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Pioneering EPR Policies in the United States

Gabriella Valderrama, University of Michigan

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Center for Local, State, and Urban Policy
Gerald R. Ford School of Public Policy
University of Michigan

Gabriella Valderrama

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Abstract

Waste is a growing issue in the United States that can be potentially aided with Extended Producer Responsibility (EPR) methods. This paper analyzes the current inventory of all EPR policies across the US. The analysis consists of the bill author's political party affiliation, state partisanship, enactment year, and the item as influencing a state's ability to pass pioneering legislation. It was found that Democrat authors and state partisanship are more likely to pass EPR bills, while there was no correlation with the year, although the enactments do follow a cyclical pattern. This research and conclusion should incentivize policymakers to enact EPR policies for products that do not have waste mitigation strategies.

Introduction

Efficient and economically feasible recycling continues to be an issue that our societies have been facing for decades. Recycling has increasingly become a domestic issue since late 2017 when China stopped taking the rest of the world's recycling as part of their national goals, resulting in low plastic prices that municipal recycling centers previously depended on (Roston, 2019). In addition to that, because oil prices are so low, it is cheaper to manufacture new plastic rather than recycle it making recycling often more expensive than landfilling trash (Roston, 2019).

Recycling in the United States has historically been the responsibility of the consumer, but for many people recycling and other environmental practices ultimately comes down to convenience (Nyamwange, 1996). In 2018, only 32.1% of waste was recycled or composted (EPA, n.d.). The majority of that number is paper and paperboard at 66.54% and then metals make up 12.62%; plastic only makes up 4.47% (EPA, n.d.). Demonstrating the high cost of recycling and behavior of Americans, plastics made up 18.46% of the waste that went to landfills in 2018, while other recyclable materials made up at least 26.48% (not considering textiles, rubber, or leather) (EPA, n.d.).

Regardless, recycling rates and amounts have been increasing (EPA, n.d.). But policymakers and the federal government are interested in increasing recycling rates even more: the EPA has a goal of recycling 50% of all waste by 2030 (Crunten & Wallace, 2021). Policymakers' interest is at a high right now and is also a bipartisan issue (Crunten & Wallace, 2021).

One potential solution to low recycling rates is extended producer responsibility (EPR). EPR forces product manufacturers to be financially responsible for recycling their materials into new products, encouraging a closed loop economy and potentially eliminate the need for virgin materials (Wallace, 2021). EPR is a partial solution to the externalization of pollution in economics and could decrease greenwashing from corporations, such as falsely declaring their products as recyclable (Wallace, 2021). Nine states so far are promoting EPR regulations for single-use plastic producers, and overall, 33 states have EPR regulations for different products (Wallace, 2021). This paper will inventory each of those policies to identify and discuss any trends seen in EPR policies.

Literature Review

Previous research and analysis of recycling in policy, behavior, and results provide foundational concepts to better understand the EPRs. Mueller's (2013) paper, for example, discovered which characteristics in recycling programs result in higher material recovery rate. The empirical data for this research was taken from 223 recycling programs in Ontario between 2005-2010 and used in t-test and regression modelling. Recovery rate was used to indicate the effectiveness of the different recycling programs. The test used data found from enforcing a bag limit of three or less, implementing a user pay waste system, having weekly recycling collection and collecting more during this recycling collection. Ultimately, the method that worked the best for recycling came down to convenience, like accepting more waste items in the recycling centers, single stream collection also helped increase recycling rates a bit. Additionally, there was a note that there is a discrepancy in recycling rates based on demographics such as race. This is important for policy making, consequently these actions should be implemented in policy making trying to increase recycling in a specific region.

Nyamwange (1996) conducted such a place-specific study, focused on finding which strategies increased public recycling in Jersey City, New Jersey. Nyamwange's method was a survey contacting 800 homes in Jersey City with a questionnaire asking about the home's recycling practices; only 297 homes returned the questionnaire and the other homes were not contacted again. Informing people about recycling programs increased individual's recycling practices, through mainly radio, newspaper ads, public campaigns, and TV programs. Recycling rates are heavily influenced by convenience, such as by increasing the amount of recycling bins in public areas. Some research suggests that external incentives are required to begin and maintain recycling, and without said incentives the recycling rate drops. Policy to increase

recycling should be focused on increasing the convenience and increasing publicly accessible knowledge.

