

Economic Impact of Kigali Ratification & Implementation

May 3, 2018



The Alliance
for Responsible Atmospheric Policy



US Industry Segments (Fluorocarbons)

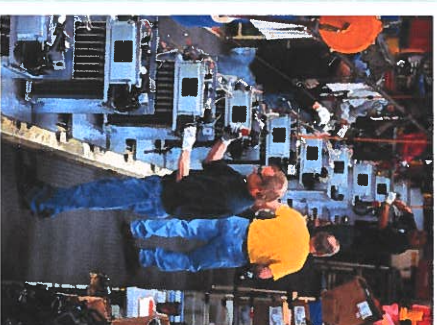
- Fluorocarbons are used in commercial HVAC, residential HVAC, commercial refrigeration, household appliances, and motor vehicle air conditioning
- Insulating foams, medical metered-dose inhalers, aerosols, and several other applications make up the remainder of the manufacturing sector



American-made products that preserve the health, safety and comfort of our daily lives

US Industry Objective

- US industry strongly supports ratification of Kigali Amendment to the Montreal Protocol and domestic implementation
- Heating Ventilation Air Conditioning and Refrigeration (HVACR) and Fluorocarbon technologies are signature American technologies
- The Kigali Amendment provides a global platform for gradual introduction and commercialization of next generation technologies in the US and in the rapidly expanding global market
- Analysis indicates that implementation of the Kigali Amendment is good for American Jobs, the balance of trade and continued American technology leadership

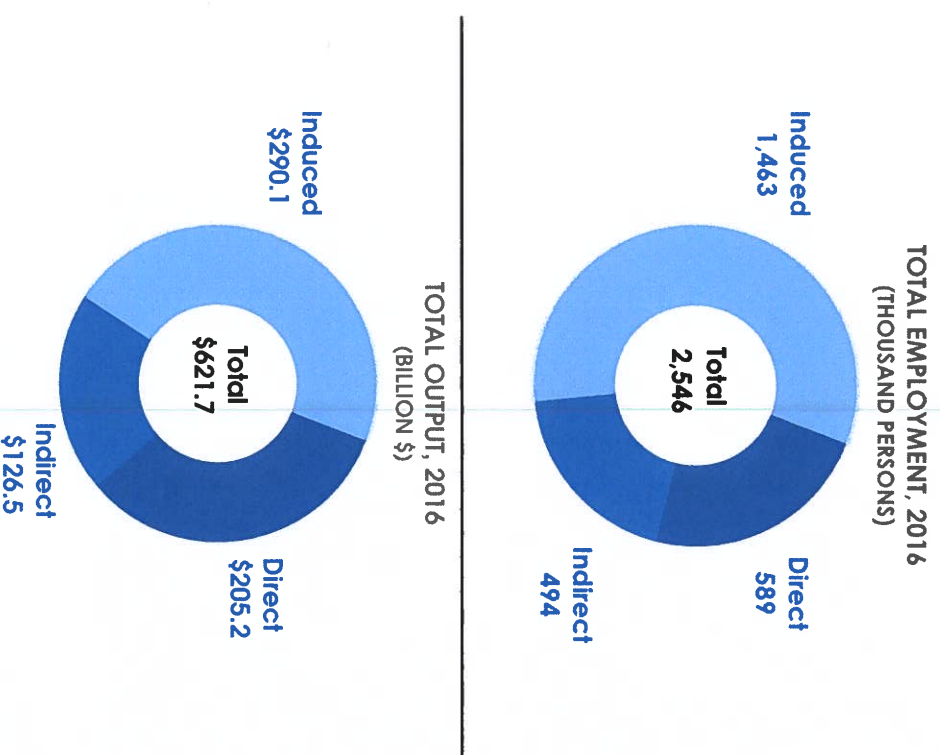


We urge the Administration to submit the Kigali Amendment to the US Senate



US Manufacturing Impact Fluorocarbons in the American Economy

- **Jobs**
 - 589K direct HVACR employment
 - \$39B in payroll
 - \$205B in sales
 - 2.5M total employment impact
- **Output**
 - \$621B in economic output, including manufacturing, distribution, service & installation (includes supply chain and induced demand)
- **Manufacturing**
 - \$178B contribution
 - 671K jobs, dominated by HVACR equipment
 - Downstream contracting, wholesale, and service make up the rest



