



Environmental Permitting Executive Dashboard

State: Commonwealth of Pennsylvania

Agency: Office of Administration and Department of
Environmental Protection

Award Category: Data Management, Analytics, and Visualization

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Commonwealth of Pennsylvania

EXECUTIVE SUMMARY

The Department of Environmental Protection's Power BI Executive Dashboard Suite modernizes how permitting data is accessed, analyzed, and used for decision-making across the agency. By consolidating data from multiple systems into an intuitive, up-to-date dashboard, including the Permit Pending Authorizations Tool, this initiative provides a unified source of truth for understanding permit workloads, trends, and processing bottlenecks.

Through automated updates and advanced analytics, the suite has enhanced staffing and resource allocation decisions, contributing to the elimination of permit backlog. It also simplified

collaboration compared to previous data-pull methods and reduced inquiry time by approximately 90%.

This initiative stands out for transforming a once-manual, fragmented reporting process into a scalable, self-service analytics environment that significantly improves transparency, operational efficiency, and data-driven decision-making across DEP to ensure environmental regulations are being met during the permitting process in the Commonwealth.

IDEA

What problem or opportunity does the project address?

The Pennsylvania Department of Environmental Protection (DEP) issues nearly 800 types of permits, licenses, and certifications (PLCs) as part of its mission to uphold environmental regulations. When a member of the public submits an application, DEP's review must abide by specified time limits. If the review takes longer than the time limit, it is considered overdue.

DEP has historically struggled to review applications on time and had a backlog of approximately 2,500 from prior years. A Power BI dashboard titled the "Permit Pending Authorizations Report" existed in a rudimentary form but was rarely used due to data only displaying a high-level snapshot of the permit backlog without the ability to drilldown to a granular level of insight and prioritize based on deadlines. Permit reviewers preferred to open individual records in the database since the previous dashboard did not offer access to permit records.



Previous Pending Authorizations Dashboard

Upon taking office, Governor Josh Shapiro made PLC modernization and reform centerpieces of his Administration with a pair of executive orders. The first executive order established a money-back guarantee for late reviews of PLCs across all state agencies. The second created a new office within the Governor's Office to coordinate the implementation of transformative economic development projects, including obtaining necessary permits, across state agencies. In response, DEP prioritized an overhaul of the Permit Pending Authorizations Dashboard.

The Permit Pending Authorizations Report presents the status of all applications for permits, licenses, and certifications that are currently under review (which DEP labels pending). The data pull is real-time whenever the dashboard is opened or refreshed. Reviews are categorized in ways that directly assist management decisions.

The new modernized format allows everyone in the chain of command to see necessary information quickly. Managers can prioritize work intuitively. The number of overdue reviews plummeted.

Why does it matter?

Activities that require permits include many types of economic pursuits from both small businesses and multinational corporations – housing developments, business parks, warehouses, data centers, drinking water, treatment plants, etc. DEP's timeliness in reviewing applications is not merely important for business endeavors in the Commonwealth and serving the public, but also affects its perception among the regulated community, the legislature, and other state agencies. Continuing with previous inefficient processes posed serious potential consequences, including the economic impact due to delayed permit issuances, negative public perception, strained relationships, and the possibility of a political impact on DEP's funding, which had already been cut for several years in a row.

Innovation

The redesign of the Permit Pending Authorizations Dashboard is aligned with how users, namely DEP management, think. The information shown is reduced to what managers need to make decisions throughout the permit process that ultimately culminate in approving or denying a permit. A statistics-heavy approach was rejected in favor of simple answers to the most important questions -- which permits are in danger of being overdue, who is assigned to next steps in the permit authorization process ("on clock" or "off clock"), and where are there roadblocks in the permit process.

The dashboard is designed based on DEP's internal terminology of "on clock" and "off clock," which describe whether the review of an application can proceed as usual or is waiting on the applicant.

- "Off clock" means DEP has contacted the applicant for further information and is awaiting a response; the review is paused.
- "On clock" means DEP is not waiting on any information and is responsible for the review.

The dashboard also characterizes reviews as "overdue" or "on track" to align with Governor Shapiro's executive order in 2023 requiring that all PLCs issued by Commonwealth agencies have a time limit for review. Each PLC has its own timeframe that ranges from 10 to 300 business days. If DEP's review takes longer, then it is overdue and the applicant is eligible for a refund of the application fee per Pennsylvania's PAYback money-back guarantee system for PLC applications.

The user interface displays a main table at the top of the screen that contains four parameters. Before the modernization, it contained over a dozen. The new parameters have been simplified and are labeled:

- Off clock and on track
- Off clock and overdue
- On clock and on track
- On clock and overdue

Structuring the table this way allows managers to quickly see the permit applications that are under DEP's control ("on clock") and overdue. The other permit applications may become a concern at a later time and need to be monitored for that reason.

The main chart focuses on how many days remain before each permit review is overdue and categorizes them by that metric. The bins in the bar chart show the following categories:

- Overdue
- ≤10 days remaining
- 11-20 days remaining
- 21-30 days remaining, etc.

