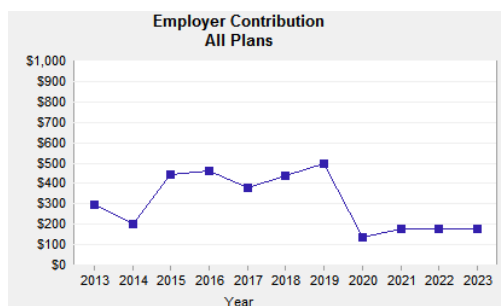


## RETIREMENT PLAN MODELING

ProVal PS is an interactive modeling application for financing pension and OPEB benefits, designed to arm decision makers with critical data and foster collaboration between the plan sponsor, their actuary, and their investment advisors. Its user experience is boardroom-friendly and requires little actuarial knowledge to run both deterministic and stochastic projections. By generating the right data, and comparing scenarios side-by-side, ProVal PS fosters a deeper understanding and develops critical documentation to support policy decisions on your plans like never before.

### Key features and functionality

#### Deterministic forecasts



**Deterministic forecasts** are easy to setup and run. Reviewing a baseline deterministic forecast of the current state can reveal a lot about the condition and the trajectory of plan finances. It illustrates the projected value of key metrics into the future based on a discrete value for each input variable, such as investment return or interest rates. It shows the expected outcomes. The baseline Deterministic Forecast – where all of the assumptions are realized – is a ubiquitous chart in most actuarial and asset allocation work, and typically the first item of review.

#### What-if . . .

Assumptions   Contributions   Benefits   Investments						
Deterministic Forecast Assumptions						
<input type="button" value="-0.25%"/> <input type="button" value="+0.25%"/> <input type="button" value="Interpolate"/> <input type="button" value="Edit Curve..."/>						
Year	PPA Funding			Curve	Duration 0	Dura
	Duration 0	Duration 5	Duration 20			
2013	4.94%	6.15%	6.76%		1.62%	
2014	4.94%	6.15%	6.76%		1.62%	
2015	4.94%	6.15%	6.76%		1.62%	
2016	4.94%	6.15%	6.76%		1.62%	

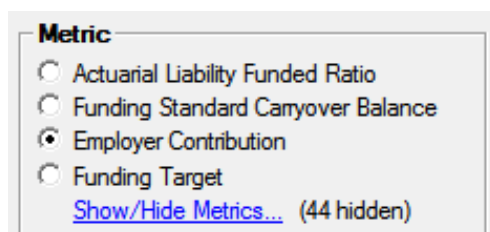
To understand the sensitivity of key results to changes in one or more the inputs, you can run what-if forecasts. You can vary virtually any aspect of the forecast:

- Economic assumptions – what happens to funded ratios if returns will be 7% instead of 7.5% as assumed?
- Contribution policy – should I accept a funding holiday when it comes, or floor contributions at the normal cost?
- Credit balance policy – how much contribution risk can be mitigated if I built up a credit balance in times when cash is available?
- Benefits policy (plan design) – what is the long

term impact of adding a new tier of benefits with higher employee contributions and lower cost of living adjustments?

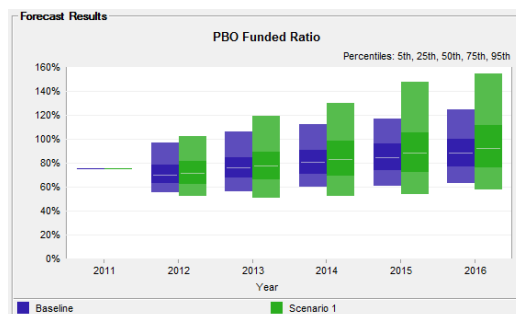
- Investment policy – how does contribution risk change with a new mix?
- Demographic assumptions – how fast will the credit balance be depleted if the industry recedes further and hours worked decline by 20%?