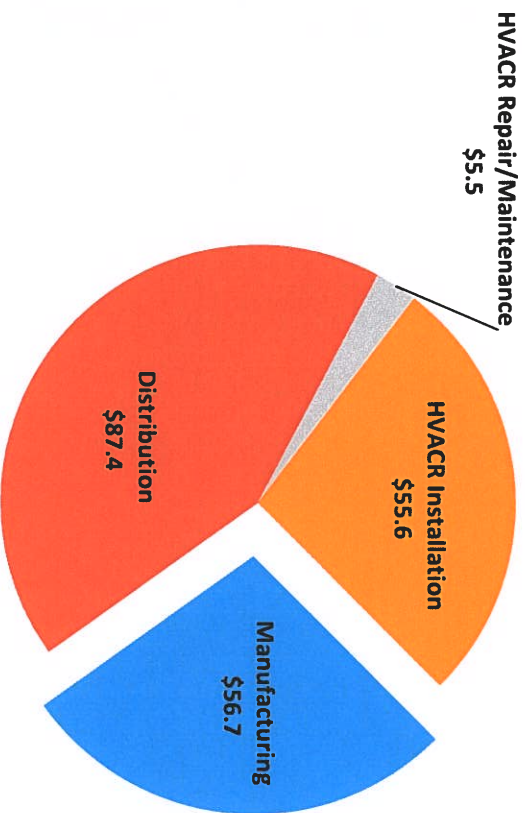
This industry is a significant contributor to American jobs, trade & economic output

US Industry Segments

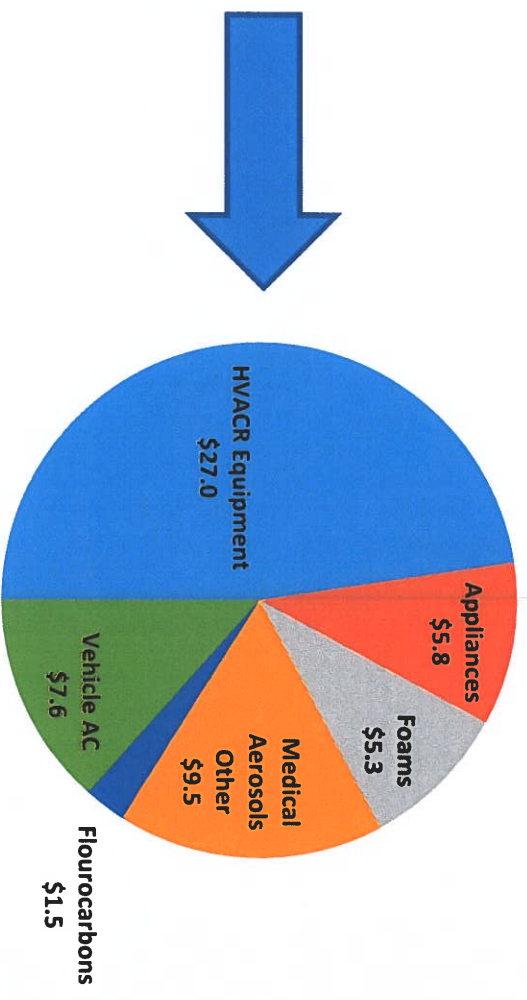
Manufacturing and Downstream Output

- Current manufacturing output is \$56.7B
- Downstream output in the wholesale, contracting, and repair and maintenance sectors is almost 3X that of manufacturing

Manufacturing + Downstream (Billions \$)



Manufacturing Shipments (Billions \$)