This strategy allows managers to target permit reviews that are about to be overdue and prioritize them for staff.

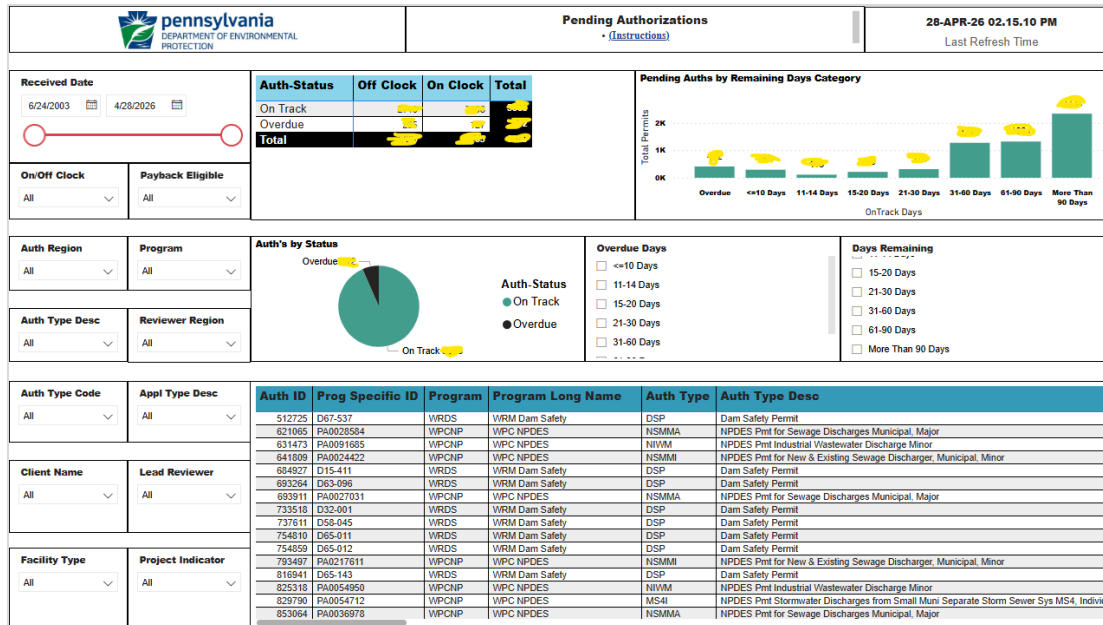
A pie chart shows the share of pending applications that are on track or overdue. This gives a quick picture of how efficiently the staff are working. Slicers or filters are aligned with these same parameters, and include but are not limited to:

- On/Off Clock
- PAYback Eligible (the Governor's money-back guarantee)
- Date Received
- Program (example: Air Quality)
- Regional Office
- Permit Type
- Facility Type

Lastly, a data table at the bottom of the screen shows individual records from the database. As criteria are narrowed, the records are also narrowed, which allows managers to identify specific permit reviews that need attention. Clicking inside the data table allows further filtering by dozens of criteria in a collapsed filter pane.

The basic data parameters and visual structure that make this dashboard successful can apply to any dashboard used in a government setting: efficiency and design. Efficiency is at the heart of public service. Funding for DEP staff and IT resources comes from taxpayers and cannot simply be increased with need. Serving them better is an unfunded mandate and every government agency must strive to do more with less.

Design is more than just the look and feel. Making any dashboard effective requires detailed discussions about which data to include or leave out. Design is critical to ensure that managers find the information they are looking for and feel comfortable returning to it. Understanding the dashboard should require no work from the user.



Pending Authorizations Dashboard (yellow highlights mark redacted internal data)

IMPLEMENTATION

Roadmap

The project kicked off in January 2024 and concluded in June of that year, encompassing a six-month timeline. The team identified the executive users (CEO, CFO, and Head of Operations), clarified the decisions the dashboard needed to support, and aligned on the top 5–10 KPIs that would matter most at an executive level. Next, the team identified the data sources; for this dashboard, all data originated from eFACTS Oracle databases.

With data sources confirmed, the team focused on data modeling as a critical step to improve dashboard performance; a well-structured data model reduces unnecessary relationships, duplicate data, and complex calculations by defining how tables on the backend relate to each other which helps reports load faster and visuals respond quickly. As business data grows, a clean model enables new tables, metrics, and reports to be added without rebuilding the dashboard. Data was cleaned using Power Query, relationships were built (with a star schema preference), and measures were created using DAX code. Using a star schema instead of multiple flat tables significantly improves report speed. The KPI layer was then defined by documenting the full list of KPIs to be included, building a sample dashboard prototype, and obtaining user sign-off before proceeding further.

