The Navy's ability to reach and sustain the required submarine production cadence, and ability to ensure the construction of 1-per-year Columbia class concurrent with VCS, CVN, and sustainment, is **gated** by the submarine industrial base (SIB) and it's capability, capacity, quality, and workforce
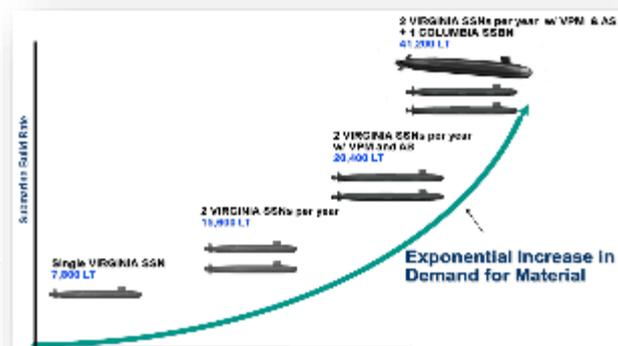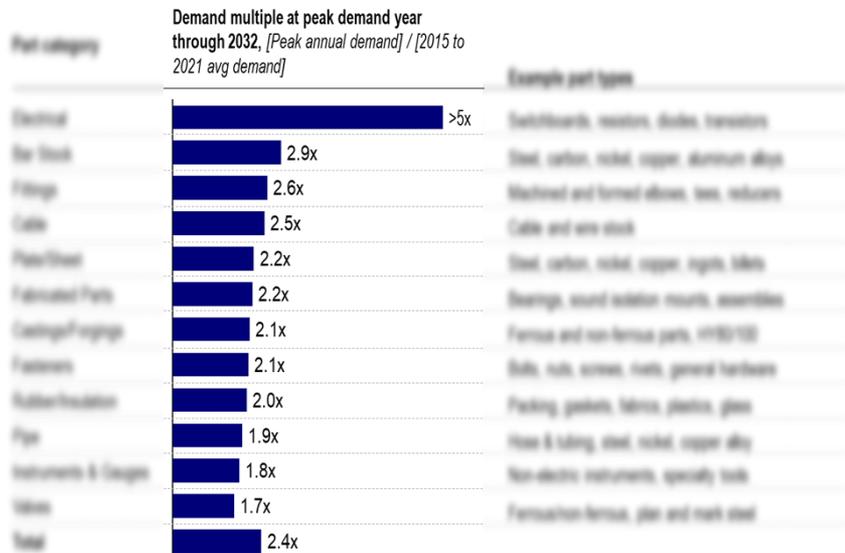
