



# Using Commercial Standards in BUILDER

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Alpha Facility Solutions

PRESENTED BY



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Stantec



TETRA TECH



# Using Commercial Standards in BUILDER

Presented by:

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**Alpha**<sup>TM</sup>  
*Facilities Solutions*  
*Building perspective.*

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# Introduction

- ALPHA has hundreds of clients in the commercial world.
- ALPHA uses many different software programs.
- 99% of our clients use the same “Standards” regardless of which program they use.
- The question came up, what would happen to our BUILDER client’s data if they were treated like a commercial client.

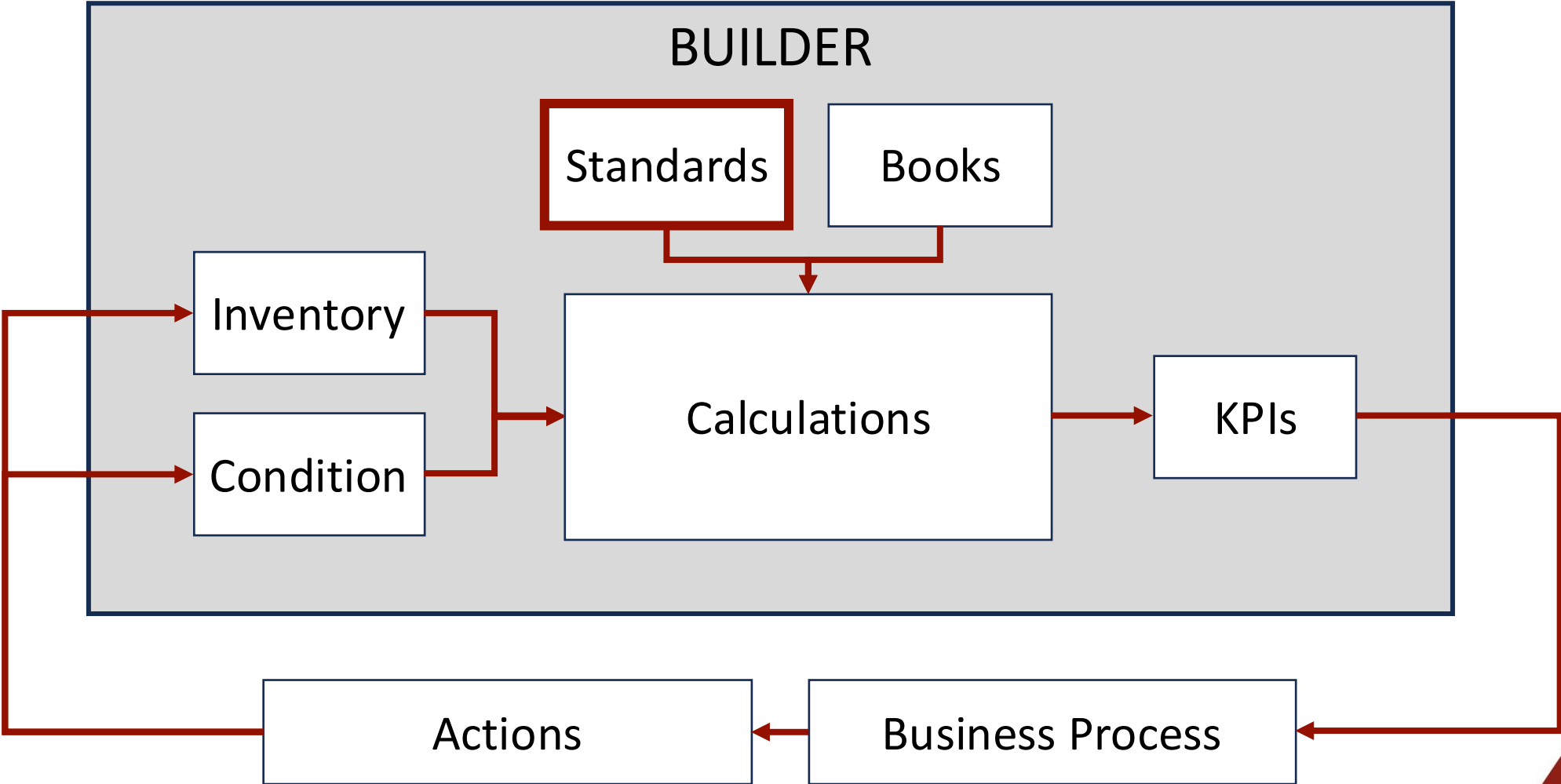


# Standards

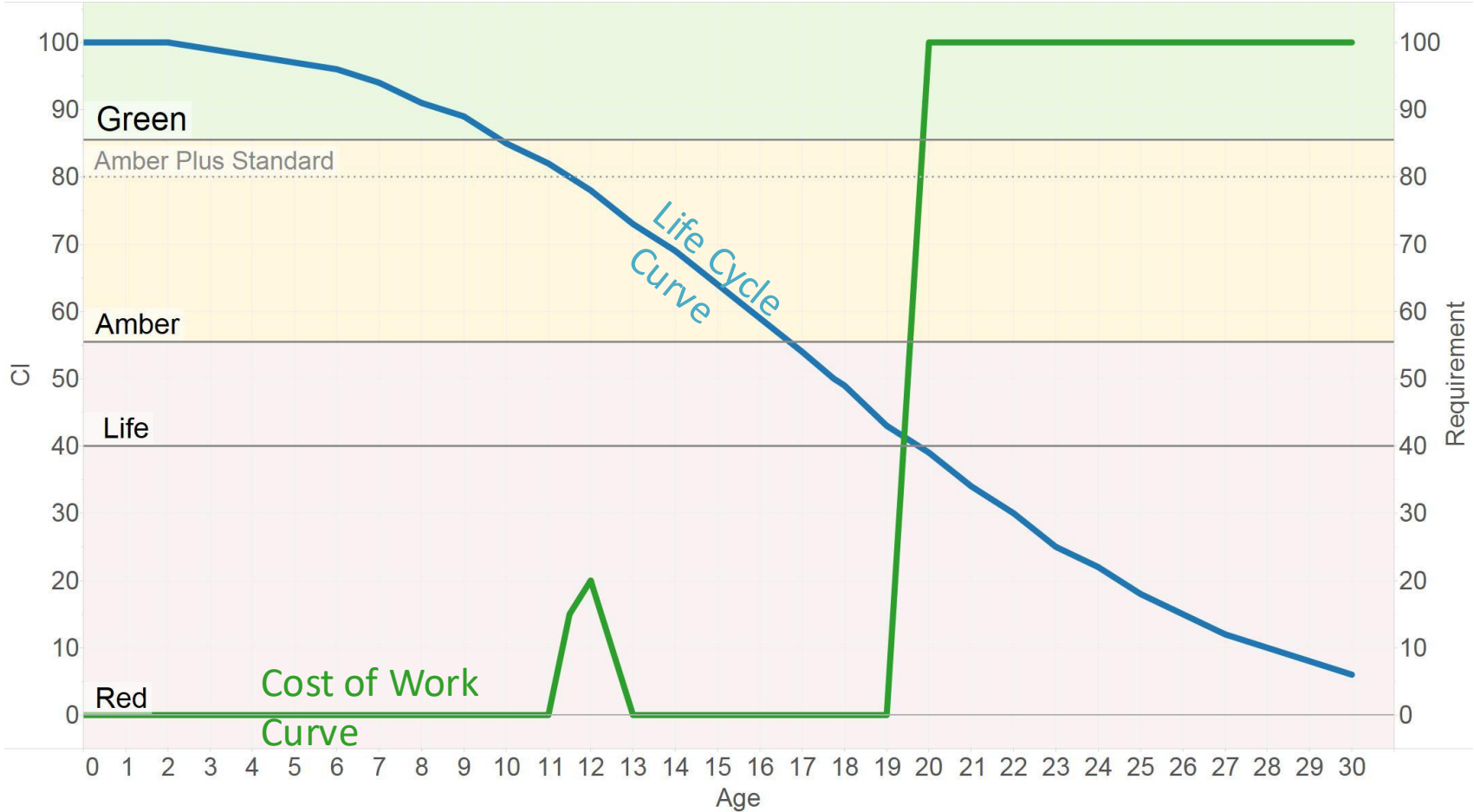
- In BUILDER the Standards are settings that determine when sections generate work, which impacts the FCI.
- There is no right or wrong settings for Standards, just different.
- Standards don't exist in a vacuum. They are a part of the asset management process for buildings.



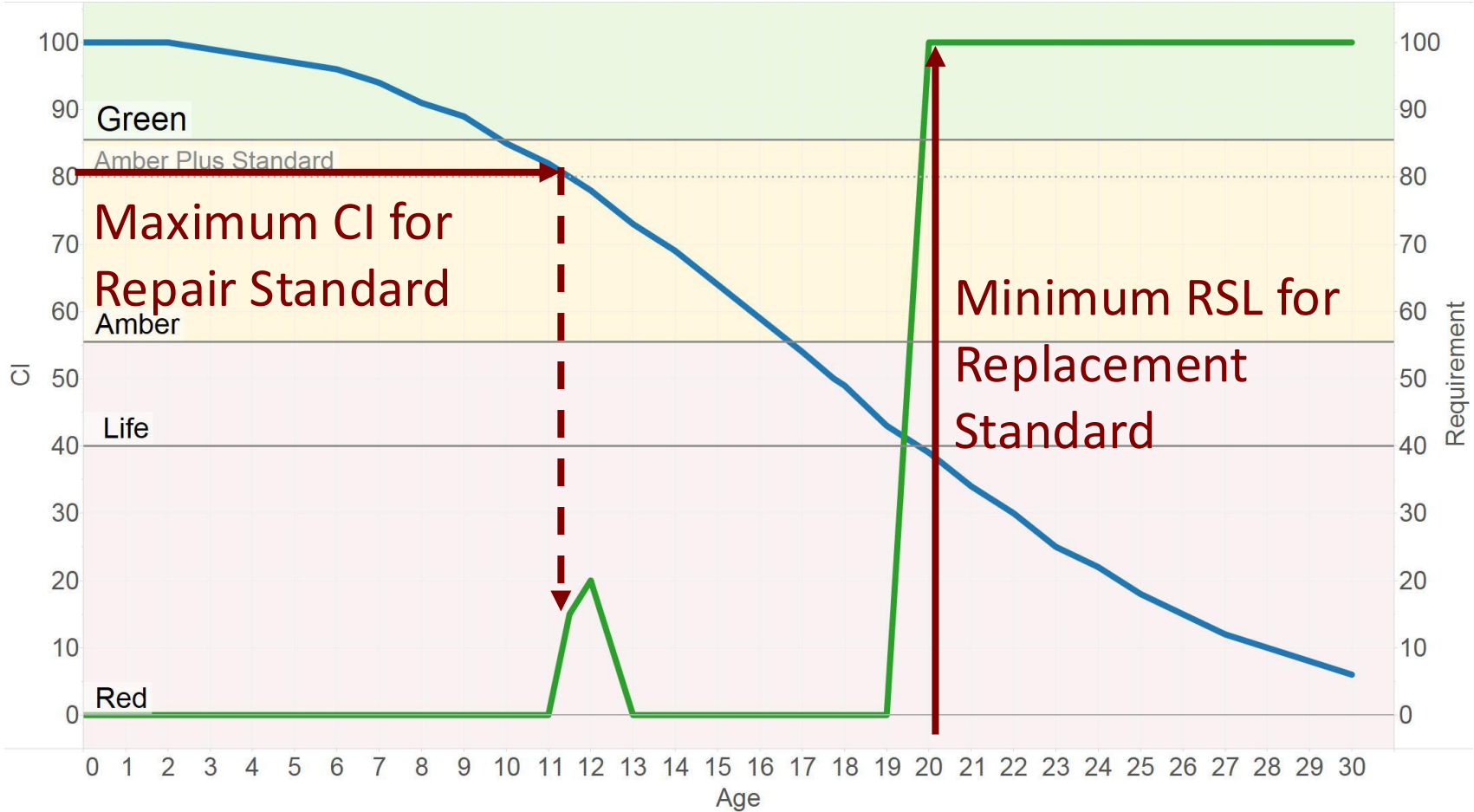
# BUILDER Does Not Live in a Vacuum



# BUILDER Standards

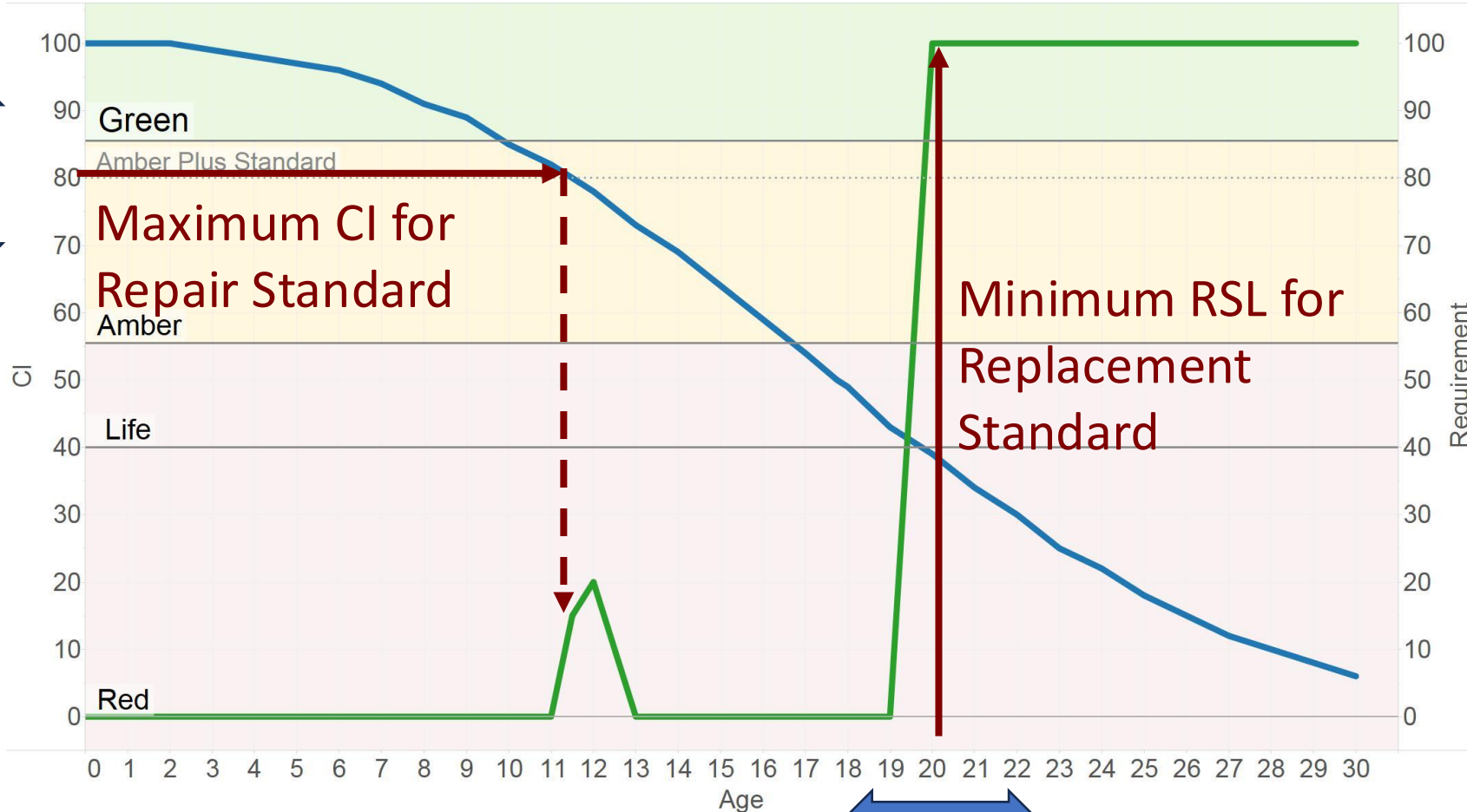


# BUILDER Standards



# BUILDER Standards

This can be shifted up or down



This can be shifted left or right



# Determining the Impact

1. Look at the Commercial Standards one at a time and all together.
2. Compare the difference between the current Standards and the Commercial Standards for the following:
  1. Total work.
  2. Cost to reach an FCI of 80 per building.
  3. Cost to reach an FCI of 90 per building.
  4. How many Q-1s, Q-2, Q-3 and Q-4 buildings.



