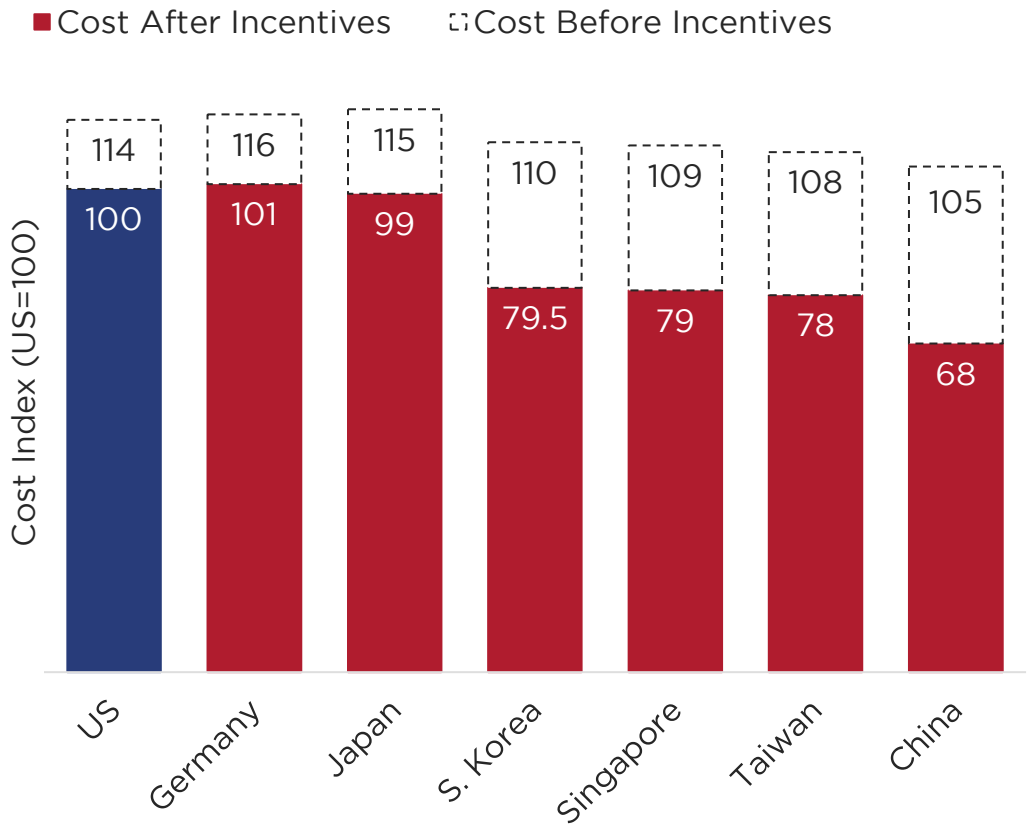
*The CHIPS Act also authorizes $200 billion in STEM, R&D, Workforce and Economic Development spending

Source: CHIPS and Science Act of 2022, Onyx

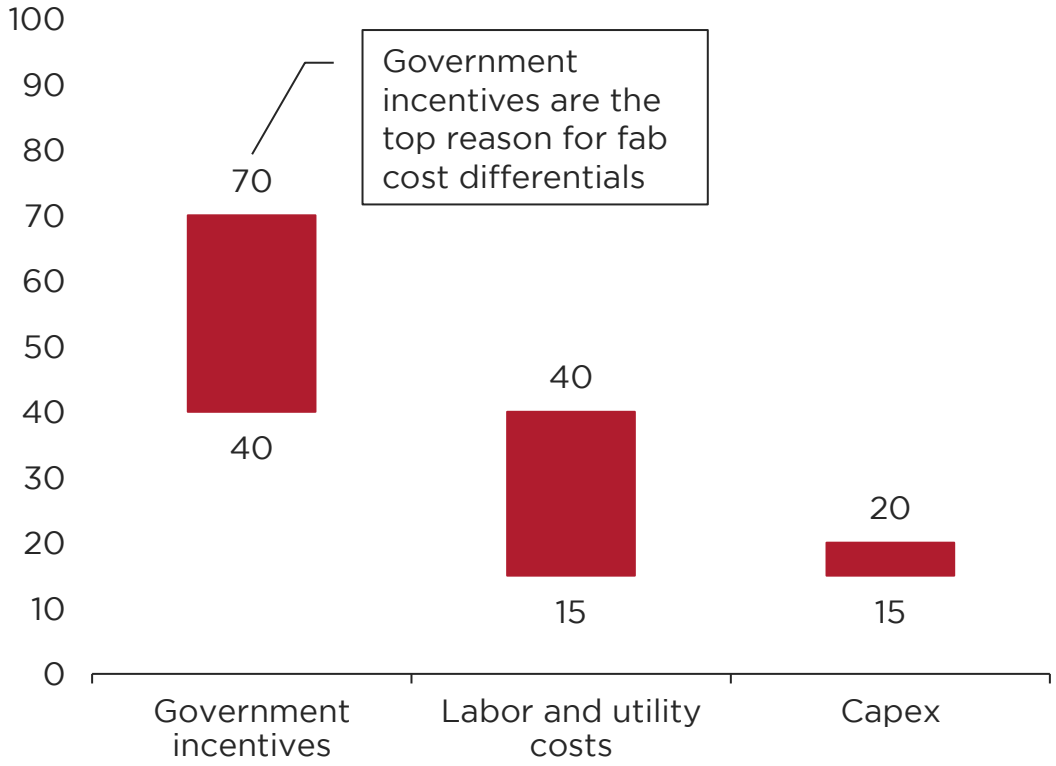
Policy levels the playing field by lowering capital costs

US capex and opex are structurally higher than most markets, many of which already benefit from government incentives