At the part-level, total SIB demand for CLB + VCS programs is expected to see a ~2.4x increase over historical averages (2015-2021), with a peak part-level demand begins in ~2028
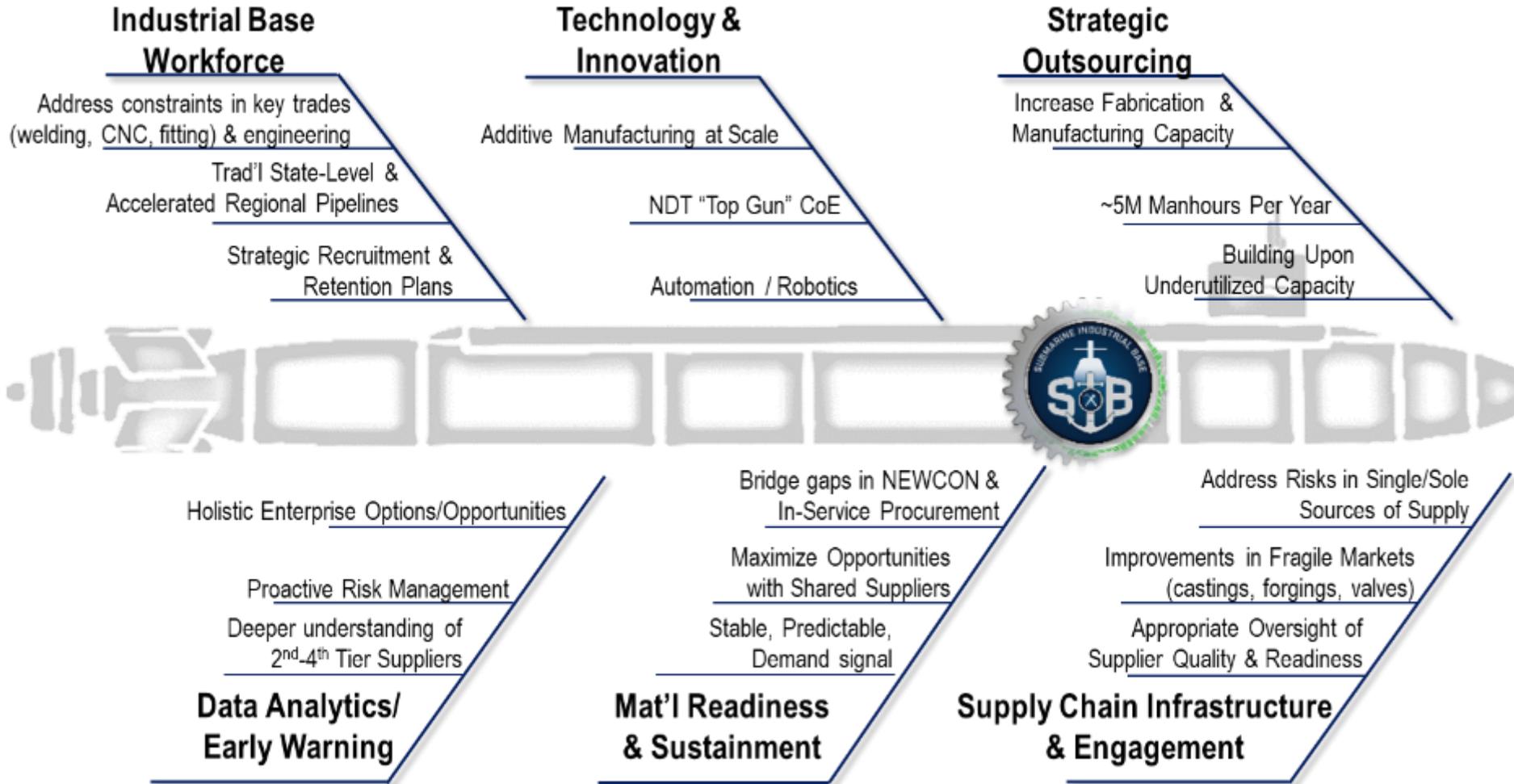
SIB enterprise must be able to attract, hire, and train ~10K new workforce members per year while improving retention
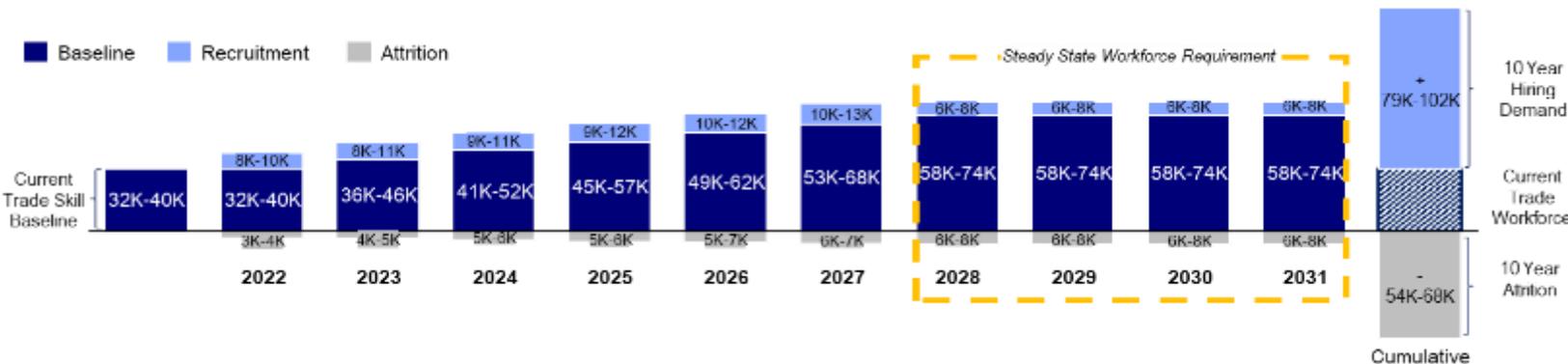
Submarine Industrial Base Priorities