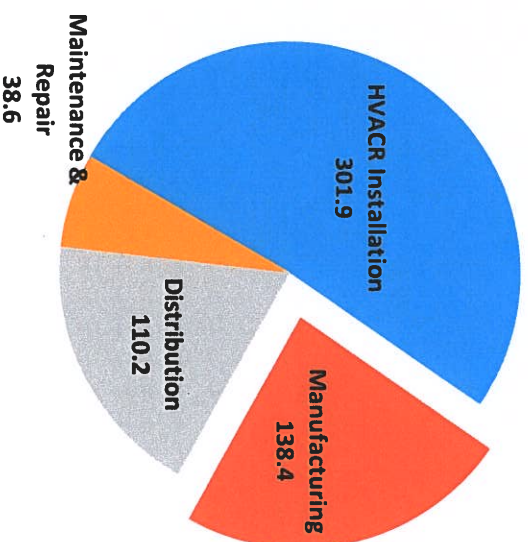


Downstream output is almost 3X the size of the manufacturing output

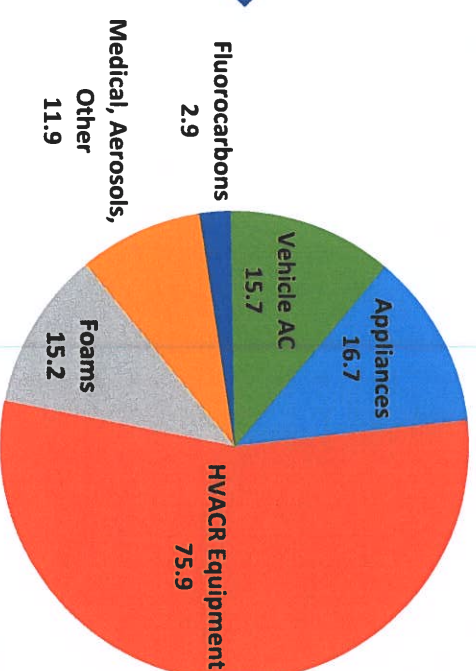
US Industry Segments Employment

- Current manufacturing impact is 138.4K jobs

Direct Industry Employment - 2016 (Thousands)



Manufacturing Employment 2016 (Thousands)



Downstream employment is over 3X the size of the manufacturing employment

US Industry Growth Prospects

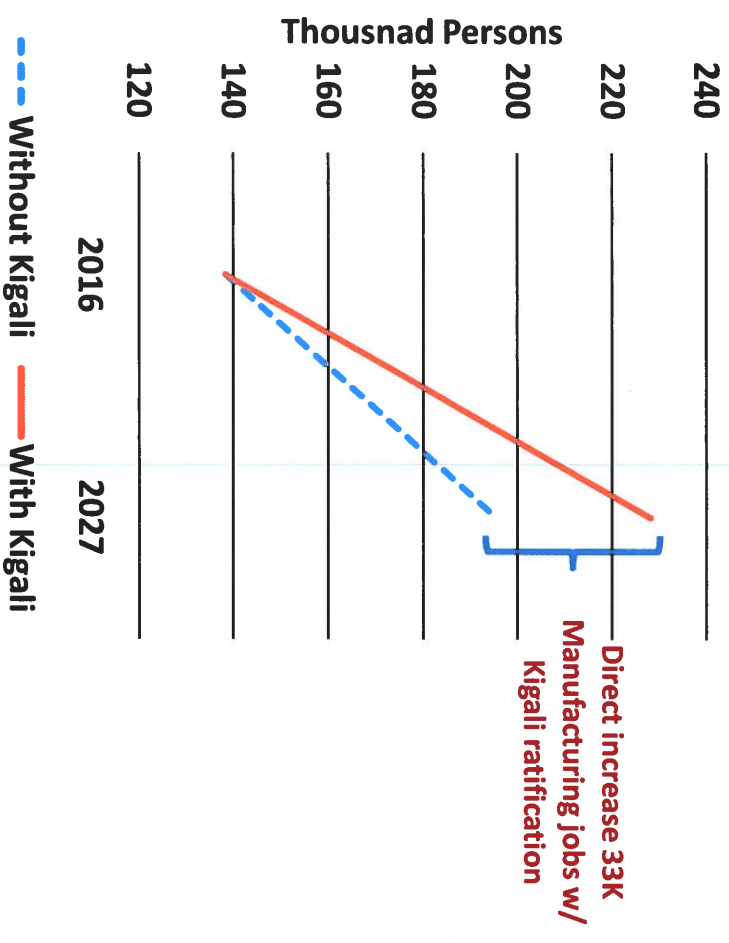
- Over the next 10 years...
 - International HVACR market expected to more than double
 - The cumulative global market will be over \$1 trillion
 - Developed countries are already transitioning to new technologies
 - Developing countries will transition away from ozone-depleting substances and this transition is at its apex between now and 2047
 - Foams, medical applications and aerosols also have large global growth opportunities
- American Innovation
 - Commercialization of next generation technology is essential at this point in the Montreal Protocol transition
 - The US HVACR industry has traditionally led these transitions and it is vital they lead this transition
 - Typical design cycle for the industry is 5-10 years, decisions being made now