2020 ESTIMATED FAB TOTAL COST COMPARISON BEFORE AND AFTER GOVERNMENT INCENTIVES



PERCENTAGE RANGE OF TOTAL COST DIFFERENCE BETWEEN US AND OTHER COUNTRIES*



*Ranges do not add to 100% as they are dependent on the comparison country and type of chips produced

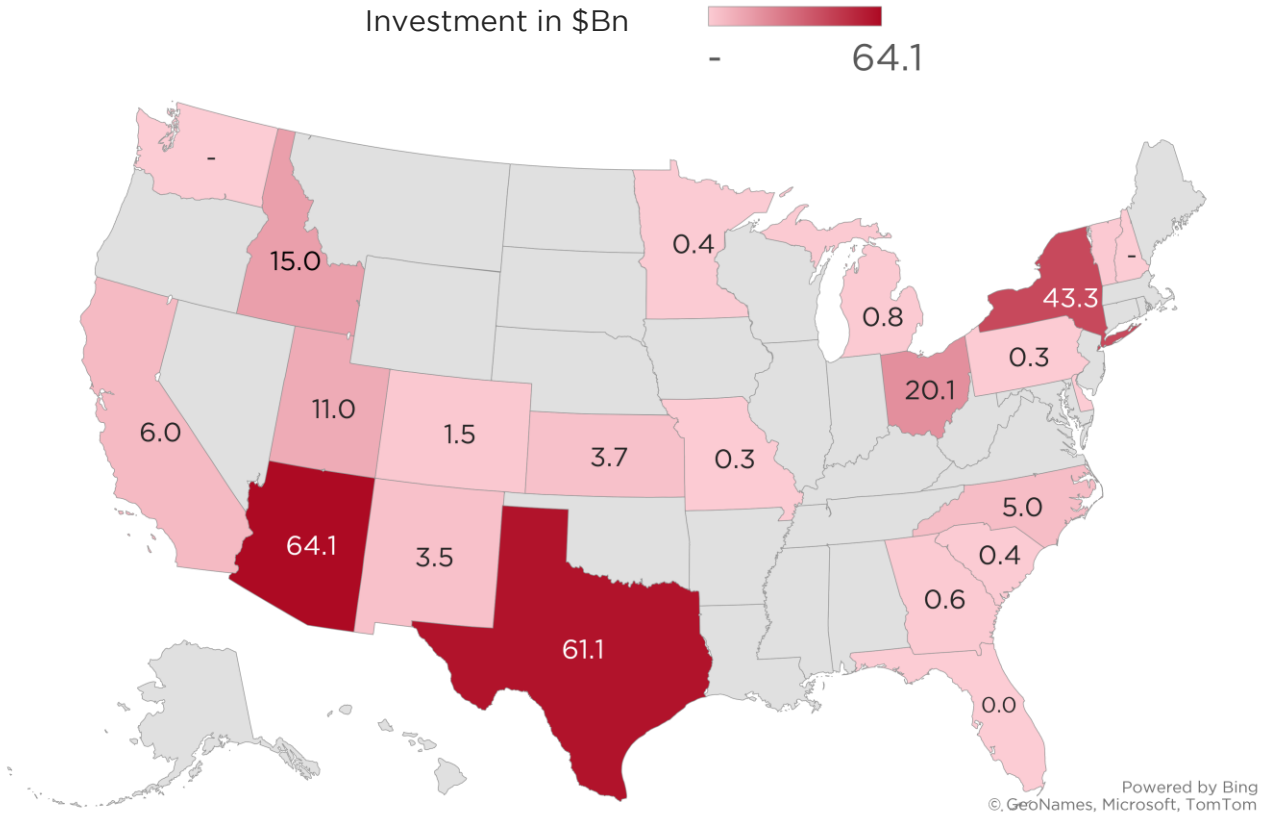
Source: BCG, Onyx

As of early 2024, CHIPS is attracting significant investment

>$250Bn in private sector investment, most of which is dependent on CHIPS Act funds