# Determining the Impact

3. To be able to compare the different clients to each other:
  1. All the work data will be presented as the % of current work.
  2. The Q-Rating data will be presented as the % of buildings.



# Determining the Impact

4. The first step was to get the data for the current settings:
  1. Total work
  2. Cost to reach an FCI of 80 per building.
  3. Cost to reach an FCI of 90 per building.
  4. How many Q-1s, Q-2, Q-3 and Q-4 buildings.





No Non-Renewable Systems Generate  
Work



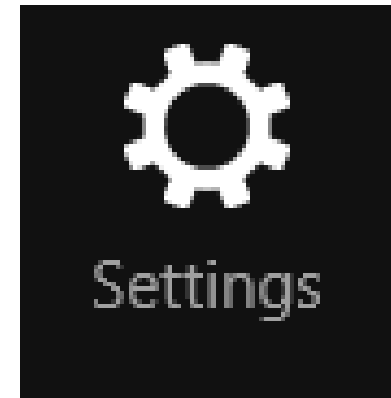
# Non-Renewable Systems

- These are the sections that should last the life of the building.
- They typically should not age out.
- For this presentation, they include everything in Uniformat Classification A (Substructure) and B10 (Superstructure).
  - This is not perfect as there are exceptions.
    - B102004 Canopies have a 20-year life cycle and are renewable
    - C 101001 Fixed Partitions Have a 50-to-125-year life cycle and are non-renewable



# Non-Renewable Systems - Settings

Who	Min CI for Repair	Max RSL for Replacement
Client Settings	80 to 0	2 to -50
Commercial Settings	0	-99



- Create new
  - Policy Sequence.
  - Policy.
  - Copy the Standards from the current Standards.
  - Change the Standards for A10, A20, and B10 to the above.
- Run a scenario with this Policy Sequence and you can see the impact.
  - Don't change the production Policy Sequence, Policy or Standards.

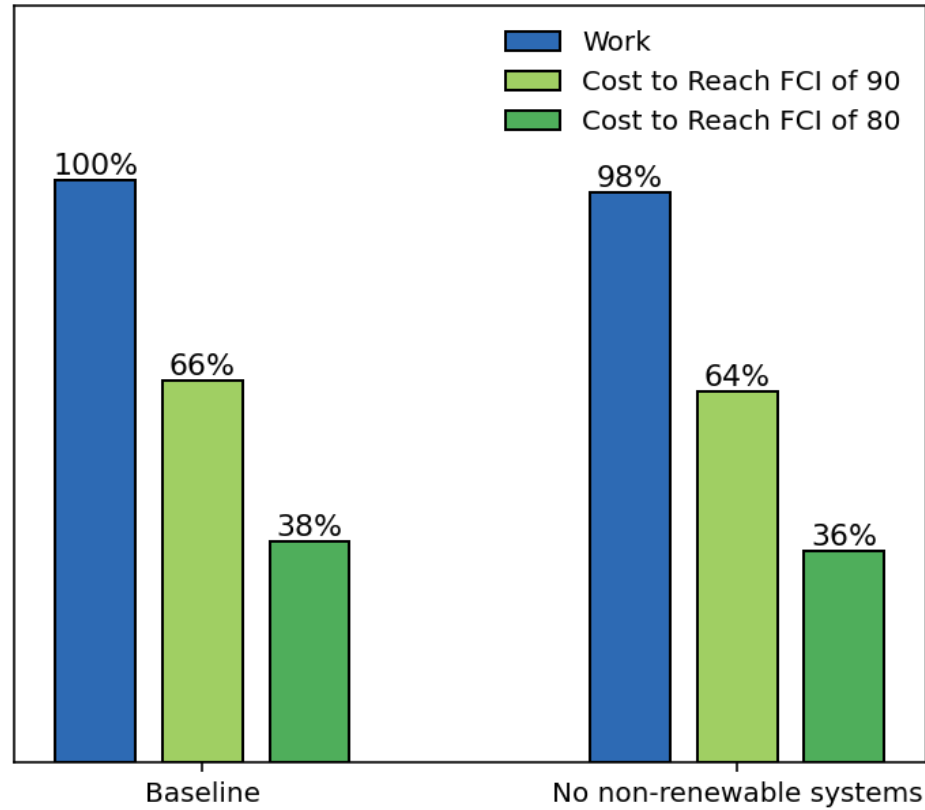


# Non-Renewable Systems – Predicted Impact

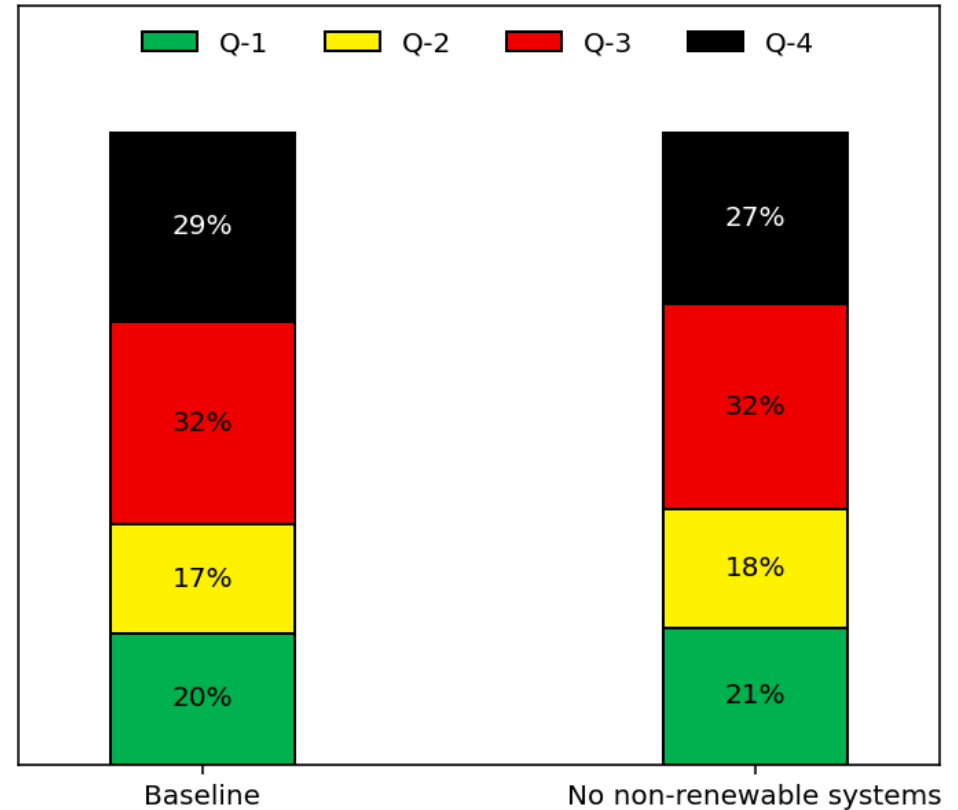
- Since this change only removes work then:
  - Work can only go down.
  - FCIs can only go up.
  - Q-Ratings can only go up.