American industry must lead the transition to new technologies to be competitive

Kigali Ratification Impact

2027

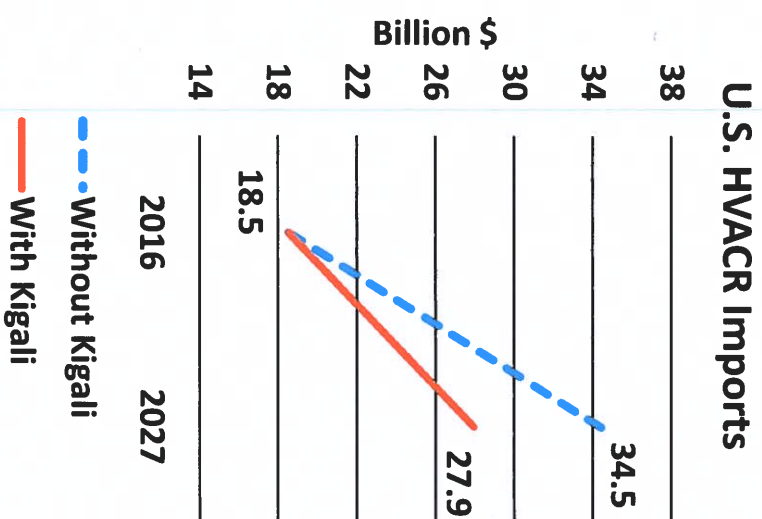
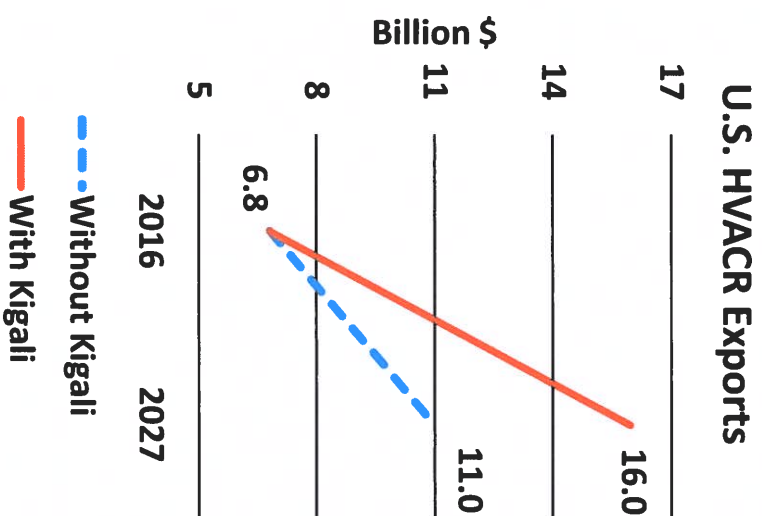
- **Manufacturing Jobs**
 - Current manufacturing impact is **138.4K** jobs
 - Kigali ratification increases direct manufacturing jobs by **33K**
 - Manufacturing growth translates into an incremental **150K** jobs economy-wide
- **Direct Economic Output**
 - Kigali ratification improves direct manufacturing output by **\$12.5B**
 - Total increased output of **\$38.8B** versus no ratification scenario
- **Trade Balance**
 - Positive impact on balance of trade
 - Manufacturing impacted directly



Kigali Amendment ratification essential to jobs growth, industry growth, trade balance

Kigali Ratification Impact Global Trade

- **Global Trade Impacts**
 - Kigali ratification will increase US supply to global HVACR markets by \$5.0B
 - Kigali will inhibit growth of old technology HVACR imports by \$6.5B
 - Fluorocarbon manufacture adds \$1 billion in net trade benefit