SEMICONDUCTOR MANUFACTURING INVESTMENTS

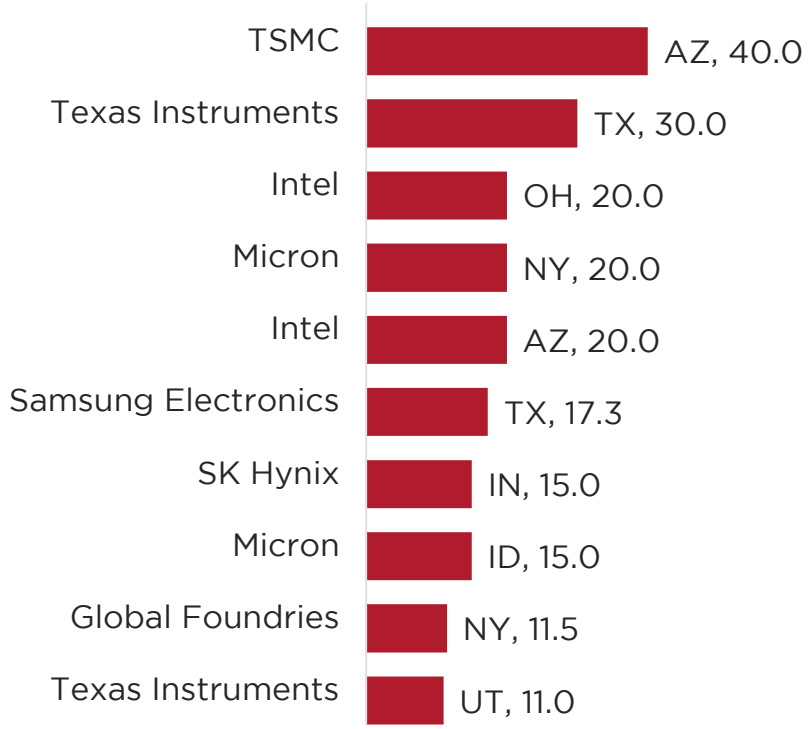
MAY 2020 TO FEBRUARY 2024, $ BILLIONS



TOP 10 PROJECTS BY VALUE

AS OF FEBRUARY 2024

STATE AND $BN OF INVESTMENT



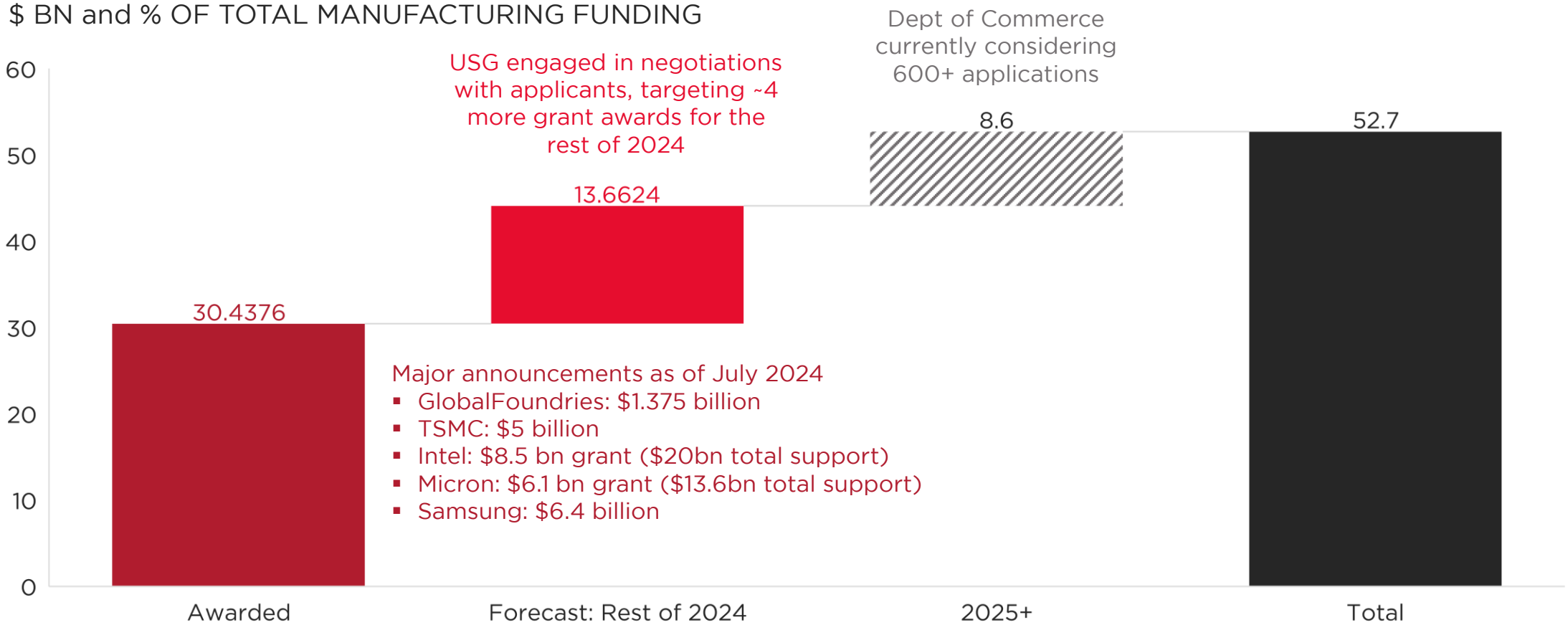
Source: Semiconductor Industry Association, Onyx

After a slow start, CHIPS awards are ramping up

Major funding announcements to industry key players, more to come

CHIPS ACT AWARDS FOR MANUFACTURING TOT

$ BN and % OF TOTAL MANUFACTURING FUNDING

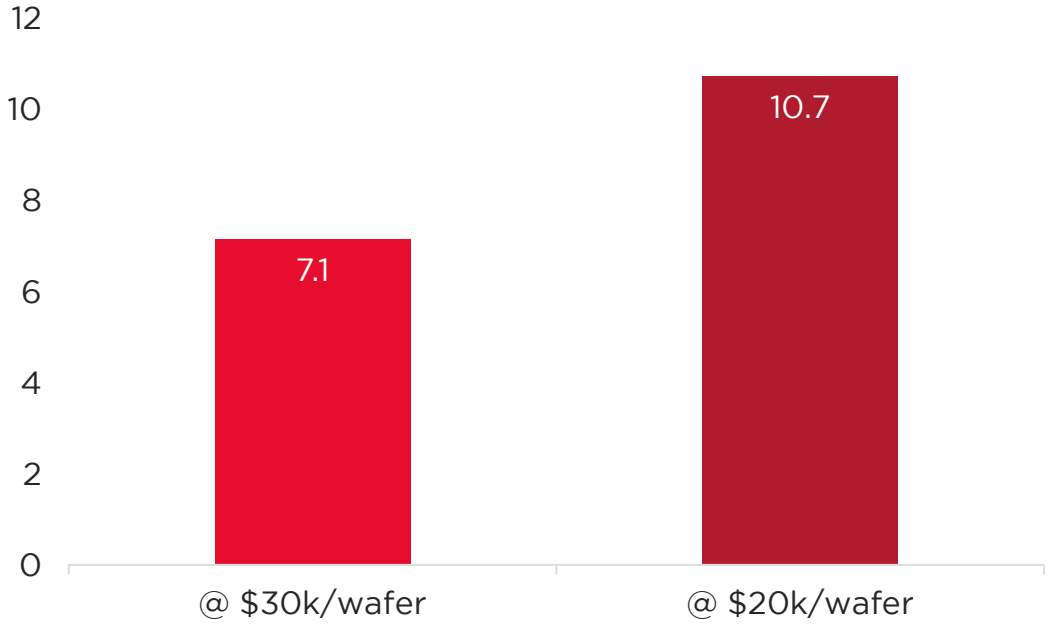


Source: Reuters, US Department of Commerce, Semiconductor Industry Association, Onyx