# Client 1 – No Non-Renewables



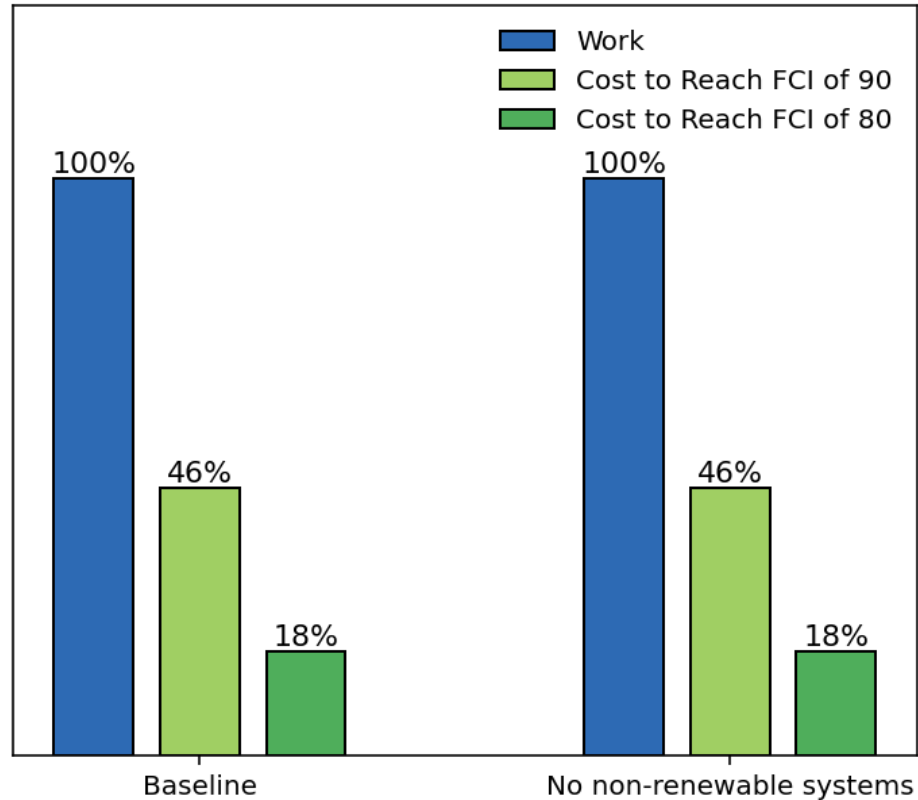
2% Drop in Costs



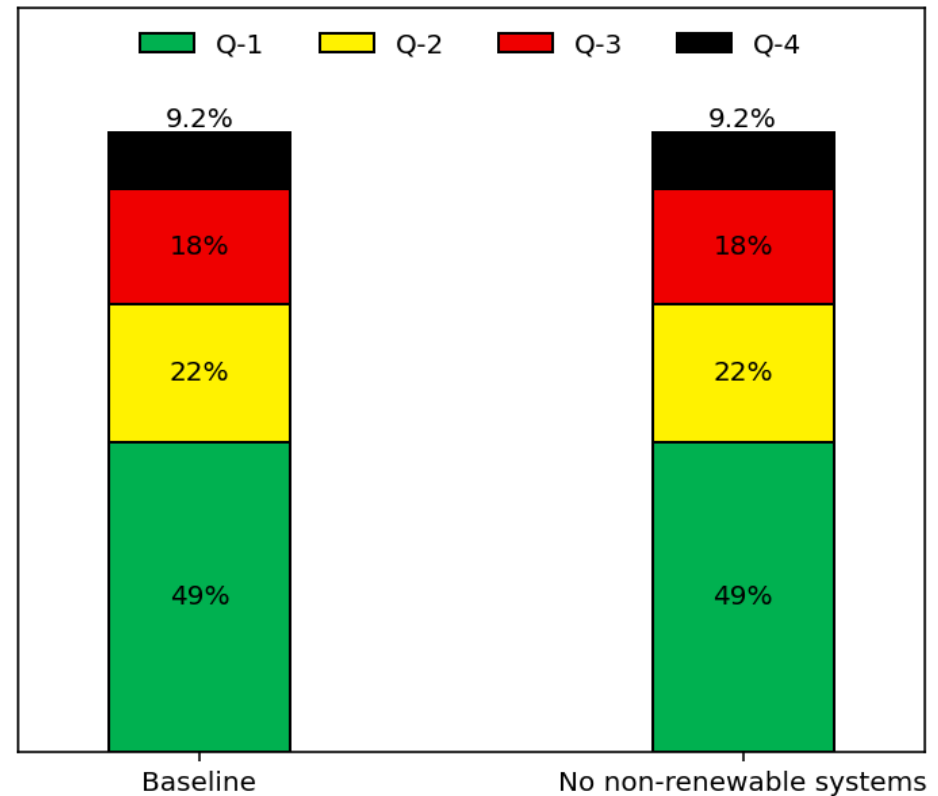
2% Drop in Q-4  
1% Gain in Q-1



# Client 2 – No Non-Renewables



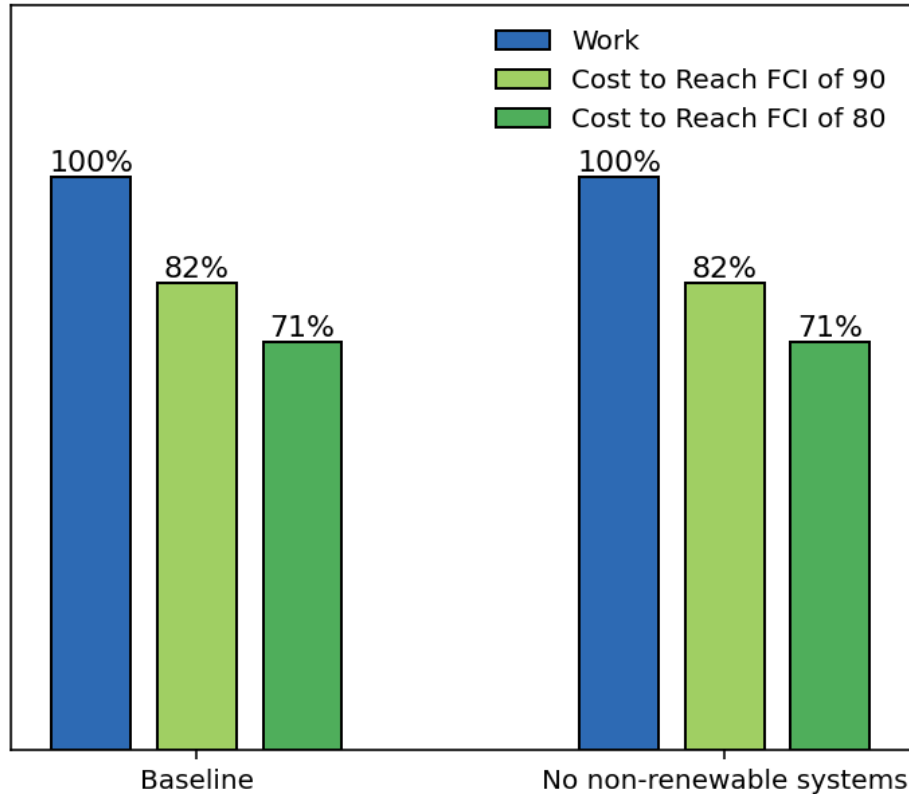
No Drop in Costs



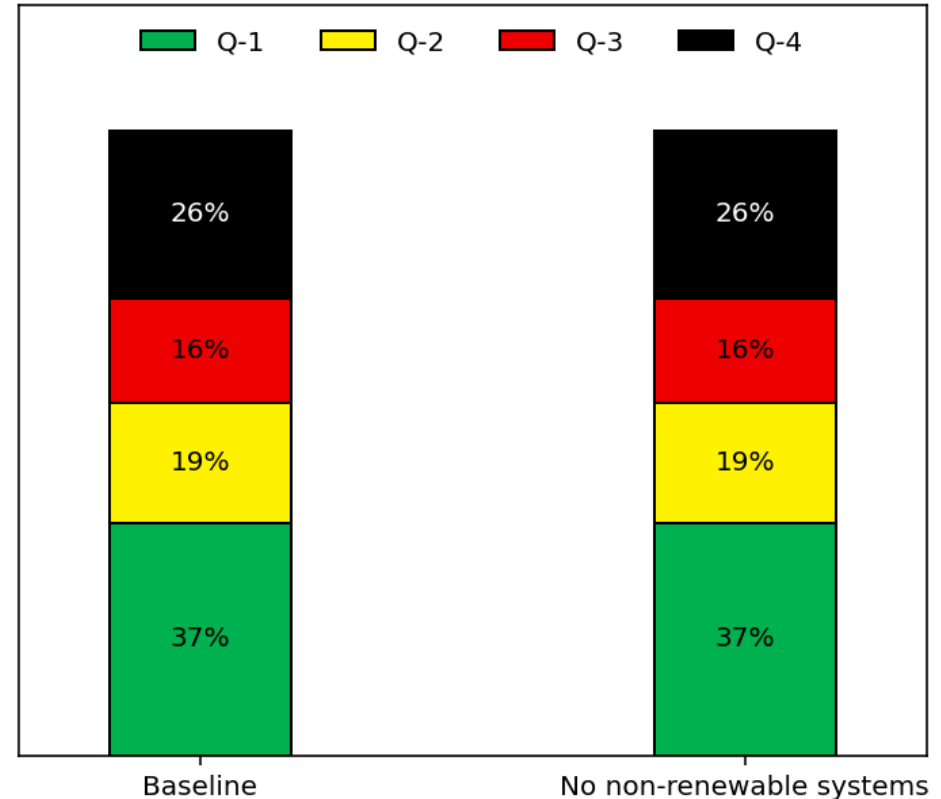
No Drop in Q-4  
No Gain in Q-1



# Client 3 – No Non-Renewables



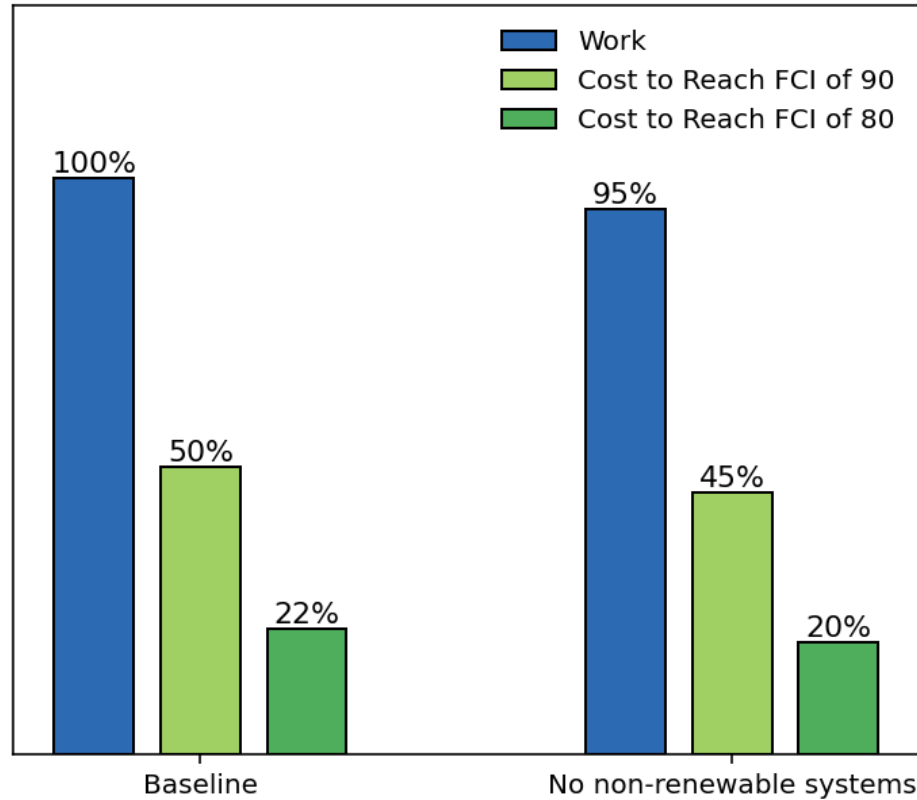
No Drop in Costs



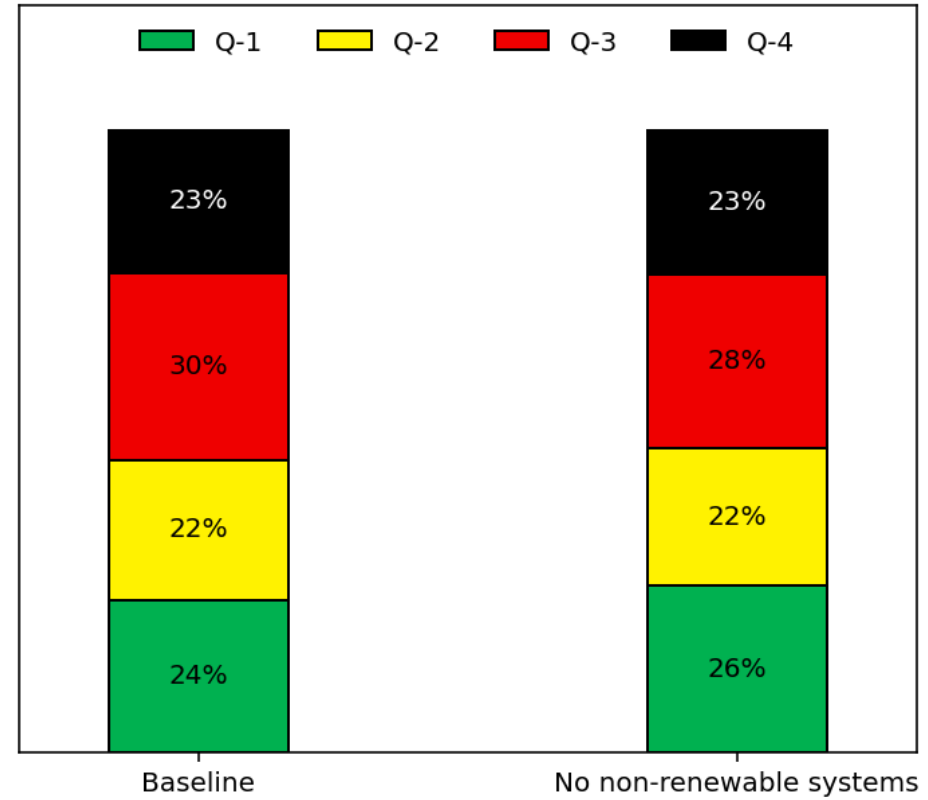
No Drop in Q-4  
No Gain in Q-1



# Client 4 – No Non-Renewables



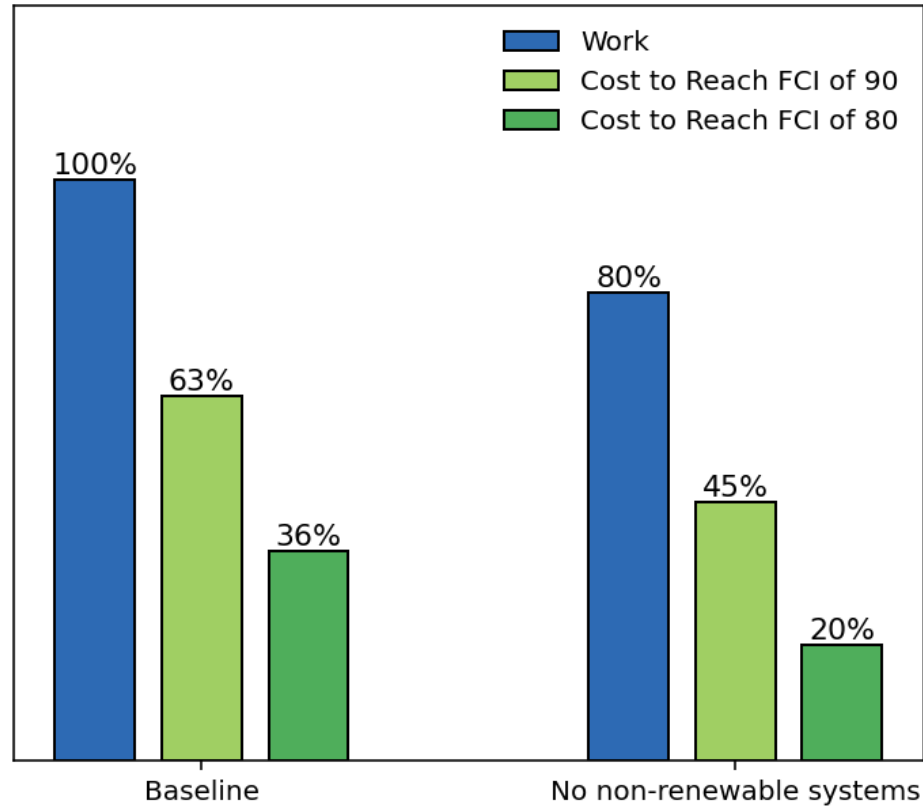
5% Drop in Costs



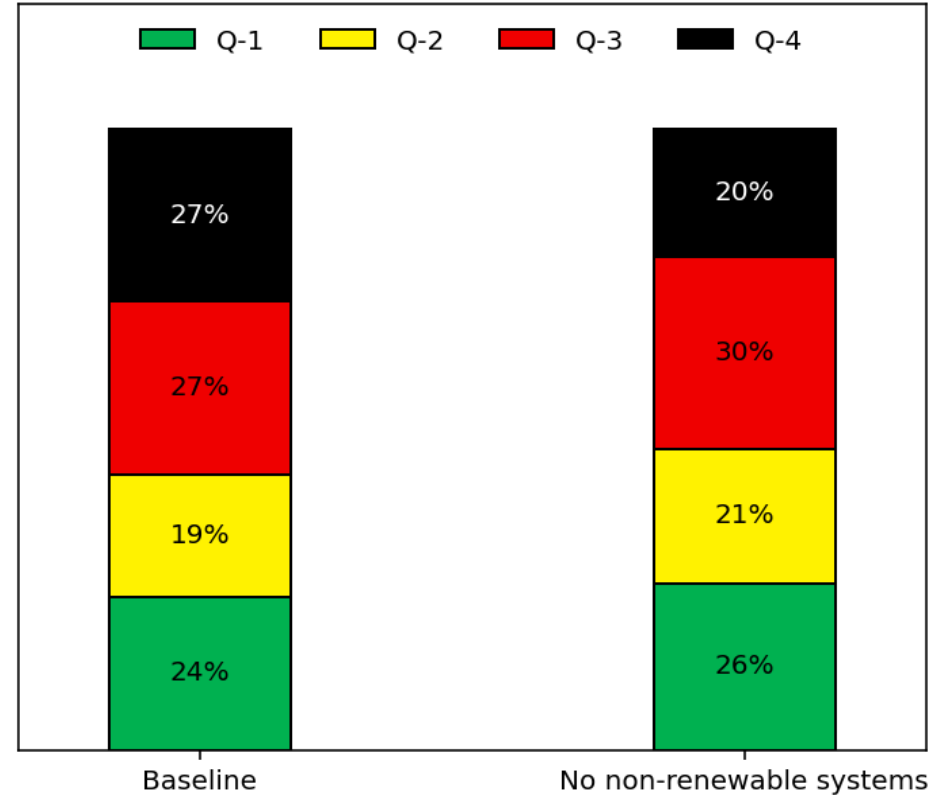
No Drop in Q-4  
2% Gain in Q-1



# Client 5 – No Non-Renewables



20% Drop in Costs



7% Drop in Q-4  
2% Gain in Q-1



# Non-Renewable Systems – Summary

Client	Cost Change	Target FCI Cost Change	Q-1 Change	Q-4 Change
1	-2%	Reduction	1%	-2%
2	0%	No Change	0%	0%
3	0%	No Change	0%	0%
4	-5%	Reduction	2%	0%
5	-20%	Reduction	2%	-7%





No Paint and Repair Work



# No Paint or Repair Work

- Most of the programs in the commercial world do not calculate the condition of a section.
  - They calculate the year that the section needs to be replaced.
  - Condition is required to calculate repairs.
  - Note: There are a couple of programs that do calculate the condition, and they have the capability to generate repairs, but we don't use it often.



# No Paint or Repair - Settings

Who	Min CI for Repair	Min CI for Paint	Maximum RPL
Client Settings	85 to 0	80 to 0	3 to -99
Commercial Settings	0	0	-99



- Create new
  - Policy Sequence.
  - Policy.
  - Copy the Standards from the current Standards.
  - Change all the Standards to the above.
- Run a scenario with this Policy Sequence and you can see the impact.
  - Don't change the production Policy Sequence, Policy or Standards.

