OTA Client Feedback and Outreach Campaign

Team Members

Jacob Talbot
Aaron Wheeler
Livia Thomollari
Yifei Zhao

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Advisor

Professor Jason Davis

Professor Sarah Stanlick

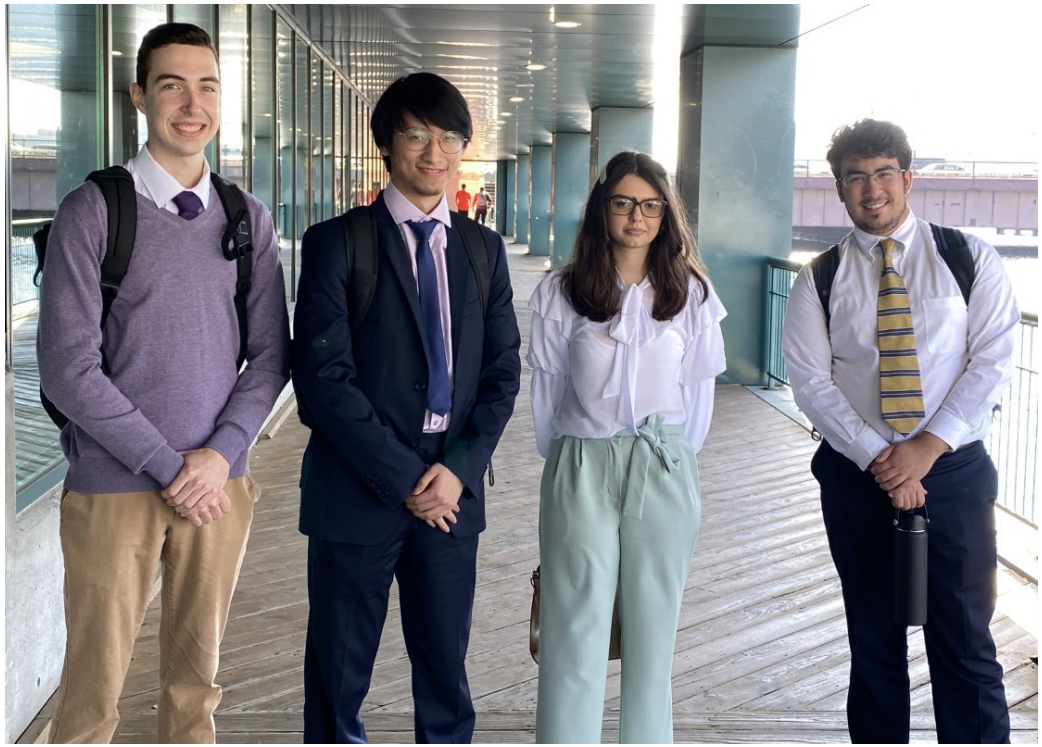
Sponsor

Massachusetts Office of Technical Assistance & Technology

Tiffany Skogstrom, Director

Caredwen Foley, Communication Analyst

Kari Sasportas, Outreach & Policy Analyst



Abstract

Oftentimes when one thinks of chemicals in relation to the environment, first thoughts typically gravitate towards chemical releases or oil spills. While these are ever-present dangers associated with chemicals, it is also important to recognize the adverse effects of the use of toxic chemicals in facilities to workers in these facilities as well as the communities surrounding them. We worked with the Massachusetts Office of Technical Assistance (OTA), to help analyze their operating procedures to provide recommendations to improve these procedures. In general, OTA is a non-regulatory government body that provides free and confidential technical assistance to companies in order to help them reduce their use of toxics. Our research primarily consisted of interviews and surveys conducted with previous OTA clients, which gave us a perspective of how effective OTA's technical assistance was, and how OTA could modify their services. We also conducted interviews with OTA stakeholders to gain an outsider perspective on OTA's services. Based on our research, we recommend that the Office of Technical Assistance promote their services through social media, especially through the social media accounts of other government agencies. We also recommend that OTA focus more on creating more individualized plans for follow-up with clients, by working with clients to determine how often they would like to be contacted before and after a site visit. Furthermore, we recommend that OTA perform more analyses to assess the feasibility of recommendations based on the client's financial and time-based commitments. Another important outcome of our project is the impact that our project has on OTA's relationship with its clients. Through our interviews, our team also conducted outreach with previous OTA clients and helped reestablish relations with them.

Introduction

About 684 million pounds of toxic chemicals were used in Massachusetts in 2019 and about 3 million pounds of these toxics were released to air, water and land disposal (Massachusetts Department of Environmental Protection, 2019). Exposure to toxic chemicals such as lead, benzene and ethylene oxide causes increased blood pressure and irritation to eyes, skin, lungs, and cancer. Low-income communities and minorities are most in danger of chemical exposure because most toxic use facilities are in areas where these communities live (Mascareñas, 2021). The implementation of Toxic Use Reduction Act (along with the work that OTA has done) has helped in decreasing the use and release of toxics in manufacturing processes, however, there are still businesses that use many toxics for different activities.

The Office of Technical Assistance and Technology (OTA) is a non-regulatory agency that provides free confidential assistance, education, and grants for toxics use reduction, energy and water conservation, and compliance with the Toxics Use Reduction Act (TURA) for Massachusetts businesses, manufacturers, and institutions (Administrative Council on Toxics Use Reduction, & Executive Office of Energy and Environmental Affairs, n.d.). As a result of the Covid-19 pandemic, the day-to-day operations of OTA have been drastically limited. Most forms of technical assistance OTA engage in with businesses and facilities such as site visits had shifted to online meetings during the pandemic, presenting a significant difficulty for OTA engineers when acquiring information about facilities being toured. In addition, the pandemic has reduced the number of facilities which are willing to do site visits, due to confidentiality issues with hosting potentially sensitive OTA client information over a remote format. Now that OTA is beginning to begin on-site operations in fall 2021, OTA still struggles with outreach and communications with companies.

The goal of this project is to research and assess the effectiveness of OTA's operating procedures in order to make recommendations to improve

OFFICE OF TECHNICAL ASSISTANCE & TECHNOLOGY

Figure 1. Office of Technical Assistance & Technology Logo

OTA's services. To meet this goal, we have developed three key objectives: 1. Research Assistance Methods and Client Perceptions to assess their effectiveness 2. Evaluate OTA's operating procedures using past surveys & stakeholder interviews 3. Conduct OTA client outreach and provide recommendations. By researching and evaluating OTA's standard operating procedures we can evaluate and propose new communication tools to help OTA better reach and assist their clients.

Previous IQP projects at WPI which centered around OTA focused on the effectiveness of OTA operations in the context of chemical safety and climate change training. Although the general methods used in these projects (namely interviews and surveys) have not changed, our project has a heavy focus on analyzing OTA's services through gathering client feedback. Furthermore, it is important to recognize our project's unique situation, taking place during a transitory period for OTA between remote and in-person site visits. While OTA client engagement was much higher before the pandemic, by discussing aspects of OTA's operating procedures with OTA clients, we hope to provide recommendations which can improve the value of OTA's services in both an in-person and remote format.