Viscusi et al. (2012) show however that changes in recycling laws do not necessarily change an individual's behavior on recycling. The overall question this study was trying to research was the efficacy of different recycling policies. This study is particularly focused on the inclusion of plastic water bottles on recycling and used a 2009 survey from 605 households and performed an economic empirical analysis on the recycling of only water bottles. The study showed that with recycling the incremental costs and benefits of recycling is more important than the average rates. For those who are not personally motivated to have a lesser environmental impact, incentives were the best manner to increase plastic water bottle recycling.

Calcott and Walls (2005) also found incentives can help with waste management. Additionally, a change in policies from downstream to upstream players can increase recycling through responsibility placed on the producers of the plastic. This shift of responsibility will change product and process design for plastic packaging and is called extended producer responsibility (EPR). EPR legislation has been ratified in the EU, Japan, and other places for packaging, home appliances, electronics, etc. EPR encourages more recyclable products, and specific incentives could be tax and subsidy combination; regardless, consumers may end up paying a higher price because ideally the producers will be taking the packaging back. Calcott and Walls (2005) concluded that incentives were enough to create a competitive market for recycling from the producer's end. This paper encourages policies to be focused on the producers and manufacturers side, rather than the individuals and ultimately having private recycling rather than government involvement.

De Lucia and Pazienza's (2019) research is specifically focused on finding economic strategies for the European Union's (EU) European Commission created an "Action Plan for a Circular Economy". Specifically investigating farmers and their attitudes towards the current strategies proposed to reduce plastic consumption in agriculture, i.e., subsidies, tax credits, and pay-back mechanisms. The study was conducted in Foggia, southern Italy, with 1,783 farmers questioned. The results showed that the different policies had different effects for each type of plastic. Plastic bags and bottles would favor tax credits, packaging and films would favor subsidies, and proximity was the most important factor for pay back mechanisms. These results are important for policy making because they identify which types of policies should be created based on the type of plastic. These policies need to be done relatively soon because the EU has a goal of making all plastic recyclable by 2030. De Lucia and Pazienza also recognize the importance of creating policy based on people's behavior regarding recycling and ensuring their willingness and ability to comply.

Meanwhile Nash and Bosso (2013) in their paper evaluated the different EPRs that states in the US have, such as the products they cover and how EPRs have been manifesting themselves across the country. Within the United States, all EPRs are either at the state or local levels, there are no federal EPRs. There has been an increase in interest in framework EPRs which would shift the policies from a product-by-product basis to a more encompassing policy. Nash and Basso have also commented on the pattern of EPRs, as they are usually enacted in waves across the country. Understanding the nature of EPRs and the effectiveness they have had for consumers, municipalities, and companies will ease the process of enacting EPRs in different localities and shifts people's mentalities that the entire responsibility of recycling is on consumers, but also on producers.

As demonstrated above there is plenty of research and the efficiency of it depending on people's behavior and their thoughts on policies, but there has been limited research solely on EPR policies. Additionally, many economic models and tactics have been included to understand the recycling market and the main influences, meanwhile convenience became clear as the most important influence on individual's recycling practices. Policies are necessary for increasing recycling rates around the US, and those policies should consider economic models and the convenience factor. The goal of this research is to demonstrate the current items that are popular among different EPR policies. On the other hand, this will also show the gaps in policy, not only in the states that have EPRs, but also manufactured items that need EPRs. This research will also shed light on the pioneers of EPRs and hopefully provide some type of incentive or guide for future EPRs from other states. This paper inventories existing EPRs in the US to answer the question: what are the trends among states and the enactment of pioneering EPR policies?

Methods

This paper is looking for the trends in statewide EPRs by creating an inventory of the enacted waste stewardship policies and focusing on the item the bill addresses for an EPR, the enactment year of the bill, the political party of the bill author, and state partisanship at the time of enactment. The information used in this inventory is exclusively from the National Conference of State Legislatures (NCSL) website. The appendix lists all the potential trend factors for each respective bill; the "Partisanship" column's information is from the "State Partisan Composition" webpage (NCSL, 2021). All the other appendix column's information is from the "Environment and Natural Resources State Bill Tracking Database" webpage (NCSL, 2021).