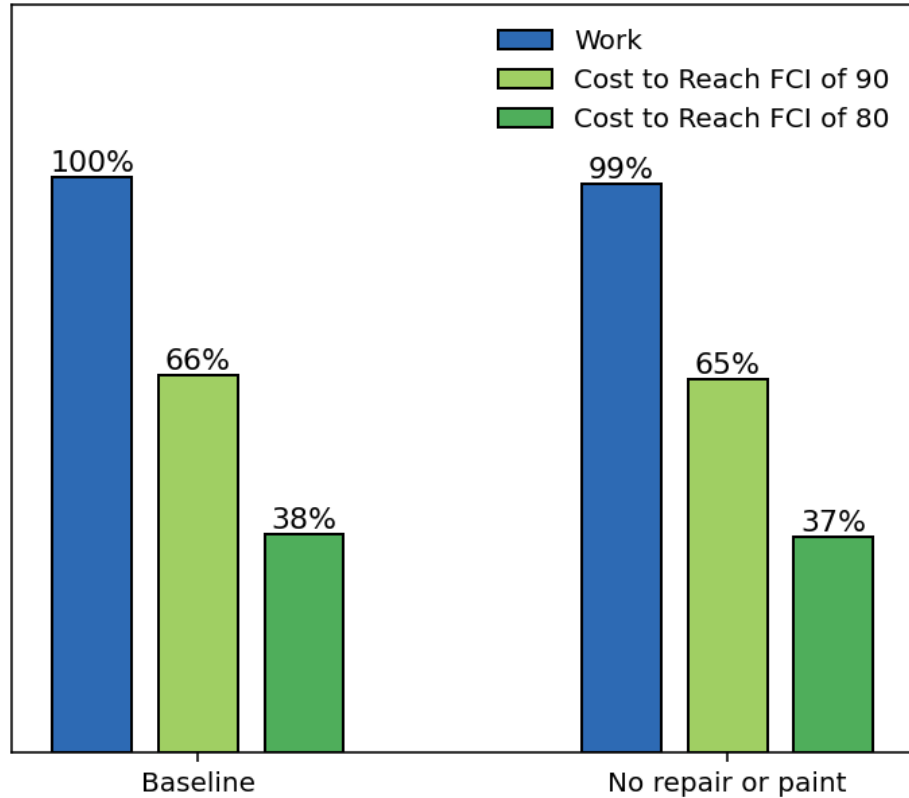


# No Paint or Repair– Predicted Impact

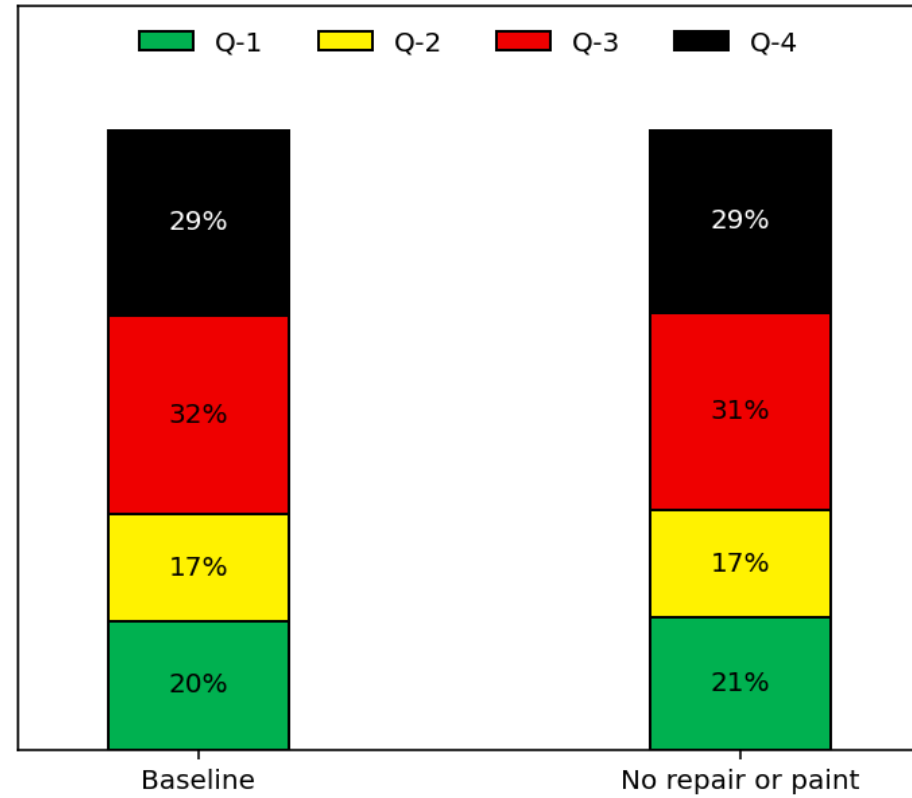
- Since this change only removes paint:
  - Work can only go down.
  - FCIs can only go up.
  - Q-Ratings can only go up.



