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CHEMICAL

SUSTAINABILITY

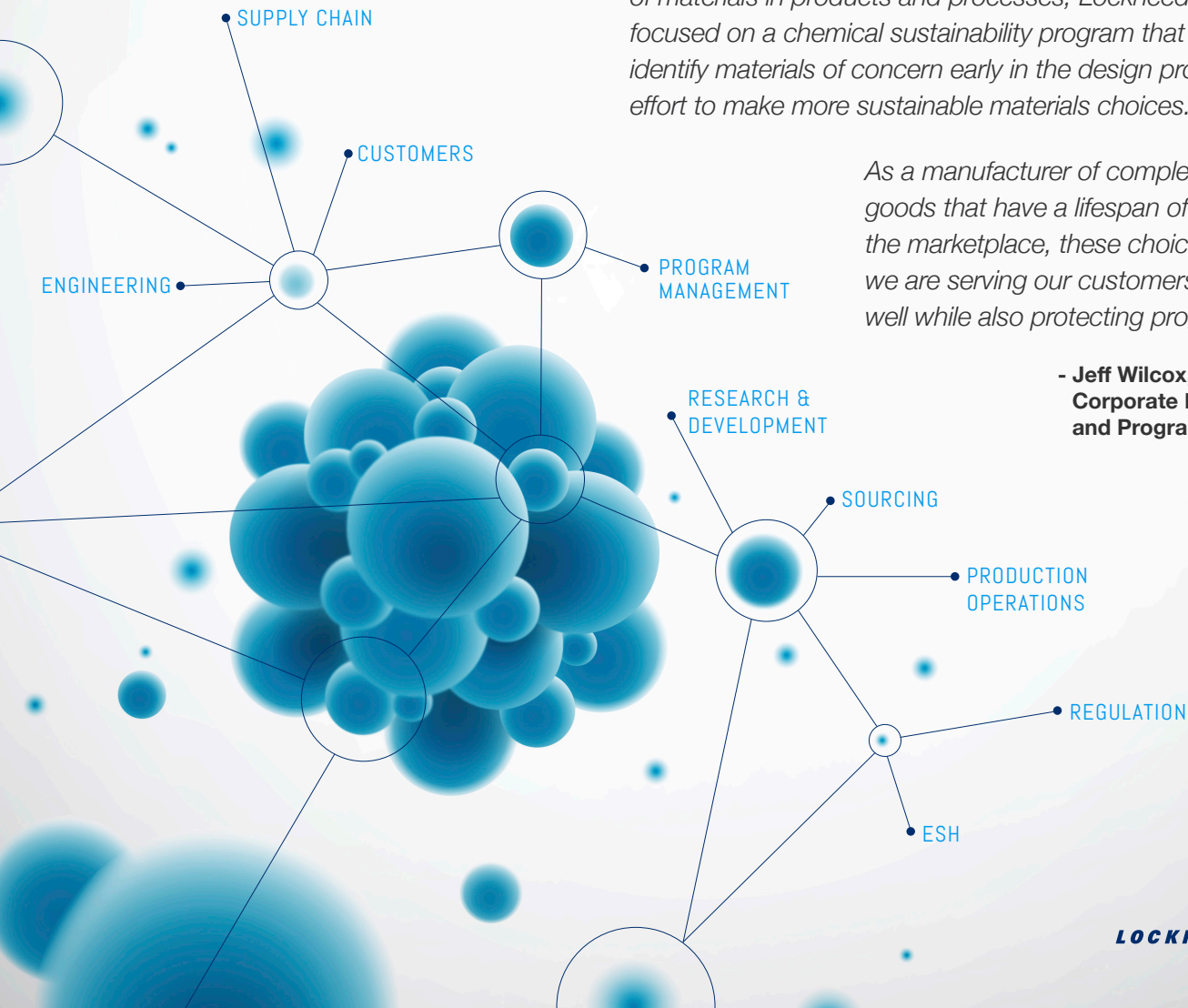
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LOCKHEED MARTIN'S PROACTIVE APPROACH TO PROTECT PROGRAM EXECUTION

“As material regulations continue to expand globally due to increased scrutiny on the environmental and safety impacts of materials in products and processes, Lockheed Martin has focused on a chemical sustainability program that helps engineers identify materials of concern early in the design process in an effort to make more sustainable materials choices.