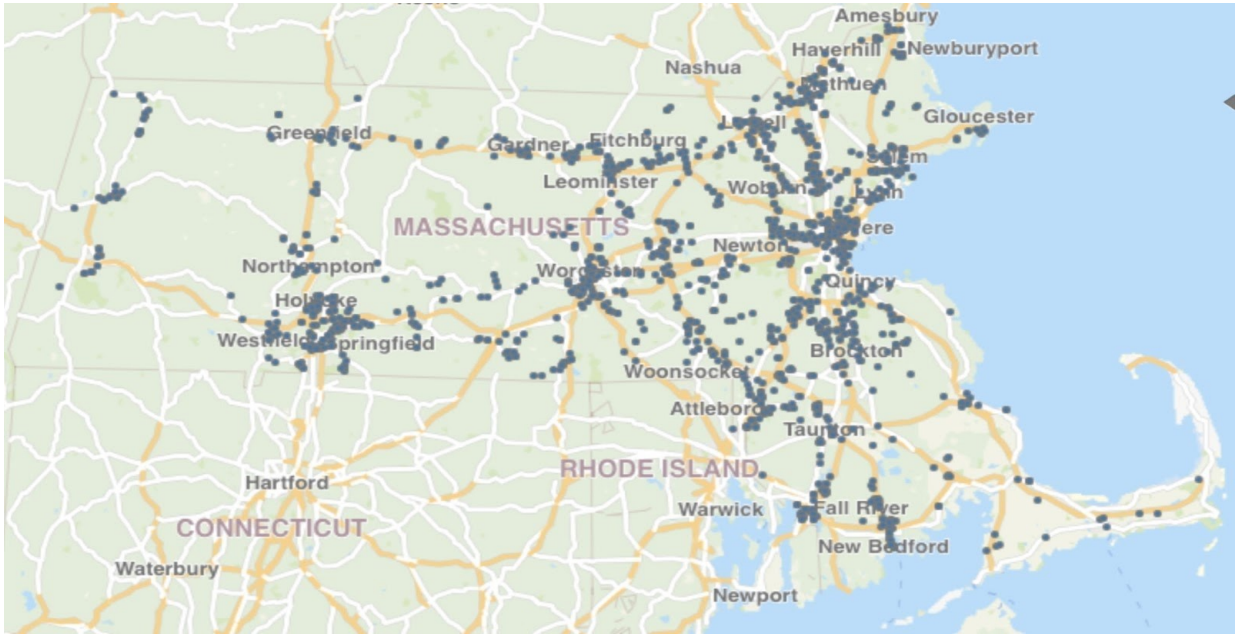


Figure 2. TURA Facilities in Massachusetts. The facilities are marked with blue.

Background

This chapter provides context about the state of toxics use in Massachusetts and details the risks associated with toxin use, the operations and programs OTA provides, and the relationship between OTA and the facilities it works with. We also investigate the relationship between environmental justice and toxics use reduction, and review how OTA's operations have been affected by the Covid-19 pandemic.

Risks Associated with Toxics Use in Facilities

Toxic substances are chemicals that cause harm to human health with exposure. In the state of Massachusetts, facilities that use a large amount of toxic chemicals are required to report the quantity on their chemical use (Toxic Use Reduction Act Program, 2021). Based on the Toxic Use Reduction Act (TURA), the facilities report the use of toxics in two broad categories: how the toxic material is used, which includes manufactured, processed, otherwise used, and what happens to the toxic after it is used (Toxics Use Reduction Institute, 2021). The TURA Data online tool records data that were reported to MassDEP by more than 400 Massachusetts toxic use facilities. A map of where these facilities are located in the state is shown in Figure 1.

When toxins are released to the environment, they can contaminate the air and the water, increasing the risk of exposure to humans. Exposure to chemicals such as benzene causes long and short-term health effects such as a decrease in red blood cells, delayed bone formation in babies, and cancer. Other chemicals such as ethylene oxide poses serious hazards to human health such as severe irritation and burns of the eyes, skin, lungs, neurological disorders, and miscarriages (Toxics Use Reduction Institute, 2021).

There are several emerging concerns for those involved with TURA. PFAS (Per- and Polyfluoroalkyl substances), a group of chemicals containing fluorine which are used in the production of some plastics and other materials, is a recent target of the TURA Administrative Council. Because PFAS are water soluble, they can seep into the ground and into groundwater and surface water. PFAS have been found in lakes, rivers, drinking water and has become an emerging issue nationwide. Exposure to PFAS can result in certain adverse health effects, especially damaging the liver, kidneys, and the immune system. MassDEP funded a U.S Geological Survey (USGS) water quality study to evaluate the presence of PFAS in Massachusetts' rivers. The USGS tested 27 rivers from August to November 2020 and found that all 27 rivers contained PFAS in them

(Massachusetts Department of Environmental Protection, 2021).

Another recent focus of OTA is helping chemical facilities protect themselves from extreme weather events often linked to climate change. Extreme weather can trigger fires or chemical explosions in toxics using facilities (Anenberg et.la, 2019). In August 2020, hurricane Laura left a chlorine plant on fire in Lake Charles, Louisiana. The chlorine gas being released into the air was detected quickly by officials and the residents were warned to stay indoors and turn off air conditioning to avoid any further incidents (Pardue, 2021). This event and other events of similar nature started conversations among residents affected and journalists on how to avoid these situations in the future. One outcome of the conversation was to better secure toxic chemicals in facilities to prevent a similar situation with Hurricane Laura happening in the future. Toxic use facilities and businesses by working with agencies such as OTA, they could store toxic substances better and reduce their toxic use.

Environmental Justice

Based on the strong connections between toxic use and environmental issues, it is also important to understand that some people are often more affected by toxin releases due to unequal development of laws, regulations, and policies which prevent the use of toxics in communities. This ties our project with environmental racism and environmental justice. Broadly speaking, environmental justice refers to a social movement which attempts to rectify and fight against environmental racism, which, in the context of OTA and the Toxics Use Reduction Act, manifests itself as the placement of facilities and other organizations in neighborhoods and areas with a high concentration of minority and low-income individuals (Mascareñas, 2021).

