APPENDICES to ANNUAL REPORT

Massachusetts Toxics Use Reduction Program

FISCAL YEAR 2018

Massachusetts
Toxics Use Reduction

Report Submitted to:

The Governor of the Commonwealth of Massachusetts
The Commonwealth of Massachusetts House of Representatives
The Commonwealth of Massachusetts Senate

Prepared by the Office of Technical Assistance and Technology in collaboration with the Toxics Use Reduction Institute and the Massachusetts Department of Environmental Protection.
December, 2018

Contents

Appendix I: Grants

Annual TURA Program Grants

Each year, TURI allocates grants to Massachusetts businesses, community groups, municipalities, and industry-academic research partnerships to further the development, implementation, and dissemination of toxics use reduction strategies.

In Fiscal Year 2018, TURI gave roughly $140,000 to 11 businesses, community groups, and municipal groups, and roughly $90,000 to 4 academic-industry research partnerships.

Food Processing

- Kettle Cuisine of Lynn, a handcrafter of small batch, all natural soups for restaurants, foodservice operators and grocery retailers, worked with the UMass Lowell Food Safety Lab to find safer cleaning and sanitizing formulations or methods that are less hazardous than sodium hydroxide.

Auto Shops

- Auto Collision Shop at Assabet Valley Technical High School of Marlboro purchased new equipment and a water-based gun washing solution that eliminates the use of hazardous solvents. Other auto body shops have proven that a water-based alternative is effective and less expensive. Instead of disposing of used solvent as hazardous waste, the school can filter and reuse the water-based solution for many years. Students benefit from a healthier work environment while learning about environmentally friendly practices to take with them into their work places after they graduate.

Safer Cleaning

- Worcester Public Schools undertook a significant new initiative to minimize the use of products containing asthmagens and hazardous chemicals in school buses and kitchens. The goal is to prevent transmission of pathogens while maintaining a healthy environment for students and staff. The project team converted school bus and kitchen sanitation practices and products to systems that are safer for human health and the environment. Working with manufacturers, the project team piloted and evaluated safer cleaning and disinfection products, equipment and work practices for use on farm-to-table fresh produce and meats, kitchen surfaces and equipment and school buses.

Organic Landscapes

- The Field Fund, Inc. of Martha's Vineyard is working to preserve and maintain Martha's Vineyard's playing fields using an organic, systems-based approach rather than installing synthetic fields. By not installing synthetic fields, the Island community aims to preserve its natural landscapes, protect ponds, fragile habitats, and single source aquifer, as well as protect young athletes from toxic exposures. To improve maintenance on natural grass playing fields, The Field Fund purchased an aerator. This is part of a larger effort to eliminate the use of synthetic fertilizers, pesticides and herbicides and develop an organic management plan for playing fields on Martha's Vineyard.
- The Town of Williamstown, a pollinator-friendly community, seeks to change residential and institutional landscaping practices by promoting ways to reduce the use of pesticides and herbicides that scientists believe are harming bee populations. The town created a team to host training programs for landscape professionals and homeowners, conduct tours of pollinator-friendly gardens, and work with local partners on educational opportunities for adults and children.

Youth Education

- Silent Spring Institute of Newton partnered with the Massachusetts Breast Cancer Coalition to reduce high school students' exposures to common carcinogens and endocrine-disrupting chemicals. The project team visited 12 high school science classrooms to help students identify common toxic chemical exposures in their homes and adopt strategies that reduce these exposures. The team did this through hands-on curriculum and Silent Spring's free mobile app Detox Me that guides users through more than 270 research-based recommendations for reducing exposures to common indoor pollutants. Students also participated in a peer-to-peer mentoring program that connected them to youth who have participated in studies that measure chemical levels in the body.