Announced CHIPS investments equate to 7-11 million wafers/yr

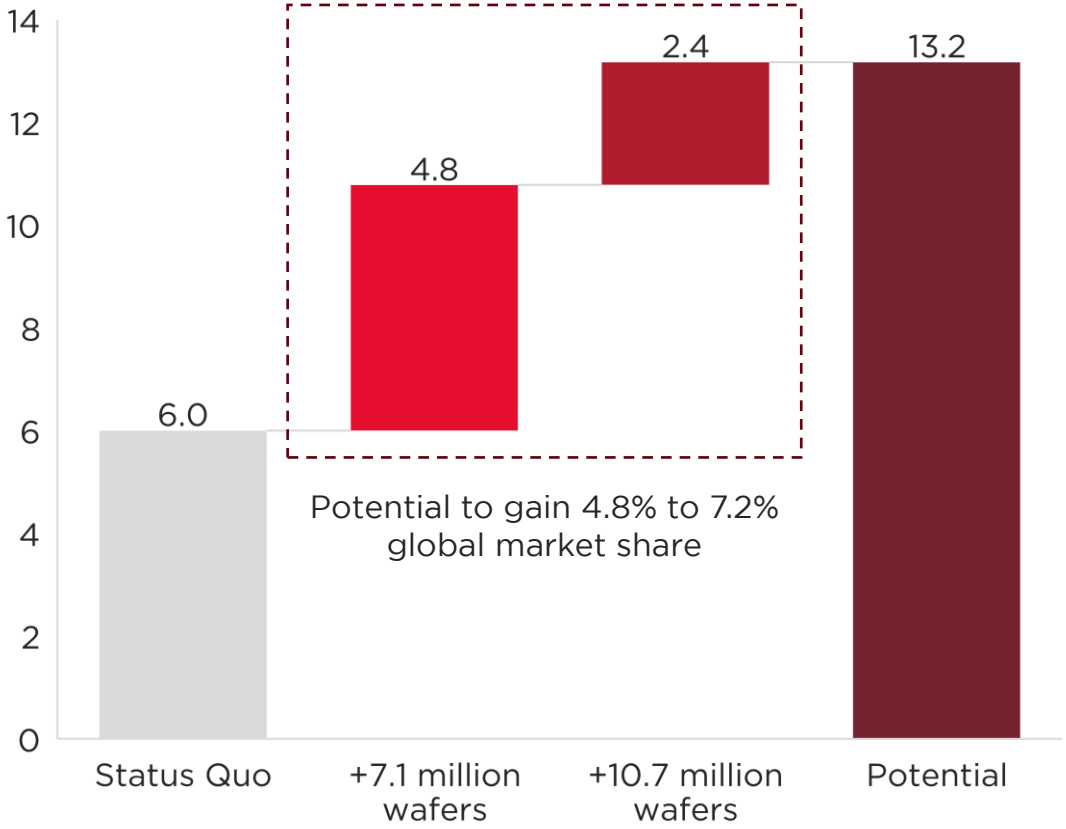
Equivalent to gaining 5% to 7% of global market share by 2030

NEW US WAFER CAPACITY BY 2030
NUMBER OF WAFERS



- New wafer capacity depends on total production costs
- Inflation pushing costs to the high-end
- Leading manufacturers report >20% cost inflation in 2023