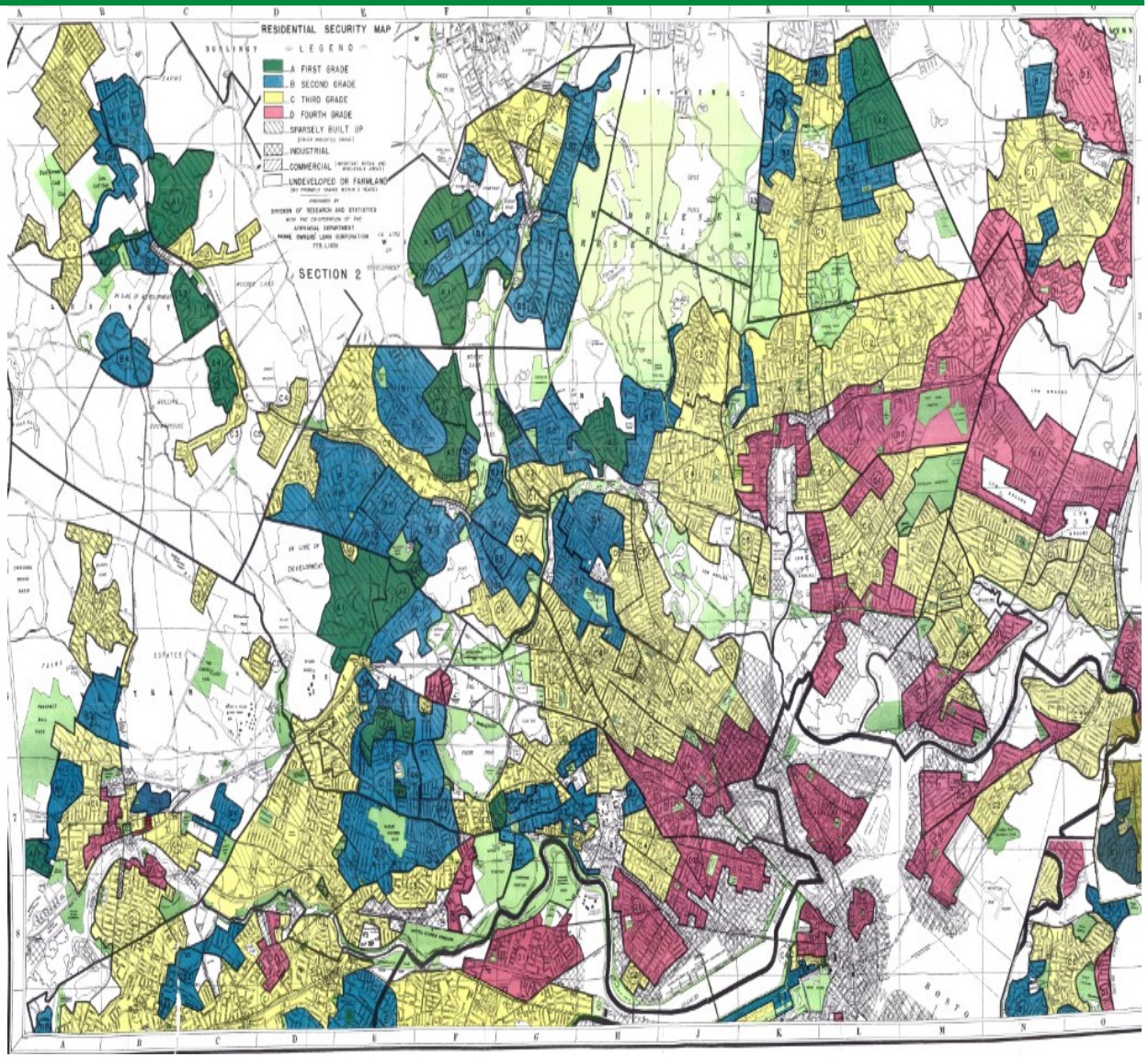


Figure 3. Redlining Map of Boston

Historically, this environmental racism has its roots in segregated America, where no laws existed to protect minorities from discriminatory practices in the housing market. These discriminatory practices led to a system where people of minority or low-income backgrounds were often grouped into neighborhoods that businesses exploited by building and operating factories and dumping waste; These communities were often called "redlined" due to the financial risk associated with lending to these communities. (Mascareñas, 2021). The map below shows a 1938 redlining map of Boston, where areas were ranked by their "desirability" from a commercial or housing perspective. Areas in red such as Chelsea, labelled as "hazardous" are disproportionately inhabited by African Americans, Hispanics. These areas can easily be corroborated with toxic use; These areas are often the location of businesses which use toxics and large toxin producing facilities are often located in these areas. High-temperature areas on urban heat maps, which indicate non-vegetated areas in cities, have strong overlaps with red areas on these redlining maps, providing further evidence supporting the correlation between low-income areas and industrial/commercial growth which causes large amounts of toxic use and production in these areas. (University of Richmond, 2016).

Redlining not only has a significant impact on minority and low-income communities in terms of commercial and housing equity, but also in terms of climate change and pollution. Redlined communities are significantly more likely to have carcinogens and other toxins released in them, even though most toxins are produced in or by high-income industrial zoned areas. In this, it is important to note that many businesses that release chemicals are not factories which produce chemicals but are instead commercial businesses which use and release toxic chemicals, such as laundromats and car washes. Redlining can also be connected to climate change, with research using urban heat maps, which measure land surface temperature, showing a strong relationship between high surface temperatures and areas traditionally associated with the positioning of facilities which use chemicals and are associated with redlined communities (Hoffman, et.al, 2020). In general, considering these disproportionalities between toxin usage in high- and low-income communities, it becomes necessary to reduce the use of toxins in redlined communities in order to promote environmental justice.

Public Programs for Toxics Use Reduction

Overview of the Toxics Use Reduction Act (TURA)

In 1989, the Massachusetts Toxics Use Reduction Act was passed with the intention of stopping pollution at the source by reducing toxics use in industrial and commercial capacities (Massachusetts Department of Environmental Protection, et. al, 2020). The purpose of the program today is to collect data and fees from toxics users, which fund programs which support toxics use reduction education, training, grants, and technical assistance to toxics users (Office of Technical Assistance, n.d). Under TURA, companies file through the Massachusetts DEP if they fall within TURA industries and uses of listed chemical(s) at the designated thresholds, therefore allowing the state to track and work towards reducing toxics use in Massachusetts (Office of Technical Assistance and Technology, n.d).

In 2019, the TURA program was responsible for collecting more than 1600 chemical use reports from 468 companies (Massachusetts Department of Environmental Protection, et. al, 2020). Massachusetts has designated three agencies, the Office of Technical Assistance (OTA), the Toxics Use Reduction Institute (TURI), and the Massachusetts Department of Environmental Protection (MassDEP), which are responsible for the services and promotion of the TURA program throughout the state. The MassDEP is the enforcement agency of TURA and is responsible for administering TURA's annual reporting; biennial planning mandate; licensing Toxics Use Reduction (TUR) planners, and reviewing, analyzing, and releasing TURA data and conclusions. TURI is responsible for providing research and conclusions on toxics and safer alternatives, training TUR planners, and maintaining a specialized library on toxic chemicals and safer alternatives. OTA is a non-regulatory agency that

provides free and confidential assistance, education, and grants for toxics use reduction, energy and water conservation, and compliance with TURA for Massachusetts businesses (Administrative Council on Toxics Use Reduction, & Executive Office of Energy and Environmental Affairs, n.d.).