# Client 1 – No Paint or Repair



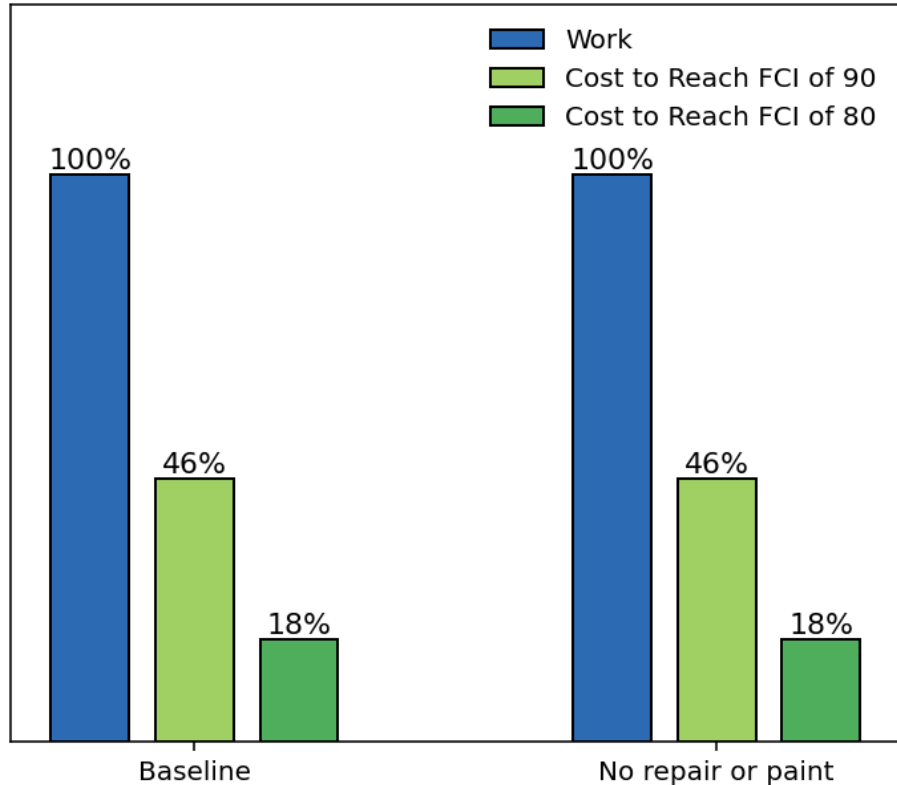
1% Drop in Costs



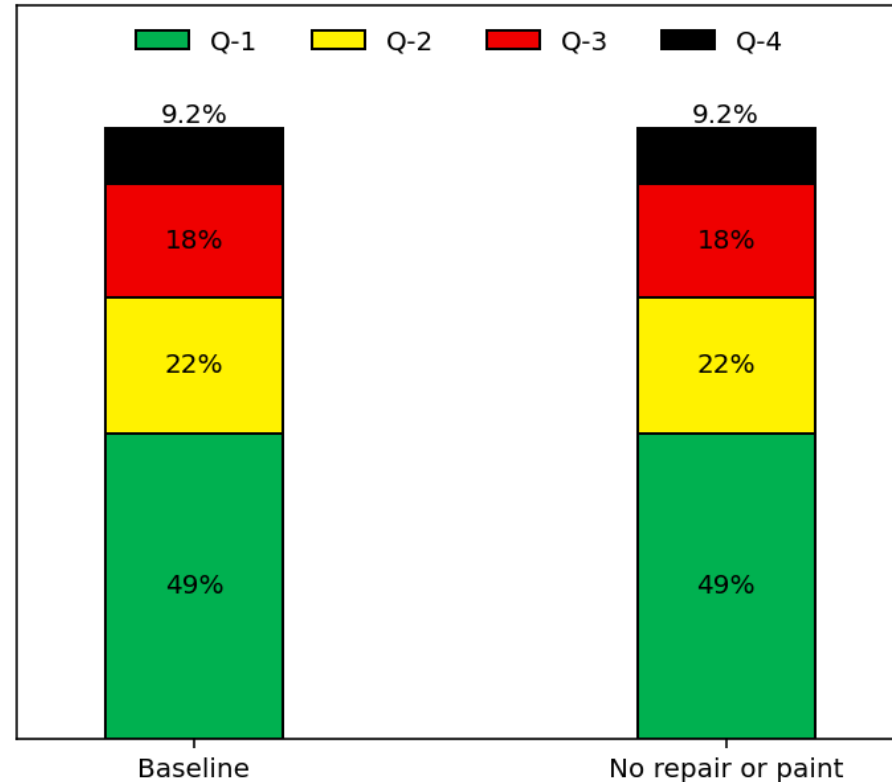
No Drop in Q-4  
1% Gain in Q-1



# Client 2 – No Paint or Repair



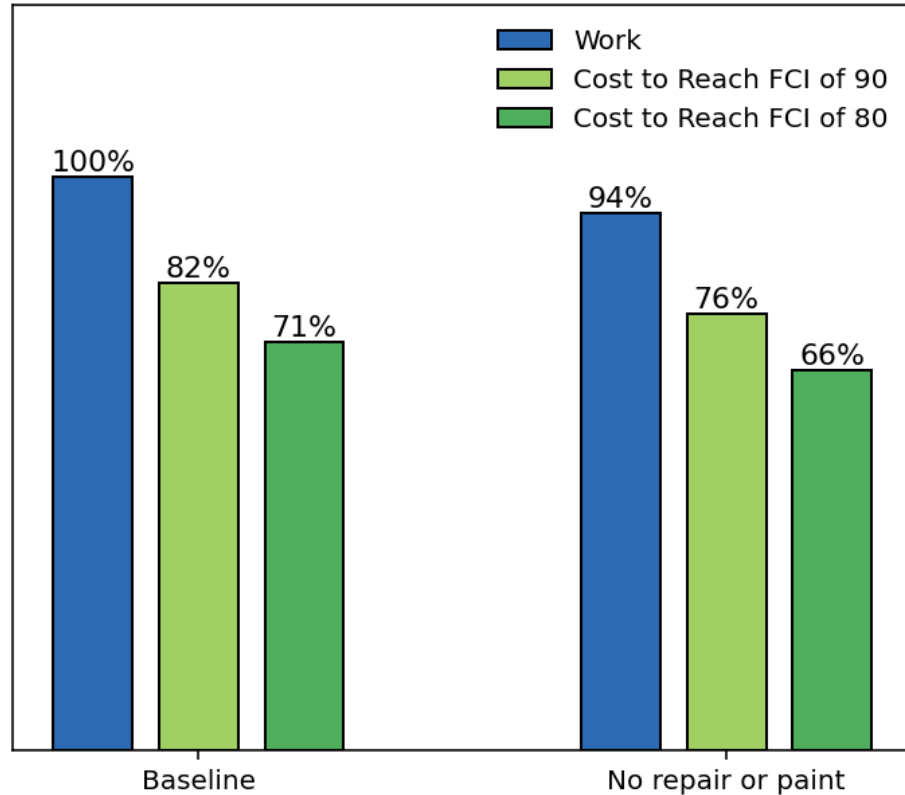
No Drop in Costs



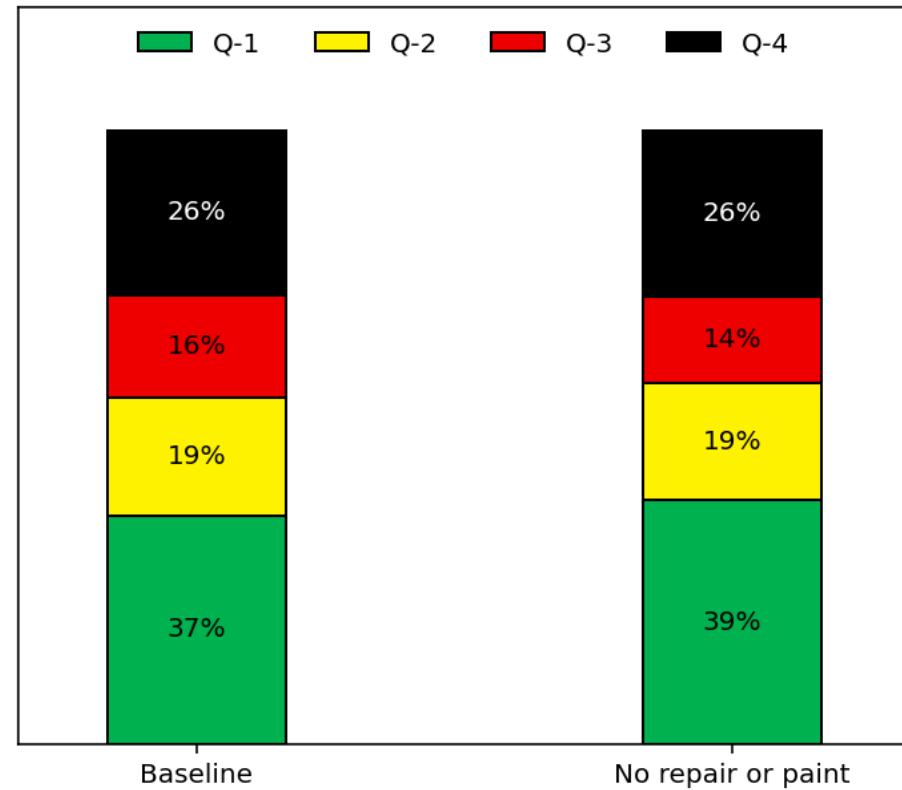
No Drop in Q-4  
No Gain in Q-1



# Client 3 – No Paint or Repair



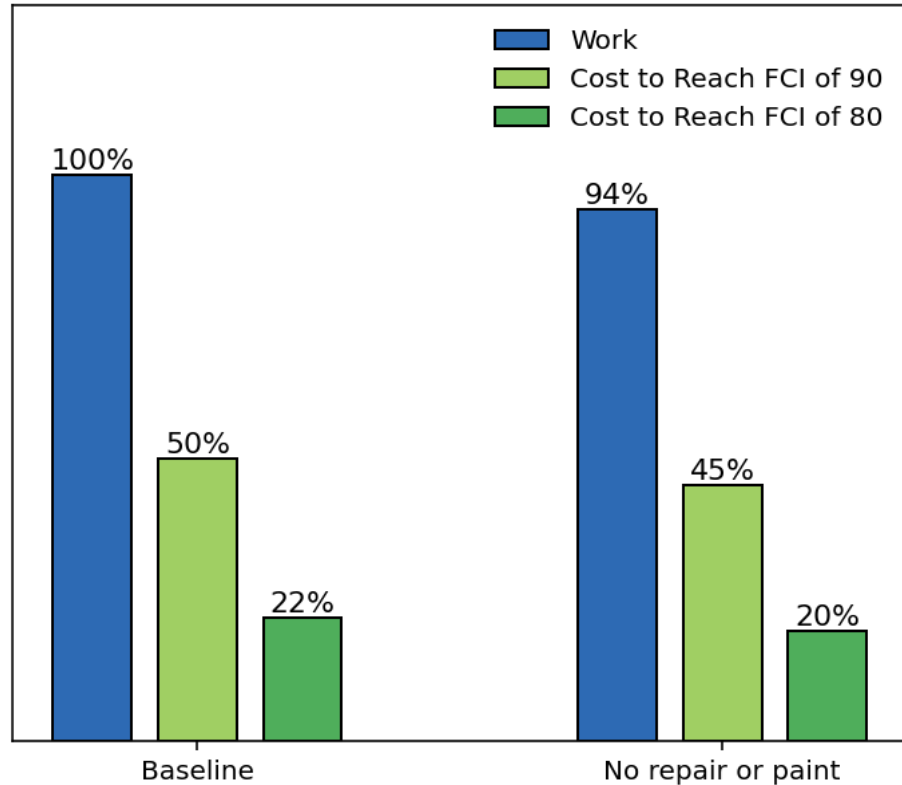
6% Drop in Costs



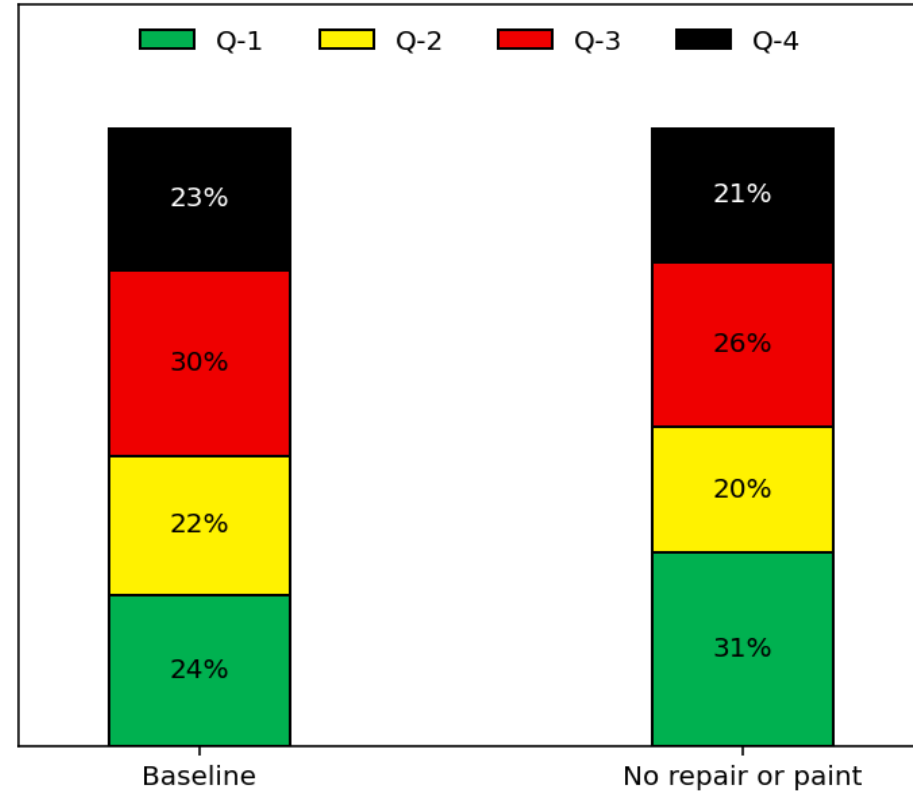
No Drop in Q-4  
2% Gain in Q-1



# Client 4 – No Paint or Repair



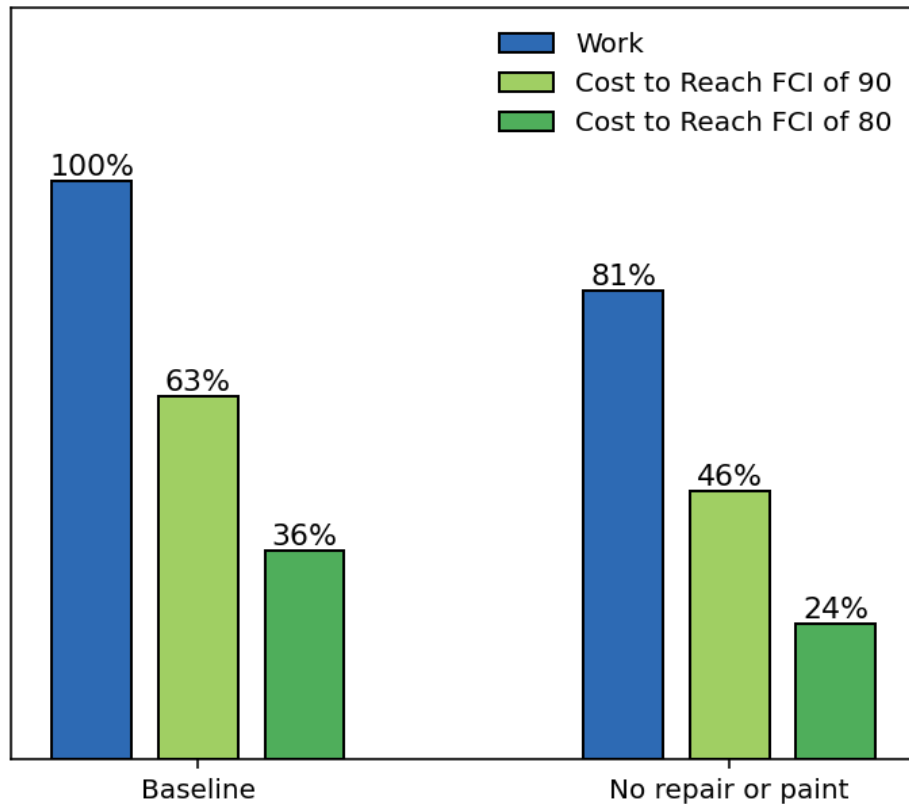
6% Drop in Costs



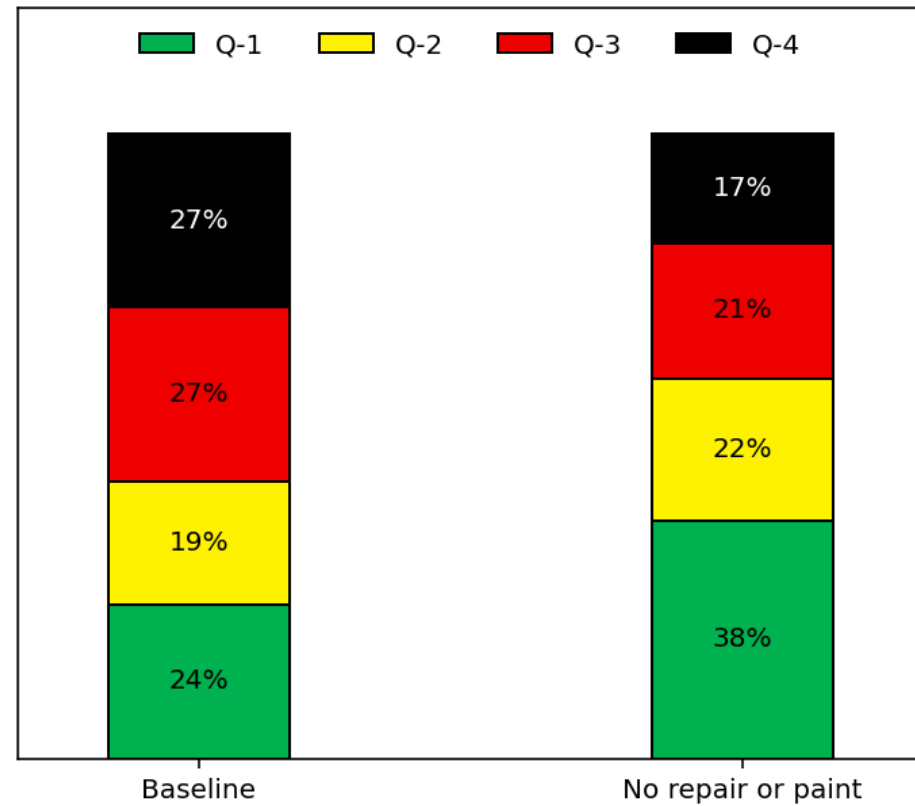
2% Drop in Q-4  
7% Gain in Q-1



# Client 5 – No Paint or Repair



19% Drop in Costs



10% Drop in Q-4  
14% Gain in Q-1



# No Paint or Repair – Summary

Client	Cost Change	Target FCI Cost Change	Q-1 Change	Q-4 Change
1	-1%	Reduction	1%	0%
2	0%	No Change	0%	0%
3	-6%	Reduction	2%	0%
4	-6%	Reduction	7%	-2%
5	-19%	Reduction	14%	-10%



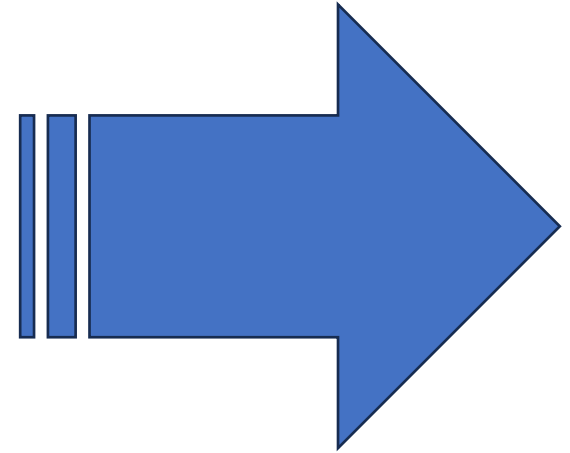


Beta-Shift of 1 and  
No Paint or Repair Work

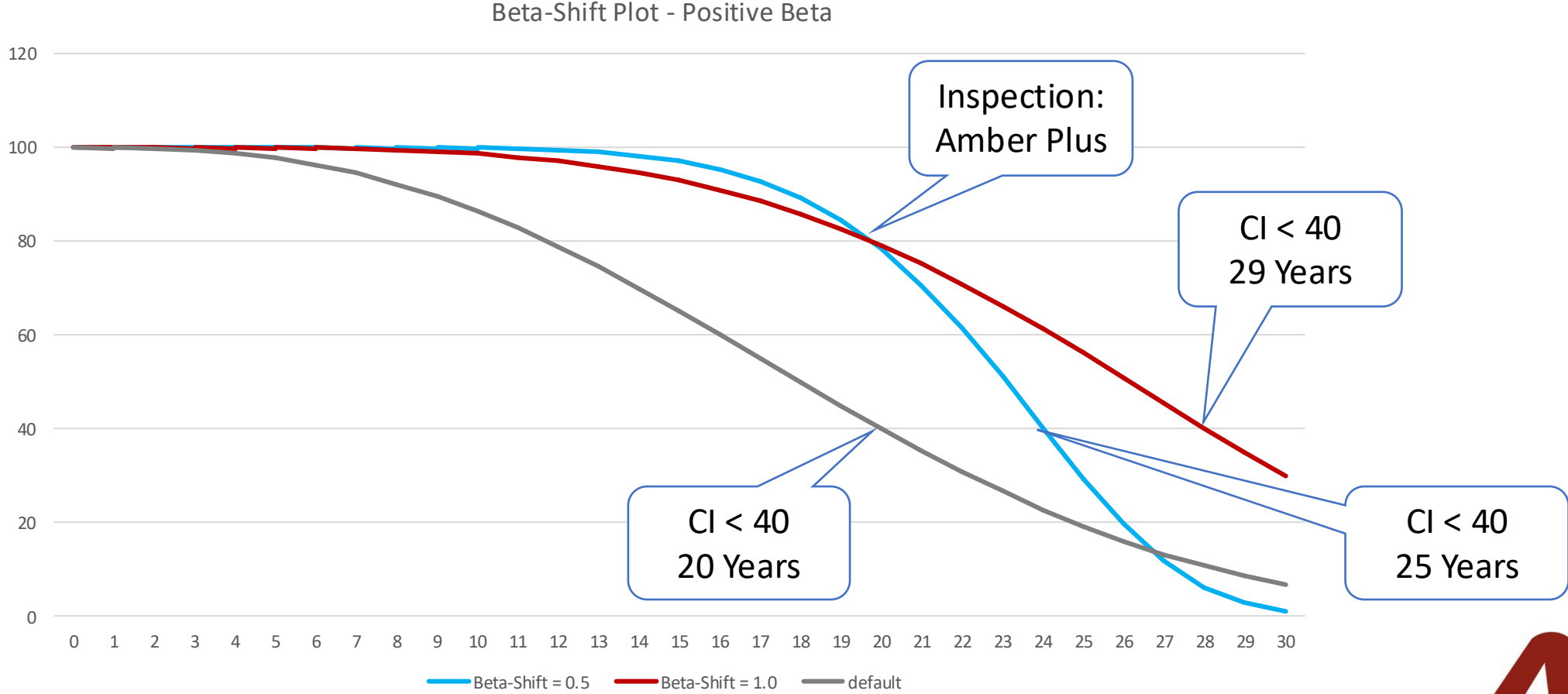


# Beta-Shift of 1

- The Beta-Shift factor is a setting used to modify the Beta value.
- The Beta-Shift factor allows BUILDER to weight the condition on a combination of the inspection and the age of a section.
- A Beta-Shift of 1 relies 100% on the inspection.
- Some of our clients have a Beta-Shift of 0.5.
  - This means that the final Beta value will be the average of the Beta calculated from the inspection and 1 (which is the Beta used when doing age-based condition)



# Beta-Shift Plot – Positive Beta



# Beta-Shift of 1- Settings

- Don't change any Standard.
- You would need a sand-box version of your data to run the data changing the Beta-Shift to 1.
- This was not available to me for any of our clients, so we didn't do the calculations.



# Beta-Shift of 1– Predicted Impact

- Since the Beta-Shift can cause sections to need replacement earlier or later, it really depends on how many sections are in the change zone and the cost of those sections.





# All the Standards



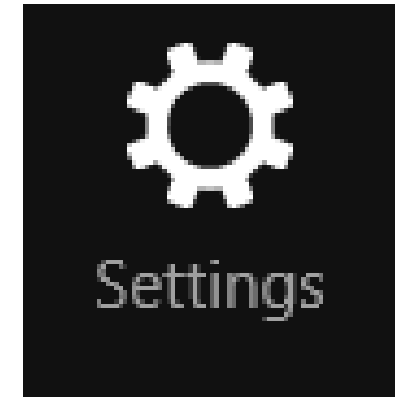
# All the Standards

- This includes the following:
  - No Non-Renewable Work.
  - No Paint or Repair Work.
- Adds setting Maximum RSL for Replace set to 0 for renewable systems.



# All the Standards- Settings

- Create new
  - Policy Sequence.
  - Policy.
  - Copy the Standards from the current Standards.
  - Change the Standards to the below.
- Run a scenario with this Policy Sequence and you can see the impact.
  - Don't change the production Policy Sequence, Policy or Standards.