The inventory is created from the bills NCSL has listed under “Waste and Recycling-Product Stewardship” and only the bills that are currently enacted from the “Environment and Natural Resources State Bill Tracking Database” webpage (2021). Duplicates of bills are not included in the inventory. Prior to omitting duplicates of bills there were 93 bills listed as enacted, once accounting for the omissions there are 77 EPR bills listed.

The key policy element the inventory includes is the specific item the EPR policy is focusing on; effectively, which product state policymakers are intending manufacturers to be liable for within the bill. Once the inventorying is complete, a “pioneering” bill, whose item type is found in less than five bills, is distinguished with a highlighted yellow box in the bill name column in the appendix. Further, I compare whether these bills address the largest sources in the United States (EPA, n.d.).

The year the bill was enacted is important to see the fluctuations in EPR enactment across the country. The year may also shed some insight on the different political climates at the time which would have been able to incentivize an increase in environmental policies.

Political affiliation is important in EPR because environmental topics have increasingly become partisan issues (Van Boven, et al., 2018). In addition to the party of the author the state party composition is included as well, which includes the state legislature and the governor control.

Results

There are 77 bills regarding EPRs that are currently enacted across the US after omitting duplicates. The bills which are not relevant for this paper are categorized into “other”, these bills include budget changes for EPR programs or creating new organizations with product

stewardship goals, implementation of frameworks to eventually have more EPR policies and other environmentally conscious legislature, and one bill that is the waste stewardship of items used in sexual assault items.