Manufacturing & Laboratories

- OFS of Sturbridge, a manufacturer of fiber optic solutions, investigated integral recycling of hydrogen fluoride, a highly toxic chemical that is used for etching glass. The company aims to minimize worker exposure by implementing a closed-loop recycling process to reuse hydrogen fluoride, thereby reducing the handling and waste of the toxic chemical. Integral recycling also improves efficiency by maintaining a consistent acid etch rate and reducing production down time for bath recharging.
- US Pack, Inc. of Leominster, a leading contract manufacturer of custom liquid specialty products, invested in capital equipment to make cleanup more efficient and produce more precise production batches. The new 10-head pressure gravity filler reduces the use of a variety of chemicals, including acetone, ethylene glycol and methanol, used in manufacturing automotive, industrial and household cleaning products. By upgrading its equipment, the company can potentially reduce the use of toxic chemicals by over 19,000 pounds per year.
- Lytron of Woburn, a designer and manufacturer of cold plates, chassis, chillers, cooling systems, and heat exchangers, aims to phase out trichloroethylene (TCE) from their cleaning process. The company worked with the TURI Lab to identify safer chemistries by (1) identifying a solvent that can work in a vacuum degreaser to remove lubricating oils from aluminum flat and fin parts and (2) researching aqueous cleaners that can remove copper tube lubricants from copper brazed parts. By removing TCE from their cleaning process, the company reduces health risks to employees and improve efficiency.
- Assistant Professor Hsi-Wu Wong of the UMass Lowell Department of Chemical Engineering partnered with Waters Corporation of Milford to identify safer solvents for use in liquid chromatography equipment that identifies and quantifies chemical compounds in complex mixtures. The final solvent formulations are intended to replace the harmful solvents currently in use including methanol, acetonitrile, and tetrahydrofuran.
- Assistant Professor Christopher Hansen of the UMass Lowell Department of Mechanical Engineering investigated replacements for chlorinated solvents used in industrial applications. The research team identified alternatives using an extensive database of solvents based on technical criteria and then verified the predicted performance at a lab-scale.

Flame Retardants

- Walker's Gymnastics and Dance of Lowell purchased new foam cubes that do not contain flame retardants for two landing pits used in the gym. Landing pits provide safe cushioned landing spots as gymnasts train on the equipment. Standard foam cubes contain hazardous flame retardant chemicals that can cause health effects such as endocrine disruption, which is of significant concern to young children.
- Professors Jayant Kumar of the UMass Lowell Department of Physics and Ram Nagarajan of the Department of Plastics Engineering partnered with Mexichem Specialty Compounds of Leominster, the largest supplier of PVC-based cable and wire products in Massachusetts. The research team worked to develop safer alternatives to antimony trioxide, a widely-used flame retardant that is listed as a probable carcinogen by the International Agency for Research on Cancer (IARC). This research leveraged UMass Lowell's expertise in safer flame retardants to reduce the use of toxic flame retardants in wire and cable product lines in Massachusetts.

Textiles

- Becks Printing in North Adams purchased an embroidery machine. The new embroidery machine eliminates the need for a screen printing machine that would have required extensive chemical use both in inks and cleaning solutions.
- Professor Ram Nagarajan of the UMass Lowell Department of Plastics Engineering partnered with Bradford Industries of Lowell to find and evaluate safer solvent blends to replace the use of the toxic solvent dimethylformamide (DMF). Using the Hansen Solubility Parameters in Practice (HSPiP) software tool, Prof. Nagarajan's team narrowed down possible alternatives that will meet Bradford's performance requirements for its textile coating applications.

Appendix II: Selected Events and Workshops

TURA Program Workshops

Each year the TURA program agencies hold workshops to provide continuing education for Toxics Use Reduction Planners, regulatory guidance and updates, and tools and resources for businesses to enhance their ability to implement pollution prevention. Some of these workshops and events are described in greater detail in the main report.