# All the Standards- Settings

Who	Systems	Min CII for Repair Paint	Min CI for Repair	Max RPL for Replacement	Max RSL for Replacement
Client Settings	A10, A20, B10	75 to 0	80 to 0	1 to -50	2 to -50
Commercial Settings	A10, A20, B10	0	0	-99	-99
Client Settings	All Others	80 to 0	85 to 0	4 to -99	3 to -4
Commercial Settings	All Others	0	0	-99	0

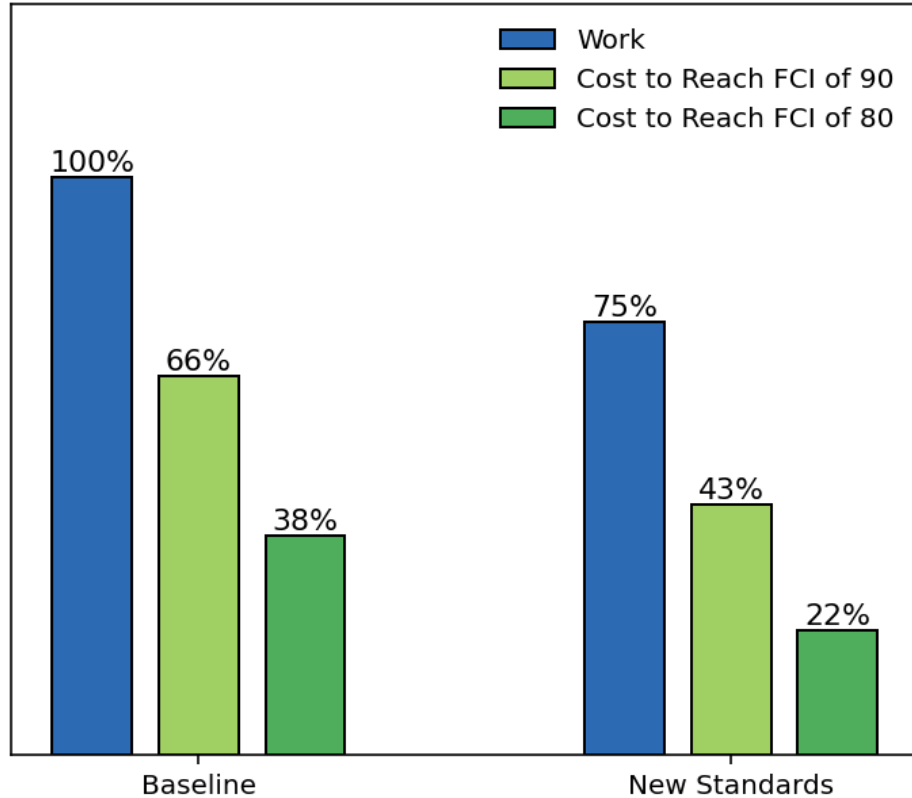


# All the Standards – Predicted Impact

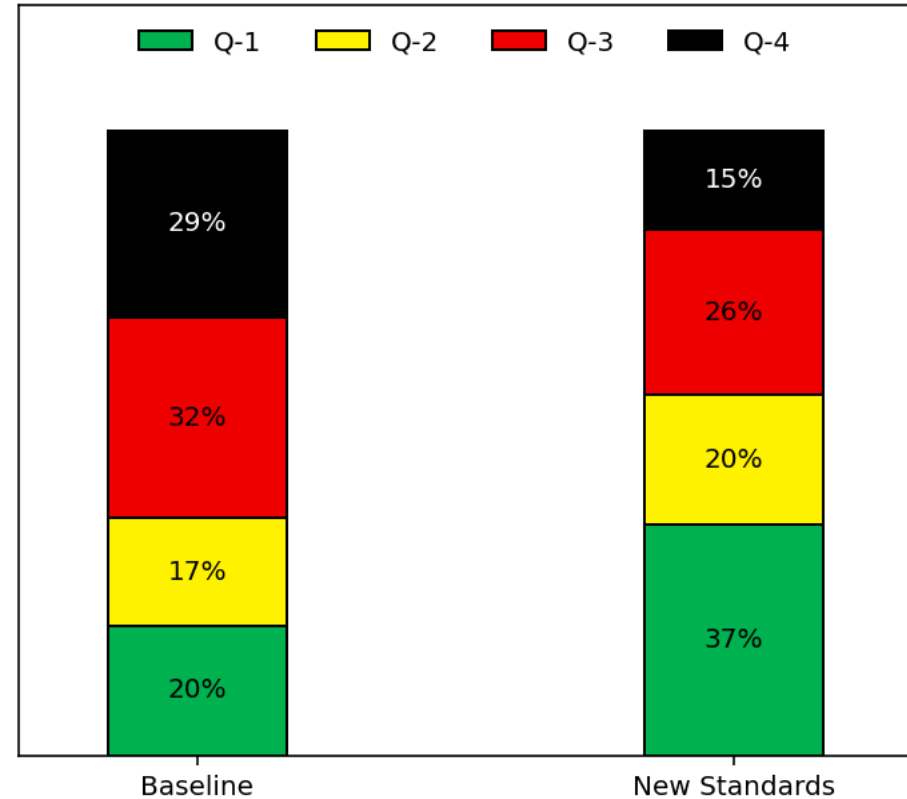
- Removing the Non-Renewables, Paint and Repair Work.
  - Work can only go down.
- The Maximum RSL for Replacement is between the current high and low values.
  - Most likely for work to go down