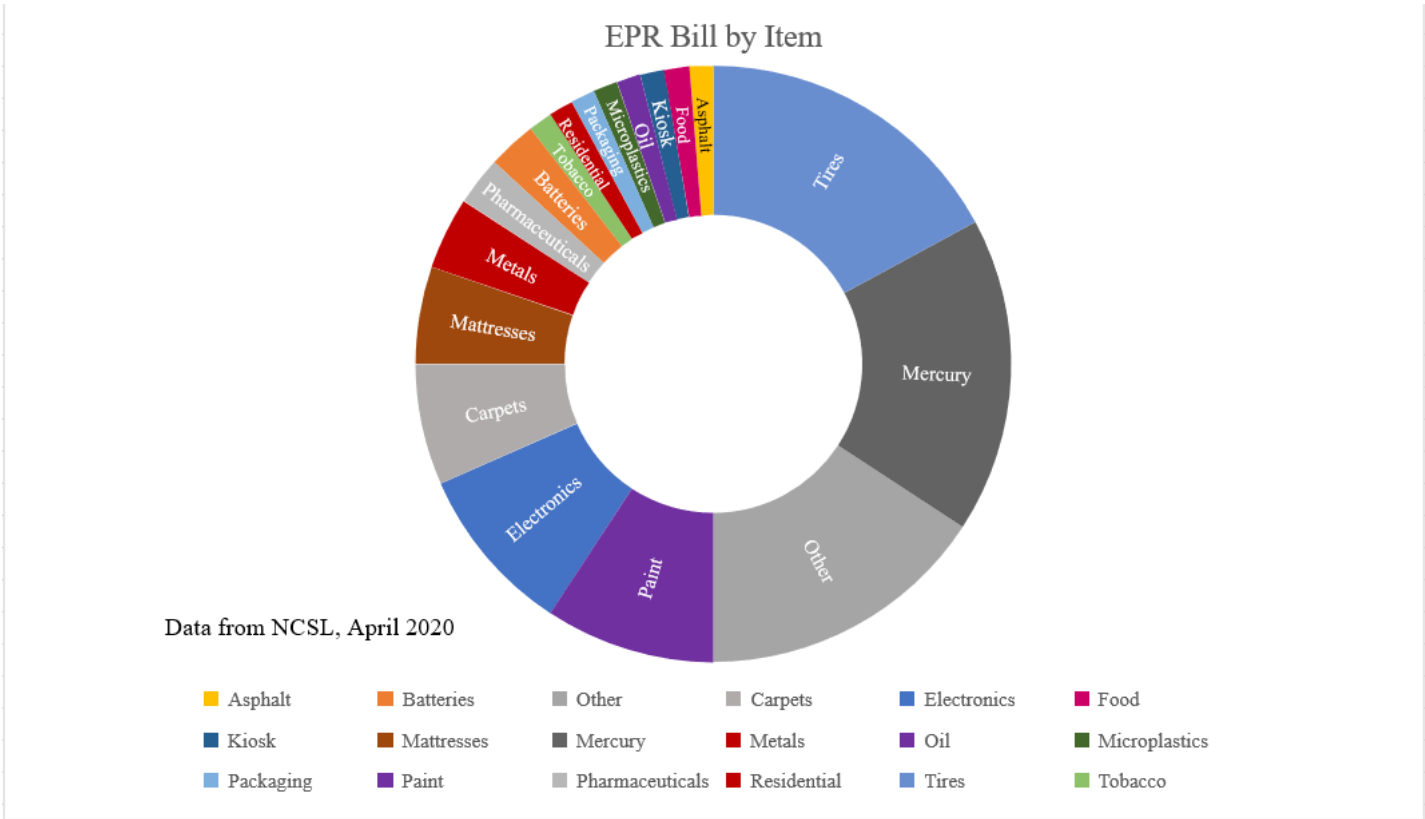


Figure 1. The proportion of EPR bills in the US by item type.

Figure 1 portrays the different proportions of the item described in each EPR bill currently enacted in the US. The pioneering items are listed as: asphalt, batteries, food, kiosks, mattresses, metals, microplastics, oil, sexual assault materials (categorized in other), packaging, residential waste, and tobacco products. The items with only one bill are asphalt, food, microplastics, oil, sexual assault materials, packaging, residential waste, and tobacco.

Looking at the different items there is an array across the county, but several are dominant among many states: such as tires, mercury related products, paint, and electronics. In

the “other” category are bills that regard budgets of different states for EPR programs, framework policies for EPR policies, along with one EPR bill regarding sexual assault materials. Tires and mercury products are the most common items in EPR bills, each with 13 different policies, although some of these policies are amendments to previously existing bills in the same state.



Figure 2. The proportion of EPR bills in the US enacted by year.

Looking at enactment years, 2010 and 2018 had the most EPR bills enacted. Meanwhile, the years 2011, 2013, 2017, and 2021 each only had one EPR bill enacted in those years across all 50 states. Figure 2 demonstrates the “waves” that were described by Nash and Bosso (2013) in their research of the timing of different EPR bill enactments.

The political party of the author for each bill is noted and the results are demonstrated below. As seen in Figure 3, the majority of EPR bills created were written by democratic affiliated representatives, making up 61.04% of EPR bill authors. Meanwhile Republican authors compose only 29.87% of the bill’s authors. The remaining 9.09% have no party affiliation and

are bills written by organizations, labeled as “N/A”. It should also be noted that many bills have supporting authors who are not all the same political affiliation. From these numbers there is a clear trend that Democrats tend to be the authors of EPR bills, whereas Republicans do not. Further there is a substantial difference in EPR enactment by state partisanship. 41 of the total 77 EPR bills enacted were under democratically held legislatures and governors (state partisanship). Meanwhile only 19 bills were enacted under states with both the legislature and governorship under Republican control, and the remaining 17 bills were enacted under divided governments (see Figure 4).

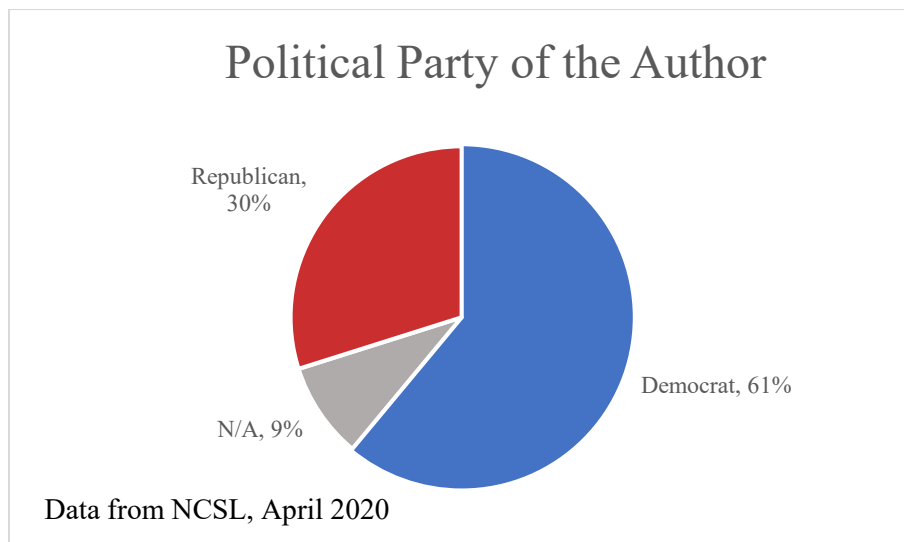


Figure 3. The percentages of political affiliation of all EPR bill authors in the US.