Fiscal Year 2018 Events and Workshops

- "Beyond the SDS" webinar, Lowell, MA, September 12, 2017.
- "Beyond the SDS" workshop, Lowell, MA, October 2, 2017.
- "Beyond the SDS" presentation in a Simmons College course, Boston, MA, October 4, 2017.
- "Beyond the SDS" workshop, Lowell, MA, February 9, 2018.
- “Building Chemical Safety into Climate Change Preparedness” workshops for local governments and first responders in Springfield, Lowell, Worcester, Devens, Haverhill, Middleborough, and Turners Falls MA on September 20, 12,18,28, October 18, 20, and November 2, 2017.
- Building Chemical Safety into Climate Change Preparedness” workshops for toxics users in Lowell, Taunton, Holyoke, Haverhill, Greenfield, Charlton, and Leominster, MA on March 1, 2, 13, 27, 27, April 3, 12, 26, 2018.
- "Champions of Toxics Use Reduction" recognition event, State House, Boston, MA, June 12, 2018.
- "DIY Cleaning Products" workshop presented by TURI lab staff and two UMass Lowell students, Lowell High School, Lowell, MA, November 2, 2017.
- "Green Your Bottom Line" food and beverage sector workshop, in partnership with the Lowell Center for Sustainable Production, Lowell, MA, September 27, 2017.
- Mark Richey Woodworking Demonstration Event, Newburyport, MA, October 19, 2017.
- Toxics Use Reduction Planners certificate course, Westford Regency Conference Center, Westford, MA, September 28, October 5, 12 and 26, 2017.
- Toxics Use Reduction Planning training for 18 visitors from South Korea, including students, faculty, industry representatives and NGOs, Lowell, MA, July 17-19, 2017.
- TURA Fall Continuing Education Conference, Taunton, MA, November 16, 2017.
- TURA Spring Continuing Education Conference, Marlborough, MA, April 25, 2018.
- TURA/TRI Reporting Workshops, in Newburyport, Worcester, Greenfield, and Fall River, MA, on May 10, 22, 24, and 31, 2018.
- TUR Planner Certification Exam, Boston, MA December 8, 2016.
- UMass Lowell Sustainability Engineering Camp: TURI Green Cleaning Laboratory hosted 13 high-school students for a half-day of hands-on development of alternative cleaning solutions, July 2017.

Appendix III: Selected Publications

TURA Program Publications

The TURA program produces, curates and updates:

- Informational fact sheets on chemicals, technologies and pollution prevention techniques
- Case studies
- Regulatory guidance

Fiscal Year 2018 Reports, Journal Articles, and Videos

- "Assessment of Safer and Effective Alternatives to Methylene Chloride for Paint Stripping Products," TURI technical report, July 2017. Available at https://www.turi.org/TURI_Publications/TURI_Reports/Assessment_of_Safer_and_Effective_Alternatives_to_Methylene_Chloride_for_Paint_Stripping_Products
- DeFranco, K., Lamb, D., Kleinschmidt, D., Kessel, K., and Morose, G., "Evaluation of Hexavalent Chromium Free Bond Primers for Aerospace and Defense Applications," Products Finishing, August 1, 2017. Available at https://www.pfonline.com/articles/evaluation-of-hexavalent-chromium-free-bond-primers-for-aerospace-and-defense-applications
- "Little Leaf Farms Avoids Using Toxics," video resource, TURI, May 2018. Available at https://www.turi.org/Our_Work/Business/Industry_Sectors/Food_and_Beverage
- "Merrimack Ales in Lowell Finds Safer Ways to Clean and Sanitize," video resource, TURI, February 2018. Available at https://www.turi.org/Our_Work/Business/Small_Businesses/Breweries
- "OTA Chemical Safety and Climate Change Resilience," video resource, OTA, June 2018. Available at https://www.mass.gov/video/ota-chemical-safety-and-climate-change-resilience
- "Safer Alternatives for Athletic Fields" video resource, TURI, July 2017. Available at https://www.turi.org/Our_Work/Community/Artificial_Turf
- "Sports Turf Alternatives Assessment: Chemicals in Alternative Synthetic Infills: Thermoplastic Elastomer (TPE)," TURI report, August 2017. Available at https://www.turi.org/Our_Work/Community/Artificial_Turf/Infills_TPE
- "Toxics Use Reduction and Resource Conservation: Competitiveness Impacts for Massachusetts Businesses," TURI report, September 2017. Available at https://www.turi.org/TURI_Publications/TURI_Reports/Competitiveness_Impacts_for_Massachusetts_Businesses

Fiscal Year 2018 Fact Sheets and Case Studies

- "Food Manufacturer Shrinks Chemical Use: Cape Cod Potato Chips Changes Oil Testing Process to Eliminate Use of Two Chemicals," TURI, February 2018. Available at https://www.turi.org/TURI_Publications/Case_Studies/Food_and_Beverage/Cape_Cod_Potato_Chips_-_Food_Manufacturer_Shrinks_Chemical_Use.2018
- "INCOM, Inc. Massachusetts Company Conserves Water and Reduces Waste," OTA, March 2018.
- "Massachusetts Chemical & Materials Fact Sheet: Engineered Nanomaterials," TURI, August 2017 (revised December 2017). Available at https://www.turi.org/TURI_Publications/TURI_Chemical_Fact_Sheets/Nanomaterials_Fact_Sheet
- "Microbrewery Shines with Safer Cleaning and Sanitizing Technology: Merrimack Ales of Lowell Tests and Scores with Safer Alternatives," TURI, April 2018. Available at https://www.turi.org/TURI_Publications/Case_Studies/Microbreweries/Merrimack_Ales_Tests_Safer_Cleaning_and_Sanitizing_Technology
- "Rousselot Achieves Water Savings by Modernizing Process for Changing Markets," OTA, January 2018.