To achieve the CNOs 30-year shipbuilding plan targets, including a yearly cadence of 1 CLB + 2 VIRGINIA Class (VCS) in parallel with the construction of FORD Class Aircraft Carriers and the sustainment of the Navy's nuclear Fleet, these risks and enablers must be prioritized and executed with urgency

Industrial Base Workforce
- Address constraints in key trades (welding, CNC, fitting) & engineering
- Trad'l State-Level & Accelerated Regional Pipelines
- Strategic Recruitment & Retention Plans

Technology & Innovation
- Additive Manufacturing at Scale
- NDT "Top Gun" CoE
- Automation / Robotics

Strategic Outsourcing
- Increase Fabrication & Manufacturing Capacity
- ~5M Manhours Per Year
- Building Upon Underutilized Capacity

Data Analytics/ Early Warning
- Holistic Enterprise Options/Opportunities
- Proactive Risk Management
- Deeper understanding of 2nd-4th Tier Suppliers

Mat'l Readiness & Sustainment
- Bridge gaps in NEWCON & In-Service Procurement
- Maximize Opportunities with Shared Suppliers
- Stable, Predictable, Demand signal

Supply Chain Infrastructure & Engagement
- Address Risks in Single/Sole Sources of Supply
- Improvements in Fragile Markets (castings, forgings, valves)
- Appropriate Oversight of Supplier Quality & Readiness

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Nation-Wide Marketing Campaign ↔ **New Collar Workforce / Technology Implementation**

Dollars
Disciples — Details
Diplomats

Data Analytics

New England RTS
1,600 suppliers — 73 critical
- Above-average rate of residents with Bachelor's degrees or higher
- Below US average in number of CTEs for SIB-relevant skills relative to state population
- ME, VT population ages are 29% and 23% above Nat'l avg

California Pipeline
~2,200 suppliers — 28 critical
- San Diego → highest concentration of military personnel in the US with >18,000 military personnel exiting active service in San Diego area
- >10M Californians speak Spanish at home[4]

New York pipeline
900 suppliers — 24 critical
- Largest veteran inflow in the Northeast (~10,000 military personnel exit to NY annually
- Brooklyn/Bronx's unemployment is ~2x the national average

**Great Lakes Pipeline**
~2,300 suppliers — 38 critical
- >10,000 annual completions in SIB-relevant skills (e.g., metalworking, pipefitting) granted by 157 CTEs
- ~20% of US manufacturing output / employment generated by the region

ATDM Nat'l Model

Pennsylvania Pipeline 850 suppliers — 42 critical
- ~750,000 veterans; 4th in Nation
- 2,000 postsecondary CTE completions in SIB trades
- >5M residents with high school diplomas but not 4-year degrees

Virginia RTS
~1,000 suppliers — 31 critical
- >14,000 military personnel separate from the military in Hampton Roads annually9
- Cost of living 5% below national average in SIB supplier hubs of Hampton Roads and Richmond

State Pipelines

Regional Training Systems (RTS)
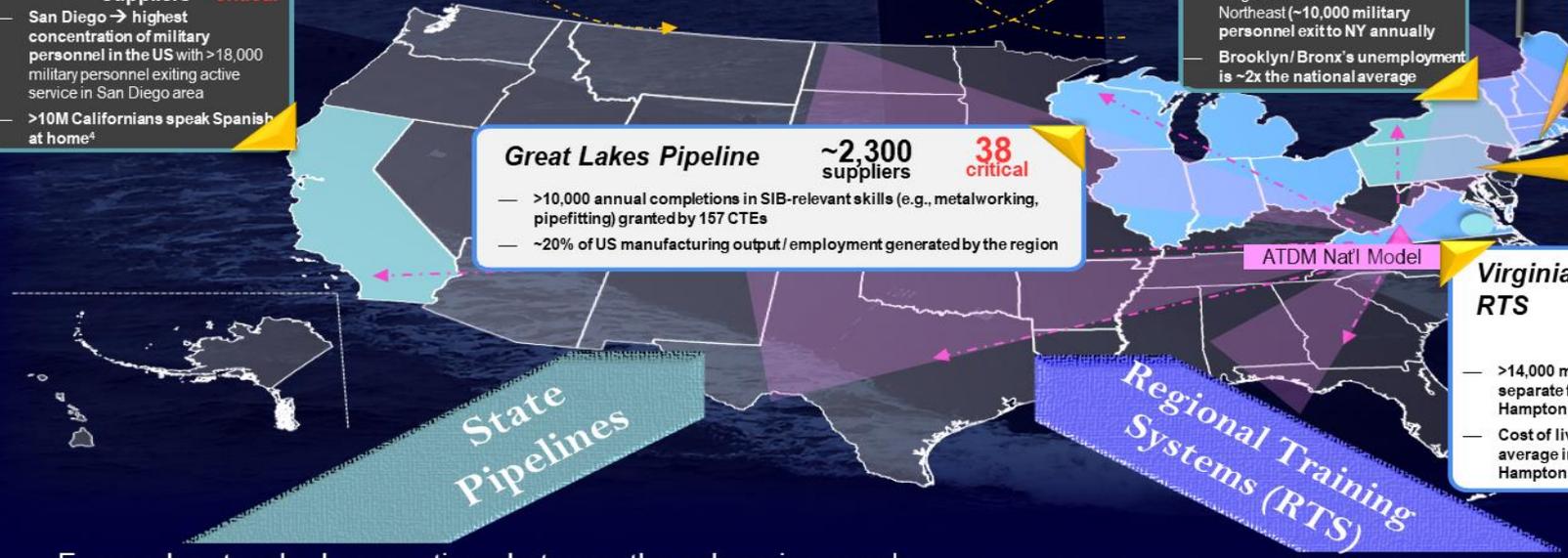
Focused, networked connections between the submarine supply chain demand signal (industry partners), academic partners, and the surrounding ecosystem of state/local government, industry organizations, and community programs.