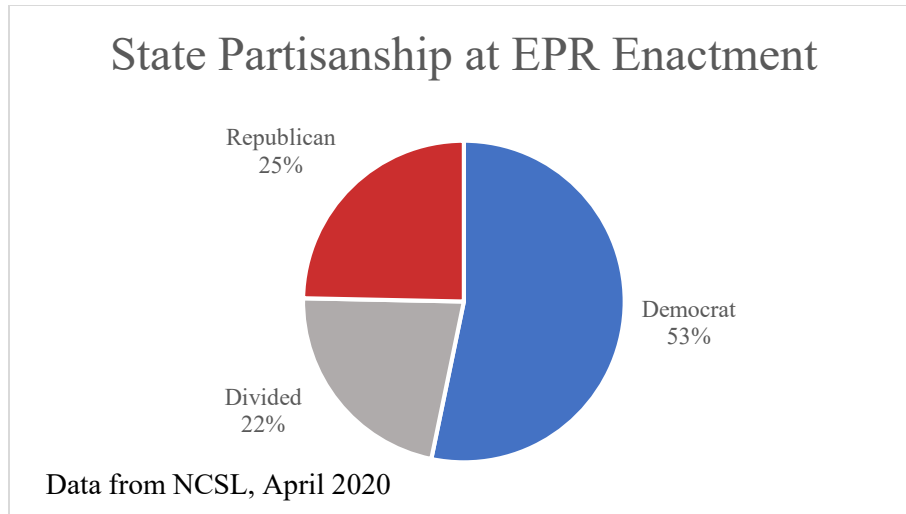


Figure 4. The percentage breakdown of the state partisanship at the time of EPR enactment date for all EPR bills across the US.

Analysis

Looking at the bill items and whether they correspond to the largest sources of waste in the US, there are only four bills that directly aim to increase recycling of two of the largest sources of waste: food and metals. Food made up 21.59% and metals composed 8.76% of the total municipal waste that went to the landfill in 2018 (EPA, n.d.). A noteworthy point is that metals are the second most recycled group of waste (after paper), but only compose 12.62% of total recycling; similarly, food is the second largest source of municipal waste, after paper (EPA, n.d.). Even though paper makes both the largest source of waste and recycling, only 68% of paper was recycled in 2018 (EPA, n.d.). The only bills that may indirectly increase paper recycling are the residential waste and packaging bills (FL H 73 and ME H 1041, respectively). It is unclear the effect the microplastics bill (CA S 1263) has on reducing plastic in municipal waste, since they are small, but the bill still addresses plastic—which was 12.20% of the total waste in landfills and only 4.47% of recycling in 2018 (National Geographic, n.d.; EPA, n.d.).

Overall, most EPR bills, even pioneering ones, do not address the largest sources of waste in the US, according to the EPA's municipal waste data (n.d.).

On the other hand, some bills focus on items that already have high recycling rates: the battery bills (CA A 142 and VT H 695) were both enacted after there was already a 99% recycling rate of lead acid batteries in the US (EPA, n.d.). This 99% recovery rate for lead-acid batteries has not changed since 2010, which is parallel to Viscusi et al.'s (2012) discovery that recycling policies do not influence people's behavior and therefore recycling rates. Meaning, EPRs can have a large increase in recycling rates for an item/product if that item has a currently low recycling rate.

There seems to be no correlation between year and the pioneering policies. The enactment years range from 2010 to 2021 with no prevalent timings. Looking at the political composition of the state partisanship and of the authors there were only four (from 20 total pioneering bills) of the pioneering policies that has both complete Republican partisanship and a Republican author. Meanwhile nine of the pioneering bills had both Democratic partisanship and author. The other bills either had a divided government or an organization wrote the bill. Something noteworthy is that in many instances states enact more than one EPR during the same year. Moreover, many times these bills with the same enactment year will be of the same item (across states or amendments in the same state).