Appendix IV: Selected Presentations and Webinars

About Presentations and Webinars

Throughout the year, TURA program staff present a wide variety of pollution prevention and regulatory topics to audiences at TURA program events and at events held by partner organizations. As presentations may have been repeated at multiple venues, this list includes both categories.

Fiscal Year 2018 Presentations and Webinars

- Bizzozero, R., “Examples of TUR Outcomes,” presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Bizzozero, R., “Form S Reporting Challenges,” presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Bizzozero, R., “Welcome to the South Korean Ministry of the Environment and Industry Delegates,” OTA and MassDEP presentation for Korean delegation of industry representatives and regulators, Boston, MA, April 12, 2018.
- Butow, M., "Beyond the MSDS," presentation in Simmons College’s "Toxicology and Health" course, Boston, MA, October 4, 2017.
- Butow, M., "Nanotechnology Use and Implications" webinar, December 7, 2017.
- Cain, L., “Errors Common to Form S and Form R Reporting,” presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Eliason, P., "Implementing the Massachusetts Toxics Use Reduction Act," International Symposium, Seoul, Korea, March 29, 2018.
- Eliason, P., “Relaunching the P2OASys Tool for TUR Planners” webinar, January 8, 2018.
- Eliason, P., "The Massachusetts Toxics Use Reduction Act" for Korean delegation of industry representatives and regulators, Lowell, MA, April 12, 2018.
- Eliason, P., "The Massachusetts Toxics Use Reduction Institute (TURI)," MA Sustainable Communities and Campuses Conference, Plymouth, MA, April 27, 2018.
- Eliason, P., "The Toxics Use Reduction EMS," Central Massachusetts Business and Environment Network (CMBEN), Worcester, MA, September 12, 2017.
- Eliason, P., "Toxics Use Reduction Planning as a Strategy for Even More Effective Management of Chemicals at Your Facility," Northrup Grumman Corporation, June 18, 2018.
- Harriman, L., Tenney, H., and Eliason, P., "The Massachusetts Toxics Use Reduction Institute (TURI): A Resource You Should Know About" presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Hope, W., “Online Reporting Tool for Form R Reporting,” presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Hope, W., “Online Reporting Tool for Form S Reporting,” presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Kincannon, F., "Garden Club Federation of Massachusetts, Environmental Studies School," Environmental Studies School, Lowell, MA, September 23, 2017.
- Kincannon, F., "The Massachusetts Toxics Use Reduction Act (TURA): Services for Businesses and Communities," Massachusetts Chemical Safety & Climate Change Preparedness Training – NMCOG, Lowell, MA, September 12, 2017.
- Kincannon, F., "The Massachusetts Toxics Use Reduction Act (TURA): Services for Businesses and Communities,"

Massachusetts Chemical Safety & Climate Change Preparedness Training – MVPC, Haverhill, MA, October 18, 2017.