## Risk & reward

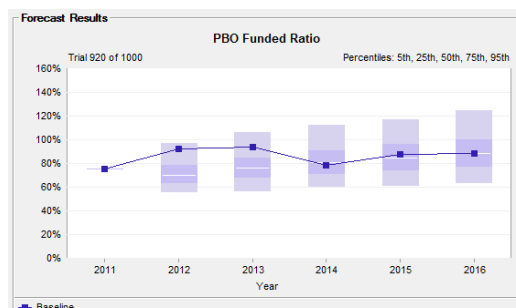


Many plan managers adopt customized (or even unique) definitions of risk and reward and accordingly, the data produced by ProVal PS can be filtered to reflect those definitions. You can tailor the list of metrics that is visible, in order to ignore the ones that just don't matter to you. You can define your own **custom variables** (and even name them yourself) in ProVal and display them in ProVal PS.

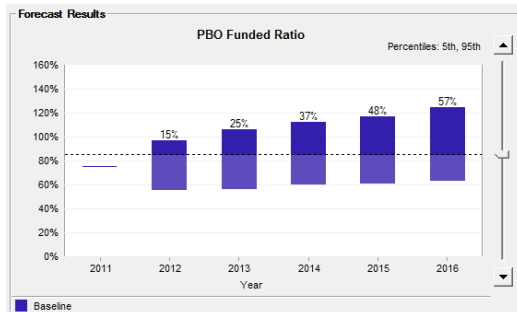
## Asset liability modeling



To model plan risks by running thousands of trials of economic experience, run one or more **Stochastic Forecasts**. These create distributions of key metrics into future years. It shows the range of potential outcomes and the likelihood of their occurrence.

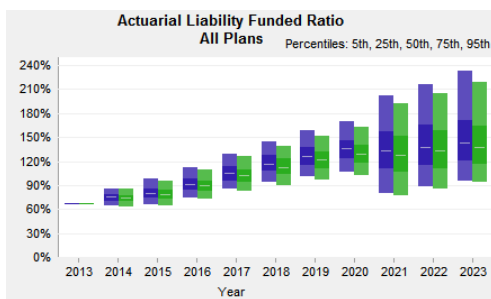


If stochastic outliers beg for questions, you can perform a **trial trace** by referencing a specific result (e.g. the worst case contribution in 2020) and revealing the details of that trial, to better understand the drivers that generated it.



By turning on the **target line** and setting to a specific value, a new line chart is overlaid onto the floating bars, separating the chart into two sections: trials that fell above or below that target value, and the approximate probability of each section. Answers questions such as: what is the chance our contribution might exceed 10M in 2015?

## Side-by-side comparisons

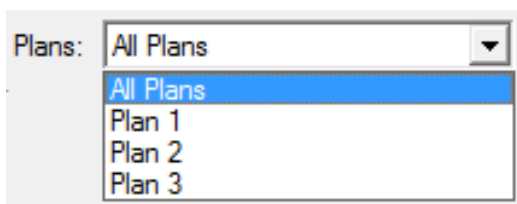


The essential value of projections lies in comparing them to other projections. As Edward Tufte wrote in *In Envisioning Information*:

At the heart of quantitative reasoning is a single question: *Compared to what?* Small multiple designs, multivariate and data bountiful, answer directly by visually enforcing comparison of changes, of the differences among objects, of the scope of alternatives.

ProVal PS allows you to establish scenarios to facilitate such comparisons and view them side by side in the same chart.

## Multiple plans supported



Medium- to large-plan sponsors often have multiple plans and ideally, would analyze changes considering all of their plans together. ProVal PS allows you to aggregate as many plans as you like, even of disparate types (pension, SERP, and OPEB plans), and will show forecast results for each plan individually as well as show a total for all plans combined.

## Other key features

- Export to Excel: You can dump all results into a spreadsheet with a single click, in case you want to incorporate your work with other projects or prepare a custom chart.
- Percentiles: ProVal PS calculates all stochastic results on a trial by trial basis, then percentiles them. The default presentation is to show the 5th, 25th, 50th, 75th and 95th percentile values but these may be changed in the program at any time.



- Rescale charts: It is sound graphical practice to maintain consistent y-axis values when comparing items of similar units. The rescale button allows full control over the y-axis to facilitate this.
- Details: This corresponds to ProVal's Deterministic forecast exhibits, and is available for Deterministic forecasts and when using trial trace.
- Custom code: ProVal PS will inherit and honor many custom code modules created for use in ProVal.

### **Licensing and fees**

ProVal PS is a separate application requiring an additional license agreement. It includes an API to allow you to create your own applications. Please contact [sales@winklevoss.com](mailto:sales@winklevoss.com) for more information.