The consistent rise in EPR bills for the past three years (not including 2021) indicate a steady pace toward a waste-conscious future. In addition to this the wave-like pattern in EPR bill enactment is in accordance with Nash and Bosso's (2013) findings and has highlighted the most recent bills. The bills were passed in 23 different states and Washington, D.C. and both Republicans and Democrats have encouraged enacting EPRs, although Republicans to a lesser

degree. These two points portray that there is recognition of the growing waste issue, and that more policies will be enacted. Although the “other” category is a significant portion of these EPRs and does not actually mitigate any waste, but they do support a future framework for EPR policies through increases in the annual budget and creating organizations dedicated to mitigating the waste disposal, which provide the foundation for future EPRs. The most interesting bills are the ones that are not common—the pioneering bills—these are leading EPR policies and expanding EPRs from only the common items (electronics, tires, mercury related, etc.) to other types of waste.

Conclusion

This paper inventories all the EPR policies across the country from the NCSL website, although it may not be an exhaustive list of all the EPRs that are enacted across the country as it does not cover policies that were enacted prior to 2010, or which NCSL may have missed in their database. Researching beyond NCSL could determine whether there are more currently enacted EPR bills that are not included on their site and could identify EPR bills that were enacted prior to 2010. Furthermore, there should be more research done on the states with the most EPRs and investigate whether they have a framework which enables the enactment of EPR policies or if there are other factors that facilitate enactment of EPR bills. Specifically, California and Maine have the most EPR bills out of all 50 states, respectively 11 and 14 bills, making up almost a third of all EPR bills in the US. California and Maine have a seemingly significant gap in EPR bill enactment from other states, as the state with the third most EPR bills, Rhode Island, only has six bills. In addition to having the most EPR bills, California and Maine are also home to nine of the 20 pioneering bills, hence these two states may be key in demonstrating other states how to holistically increase recycling. Further research could also include the implementation of

the bills and the recycling rates that are a result of the bill, i.e., the effectiveness of the bill. The implementation and effectiveness of a bill is equally as important as the enactment of a bill, to ensure the bill is accomplishing its goal.

Not all EPRs focus on increasing recycling rates, nor focus on the largest recyclable waste sources in the US. Given that some EPR policies focus on items that already have high recycling rates (i.e., batteries), it is unclear what the underlying motivations are for these EPR bills. Further research could also be conducted for these EPR policies to conclude the motivations, whether they be to ensure future environmental stewardship, politically inclined, or other.

As for suggestions to policymakers they should enact EPRs that focus on items that have low recycling rates now, which have high potential for a positive impact. And overall, policymakers should be creating policies to positively shape the future and hopefully this research will inspire policymakers to look at the impact of their bills, and if not then inspire their constituents to hold their policymakers to a higher standard.

Appendix

Bill Name	State	Year	Author Party	Partisanship	Item
AR H 1362	Arkansas	2019	Republican	Republican	Tires
AR H 1902	Arkansas	2019	Republican	Republican	Tires
CA A 142	California	2020	Democrat	Democrat	Batteries
CA A 187	California	2020	Democrat	Democrat	Mattresses
CA A 729	California	2020	Democrat	Democrat	Carpets
CA S 212	California	2018	Democrat	Democrat	Pharmaceuticals
CA A 1158	California	2018	Democrat	Democrat	Carpets
CA S 1263	California	2018	Democrat	Democrat	Microplastics
CA A 1689	California	2018	N/A	Democrat	Metals
CA A 2097	California	2018	Republican	Democrat	Carpets
CA A 1158	California	2017	Democrat	Democrat	Carpets
CA A 1343	California	2010	Democrat	Divided	Paint
CA A 2398	California	2010	Democrat	Divided	Carpets