- Marshall, J., "P2OASys Update," 2nd Annual International Technical Workshop on Climate Risk, Kennebunk, ME, October 26, 2017.
- Marshall, J., "Upgrade and Relaunch of P2OASys," IC2 Webinar, October 31, 2017.
- Massey, R. "Federal and State Chemicals Policy," presentation in Tufts University's Occupational and Environmental Health class, Boston, MA, November 13, 2017.
- Massey, R. "Sports Fields: A Toxics Use Reduction Perspective." Non-Toxic Portsmouth, Portsmouth, NH, February 15, 2018.
- Massey, R., Onasch, J., "Sports Fields: Assessing the Alternatives" webinar, February 27, 2018.
- McCarthy, A., Byra, H., "Clean and Green: DIY Cleaners and Best Practices," Mass Haverhill PTA 2nd Annual Health Summit, Waltham, MA, November 16, 2017.
- McCarthy, A., "Chemical Hazard Resources: Where to Find Them and How to Use Them," Green Chemistry and Engineering Conference, Portland, OR, June 20, 2018.
- Morose, G., "Safer and Effective Alternatives to Methylene Chloride for Paint Stripping Products," EPA Workshop on Furniture Refinishing and Methylene Chloride, Boston, MA, September 12, 2017.
- Morose, G., "Safer Solutions for Methylene Chloride" webinar, June 5, 2018.
- Onasch, J., "Alternatives to Perchloroethylene in Dry Cleaning," IC2 webinar, April 3, 2018.
- Onasch, J., "Green Your Bottom Line [in the Food and Beverage Industry]," US Small Business Administration Webinar, December 12, 2017.
- Onasch, J., "The Massachusetts Toxics Use Reduction Institute: Services for Businesses and Industry," OTA Chemical Safety Workshop, Charlton, MA, April 12, 2018.
- Onasch, J., "Toxics Use Reduction in Food & Beverage," NEWMOA and VT DEC Dairy Summit, Norwich, VT, February 12, 2018.
- Onasch, J., "Reducing Toxics in Small Businesses," Assabet Valley Regional Technical High School, Marlborough, MA, January 25, 2018.
- Onasch, J., "Toxics Use Reduction as a Sustainability Tool," A&WMA Conference, Hartford, CT, June 28, 2018.
- Onasch, J., "Toxics Use Reduction in Breweries," Night Shift Brewing, Everett, MA, June 11, 2018.
- Peck, S., “Online Reporting Resources and People to Contact,” presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Peck, S.,”Overview of Federal TRI and State TURA Reporting,” presented at the four TURA/TRI Reporting Workshops in Newburyport, Worcester, Greenfield, and Fall River, May 10, 22, 24, and 31, 2018.
- Peck, S., “Some Measures of Success of the Massachusetts Toxics Use Reduction Program,” OTA and MassDEP presentation for Korean delegation of industry representatives and regulators, Boston, MA, April 12, 2018.
- Skogstrom, T., “OTA Resources & Climate Change Preparedness,” Building Chemical Safety and Climate Preparedness Workshops 2017-2018; Working Port Conference, Boston, MA, January 24, 2018; Superstorms and Superfund Sites, Preventing Toxic Exposures from Climate Change Disasters Webinar, March 13, 2018; Cambridge LEPC, Cambridge, MA, April 4, 2018; Tri-EPIC LEPC, Southbridge, MA, June 12, 2018.

Appendix V: Selected Press Coverage

TURA Program Press Coverage

This list includes mainly external coverage of the TURA program's work during Fiscal Year 2018.