As a manufacturer of complex durable goods that have a lifespan of decades in the marketplace, these choices ensure that we are serving our customers and the planet well while also protecting program execution.”

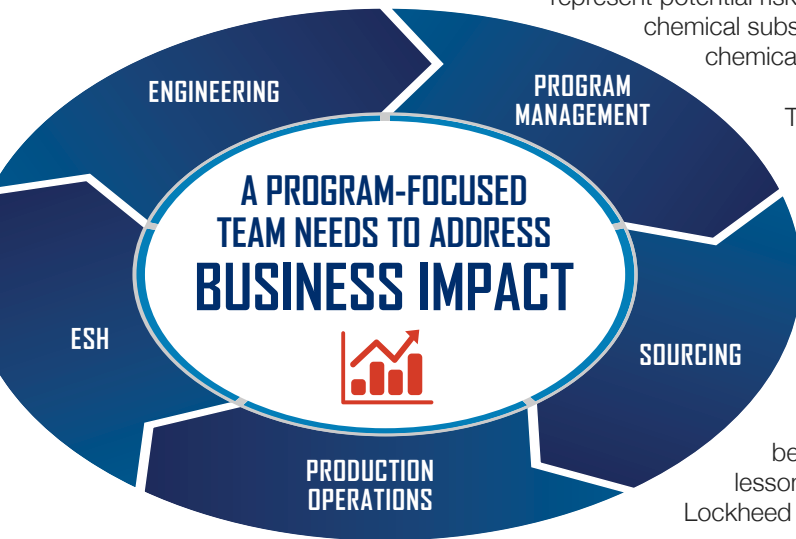
- Jeff Wilcox, Vice President, Corporate Engineering and Program Operations



EXECUTIVE SUMMARY

The Aerospace and Defense industry is being impacted by increasing chemical and material restrictions and regulations from a wide variety of domestic and international government bodies.

These efforts are driven by environmental, safety and health (ESH) concerns, and our continued use of many of these substances represents potential risk to our programs, meeting customer requirements, our ability to procure these materials, and/or our cost to use them in our products and processes. The impact of those regulations and restrictions on our supply chain (e.g. potential availability and obsolescence), customer requirements and the affordability of our products (both in material and processing costs) represent potential risk to our programs. We are proactively addressing the proliferation of chemical substance restrictions facing our products and are working to identify chemicals and materials that do not pose these challenges.



The chemical sustainability of Lockheed Martin products and processes is the joint responsibility of a number of organizations. Internally, we work to address these issues through our multi-functional Restricted Substances Working Group, which is focused on: identifying the chemicals and materials that may present the biggest risk for Lockheed Martin's operations, and identifying less hazardous alternatives; developing corporate policy document and guidance; and leveraging best practices and lessons learned from across Lockheed Martin and the industry.

“ We are proactively working to identify chemicals and materials that present less risk to human health, the environment and program execution. ”

Questions/Topics for Leaders:

- Do you know the vulnerability of materials used in your program and do you have mitigation plans in place?
- Do you have a cross-functional team established (engineering, ESH, and supply chain) to provide periodic updates and assessments?
- Does your program management plan establish a periodic review to assess risk management for chemical/material availability looking at both risks and opportunities?
- As we expand globally does the program have insights into chemicals and materials regulations that could affect program operations and performance?
- How can we work with customers to incorporate chemical sustainability requirements into program requirements in order to reduce risks and costs, and to avoid operational disruptions?
- As we move into commercial markets, have you considered the applicable regulations/standards you must meet that may have had exemptions under a military program?

LOCKHEED MARTIN CHEMICAL SUSTAINABILITY TIMELINE

Since the 1980's, we have worked to reduce or eliminate hazardous chemicals and materials in our operations.