A combination of centralized and distributed training and education activities, sized to address current and projected regional workforce gaps, and tailored to each region's unique training and education ecosystem's infrastructure and demand signal

Battle #1: *Surging Demand, Uneven Response*

– Existing SIB capability and capacity are insufficient to meet the current and future demand for submarine construction and sustainment activities. To shore up the required resiliency and robustness in critical SIB markets and suppliers, the Enterprise must demand communication and collaboration around the magnitude, prioritization, and timing of efforts.

Battle #2: *A War for Talent*

– Addressing workforce challenges requires actions and levers across a continuum of models, velocity, and people. We must build <u>and fill</u> industrial base talent pipelines across every part of the spectrum, while concurrently improving retention, culture, and mission connection.

Battle #3: Technology at Scale

– Technology that supports workforce efficiency/effectiveness (automated welding, robotics, and additive manufacturing) is not effectively deployed across the SIB. Navy and industry must collectively make strategic and aggressive decisions that appropriately balance risks and opportunities.

Battle #4: *Weaponizing Data Analytics*

– The Submarine Enterprise must quantitatively and qualitatively describe challenges, gaps, and the impact of efforts/investments. Data-driven, data-informed decisions are an absolute requirement to drive the required levels of urgency and to transition culture in a way that sustains success.

Battle #5: Building a Strategic Network of Disciples and Diplomats

– SIB workforce and manufacturing challenges are too great for any single company, region, or organization to "own" and fix. To achieve the required levels of scale and speed, efforts must be a "whole of Government, whole of Industry" approach that demands accountability and action, and leverages champions and advocacy at every level.

BuildSubmarines.com Campaign

Click to play ad spot.

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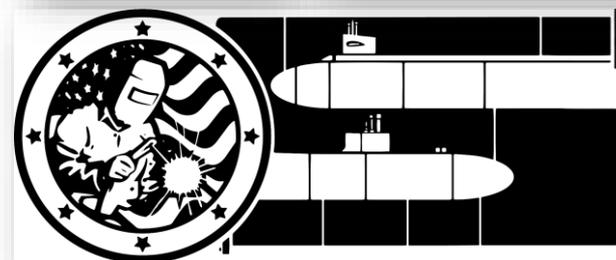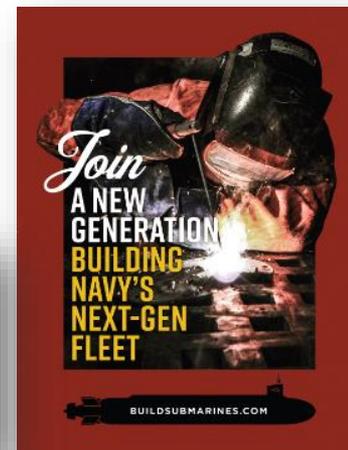
Accelerated Training in Defense Manufacturing (ATDM):

- Targets adult learners / transitioning military / veterans
- 600+ hours of shipbuilding / ship sustainment training
- Completes in 4 months (vice years)
- 4 critical trades: welding, machining, metrology, additive manufacturing (AM)
- Scale to 800 - 1,000 ppl/yr

AM Center of Excellence (CoE):

- FY23+ priority and a key enabler of concurrent submarine production of COLUMBIA and VIRGINIA Class Submarines, in parallel with the construction of FORD Class Aircraft Carriers, and the sustainment of the Navy's nuclear fleet
- CoE will:
  - Promote the adoption of a mature industrial qualification process and data to earn technical warrant holder approval for AM production
  - Enable scale and speed to address material readiness challenges and critical fragilities in the castings / forgings market space
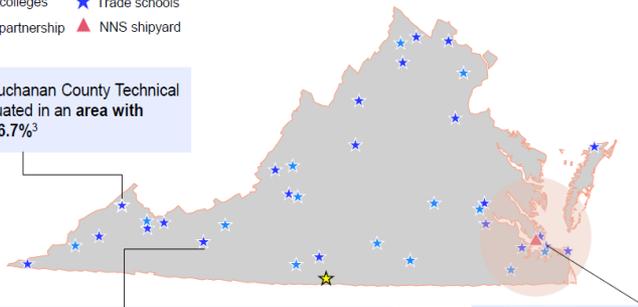 - Provide a platform for training a skilled AM workforce through *partnership with the ATDM program*