Overview of the Office of Technical Assistance and Technology

The Office of Technical Assistance and Technology (OTA) is a non-regulatory agency within the Executive Office of Energy and Environmental Affairs that provides free, confidential, onsite, and remote technical assistance to Massachusetts businesses, manufacturers, and institutions with the purpose of supporting the environmental responsibility in Massachusetts (Office of Technical Assistance, n.d). OTA offers 3 types of general technical assistance: phone and email technical assistance, education materials on toxics use reduction, and site visits to toxic user's facilities. Furthermore, they offer several types of focused assistance ranging from chemical safety and climate change resilience training to energy and water efficiency.

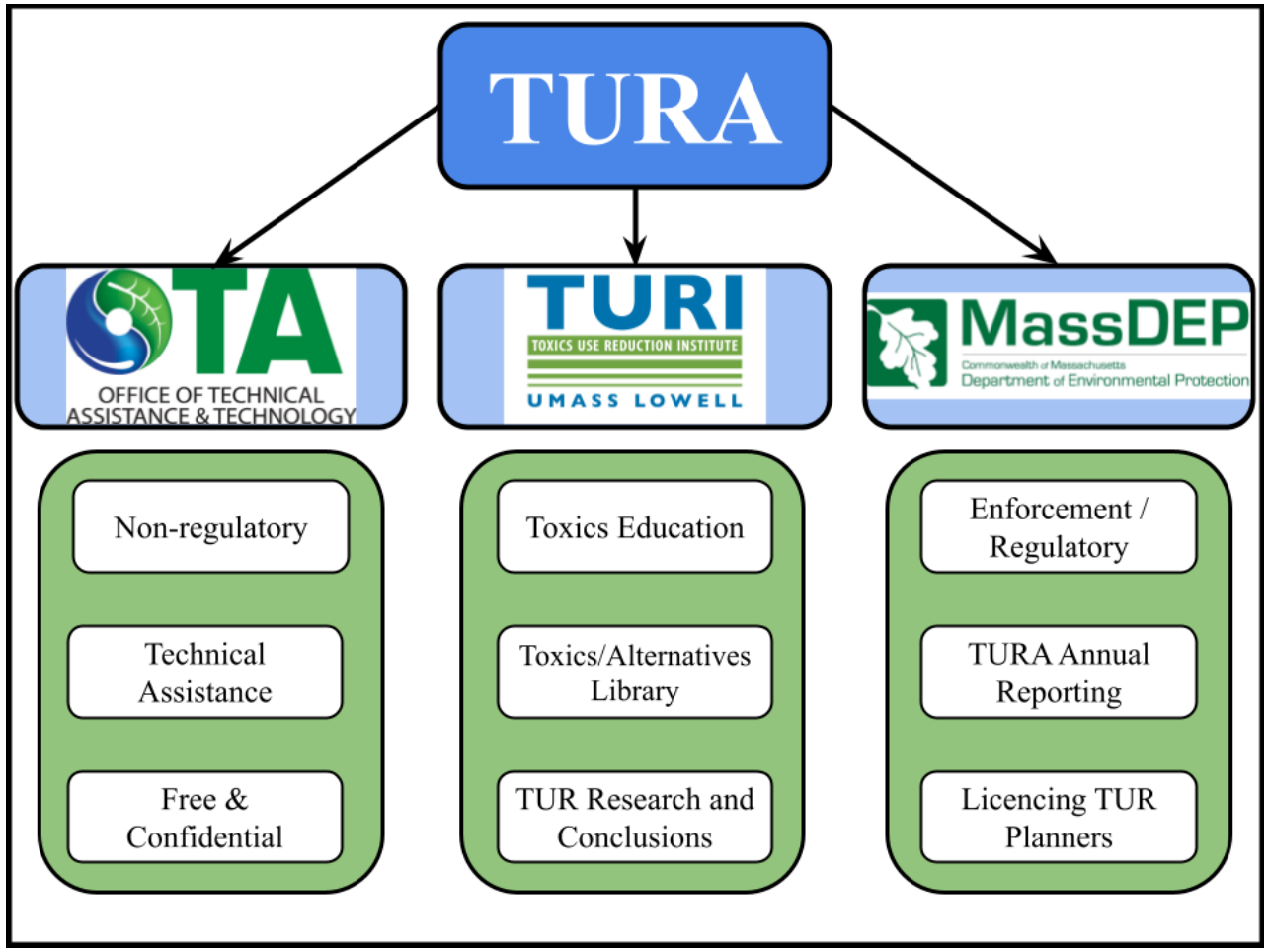


Figure 4: Infographic of TURA Agencies and their various responsibilities .

OTA's services have several different purposes that range from education and outreach to toxics users to remote and onsite technical assistance. Phone and email communication is OTA's first line for toxics users to reach OTA and it allows businesses to get assistance with questions relating to TURA, changing regulations, and finding safer chemical alternatives. OTA also provides educational resources from a library of past reports about toxics use reduction and technical assistance to case studies of facilities that received significant help from OTA (Executive Office of Energy and Environmental Affairs, & Office of Technical Assistance, n.d). OTA has also provided industry-specific training, such as for the automotive repair and metal plating industries, along with more generalized workshops on fundamentals of energy efficiency and water conservation (Office of Technical Assistance, n.d). The primary activity of OTA is site visits to toxics users' facilities, which allow an OTA engineer to go the facility, tour it, and then discuss with building management what

steps can be taken to come into compliance with TURA regulations or offer safer alternatives to current chemicals and practices (Office of Technical Assistance, n.d). The services that OTA offers are an essential part of TURA and allow the Commonwealth to reach out to toxics users and stop the use of toxics at their source.

Beyond their general services, OTA offers several focused services to meet the needs of the businesses and agencies in a range of applications from regulation compliance to PFAS identification. OTA's environmental compliance assistance provides information for business on most environmental laws and acts ("Request environmental compliance recommendations," 2021), while their pollution prevention assistance is more focused on assistance with TURA regulations ("Request pollution prevention recommendations," 2021). OTA also provides energy efficiency assistance, where they provide information and recommendations on how to use and choose energy efficiently ("Request energy efficiency recommendations," 2021), along with renewable energy assistance, where they help businesses implement a variety of renewable energy projects with utility, state, and federal financial incentives and resources ("Request renewable energy recommendations for your facility," 2021).

OTA also assists with water conservation in manufacturing operations, wastewater discharge compliance, water reclamation and reuse, water saving technologies, and operations and maintenance best practice ("Request water conservation and wastewater recommendations," 2021). Furthermore, climate change and resilience training helps businesses and governments prepare for climate change disasters through climate change vulnerability assessments and community toxics mapping ("Chemical Safety and Climate Change Preparedness," 2021). Finally, OTA continues to develop new services, like PFAS identification to find per- and polyfluoroalkyl substances in surface soil and drinking water, to continue to meet the needs of their clients even as new environmental issues arise (Massachusetts Department of Environmental Protection, 2021).