1980's

Site pollution prevention programs drove chemical replacement projects

2000's

Development of BA and customer restricted substances lists

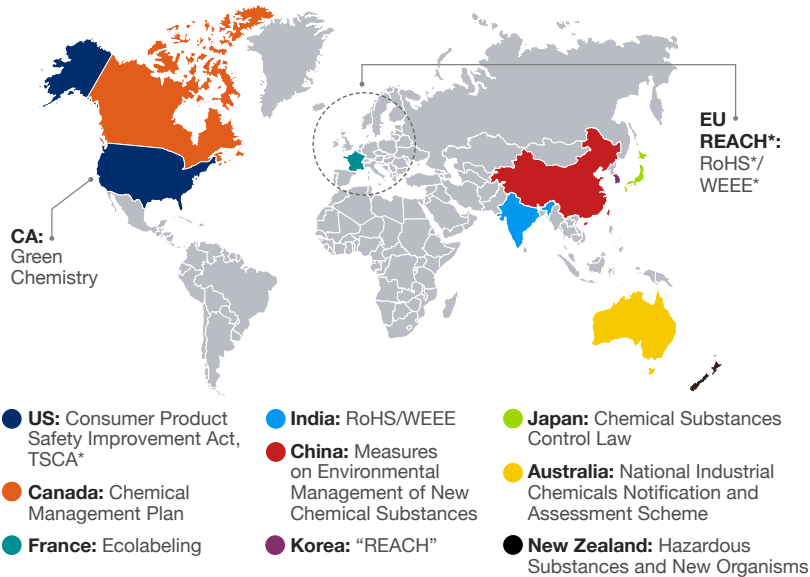
1980's/1990's

Montreal protocol, substitution of ozone depleting substances

CURRENT SITUATION

Since the passing of the US Toxic Substances Control Act (TSCA) in 1976 and more recently, the European Commission Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) in 2007, there has been an expansion of chemical and material restrictions and regulations from domestic and international government bodies (see map below). While we have seen some relief from the requirements in the form of military exemptions in the past, the uncertainty of exemption continuation and expansion into commercial markets may result in additional restrictions. Even when we fall under military exemptions, stricter regulations are driving the phase out of certain chemicals by chemical manufacturers.

GLOBAL / REGIONAL ACTIONS EVOLVING SIMULTANEOUSLY



As a result of these expanding requirements, we are receiving requests for chemical substance usage data from external stakeholders including customers and industry groups. These growing external requirements are increasing the need for transparency on chemical make-up of products/processes.

The Aerospace and Defense industry faces unique challenges when identifying replacement technologies. Our product development cycles may last years or even decades, so the chemicals we select today must be viable when a product is released several years in the future. Using a substitute material requires that the product re-enters the testing process, which impacts cost and timing. For example, many of our products are driven by customer specifications and our product portfolio includes products with long development cycles and lifespans compared to commercial products. It takes approximately five to seven years to test and qualify alternatives. Quality and performance of products is essential.

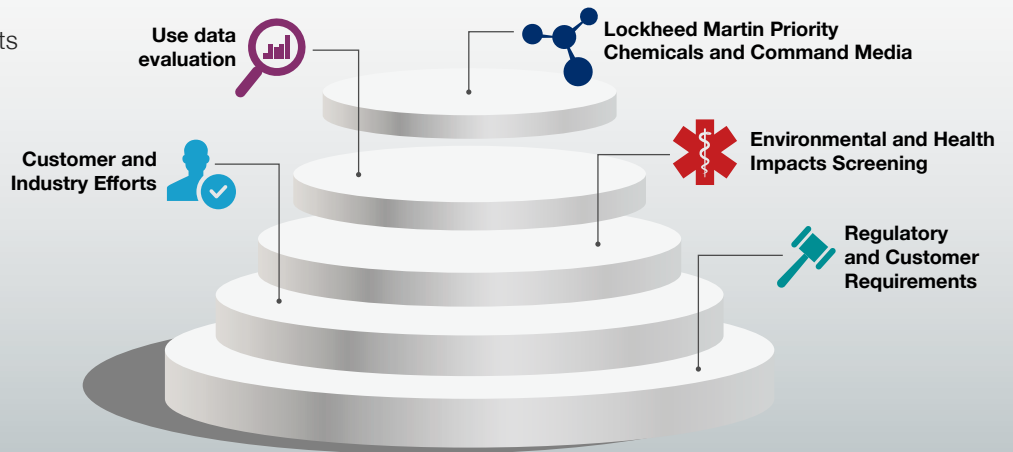
**serve as prototypes for developing nations regulatory frameworks*

WHAT LOCKHEED MARTIN IS DOING

We have developed a formal process to identify chemicals used in our products and processes that may be substituted with less hazardous alternatives.