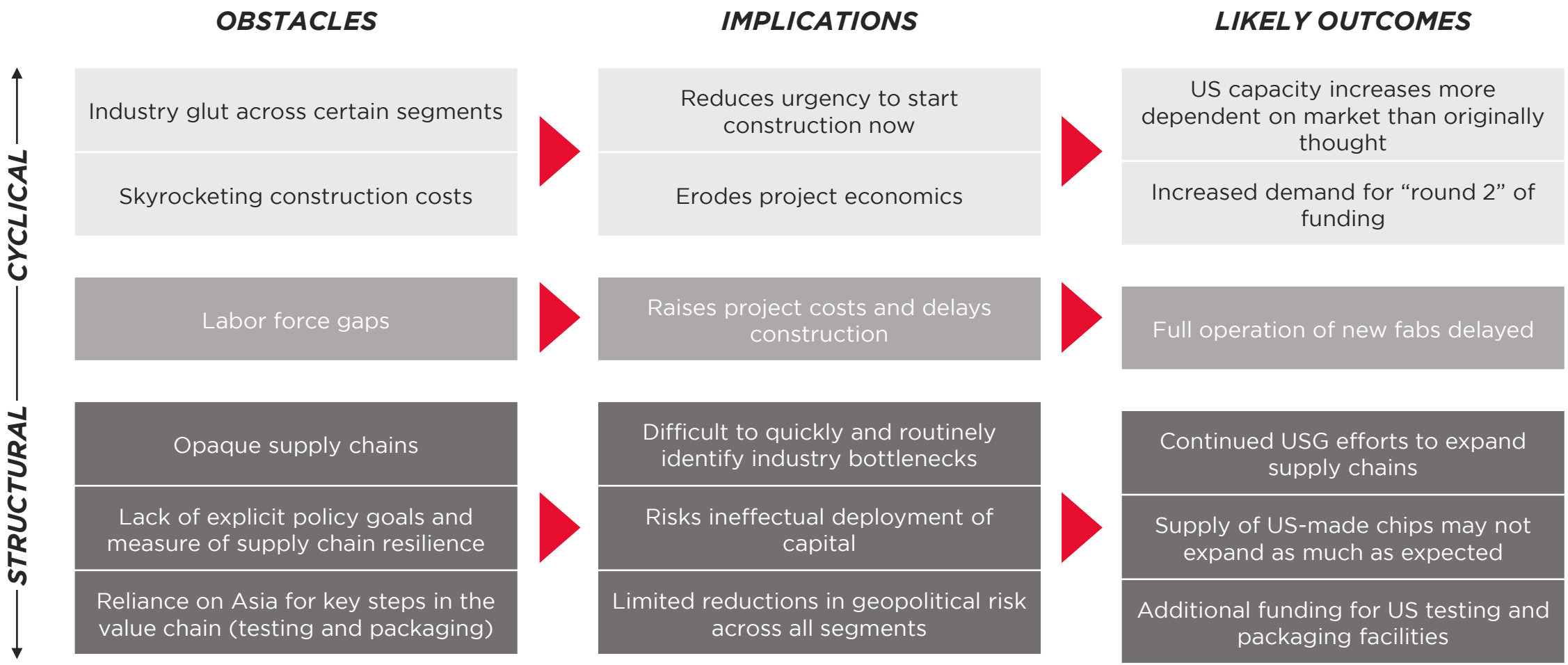
POTENTIAL US WAFER MARKET SHARE BY 2030
% OF TOTAL GLOBAL CAPACITY



Source: Semiconductor Industry Association, SEMI, TSMC, Onyx

However, major obstacles put policy objectives at risk

CHIPS criticized for being a spending package without a clear strategy



Source: Carnegie Endowment for International Peace, Brookings Institute, Onyx

SECTION II

Inflation Reduction Act

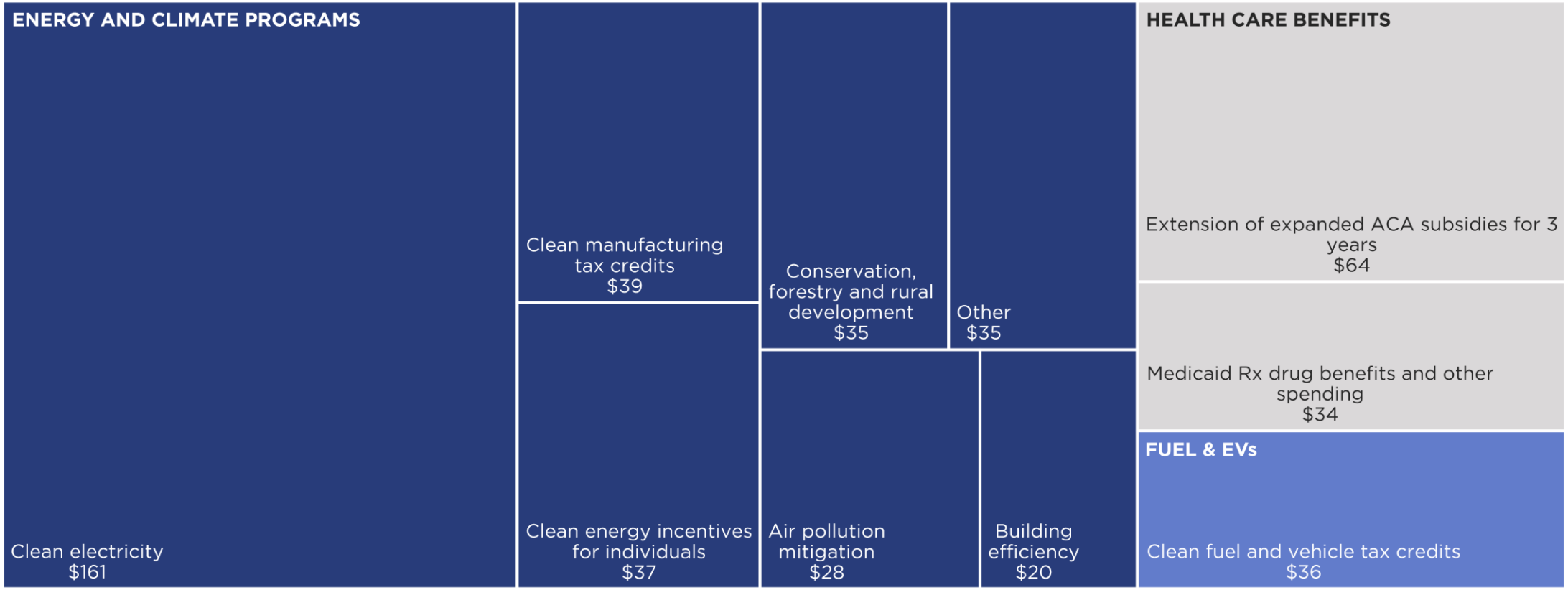
IRA: Largest climate investment in US history

$391 billion in energy and climate programs over ten years

INFLATION REDUCTION ACT TEN-YEAR BUDGET

Total Spending: $489 Billion

(Not shown: $276 bn to reduce the federal deficit, and Savings of $765 billion from corporate taxes and Medicare/aid savings)



Source: The New York Times, Committee for a Responsible Federal Budget, whitehouse.gov, Onyx