OTA operates under strict rules of confidentiality, meaning that OTA does not share the names of the businesses or individuals that they assist with anybody outside of OTA. Toxics users need confidentiality to know that if they come forward to OTA for help, they will not be fined or punished by the MassDEP and therefore unable to even afford to come into compliance with TURA regulations, so by making their services confidential OTA can bring companies into compliance with TURA in a faster time and with less resistance than a regulatory agency, like the MassDEP (Executive Office of Energy and Environmental Affairs, & Office of Technical Assistance and Technology). Although confidentiality is a major component to OTA operations, OTA also recognizes that safety of the people in and around the facilities is of the utmost importance, so OTA is obligated to report serious hazards that pose severe and immediate risks to employees of a facility and the surrounding community, for example something like an eminent risk of a chemical explosion for

Figure 5: Picture of the IQP Team meeting our sponsors from OTA for the first time in person before our final presentation.

instance. OTA's confidentiality policy allows OTA to build trust and offer these great services to their clients even when they fall out of compliance with TURA.

OTA Operations During the COVID-19 Pandemic

The Covid-19 pandemic resulted in the complete shift of OTA operations from onsite operations to remote operations. In comparison to the number of tours before the pandemic, the shift to a remote format had resulted in a dramatic decrease in the number of tours done by OTA. In addition, the amount of data which could be collected over a remote medium by an OTA engineer is limited. Onsite operations typically consisted of site visits, where an OTA engineer would identify and provide suggestions to help with a plethora of potential technical issues in the facility. OTA also conducted onsite operations to provide aid, where technical assistance providers can help develop methods to reduce any workplace and environmental risks associated with using chemicals, and to develop safer alternatives to chemicals and chemical processes (Illingworth, et.al, 2020). According to OTA staff, while the general form of remote site visits has not changed dramatically from in-person site visits, OTA's general experience with remote work has been negative, with the number of site visits decreasing since the use of remote visits started. Data is also harder for OTA to collect over a remote format and confidentiality issues have also made remote site visits difficult for OTA. Considering this, OTA resumed in-person site visits in September 2021.

Despite the issues present for OTA in remote site visits, they attempted to work as close to full capacity as possible using a remote visit system where facilities gave remote tours to OTA assistance providers through services like Zoom, Microsoft Teams. These tours typically consisted of facility employees walking around the site with a camera, showing any potentially dangerous chemicals or chemical processes to OTA employees. The facility giving the tour is required to give any safety data sheets for potentially dangerous chemicals, as well as floor plans. This remote system has come with a large reduction in the number of OTA clients seeking services. An additional major issue is confidentiality, where giving a tour of a facility on an open network may provide security issues to the company giving the tour. Remote visits also provide a significant challenge to OTA assistance providers, where a large amount of information on site safety cannot be collected through a remote medium (Illingworth, et.al, 2020).

OTA's Contribution to TUR and the Importance of Feedback

OTA has played a significant role in helping companies, institutions, and corporations to reduce their toxics usage by providing

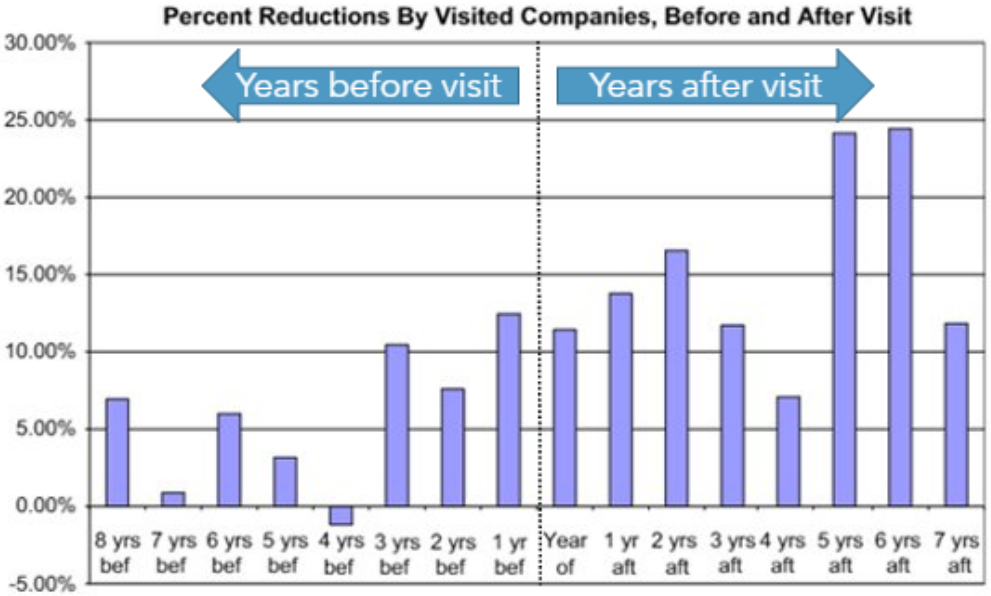


Figure 6: A mixed chart in the year category to present the overall trend of toxic use reduction while marking OTA's assistance.

Barrier	Responses	Percentage (of 196 Respondents)
Technical feasibility problems	121	62%
Financial costs too high	107	55%
Concerns about product quality	97	49%
Customer requirements	88	45%
Lack of sufficient expected benefits	56	29%
Project considered too time consuming	37	19%
Project considered low priority for management	18	9%
Lack of support from supply chain partners	16	8%
Regulatory environment	14	7%
Other	13	7%
Lack of organizational support for implementation	13	7%

Figure 7: ***Overall distribution of problems and barriers companies have encountered after visiting OTA***

confidential assistance. Client feedback is essential for OTA as it allows them to identify where services are ineffective and make improvements.

Companies that received help from OTA see a much higher toxics use reduction rate after the site visit. Before visiting OTA, companies see less toxic use reduction and even sees more toxic usage (Reibstein et. al, 2008). Figure 4 confirms that OTA's contribution to overall toxic use reduction by assisting companies, businesses, and institutions with TURA is significant.

While OTA provides technical assistance to a wide range of companies and institutions within the category of "using documented toxic chemicals", the experiences each company has with OTA can be totally different (Reibstein et. al, 2008). The feedback from companies, institutions, and corporations to OTA is crucial when analyzing the implementation of the TURA in Massachusetts. Figure 5 is an example of feedback from the companies in responding to OTA's services. The overall probability of a certain problem that a company is experiencing when getting OTA's technical assistance can inform OTA about their weaknesses and help them improve their services in the future.

Background Summary

The Toxics Use Reduction Act (TURA) is a program designed and maintained by the Office of Technical Assistance (OTA), Massachusetts Department of Environmental Protection (MassDEP), and Toxics Use Reduction Institute (TURI) with the goal of reducing toxics use in Massachusetts by stopping the use of specified toxics before they are put into consumer products or used in industrial applications. OTA plays a large role in TURA, as the sole focus of OTA is assisting their clients in toxics use reduction and TURA compliance, but with the Covid-19 pandemic the day-to-day operations of OTA have been disrupted. Major issues with confidentiality for remote site visits over conferencing apps make businesses less likely to be willing to accept remote site visits. Despite this, OTA still has a very important role in implementing TURA. In addition, the feedback from companies to OTA about their services is also very important, as it can help OTA improve their services.