# Client 1 – All the Standards



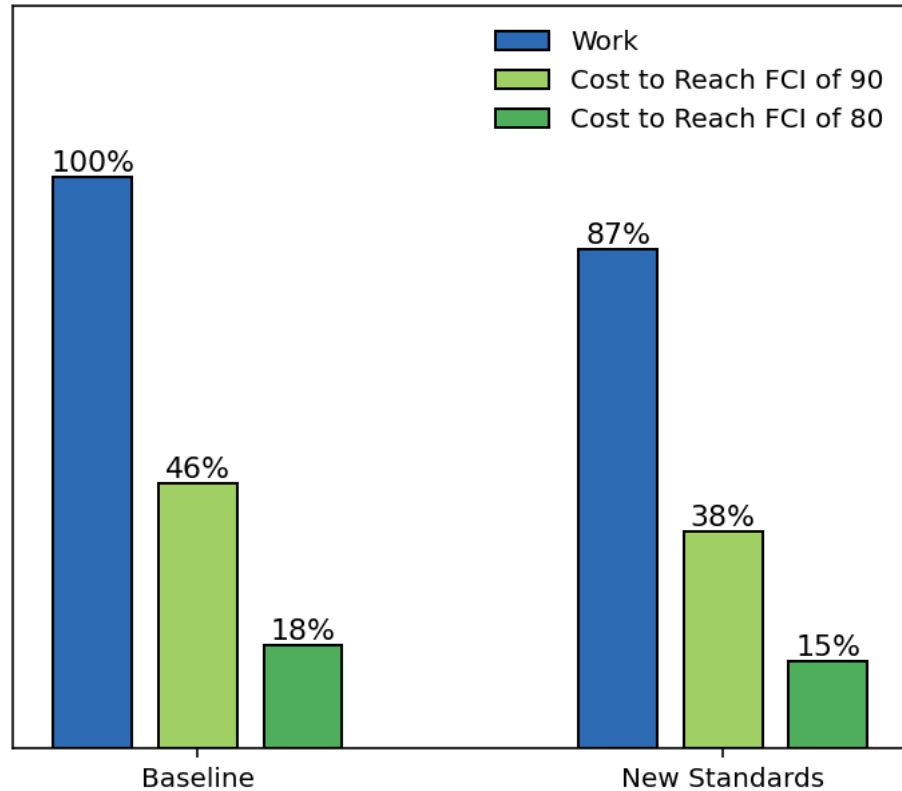
25% Drop in Costs



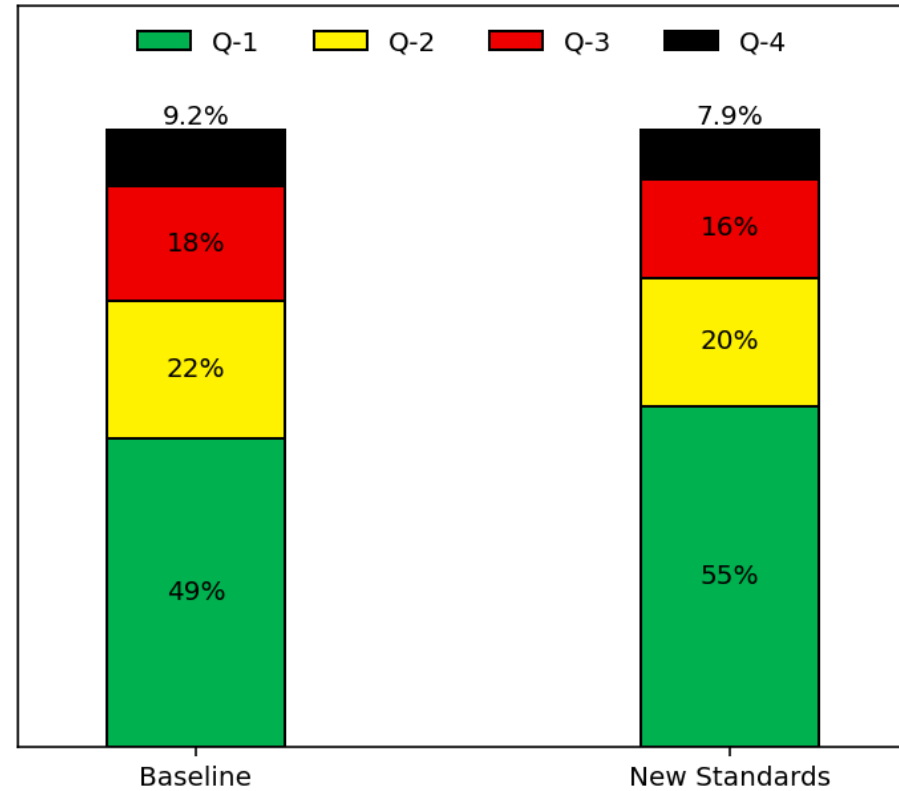
14% Drop in Q-4  
17% Gain in Q-1



# Client 2 – All the Standards



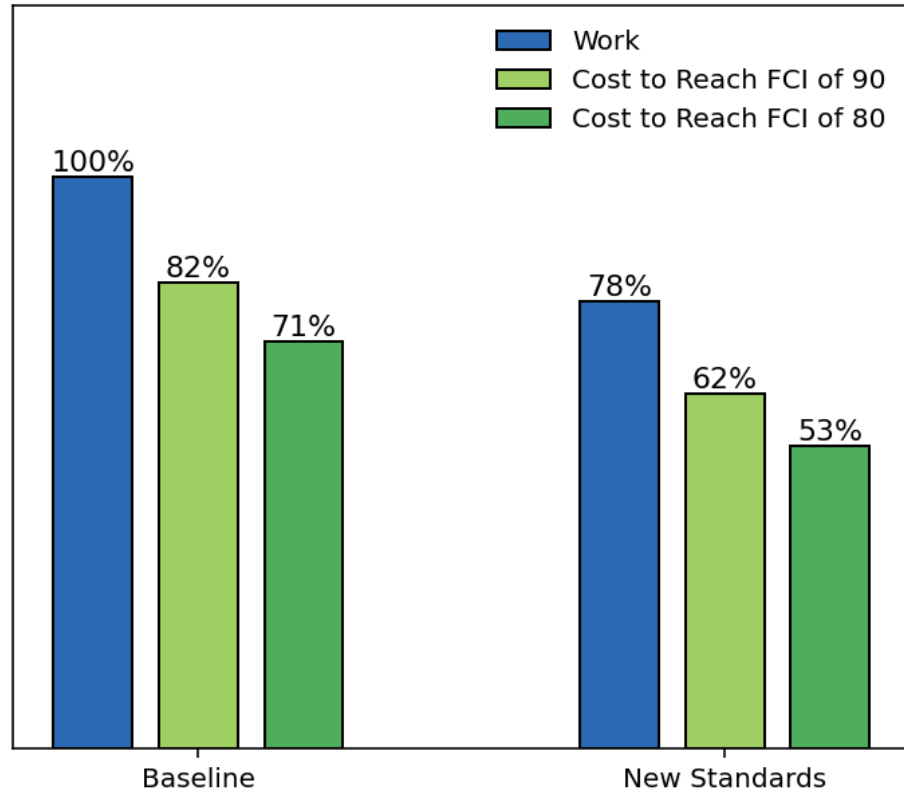
13% Drop in Costs



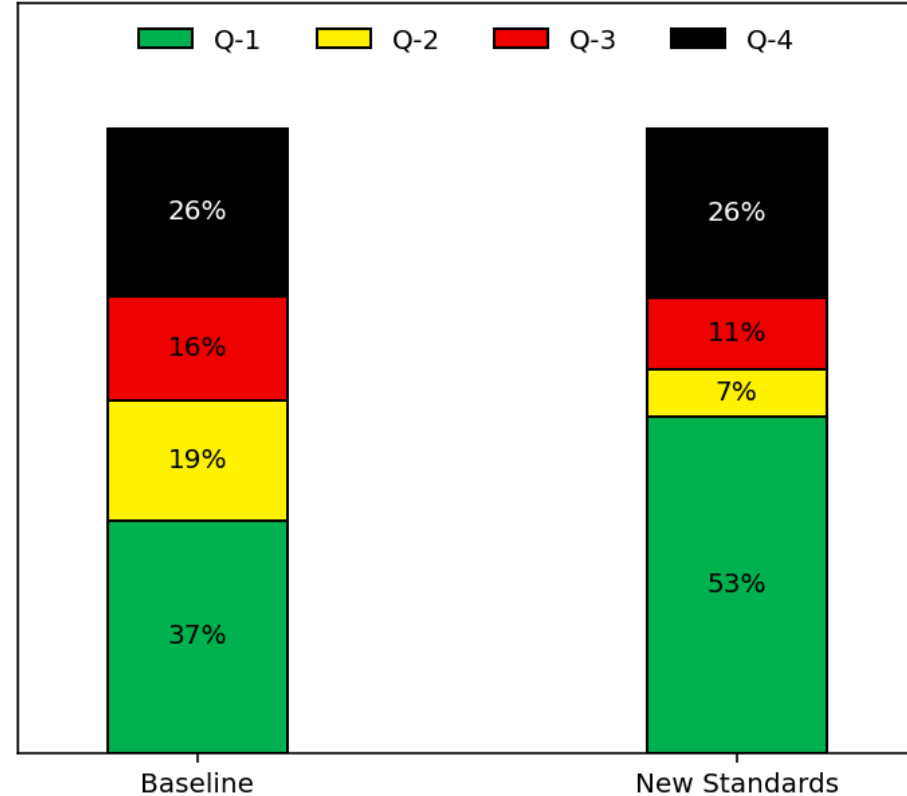
1% Drop in Q-4  
6% Gain in Q-1



# Client 3 – All the Standards



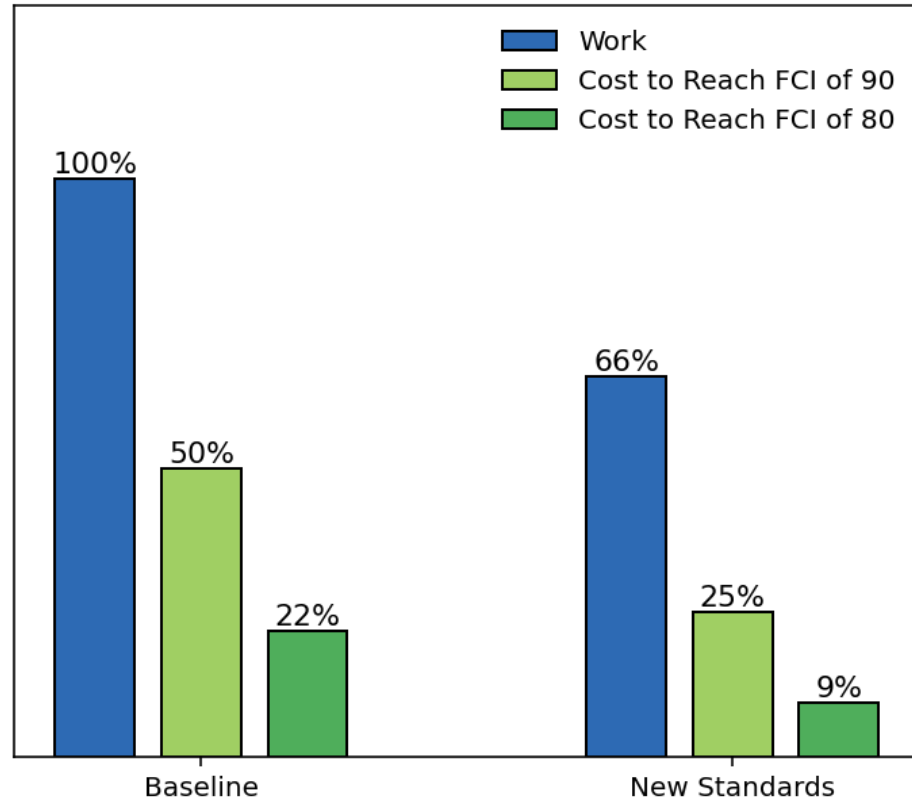
22% Drop in Costs



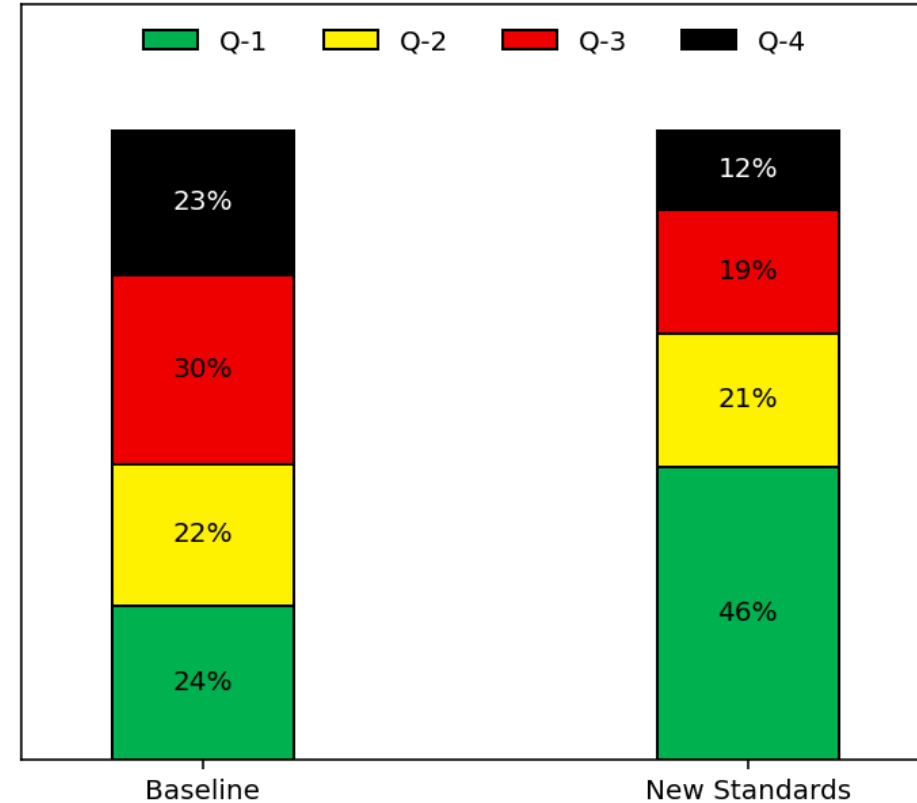
No Drop in Q-4  
16% Gain in Q-1



# Client 4 – All the Standards



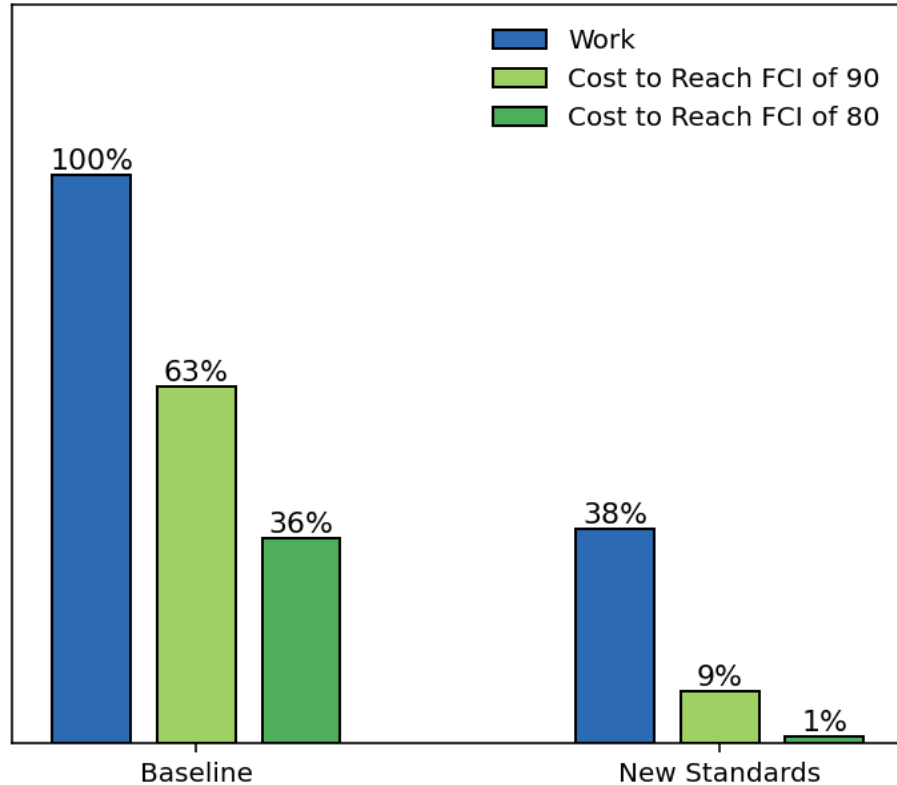
34% Drop in Costs



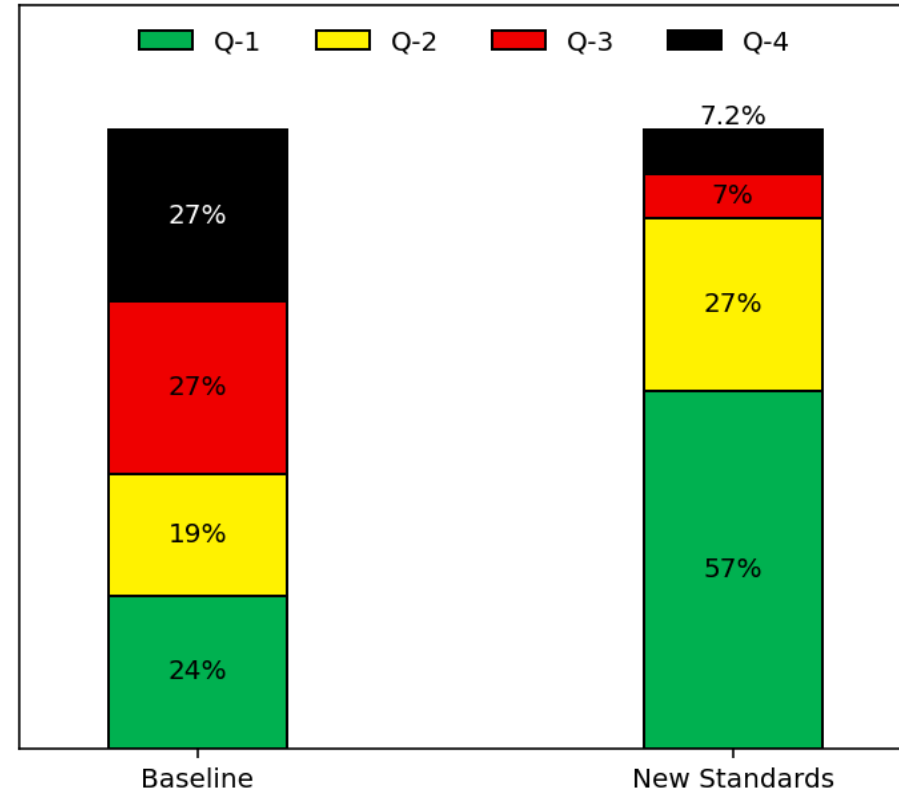
11% Drop in Q-4  
22% Gain in Q-1



# Client 5 – All the Standards



62% Drop in Costs



20% Drop in Q-4  
23% Gain in Q-1



# All the Standards – Summary

Client	Cost Change	Target FCI Cost Change	Q-1 Change	Q-4 Change
1	-25%	Reduction	17%	-14%
2	-13%	Reduction	6%	-1%
3	-22%	Reduction	16%	0%
4	-34%	Reduction	22%	-11%
5	-62%	Reduction	23%	-20%



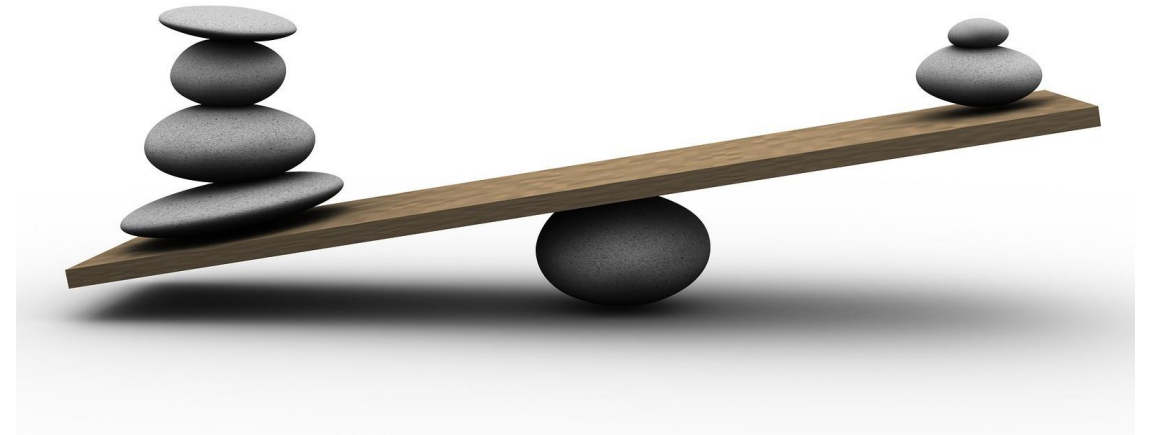


# Calculating FCI Using Sum of the CRV instead of PRV



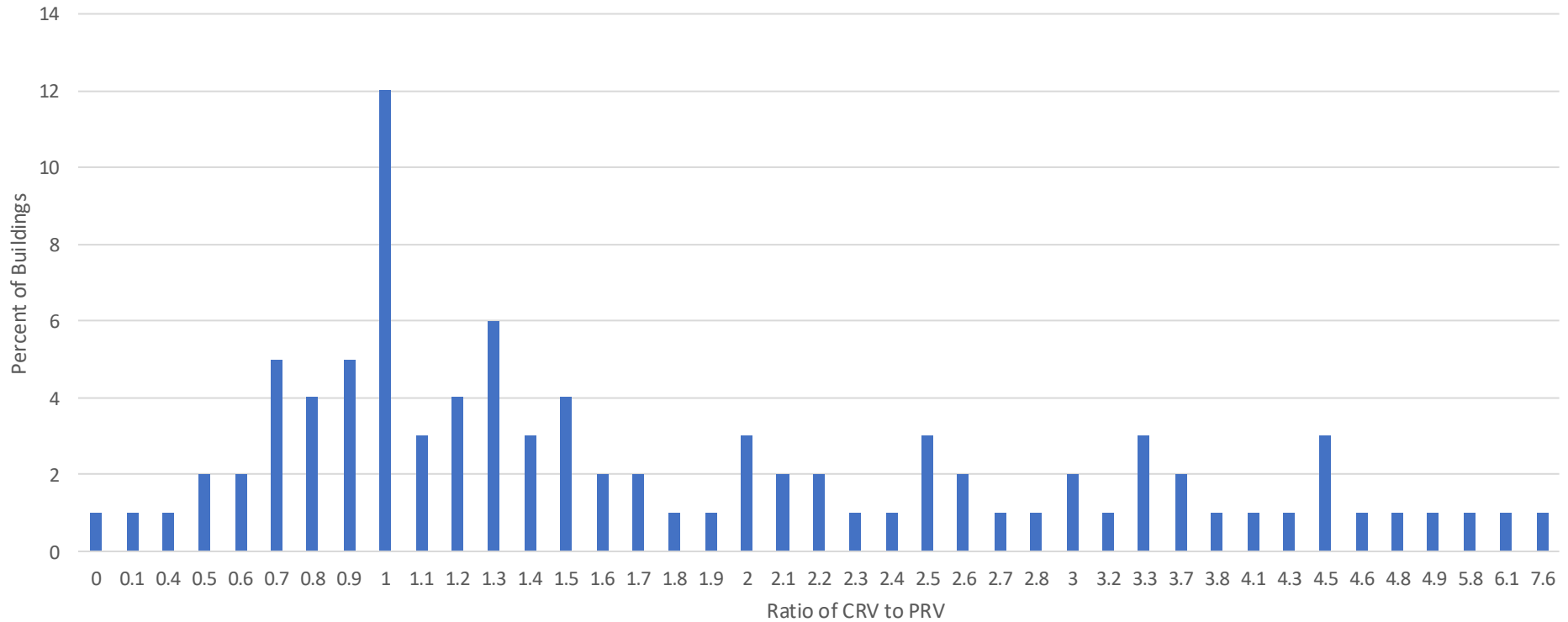
# Using the CRV in FCI

- Most federal clients have a real property system that calculates the PRV.
- These PRV calculations do not match the cost of the inventory of a specific building.
- This mismatch generates ratios of CRV to PRV that impact the FCI calculation greatly.