Fiscal Year 2018 Press Coverage

- Aguirre, E., "Students Win NSF Graduate Research Fellowships," UMass Lowell News, May 5, 2018. Available at https://www.uml.edu/News/stories/2018/Students-NSF-Fellowships.aspx
- Angelo, K., "Researchers Develop Safer Solution for Paint Stripping Products: Breakthrough Solvent Developed in University Labs Featured on CBS News," UMass Lowell News, January 12, 2018. Available at https://www.uml.edu/News/stories/2018/TURI-Research-CBS.aspx
- Angelo, K., "Toss the Toxics: Prof. Lauded at State House: Helps Food Manufacturers Find Safer Cleaning Options," UMass Lowell News, June 20, 2018. Available at https://www.uml.edu/News/stories/2018/Boce-TURI-StateHouse.aspx
- Arsenault, C., "Eldrige Receives Sudbury Valley Trustees Distinguished Service Honor," Sudbury Patch, September 20, 2017. Available at https://patch.com/massachusetts/sudbury/eldridge-receives-sudbury-valley-trustees-distinguished-service-honor
- Barry, C., Morose, G., Begin, K., Atwater, M., Hansen, C., "The Identification and Screening of Lower Toxicity Solvents for Contact Adhesives," International Journal of Adhesion and Adhesives, Vol. 78, pp. 174-181, October 2017. Available at https://www.sciencedirect.com/science/article/pii/S0143749617301240
- "Boston Librarians Share Their Thoughts on the Value of Liberty Group Training," Softlink blog, February 2018. Available at https://www.softlinkint.com/ic/blog/liberty-library-software-group-training-boston
- Brennen, E., "Plenty of Movers and Shakers over Winter Break: NERVE Center and TURI Relocate, While Perry and Pasteur Renovations Ramp Up," UMass Lowell News, January 22, 2018. Available at https://www.uml.edu/News/stories/2018/Facilities-Winter-2018.aspx
- Capelouto, J., "State Facing Criticism on Environmental Justice Policy," Sentinel & Enterprise, October 24, 2017. Available at http://www.sentinelandenterprise.com/news/ci_31398388/state-facing-criticism-environmental-justice-policy
- Carpinone, D., and Jankowski, T., "Natural Grass is the Only Safe Choice," Seacoast Online, April 29, 2018. Available at http://www.seacoastonline.com/news/20180429/natural-grass-is-only-safe-choice
- "County Fare: Free Films Focus on Future of Farming, Food," The Berkshire Eagle, March 6, 2018. Available at https://www.berkshireeagle.com/stories/county-fare-free-films-focus-on-future-of-farming-food,533927
- Doyle, M., Slavin, D., and Thomson, R., "Just Say No to Plastic," MV Times, April 25, 2018. Available at https://www.mvtimes.com/2018/04/25/just-say-no-plastic/
- Dravis, R., "Grant Helps Spread the 'Bee Friendly Williamstown' Buzz," iBerkshires, September 29, 2017. Available at http://www.iberkshires.com/story/55687/Grant-Helps-Spread-the-Bee-Friendly-Williamstown-Buzz.html
- Erickson, B., "Replacing Methylene Chloride in Paint Strippers," Chemical & Engineering News, June 11, 2018. Available at https://cen.acs.org/safety/consumer-safety/Replacing-methylene-chloride-paint-strippers/96/i24
- Esler, B., "Mark Richey Woodworking Wins Awards for Pollution Reduction Investments," Woodworking Network, November 5, 2017. Available at https://www.woodworkingnetwork.com/news/woodworking-industry-news/mark-richey-woodworking-wins-awards-pollution-reduction-investments
- Giarrosso, A., "Greening Organic Labs at UMass Lowell," ACS Network blog, February 21, 2018. Available at https://communities.acs.org/community/science/sustainability/green-chemistry-nexus-blog/blog/2018/02/21/greening-organic-labs-at-umass-lowell
- Goodheart, J., "Is Dry Cleaning About to Get Wetter, Safer and Greener?," Capital & Main, October 25, 2017. Available at https://capitalandmain.com/is-dry-cleaning-about-to-get-wetter-safer-and-greener-10-25

- Lindsey, D., "The Clark Celebrates Tiny, But Important Ally: Bees," The Berkshire Eagle, May 6, 2018. Available at https://www.berkshireeagle.com/stories/the-clark-celebrates-tiny-but-important-ally-bees,538963
- "Local Businesses Lauded for Reducing Use of Toxins," Lowell Sun, July 10, 2018. Available at http://www.lowellsun.com/mysun/ci_31998225/local-businesses-lauded-reducing-use-toxins
- "Local Firms Praised for Reducing Toxins," UMass Lowell News, June 18, 2018. Available at https://www.uml.edu/News/news-articles/2018/sun-turi.aspx
- "Lowell Celebrates Earth Month with Events," UMass Lowell News, April 13, 2018. Available at https://www.uml.edu/News/press-releases/2018/LowellEarthMonth2018release.aspx
- "Mark Richey Woodworking Garners National Award," Newburyport News, October 31, 2017. Available at http://www.newburyportnews.com/news/local_news/mark-richey-woodworking-garners-national-award/article_d14711bc-c848-50fd-b099-ffe31a2459dc.html
- Massey, R., "A Business Prescription for Reducing Toxic Chemical Use," Brink News, December 1, 2017. Available at http://www.brinknews.com/a-business-prescription-for-reducing-toxic-chemical-use/
- Massey, R., "A Business Prescription for Reducing Toxic Chemical Use," GreenBiz, October 18, 2017. Available at https://www.greenbiz.com/article/business-prescription-reducing-toxic-chemical-use
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- Rajala, L., "New Hampshire's Chemical Reaction: Lawmakers Seek to Put Tighter Controls on PFCs," New Hampshire Business Review, March 29, 2018. Available at http://www.nhbr.com/March-30-2018/New-Hampshires-chemical-reaction/
- "Researchers Develop Safer Solution for Paint Stripping Products," World of Chemicals, April 16, 2018. Available at https://www.worldofchemicals.com/media/researchers-develop-safer-solution-for-paint-stripping-products/966.html
- "Researchers Tout Safer Alternative to Potentially Deadly Paint Stripper Chemical," CBS News, January 2, 2018. Available at https://www.cbsnews.com/news/researchers-find-safer-alternative-paint-stripper-chemical-methylene-chloride/
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- Silent Spring Institute, "Engaging High School Students in Environmental Health: A Young Scientist Makes an Impact," Silent Spring Institute blog, February 15, 2018. Available at https://silentspring.org/blog/engaging-high-school-students-environmental-health-young-scientist-makes-impact
- Tuitt, K., "For Lowell Gym, There's No Place Like (New, Safe) Foam," Lowell Sun, December 30, 2017. Available at http://www.lowellsun.com/news/ci_31559605/lowell-gym-theres-no-place-like-new-safe
- "TURI Publishes Nanomaterials Fact Sheet," JD Supra, September 15, 2017. Available at https://www.jdsupra.com/legalnews/turi-publishes-nanomaterials-fact-sheet-76123/
- "UMass Researchers Develop Paint Stripper Alternative," PaintSquare, January 18, 2018. Available at https://www.paintsquare.com/news/?fuseaction=view&id=18029
- "UML Pair Earn Pollution Plaudits," Lowell Sun, July 18, 2017. Available at http://www.lowellsun.com/mysun/ci_31148794/uml-pair-earn-pollution-plaudits