When analyzing toxics use in Massachusetts, it is important to understand the impact that our project will have on the communities we work in. Redlining and other forms of environmental racism should be factored into how facilities impact the communities they are in. Toxics use reduction can be a major step towards reaching environmental justice because the release and emissions of toxins has a disproportionate effect on minority and low-income communities.

OTA (Office of Technical Assistance and Technology) is conducting this survey to collect your feedback about your experiences with us. We greatly appreciate the time you are spending to help us assess and improve our services. This survey should take you approximately 20-30 minutes to complete. Your survey link is specific to you. Please do not share it with anyone else. If you are interrupted while you are taking the survey, you may close out of it and your progress will be saved when you access the survey again using the same link. If someone other than you should be completing this survey on behalf of your company, please contact [redacted]

Figure 8: Pre-survey statement

Methodology

The purpose of our project is to assist the Office of Technical Assistance (OTA) in assessing the efficacy, perception, and reach of OTA services. OTA provides a variety of services for toxics users and facilities in Massachusetts and are seeking a comprehensive look at current operating procedures. The result of interview and survey analysis will be recommendations to improve their services. We will primarily be interviewing and surveying companies that OTA has interacted with at least once in the last 5 years to directly evaluate operation procedures through client experiences. Furthermore, we will also interview key TURA and OTA stakeholders to develop a range of perspectives on OTA interactions with their clients. By gathering company feedback, interviewing OTA stakeholders, and comparing the results of past feedback surveys we were able to understand and assess the effectiveness of OTA operating procedures and were able to provide recommendations to improve these services.

Objective 1: Research OTA Assistance Methods and Client Perceptions of OTA to get a Better Understanding of Operating Procedures and their Effectiveness

Our first objective was to research OTA's assistance methods to get a better understanding of their operating procedures when assisting clients. We examined the current OTA operating procedures and their impacts on OTA clients through semi-structured phone interviews and surveys when an interview is not possible. Furthermore, interviews with stakeholders broadened our perception of OTA and gave us a better assessment of their services. We had planned on participating in either virtual or in person site visits with OTA, but due to the changing nature of the pandemic we were unable to go on any site visits.

We conducted semi-structured interviews with OTA clients as well as key stakeholders in the TURA program. The questions in Appendix A allowed clients to give their opinions on OTA and provided useful qualitative data on the effectiveness of OTA operations. We used semi-structured interviews because they have an open question framework that allows for focused but flexible two-way communication between the interviewer and interviewee with room for either to bring in more detail where needed (Keller, et al., 2019). Since these interviews were with OTA clients, the content of the interview was primarily focused on the interactions between the clients and OTA. OTA provided a list of clients that they have worked with for us to reach out to for interviews, but due to OTA's confidentiality agreement, none of the identifying information of these companies can be released. Furthermore, we conducted interviews with industry experts from organizations like the Toxics Use Reduction Institute, Minnesota Technical Assistance Project (MnTAP), and the WA Department of ecology. We also interviewed OTA staff, like Jim Cain, to get a more detailed perspective on OTA's operating procedures from somebody who is working with them and applying them in interactions with clients. By engaging with these clients, industry experts, and OTA staff, we were able to measure clients' satisfaction with OTA services, understand how the industry experts perceive OTA, and got firsthand operating procedures from OTA staff that will allow us to later assess their effectiveness.

In cases when businesses were not be able to do an interview, they had the option to fill out a survey corresponding to their experiences with OTA. The surveys were distributed using Qualtrics. It contained open-ended questions that helped with receiving feedback from the companies who have worked with OTA and allowed us to better understand how effective their services are to these companies. To protect the identity of the companies, we used unique number identifiers in Qualtrics in place of the company names. Respondents are more likely to answer questions when surveys are not as long; consequently, the survey we created was be kept

short, containing 14 questions (Chudoba 2010). After several businesses responded to the survey, we analyzed the responses to examine which services need improvements. The questions for the survey are presented in Appendix A.

Objective 2: Evaluate OTA's Operating Procedures using Past Surveys

After conducting semi-structured phone interviews and surveys with select facilities who have recently received OTA assistance, it was important to compare any qualitative and quantitative data we acquired from former surveys. Reviewing the results of other surveys done by OTA allowed our team to identify any shifts in OTA-client interactions over time. This helped our team to develop a consolidated feedback system based on any data we collected and on secondary research.

Our secondary research consisted of analyzing data found through previous surveys done by OTA. This secondary research was corroborated with our research, evaluating the effectiveness of OTA's outreach and site visit protocols. Many of the case studies were focused on interactions between TURA filers and OTA, specifically dealing with communication issues, as well as identifying any issues with site visit protocols. By analyzing these surveys, we were able to see how client perceptions of OTA operating procedures have changed over time. Furthermore, this analysis allowed our group to judge the effectiveness of past surveys and apply changes to our survey to get better client feedback and perceptions on OTA operating procedures. Previous and current Operating Procedures were also analyzed to ensure that any potential changes we propose have not been implemented by OTA in the past.

Objective 3: Conduct OTA client outreach and provide recommendations for feedback and communication tools

OTA also requested that we conduct outreach with businesses that have received assistance from OTA in the past five years. In addition to any qualitative data our group has obtained through outreach with these clients, meeting with former OTA clients allowed for our team to reestablish relations between OTA and its clients, especially after the pandemic which resulted in a sharp decrease in interactions between OTA and its clients.

Considering that proposing changes to communication and evaluation tools was a major goal of our project, several potential communication tools have been researched by our team to spread awareness of OTA services among potential OTA clients. Benchmarking any outreach programs done by other organizations, especially government organizations which prioritize confidentiality, served as a good base for any research done on implementing new communications tools. Possible focuses of our research were social media accounts, which could allow OTA to receive feedback from clients while simultaneously launching an outreach program and using social media as a communications device (Kavanaugh, et.al, 2011). OTA's strict confidentiality policy would make any communication

Company Category	# of Companies
# of Companies We Reached Out To	124
# of Respondents	29
Total # of Interviews	18
# of Phone Interview	13/18 interviews
# of Web Interview	4/18 interviews
# of Survey Responses	11
# of Email Reponses	1
# of Referrals to OTA Staff	8