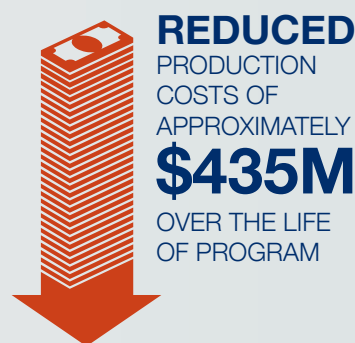
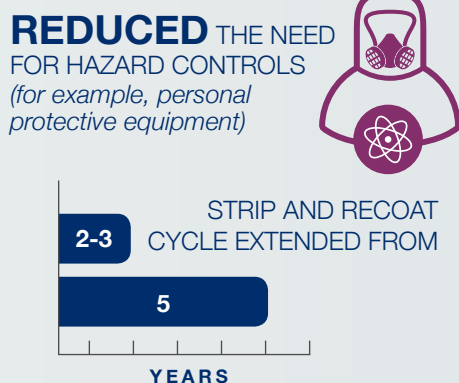
We consider materials' published toxicity along with sustainable business practices and customer requirements when identifying and implementing alternative chemical projects.

PROACTIVE APPROACH TO PROTECT PROGRAM EXECUTION



- 2007** EU REACH regulation went into force, requiring greater insight into LM product chemical composition
- 2013** Chemical sustainability process, evaluating purchase/use of chemicals that are of concern externally
- 2015** LM priority chemicals usage baseline
- 2015** LM priority chemicals list based on chemical use/purchase; restricted substances command media
- 2015/2016** IAEG Aerospace and Defense Declarable Substances List, development of standard
- 2015/2016** Materials management system proof of concept
- 2016/2017** Pilot supplier declaration standard

Our business areas have been actively pursuing replacement technologies. For example, Aeronautics Advanced Development Program engineers identified an alternate outer mold line coating for the F-35, which has multiple performance and environmental and safety improvements, including:



We are working on chemical replacement projects in our facilities. Halon 1301 has been widely used in fire suppression systems since the 1960s. Due to published Environmental, Safety and Health (ESH) hazardous and potential obsolescence issues related to halon, our facilities organization sought out a replacement system for the Denver Data Center's fire suppression system. By partnering with 3M, we identified an alternative to the halon-based fire suppression systems, which among other ESH benefits compared to halon, has zero ozone depleting potential and thus less risk of future obsolescence.

We are partnering with suppliers to stay ahead of potential supply chain disruptions. For example, due to the US Environmental Protection Agency (EPA) action to restrict the usage of chlorinated paraffins (CPs), manufactures will cease production of certain CPs. Lockheed Martin is working closely with the Department of Defense and the National Aerospace Standards Committee (NASc) (which is comprised of airframe and engine OEMs, customer representatives, and fastener suppliers) to understand the impact on the supply chain if this material were no longer available.



WHERE WE ARE GOING

The efforts described in this paper represent the first step in order to more fully assess the impact of evolving chemical regulations and restrictions on our programs, in order to proactively protect program execution. We are collaborating with peer companies through industry and customer working groups to identify industry-wide solutions related to chemical sustainability. The International Aerospace Environmental Group (IAEG) has developed an approach for identifying all regulated substances relevant to our industry and a process to identify top priority materials for replacement. Our Global Supply Chain Operations group is leading an effort to evaluate a materials management solution in order to help facilitate disclosure of chemicals of interest in our supply chain. Through these efforts, we are working toward a more comprehensive product stewardship program in order to mitigate program risks and to take into consideration ESH impacts across the value chain of our products.