Appendix VI: OTA Recommendations and Implementation Status

OTA Free and Confidential Technical Assistance

Technical assistance usually consists of a site visit, report delivery with recommendations based on the facility's needs and interests, as well as email and phone communications to discuss finer points and assist with the implementation of recommendations.

Fiscal Year 2018 OTA Recommendations

During Fiscal Year 2018, OTA engineers provided 136 recommendations to the businesses and facilities that received visits. 70 percent of these recommendations concerned regulatory compliance topics and 30 percent concerned pollution prevention or resource conservation topics like toxics use and waste reduction, energy conservation, and water conservation. By July 2018, 71 percent of all Fiscal Year 2018 recommendations were implemented or still under consideration.

Approximately 74 percent of regulatory recommendations given were implemented or planned to be implemented. Many regulatory recommendations concern air emissions and permitting, hazardous waste, chemical storage requirements, worker safety, and chemical reporting and fee requirements.

Of the recommendations that did not concern regulatory compliance, 51 percent concerned toxics use reduction, 34 percent concerned energy conservation, and a small percent concerned water conservation and other topics. Toxics and waste reduction recommendations that were implemented concern process changes or increased production process efficiency, safer chemical substitutions, recycling to reduce the use of chemicals, and improved maintenance practices. Energy efficiency or renewable energy recommendations that were implemented mainly concerned energy efficiency incentives and funding opportunities.

While it may be possible for facilities to implement some recommendations immediately, in most cases, changes take over a year to evaluate and implement; and, therefore, over a year to yield results. OTA technical assistance providers take great care in allowing business personnel enough time to consider and evaluate the feasibility of recommendations. This means that, in some cases, OTA technical assistance providers were not able to follow up with some companies visited near the conclusion of Fiscal Year 2018. In Fiscal Year 2018, approximately 24 percent of recommendations given had not been followed-up on by technical assistance providers by June 2018. Those businesses will receive continuing assistance and follow-up during Fiscal Year 2019.

Four percent of all recommendations given were recorded as "not implemented" for reasons of time constraints and financial or other barriers.

Appendix VII: TURA Program Revenue and Expenditures

Fiscal Year 2018 Revenues

TURA fees collected: $2,504,000

TUR Planner fees: $8,400

Total revenues: $2,512,400

Fiscal Year 2018 Expenditures

OTA

Personnel costs: $617,100

Administrative costs: $19,600

Other costs: $300

Total: $637,000

MassDEP

Personnel costs: $305,500

Administrative costs: $6,300

Total: $311,800

TURI

Personnel (staff and students)[1]: $1,165,100

Education and training events[2]: $40,100

University research and laboratory support: $69,100

Grants to businesses, community groups, and municipalities: $144,700

Administrative costs: $22,700

Library and information support: $24,600

Communications, printing, website and educational outreach: $119,200

Total: $1,585,500

[1] Personnel expenditures include $88,200 for research assistants working on industry grant and laboratory projects.

[2] TURI also collected $31,800 in training registration fees, which went to support staff salaries and operating expenses.


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