CO S 55	Colorado	2020	Republican	Democrat	Framework
CO S 198	Colorado	2019	Republican	Democrat	Tires
CO S 1322	Colorado	2018	Democrat	Divided	Budget
CO S 29	Colorado	2014	Democrat	Democrat	Paint
CO S 1352	Colorado	2014	Democrat	Democrat	Tires
CT S 828	Connecticut	2011	N/A	Democrat	Paint
DC B 242	D.C.	2018	Democrat	Democrat	Budget
DC B 754	D.C.	2018	Democrat	Democrat	Budget
FL H 73	Florida	2020	Republican	Republican	Residential
IL S 557	Illinois	2021	Democrat	Democrat	Sexual Assault
IL H 821	Illinois	2018	Democrat	Divided	Budget
IL H 2876	Illinois	2018	Democrat	Divided	Asphalt
IL S 679	Illinois	2016	Democrat	Divided	Mercury
IN H 1403	Indiana	2020	Republican	Republican	Tires
IA H 2496	Iowa	2010	N/A	Democrat	Framework
KS H 2248	Kansas	2020	N/A	Divided	Metals
LA H 142	Louisiana	2018	Democrat	Divided	Tires
LA H 746	Louisiana	2015	Republican	Republican	Tires
ME H 401	Maine	2020	Democrat	Democrat	Tobacco
ME H 515	Maine	2020	Democrat	Democrat	Mattresses
ME H 1041	Maine	2020	Democrat	Democrat	Packaging
ME H 1185	Maine	2019	Democrat	Democrat	Framework
ME H 1194	Maine	2020	Democrat	Democrat	Mercury
ME S 468	Maine	2016	Republican	Divided	Oil
ME S 451	Maine	2014	Republican	Divided	Paint
ME H 952	Maine	2014	Democrat	Divided	Mercury
ME H 725	Maine	2012	Democrat	Republican	Electronics
ME H 1027	Maine	2012	Republican	Republican	Framework
ME H 381	Maine	2010	Democrat	Democrat	Electronics
ME S 428	Maine	2010	Democrat	Democrat	Electronics
ME H 675	Maine	2010	Democrat	Democrat	Mercury
ME H 1159	Maine	2010	Democrat	Democrat	Framework
MA S 2303	Massachusetts	2014	N/A	Democrat	Mercury
MI S 916	Michigan	2018	Republican	Republican	Kiosks
MN S 2192	Minnesota	2014	N/A	Democrat	Mercury
NY A 8084	New York	2014	Democrat	Democrat	Mercury
OK S 878	Oklahoma	2020	Republican	Republican	Tires
OK S 426	Oklahoma	2018	Republican	Republican	Tires
OK S 1412	Oklahoma	2018	Republican	Republican	Tires
OK H 3102	Oklahoma	2014	Republican	Republican	Tires
OR H 2048	Oregon	2013	N/A	Democrat	Paint
OR H 3606	Oregon	2010	Democrat	Democrat	Electronics

RI S 539	Rhode Island	2016	Democrat	Democrat	Mattresses
RI H 5755	Rhode Island	2016	Democrat	Democrat	Mattresses
RI S 854	Rhode Island	2010	Democrat	Divided	Framework
RI S 2353	Rhode Island	2010	Democrat	Divided	Mercury
RI H 5616	Rhode Island	2010	Democrat	Divided	Framework
RI H 7199	Rhode Island	2010	Democrat	Divided	Mercury
SC H 3847	South Carolina	2014	Republican	Republican	Electronics
SC H 4093	South Carolina	2010	Republican	Republican	Electronics
TN SJR 101	Tennessee	2018	Republican	Republican	Food
TN S 2403	Tennessee	2010	Republican	Divided	Mercury
UT S 46	Utah	2019	Republican	Republican	Tires
UT H 146	Utah	2019	Republican	Republican	Tires
UT H 8	Utah	2018	Republican	Republican	Budget
UT H 84	Utah	2015	Republican	Republican	Metals
VT H 292	Vermont	2014	Democrat	Democrat	Paint
VT H 695	Vermont	2014	Democrat	Democrat	Batteries
VT S 77	Vermont	2010	Democrat	Divided	Electronics
WA H 1652	Washington	2019	Democrat	Democrat	Paint
WA H 1047	Washington	2018	Democrat	Democrat	Pharmaceuticals
WA S 5762	Washington	2018	Democrat	Democrat	Mercury
WA H 2246	Washington	2014	Democrat	Democrat	Mercury
WA S 5543	Washington	2010	Democrat	Democrat	Mercury

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