IRA policy objectives focus on energy transition

Should result in reduced emissions and more resilient supply chains

IRA POLICY OBJECTIVES

1. Reduce GHG Emissions

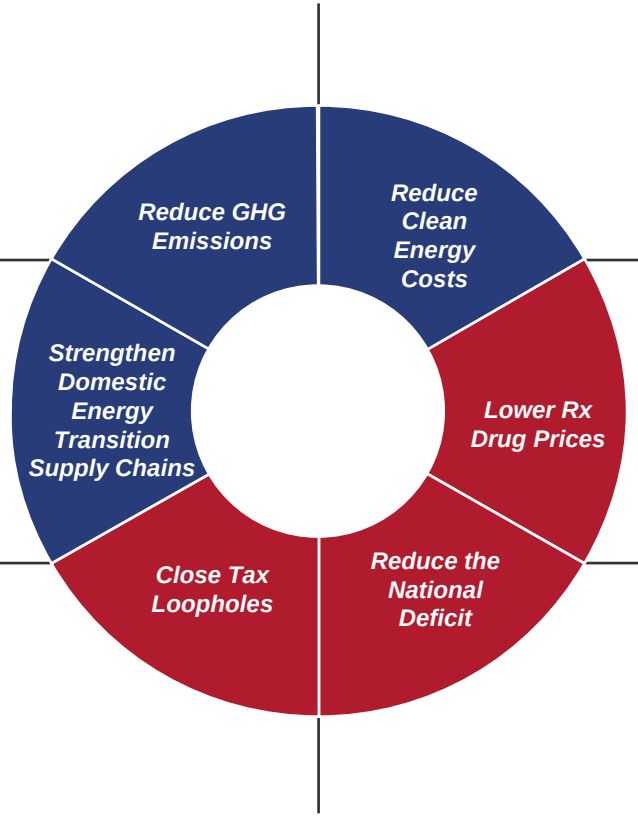
- Cut US emissions by 40% by 2030 compared to 2005 baseline
- Accomplished through clean electricity generation and ramp-up of EV adoption rate
- Pre-IRA policies would have cut emissions by 27%, and President Biden's goal was to cut emissions by 50%

2. Strengthen Domestic Energy Transition Supply Chains

- Re-/Near-shore EV, EV batteries, and energy storage manufacturing to North America
- De-risk investment in battery supply and reduce reliance on China

Close Tax Loopholes

- Estimated $160 billion in taxes evaded by top 1% of earners
- 15% tax on all companies that make more than $1 bn/year
- 1% tax on all corporate stock buybacks
- Estimated $124 billion in IRS revenue over 10 years



3. Reduce Clean Energy Costs

- Electric vehicle tax credits (up to $7,500 for new, $4,000 for used)
- $14,000 for energy-efficient home appliances
- 30% tax credits for new solar panel installations

Lower Rx Drug Prices

- IRA allows Medicare to negotiate with drug manufacturers for lower prices
- Thought to reduce Rx prices for 5-7 million Medicare beneficiaries
- Out-of-pocket Rx costs capped at $2,000
- Insulin costs for Medicare capped at $35/month
- Expected to save the government $250 bn over ten years

Reduce the National Deficit

- Net difference between savings and spending programs will be used to reduce the national deficit

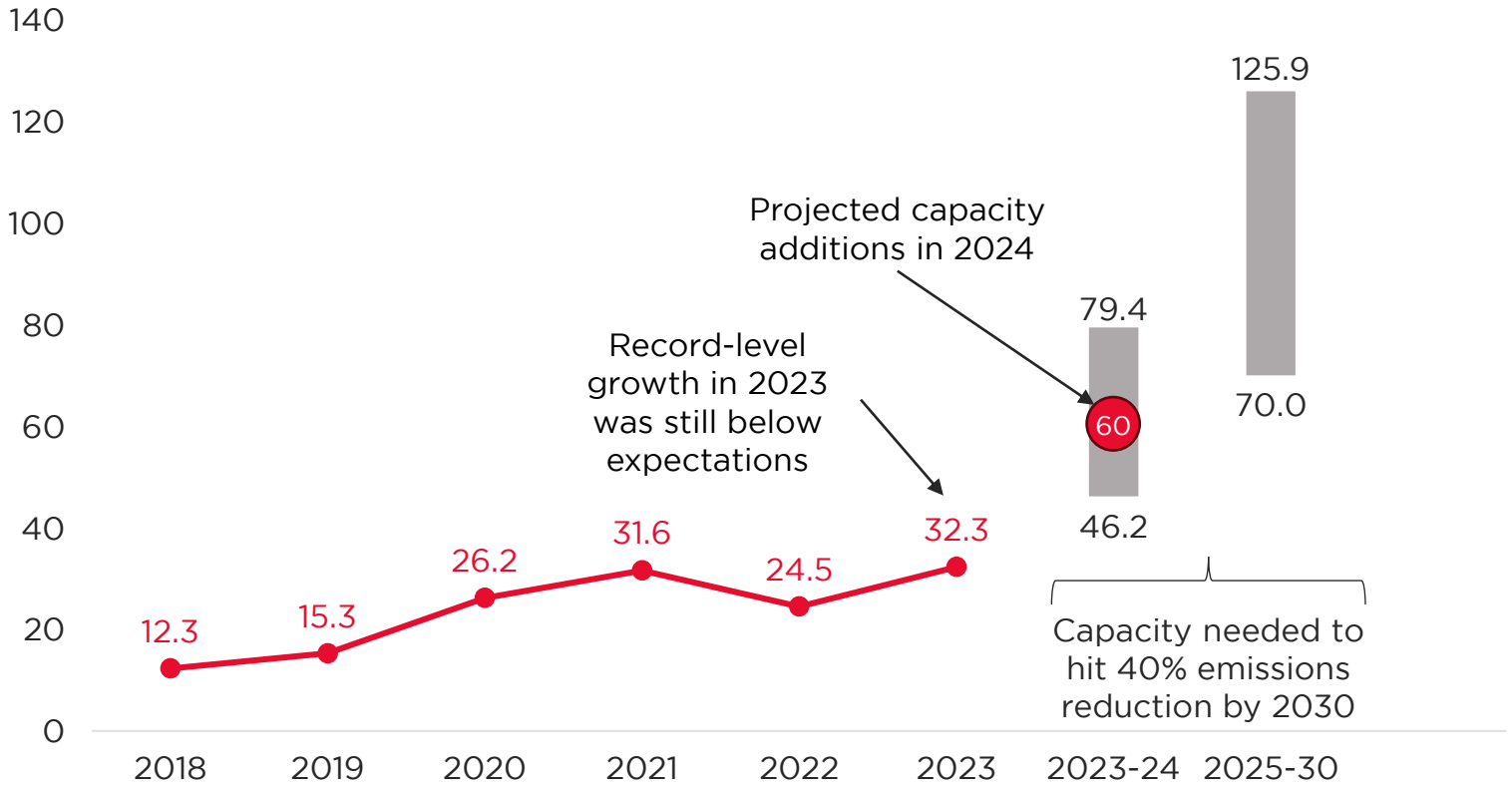
Source: Inflation Reduction Act of 2022, Onyx