Design work followed executive-level UX standards by using consistent colors (green to indicate good performance and red to indicate poor performance), avoiding clutter, and selecting visuals appropriate for leadership consumption, such as KPI cards, line charts for trends, and bar charts for comparisons. The solution was built in Power BI by importing data, creating measures with DAX code, building visuals, and adding minimal slicers (such as date and region). Interactivity was added with an emphasis on simple click-to-insight experiences rather than complex filtering. The roadmap also included performance optimization, validation with stakeholders (reviewing with business users, validating numbers, and adjusting layout based on feedback), publishing and sharing, and ongoing governance and maintenance.

Project management approach and role involvement

The project followed an Agile methodology. The team worked in short sprints (typically 1–2 weeks) to deliver small, usable pieces quickly and to gather frequent feedback from executives. Permit managers attended bi-weekly meetings with the development team and Product Owner to provide collaborative input and solutioning. The approach progressed through discovery and planning, requirements and design, iterative development (the core Agile phase), testing and validation, deployment, adoption and training, and finally maintenance and continuous improvement. The team structure included:

- DEP Executive oversight
- Business ownership
- Project management and Scrum Master responsibilities
- Delivery roles—including Power BI development, data engineering, and QA/analysis

How did you do it?

DEP leveraged the use of existing technologies (Power BI and eFACTS Oracle database) and teams (Data Management and Analytics) to complete this project. The solution was implemented using a layered technical architecture designed to make the dashboard reliable, understandable, and secure. The data sources layer represented where the data originated. The semantic model serves as the core of Power BI and was built inside Power BI to define relationships, measures (DAX), and KPIs. On top of the model, the visualization layer delivered the dashboard experience through KPI cards, charts, and slicers (filters). Dashboards were published on the Power BI Report Server to support hosting, data refresh scheduling, and sharing and collaboration.

Security and operational readiness were addressed through a dedicated security layer, where a security group was applied so only the executive team could view the dashboards. The solution also included refreshing processes and monitoring to ensure ongoing availability and performance.

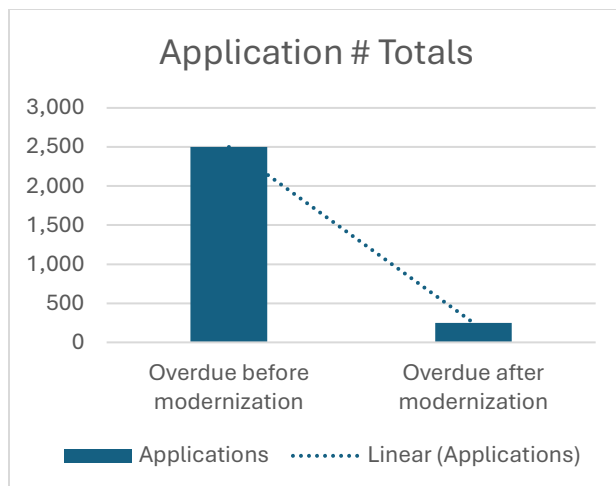
IMPACT

Before this modernized tool, DEP was drowning in permit applications. Interactions with applicants were combative because of previous negative experiences. State legislators were pulled in to increase pressure on high-profile projects. The public was not hearing about the good work DEP was doing to protect Pennsylvania's air, land, and water.

After the tool was implemented, it became widely used almost overnight and gave structure to the routines of the permit review chain of command. It was discussed during managers' meetings, and the data was used to allocate work among staff. Because it showed such a clear picture, the number of overdue applications dropped dramatically. No permit refunds had to be issued via PAYback since the dashboard was implemented. In October 2025, DEP announced it had eliminated its historic permit backlog.

Feedback on the dashboard is received through multiple channels. It primarily comes from a group of executives and bureau directors who meet bi-weekly to discuss permitting efficiency. Key stakeholders within the agency also share their findings on an ad-hoc basis.

There are no plans to modify the dashboard because it serves its purpose well, and no significant changes have been made since the launch.



Before this report was overhauled, DEP routinely had as many as 2,500 applications overdue at any given time (around 40% of the total under review). Now, the number is approximately 250 (4%). That metric decreased by a factor of ten (*see charts on right*). The report is widely used by DEP staff.

“The Pending Authorizations Report was the single biggest improvement to our permitting process in the last decade. It changed the way we think and behave regarding efficiency. Managers at every level can keep a constant view on the information that is most important to them. Before it, we were relying on phone calls and weekly meetings to learn the status of each permit review; now it refreshes at the touch of a button.”

- Neil Bakshi, Executive Assistant, DEP Executive Deputy Secretary

“The Power BI tool helps managers do a few very important things. We use it to track review timelines to ensure we are meeting Department requirements, but also to ensure that employees are working within our review SOPs. It further allows the program to track approaching deadlines and group projects by specific reviewer. It also helps us continually audit data entry in eFACTS by checking authorization status or by seeing projects on the list that should have been disposed.”

- Andy Strubilla, Environmental Engineer Manager, Safe Drinking Water

In conclusion, the significance of analyzing data in a visual format, with user experience at the forefront, has helped to resolve a longstanding issue of delayed permit processing authorizations in Pennsylvania. DEP can now make swift decisions based on simplified and easy to understand real-time data to assist in economic efforts via environmental regulations statewide.