Figure 8: A Table showing a summary of the basic data we collected

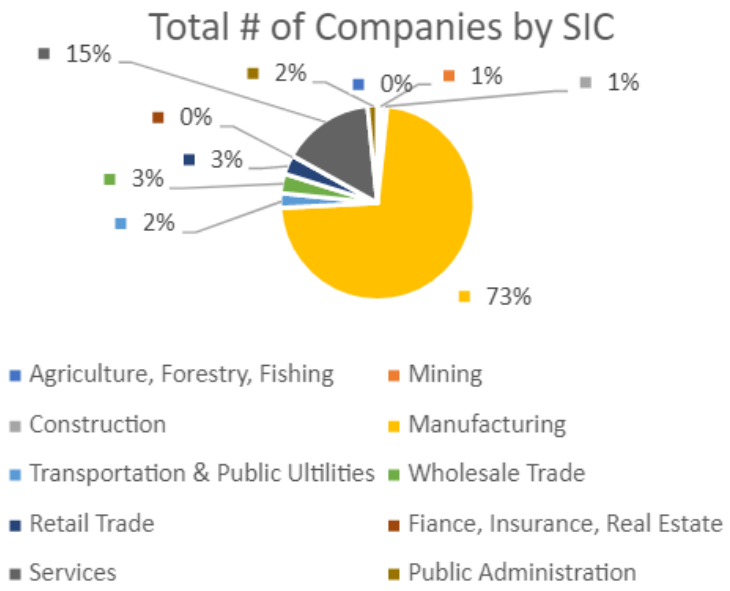


Figure 9: A pie chart showing the distribution of companies reach out to by SIC code

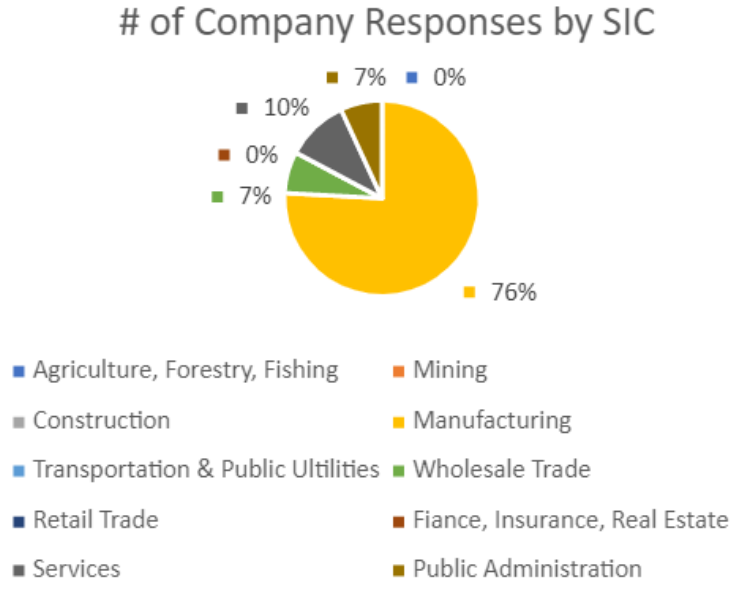


Figure 10: A pie chart showing the distribution of respondents by SIC code

between OTA and its clients through social media unlikely; however, a social media account could act as an effective outreach tool.

Analyzing Our Data

In our request for interviews and surveys, we contacted 124 companies and received a total of 29 responses that wanted an interview or survey. Of these responses, 18 companies chose to do a phone (14 of 18 companies) or web (4 of 18 companies) interview while the other 11 companies chose to respond with our survey. Additionally, we saw an email response to our interview questions, which we noted separately. Moreover, these interviews and surveys were also used to generate 8 referrals to OTA staff. As a result of the COVID-19 pandemic, OTA has lost a large amount of communication it once had with its former clients, and by reintroducing companies which had previously had site visits back to OTA can help OTA hit the ground running as they start to do more site visits.

Figure 9 shows how the companies are distributed in terms of SIC codes. SIC codes are Standard Industrial Codes that are unique to each company or business, depending on their types of industry. About 73 percent of our total target companies were manufacturers. In comparison, all other companies made up about 27 percent of the total number of companies reached out to. This break up is not surprising since chemicals are more likely to be used or produced in manufacturing industries, especially toxic chemicals, whereas industries such as retail trade, finance, and public administration might have never used toxic chemicals or used negligible amounts. Similarly, most responses we received from those target companies were also from manufacturers as seen by Figure 10.

From this analysis, the team could glean several themes and patterns. Most responses noted that the quality of assistance received was positive (Only 1 out of 29 responses noted a negative experience). However, many companies had issues with OTA's outreach and

visibility. Namely, many companies have very little knowledge of the wide variety of services that OTA offers and are only notified of the existence of OTA after being referred by the DEP or another environmental agency, oftentimes as the result of them being out of compliance with state law. Another common theme in our interview responses was that many companies felt that OTA should do more follow-ups after a site visit to make sure that any recommendations made to companies are able to be effectively implemented.

Due to the open-ended nature of our surveys and interviews, the percent of respondents for a certain subcategory should not be seen as a reflection of what percentage of OTA clients agree with said subcategory, but rather as a percentage of the companies who directly referenced said subcategory.

Outreach and visibility are two of the main focus areas of our survey. From our survey and interview responses, it became clear that while OTA is well known among established facilities in Massachusetts, but many newly established companies expressed that they had not known about OTA's services until referred to by another government agency and expressed that a social media presence which promotes OTA's services would be beneficial in helping increase the number of prospective interactions between OTA and its clients. While 13.8% of the total respondents noted OTA's visibility and outreach method were sufficient, 20.7% of the respondents

Outreach & Visibility
Technical Assistance Feedback
TURA Regulations and Relations

Figure 10: Complete theme coding frequency table

Theme/Subcategory	Number of times mentioned in response	Percentage of Total Respondents
Thought OTA's visibility and outreach methods were good enough	4	13.8%
Recommended OTA to other companies	1	3.4%
Wanted OTA to have a bigger social media presence	6	20.7%
Recommended OTA investigate other programs or connect with other agencies	6	20.7%
Uses services outside of OTA	9	31.0%
Wished more information about OTA services was available to companies	8	27.6%
Wants OTA to be more present at industry events	6	20.7%
Technical assistance was overall positive	28	96.6%
Mentioned that OTA's work was a necessary service	3	10.3%
Thought that OTA's site visits were too scripted and didn't focus on the problem that needed to be addressed	2	6.9%
Recommendations made by OTA were either too large scale or expensive to reasonably implement	6	20.7%
Wants more follow ups from OTA	7	24.1%
Only worked with the OTA to remain in compliance	5	17.2%
Wanted the OTA to assist with actual filing	3	10.3%
Recommendations tend to be industrial focused rather than pharmaceutical	2	6.9%
Wants OTA staff to include more subject matter experts	1	3.4%
Felt that frequency of follow-ups was pushy or pressuring	1	3.4%
Was unaware of TURI services or thought there was a disconnect between OTA and TURI	4	13.8%
Frustrated with TURA regulations	3	10.3%
Total Responses	29	

suggested that OTA needed to have a larger social media presence and commented that having a good social media presence could have assisted their company in receiving help before chemical use became an issue. Many respondents also felt that it was somewhat difficult to maintain contact with OTA and felt that OTA could have a larger presence at trade shows and industry trainings. Of the surveyed and interviewed companies, 20.7% of respondents suggested that OTA be more present at industry events, and 27.6% wished more information about OTA services was available to companies. While this data indicates that OTA has good outreach and communication with current and former clients, it highlights an interest in new and developing companies to receive help from OTA in a way that addresses potential issues before a toxic use issue arises.