1. Clean power investment is rising, but still falling short of target

New capacity will catch-up in 2024 if construction stays on schedule

ANNUAL US CLEAN ELECTRICITY CAPACITY ADDITIONS AND NEEDS TO HIT CLIMATE TARGETS

GW NET SUMMER CAPACITY



KEY POINTS

- Capacity needed to hit climate targets is uncertain, depends on assumptions and models used
- 2023 new capacity was 13.9 to 47.1 GW below needed levels
- 2024 capacity additions are on target to keep up with the minimum requirement (2024 target plus 2023 shortfall)
- New capacity additions need to increase at least another 10 GW/year by 2025

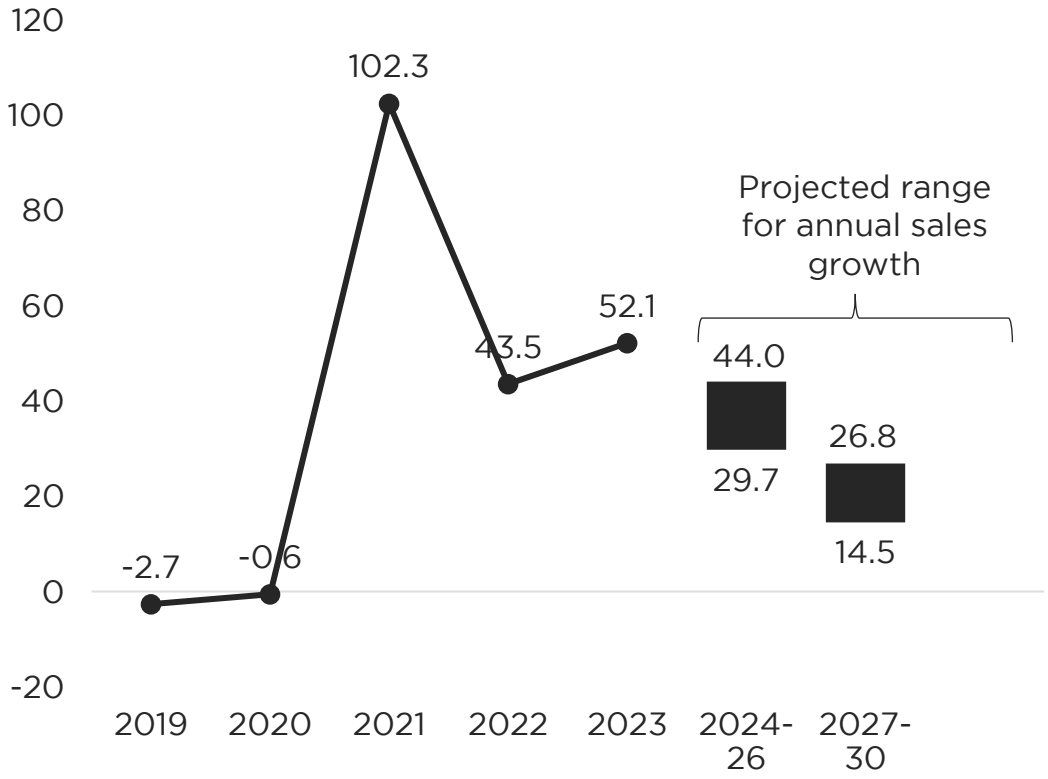
Source: Clean Investment Monitor, Energy Innovation, REPEAT Project, and Rhodium Group, Onyx