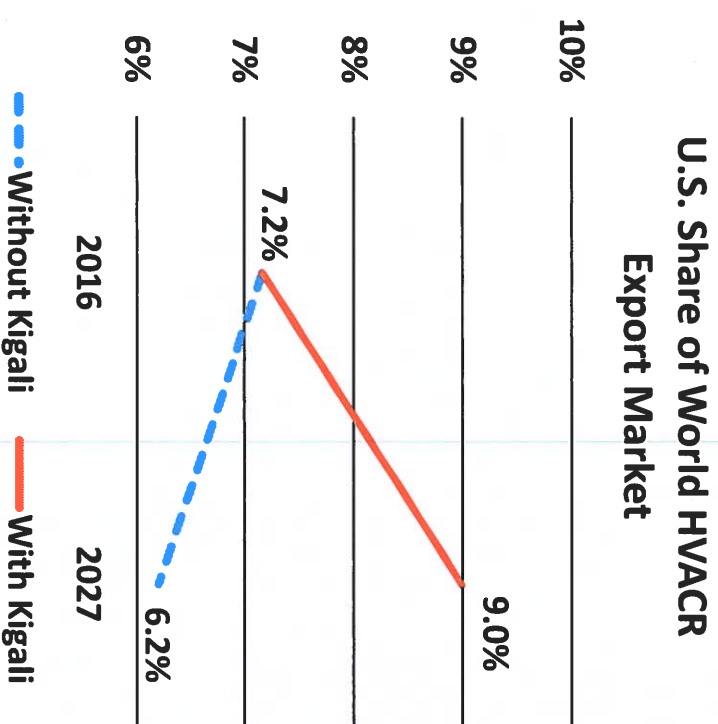


Kigali Amendment ratification will grow US exports and improve balance of trade

Kigali Ratification Impact

HVACR Global Export Market

- The HVACR global export market will grow by 6% per year to meet needs of China, India, Latin America, and Africa
- With Kigali, US exports will outperform, increasing US share of global market from 7.2% to 9.0%
- Without Kigali, exports will underperform



US is a net importer, but gains share of global market with Kigali Amendment Ratification

Kigali Ratification Impact Refrigerant Production & Reclaim

- Fluorocarbon manufacturing would benefit from increased exports if Kigali is ratified and suffer from imports of older refrigerants if not
- \$1B net benefit included in analysis
- Reclaimed HFCs with Kigali ratification are estimated to increase reclaim sales by \$0.8 billion and add almost 4,000 jobs. (not included in totals)

HVACR Technology & Investment

- The American HVACR industry led global innovation, which is driven by domestic demand
- Investments in next generation refrigerants and equipment technologies are already underway
 - In 2015, AHRI members representing 90% of US HVACR manufacturing committed \$5B through 2025 in R&D and capital investment to commercialize high efficiency equipment using next generation refrigerants
 - American investments in R&D and capacity for Kigali-related growth will generate 1,400 additional jobs and \$1B in capital investment if Kigali is ratified
 - Without Kigali ratification, manufacturing and R&D for new technologies will move to international markets to meet local demand for new technologies

Kigali Amendment ratification essential to maintain and expand American leadership

Economic Analysis Background

- Inforum and JMS Consulting contracted to assess industry size and conduct scenario analysis
- All segments of fluorocarbon using and producing industry assessed; focus on HVACR.
- Direct industry size based on Economic Census data and industry interviews
- Indirect and Induced impacts estimated with Inforum models
- Growth based on economic models and industry input
- Kigali projections derived from interviews and surveys of industry experts
- Reported results are consensus projections

Inforum has 50 years experience in applying industry modeling tools to improving business planning, informing policy analysis, and furthering the general understanding of the economy and economic data. Inforum's modeling tools are particularly well-suited to addressing questions that have both macroeconomic and industry impacts. Examples of Inforum projects include: analysis of tariffs and trade, evaluation of tax reform, evaluating future scenarios of natural gas and industrial competitiveness, as well as understanding the general impact and contribution of specific industries.