The survey results have also shown that a significant portion of the respondents would like OTA to collaborate more with private environmental contractors as well as have other state agencies such as the MWRA refer companies to OTA more commonly. About 20.7% of companies suggested that OTA work more with other programs or connect with other agencies.

Another major theme from our interviews and survey responses was technical assistance feedback. Most of the companies, about 96.6% of the respondents, expressed they had a positive experience working with OTA staff members and 8.7% of the respondents gave a testimonial regarding OTA or noted that OTA's work was a necessary service. 24.1% of the participants found OTA's recommendations and assistance helpful, but they wished OTA had followed up with them more frequently during the period they were working together. Some companies, while expressing that OTA had made several good follow-ups, also mentioned that they felt left in the dark after receiving help from OTA and expressed that they were interested in receiving more follow-ups after their technical problem had been resolved. However, one respondent described the frequency of the follow ups as pressuring. Other technical assistance feedback related to staff members specifically. One respondent expressed that OTA services would become much more valuable to them if OTA staff members included more subject matter experts. About 6.9% of the respondents said that the site visits felt scripted and would have want the staff members to focus on the problem that had to be addressed, and 20.7% of the participants thought the recommendations they were provided with were too large in scale or expensive to be reasonably implemented.

While interview and survey responses have overwhelmingly painted experiences with OTA as a positive, many responses noted some aspects of their experience that could be improved.

The final major theme was assistance with TURA and the relationships between the agencies under TURA. OTA has established relations with their sister organization, the Toxics Use Reduction Institute (TURI) at UMass Lowell, but 13.8% of the surveyed companies were unaware of TURI services or felt there was a disconnect between OTA and TURI. According to many companies, the main disconnect comes with communication between the organizations. Examples include limited OTA referrals to TURI, and a lack of communication on progress working with companies that both organizations assist. Most of the other feedback in the area focused more specifically on frustration with TURA regulations with 10.3% of respondents expressing they were frustrated with TURA regulations. Although some of these frustrations were related to TURA regulations that we cannot change, like the threshold levels of chemicals and having to report threshold levels of chemicals in manufacturing and processes, while others were related to the link between TURA, TURI and OTA. According to companies and industry collectives, the advertised link between TURA and subordinate agencies, OTA, TURI, and DEP, leads to confusion about the OTA being a regulatory agency, like the DEP, when they are the exact opposite. Although this group of respondents is small at 10.3%, it reveals that the OTA has a visibility problem relating to their relations clearly advertised link to TURA.

Recommendations

Based on our coding analysis, we took all suggestions or complaints made by companies with more than 5 respondents, and then incorporated those categories into our recommendations. Some suggestions and complaints were combined together into one recommendation, along with taking stakeholder discussions into account.

Many survey and interview respondents have expressed that they have only heard about OTA's services through the lenses of toxic use reduction and expressed surprise when they heard that OTA provides other services, such as energy efficiency and water conservation assistance. Many companies have only heard about OTA through its relationship with the Toxic Use Reduction Act, therefore making it difficult or even impossible for companies not in active contact with OTA to know about its services. As such, we recommend that OTA promotes some of its alternative services more through social media and works more consistently with government agencies to promote its other services.

Many companies have expressed disappointment in the fact that OTA only follows up with them about once a year once their technical issue has been resolved. Although increasing the number of follow-ups could solve this issue, it could also anger some companies who feel that OTA is putting pressure on them. As such, we recommend that OTA makes an individualized plan with each company to map out how often they would like to be contacted after receiving assistance.

Many respondents expressed that the recommendations made by OTA were too large in scale or were expensive to implement. We recommend that OTA talk with the companies first about the issues they are trying to address and solve, the time duration of implementing proposed recommendations, and the financial costs to fully assess the project feasibility for the company.

Other Long-Term Recommendations Include:

- Having a larger presence at industry events relating to emerging concerns.
- Work to further relationship with TURI through company referrals, use of the TURI databases, working jointly with companies.
- If a company asks for specific assistance, OTA staff should stick to that problem until it is resolved.

Challenges & Future Improvements

Over the course of this project, we encountered several different challenges when working with OTA and their clients that should be noted for later studies. The response rate with companies was the greatest challenge, originally only receiving 23 of 124 responses, but after a reminder email to nonresponsive companies, we increased our response rate to 29 of 124 responses or 23.4%. While a response rate of 29 out of 124 for a standard population is more than adequate, the individuals we contacted were entirely sourced from individuals who had worked with OTA in the past five years and therefore were much more likely to respond. There are many reasons that our response rate is not as high as it could be, for example the long time between many of the site visits done and our project was likely one of the major reasons why. It is very possible that a large amount of the contacts that we reached out to over email are no longer working at the company. This would mean that the emails we sent were likely not to a current email which would have been able to participate in an interview. A potential tool that future projects could use in this situation are using networking sites such as LinkedIn to look up contacts, see if they are still working at the company which received help from OTA, and find any other methods of contacts that could be used to organize an interview or survey.

Another potential issue that arose during our project is that all the companies we contacted had previous experience with OTA. Although our project was almost entirely focused on receiving feedback from past clients, some questions, such as those concerning OTA's visibility to companies, may yield significantly different results when asked to companies who have

never had a site visit with OTA in comparison to those who have. A potential focus for future projects (especially those with a focus of OTA's visibility) is to survey companies who have not worked with OTA in order to understand how visible OTA is to companies who have not yet received OTA assistance.

Another expansion to our data analysis which could have yielded more solid results would be another survey which would be constructed using feedback from the survey we had already conducted. Although we were able to obtain and quantify several recommendations made by companies, another survey which directly addresses the recommendations we made could be implemented in the future to gain a better understanding of what a larger group of companies thinks about said recommendations.

Conclusion

We worked with the Office of Technical Assistance and Technology (OTA) to assess their services to provide recommendations to improve those services. We accomplished this by reaching out to 124 companies that the OTA has worked with in the past 5 years and offering the options of an interview or survey to give their feedback on OTA services. Both the survey and interview questions were targeted to get open ended feedback from clients and really allow them to express how they felt about OTA services. All of this interview and survey data was then coded into three major feedback themes: Outreach & Visibility, Technical Assistance, and TURA Relations and Regulations. Common themes were culminated into a master theme table and grouped with other themes of the same category. We then pulled out the most frequent of the responses and began developing recommendations based on the most frequent responses. Our major recommendations included that OTA should more often promote their services through social media and other government agencies, make an individualized plan with clients to determine a follow up roadmap that works best for them, and to assess the feasibility (cost & time) of the project based on what is reasonable for the client. Ultimately, the services of the Office of Technical Assistance are effective, but they must increase their visibility through online outreach to better reach the companies and people that need their services.

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