2. EV sales on track despite IRA's stricter subsidies

IRA expected to have strong positive impact on EV market share by 2030

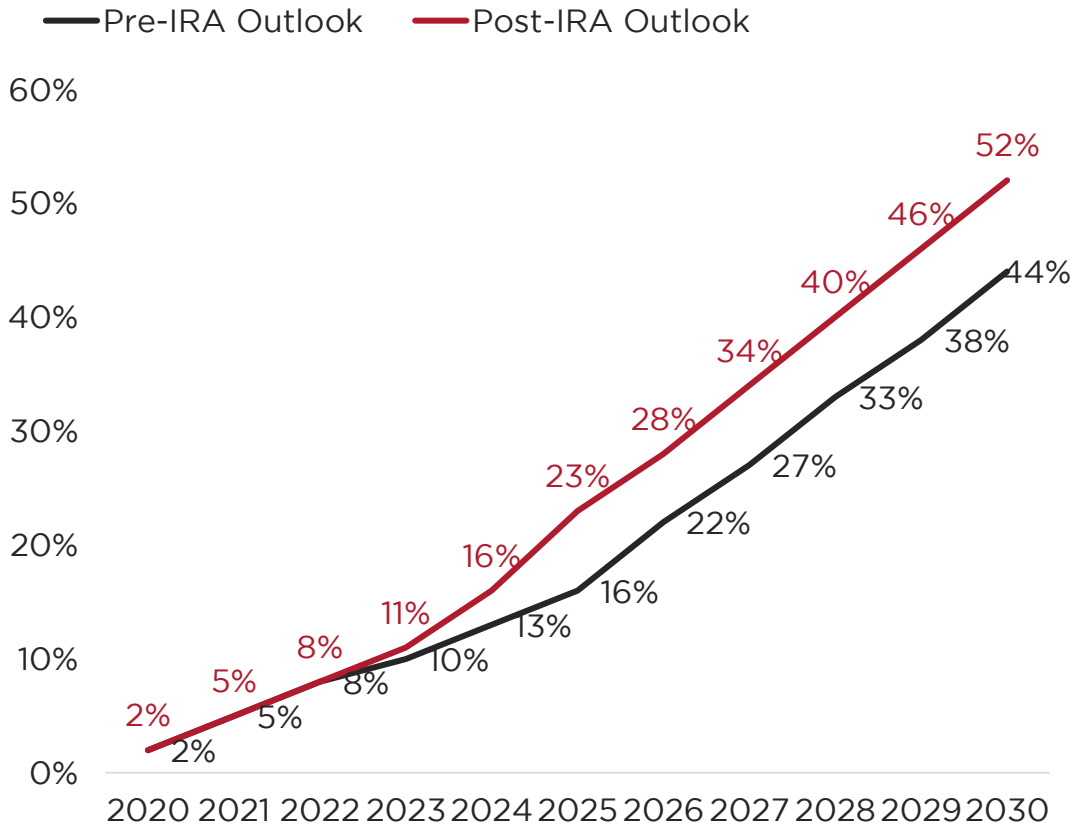
ANNUAL GROWTH RATE IN ZEV SALES

Actual sales (based on registrations) vs. 2023 projection range from Energy Innovation, REPEAT Project, and Rhodium Group



IRA WILL DRIVE HIGHER EV PENETRATION

% SHARE OF US PASSENGER VEHICLE SALES



Source: Clean Investment Monitor, Politico, Onyx

2. US “Battery Belt” is taking shape thanks to IRA

US EV industry will mature slowly, but foundation is being laid

Battery funding to peak in 2024

- Upcoming projects are concentrated in a newly forming “battery belt” across many former industrial states in the Midwest
- Project approval and construction will take time, job creation in key swing states unlikely before November election

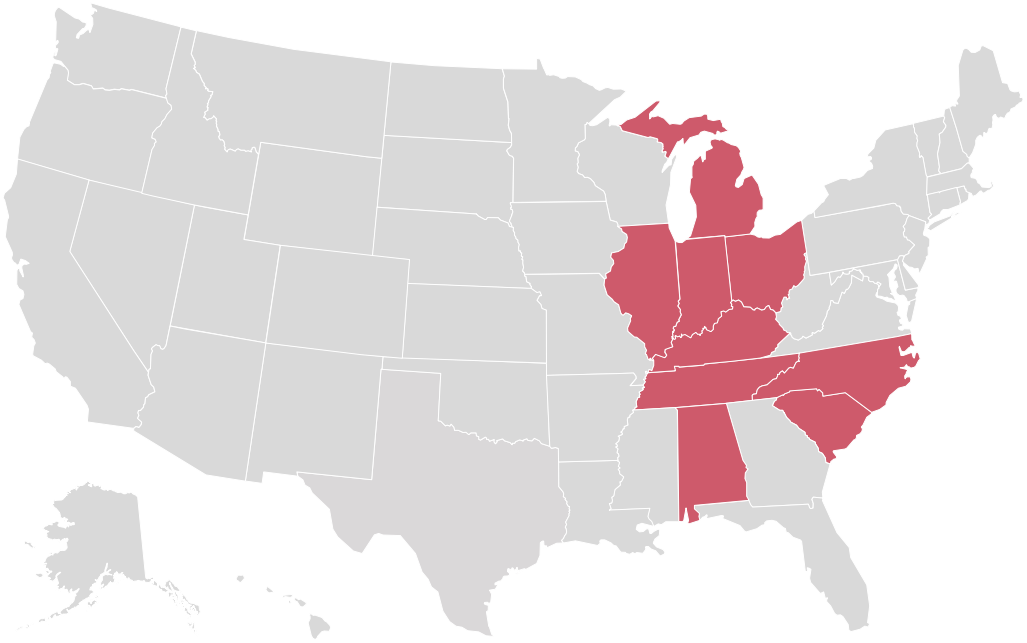
Less EV growth than hoped

- US automakers remain optimistic that they can meet IRA sourcing requirements
- Consumers can receive credits as instant rebates versus tax credits the following year

Other countries turn to industrial policy

- Global players including allied EU countries turn to their own industrial policy packages to bolster domestic industry

INVESTMENT IN DOMESTIC BATTERY PRODUCTION HAS CREATED A NEW “BATTERY BELT” IN THE UNITED STATES



Source: WSJ, Onyx

Obstacles stand in the way of more rapid implementation

Diversifying supply chains and tech innovation remain key challenges

OBSTACLES	*IMPLICATIONS*	*LIKELY OUTCOMES*
Tensions with US allies (particularly the EU) over access to subsidies and waivers	US is prioritizing domestic production over inclusion of international producers who could help meet climate goals faster	US and EU countries reach a balancing act where they either a) agree to allow each other's products to qualify for subsidies or b) establish competing programs for domestic producers
Buy American Build American (BABA) requirements	Complexity and restrictiveness holds back US OEM capacity investments	USG issued guidance for companies on foreign-made inputs (released late 2023)
Reliance on Chinese suppliers	US automakers must shift supply chains to comply and ensure products qualify for tax credits	US firms will seek safer partnership formats with foreign firms including ownership and operation of US-based facilities
Emissions reductions calculated based on widespread use of untested technologies	Emissions reductions may not be as substantial as predicted	Effectiveness of IRA emissions reductions will remain nebulous

Source: Carnegie Endowment for International Peace, Brookings Institute, Onyx

Get in touch

Website

onyxsi.com

Contact

info@onyxsi.com

LinkedIn

https://www.linkedin.com/company/onyxsi/