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Academic Landscape

Legend:
- ★ Two-year community colleges
- ★ Trade schools
- ☆ Existing SIB Danville partnership
- ▲ NNS shipyard

Potential partner: Buchanan County Technical Center is a CTE situated in an **area with unemployment at 6.7%**[3]

Potential partner: Pulaski County's highly popular welding program **needed to open an additional block of classes** to create space for 95 prospective welders annually, and includes a new $1-million welding lab[2]

Capital Projects Competing for Trade Labor

Legend:
- ● Advanced industries
- ● Rail
- ● Renewables
- ● Infrastructure

TA REALTY — $1,800 (2021 – 2028)

DIGITAL REALTY — $1,900 (2022 – 2035)

d. District Department of Transportation — $1,900[1] (2024 – 2030)

QTS — $7,500 (2014 – 2024)

VDOT — $3,800 (2020 – 2025)

SolUnesco — $1,500 (2025 – 2027)

Virginia state

1. Over six Virginia mega-projects with over $20B in capital investments, including an estimated ~$2.1B in BIL funding, could drive competition for skilled labor in the region[1]
2. However, nine sunsetting capital projects could make ~1,320 skilled workers available in the region in 2022 and 2023[1]
3. Over 60% of structural fabricators[2] and welders within 60 minutes of Hampton Roads may already be employed by SIB[1]
4. Supplier hubs Hampton Roads and Richmond have costs of living 5% below average, while Northern Virginia is ~45% above average[3]
5. Petersburg and Portsmouth counties have high unemployment (>6%), larger labor forces (>10,000), and proximity to NNS[5]
6. Over 14,000 military personnel separate from the military in Hampton Roads annually; ~50% of these veterans remain in the region[5]
7. Virginia hosts ~25 postsecondary CTEs with electrical and welding courses, graduating ~1,100 students in 2021[6]
8. The bordering states of KY, WV, and NC have pockets of unemployment >9%, labor forces of 2,500-11,100, and CTEs with pipefitting programs[7]

~1,000 suppliers[7] 31 critical suppliers

State-Unique Considerations

1. Over six Virginia mega-projects with **over $20B in capital investments**, including an estimated ~ competition for skilled labor in the region[1]
2. However, nine sunsetting capital projects could make **~1,320 skilled workers available in the region in 2022 and 2023**[1]
3. Over 60% of **structural fabricators**[2] and welders within 60 minutes of Hampton Roads may already be employed by **SIB**[1]
4. **Cost of living 5% below national average** in SIB supplier hubs of Hampton Roads and Richmond, while Northern Virginia is ~45% above average[3]
5. **Petersburg and Portsmouth counties have unemployment >6%, labor forces >10,000, and proximity to NNS**[5]
6. **Over 14,000 military personnel separate from the military** in Hampton Roads annually; ~50% of these veterans remain in the region[5]
7. Virginia hosts ~25 postsecondary CTEs with electrical and welding courses, graduating **~1,100 students** in 2021;[6] Virginia has 50+ welding programs at the secondary and postsecondary levels, including **seven welding CTEs within 100 miles of NNS**[7]
8. The bordering states of **KY, WV, and NC** have pockets of unemployment >9%, labor forces of 2,500-11,100, and **CTEs with pipefitting programs**[7]

Sun-setting Regional Projects

Project name	City, state	End date	Potential skilled labor availability[1]	Distance to NNS[2]
I-95 Express Lanes Fredericksburg Expansion	Stafford County, VA	2023	15-30	140
Manassas Data Center Campus (MICRON)	Manassas, VA	2023	140-600	170
IRM Data Center	Manassas, VA	2022	0-10	170
Transform I-66 Express Lanes (VDOT)	Gainesville, VA	2022	80-130	175
Interstate 64 Road Upgrade (VDOT)	Chesapeake, VA	2022	15-30	180
Sterling Ashburn Data Center Campus	Sterling, VA	2023	40-110	190
Interstate 95 Upgrade Phase IV	Philadelphia, PA	2022	10-20	360
Hazleton Industrial Buildings Development	Hazleton, PA	2022	30-90	375
RDSA: Beaver County Ethane Cracker Plant	Beaver County, PA	2022	80-300	400