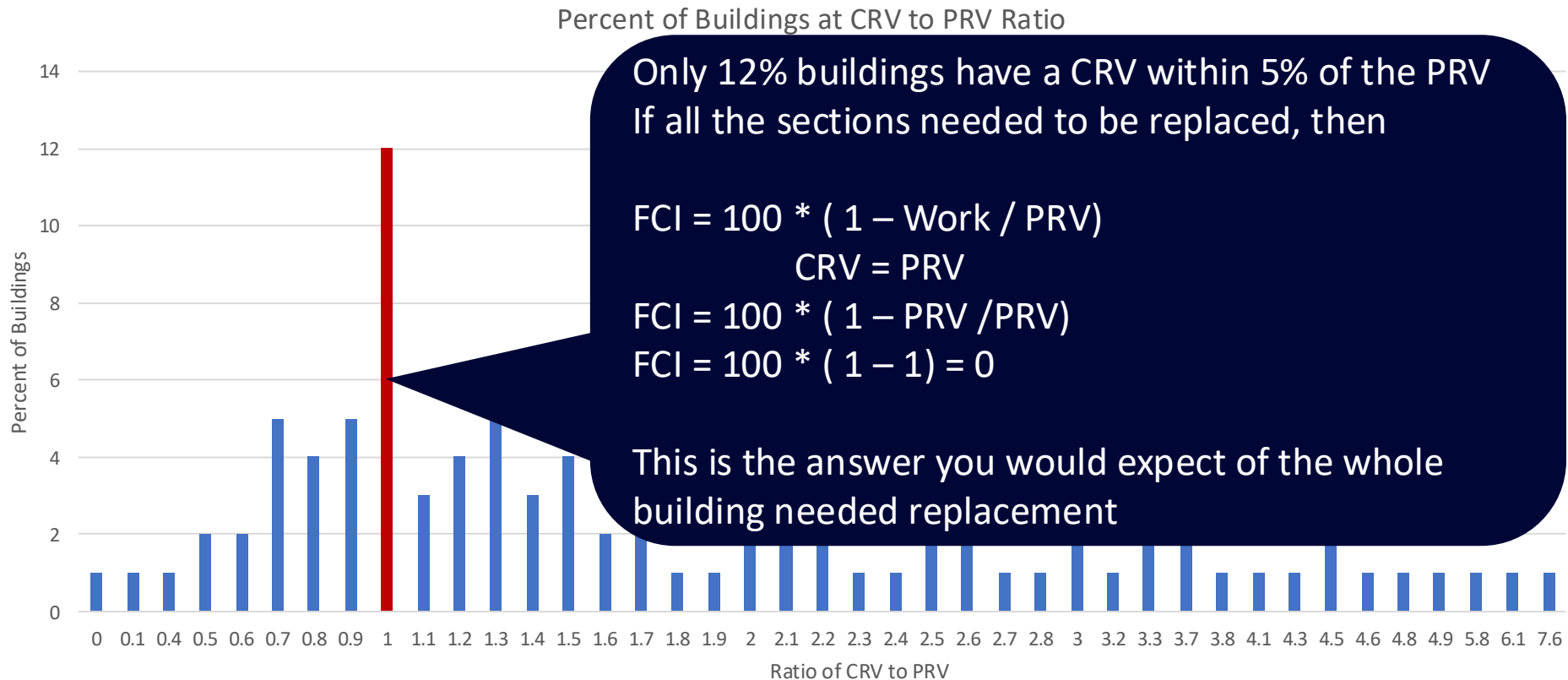


# Using the CRV in FCI

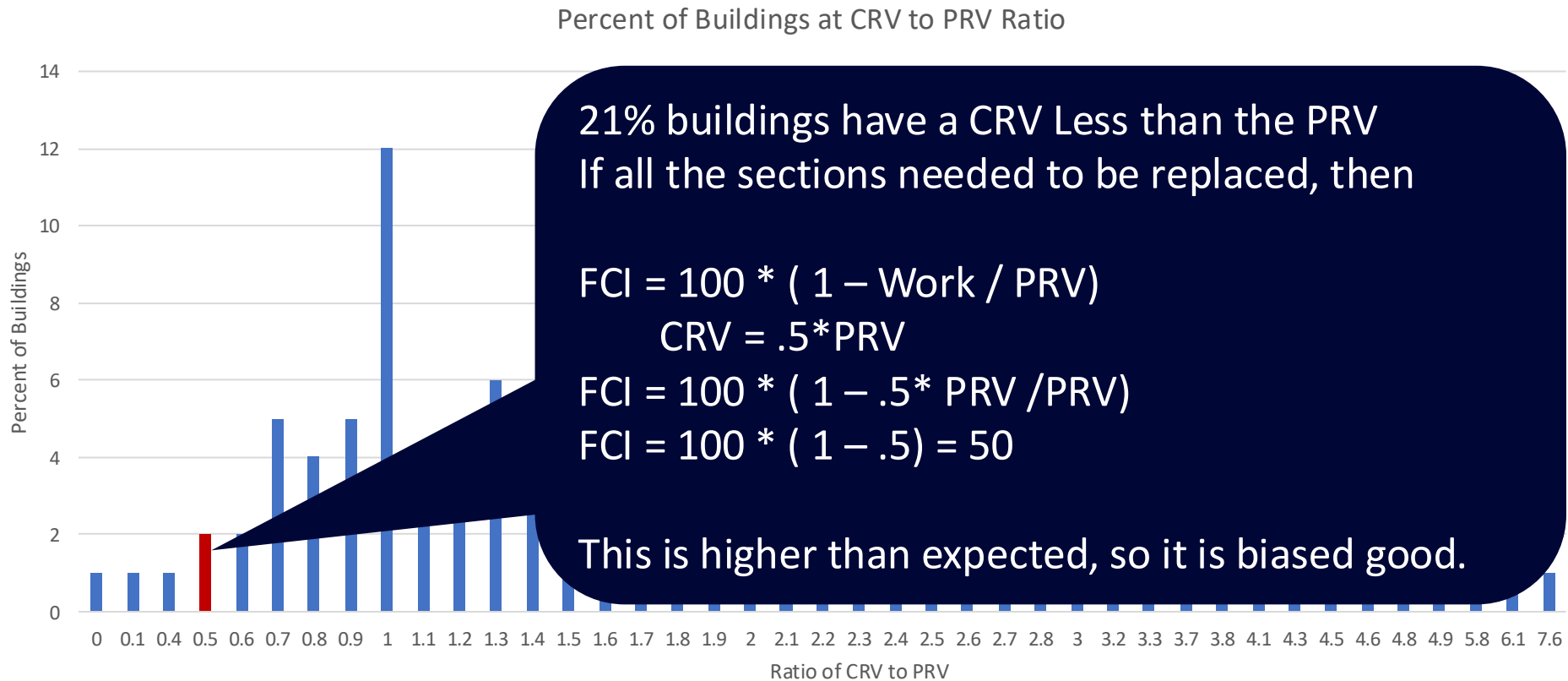
Percent of Buildings at CRV to PRV Ratio



# Using the CRV in FCI



# Using the CRV in FCI



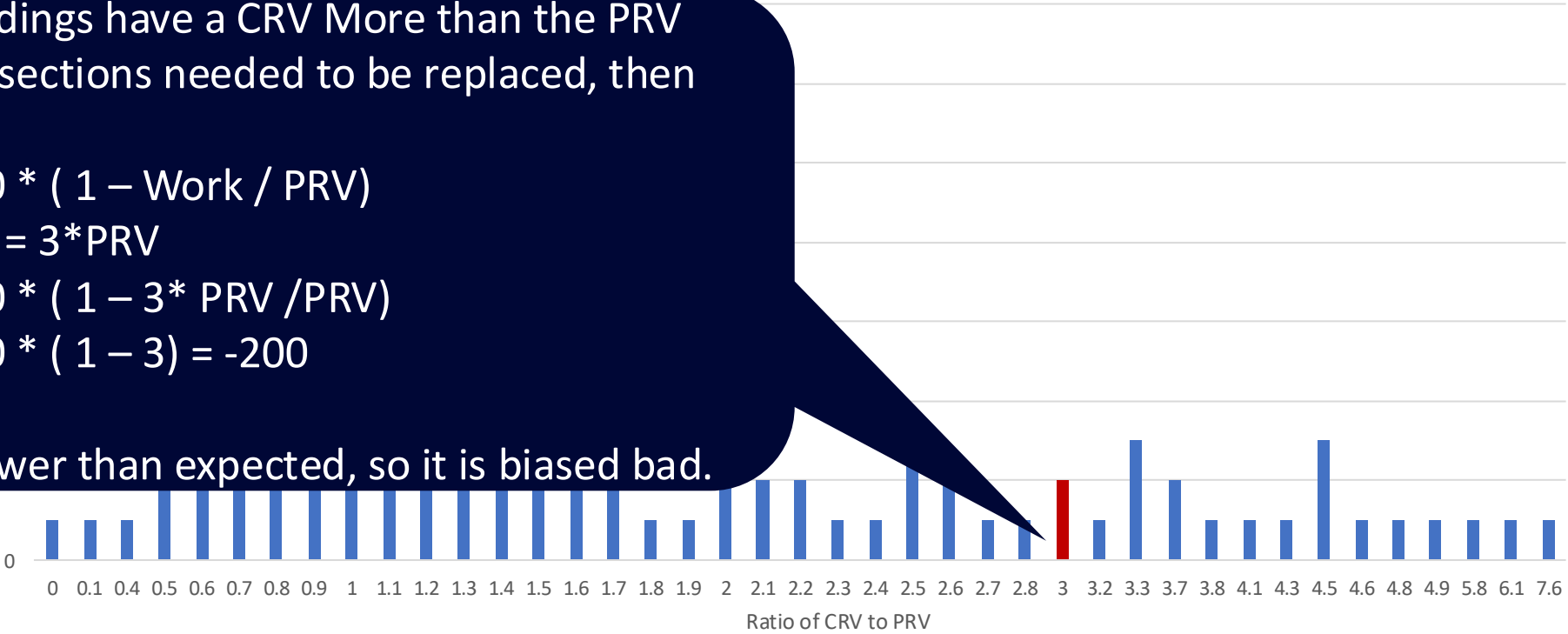
# Using the CRV in FCI

Percent of Buildings at CRV to PRV Ratio

67% buildings have a CRV More than the PRV  
If all the sections needed to be replaced, then

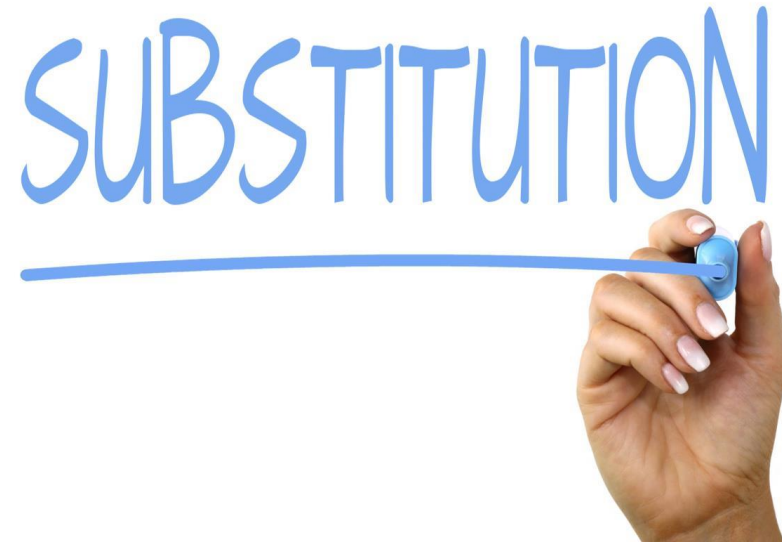
$$FCI = 100 * ( 1 - Work / PRV)$$
$$CRV = 3 * PRV$$
$$FCI = 100 * ( 1 - 3 * PRV / PRV)$$
$$FCI = 100 * ( 1 - 3 ) = -200$$

This is lower than expected, so it is biased bad.



# Using the CRV in FCI

- To get an unbiased FCI, all you need to do is set the PRV to the CRV.
- However, the PRV is not something we can change because it is calculated by another system.
- What we can do is create a new metric, the Inventory Based FCI - IFCI
  - $IFCI = 100 * (1 - \text{Work} / \text{Sum of the CRV})$



# Using the CRV in FCI- Settings

- No changes to the settings.
- Run a work plan.
- Recalculate the FCI using the sum of the CRV.
- Convert the FCI to a Q-Rating.
- Calculate the cost for each building to reach an FCI of 80.
- Calculate the cost for each building to reach an FCI of 90.

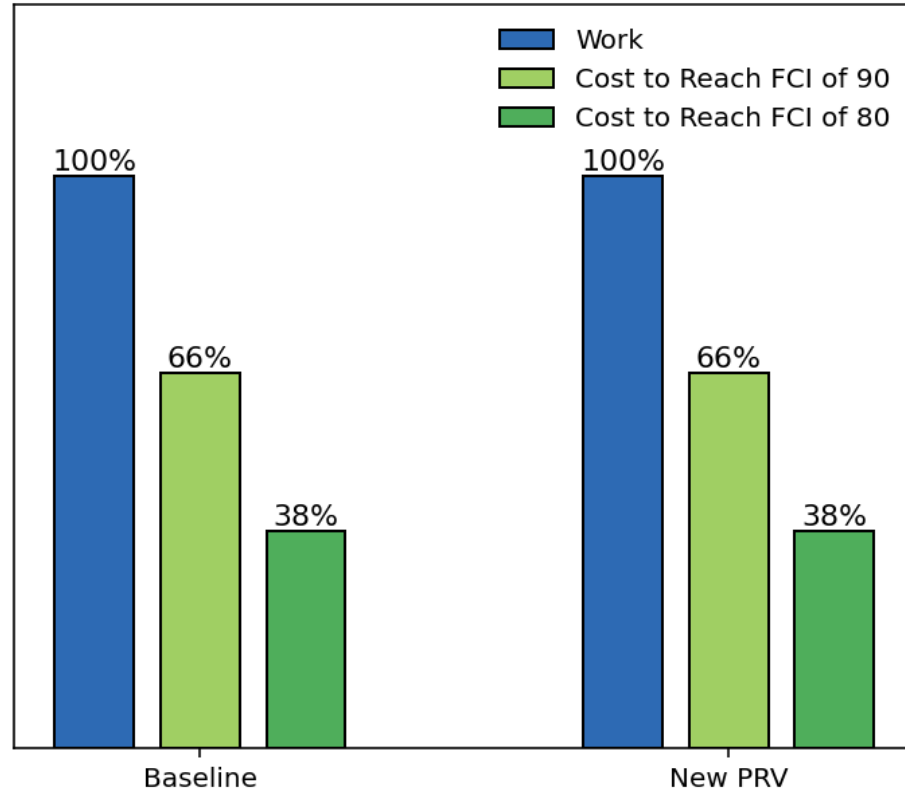


# Using the CRV in FCI – Predicted Impact

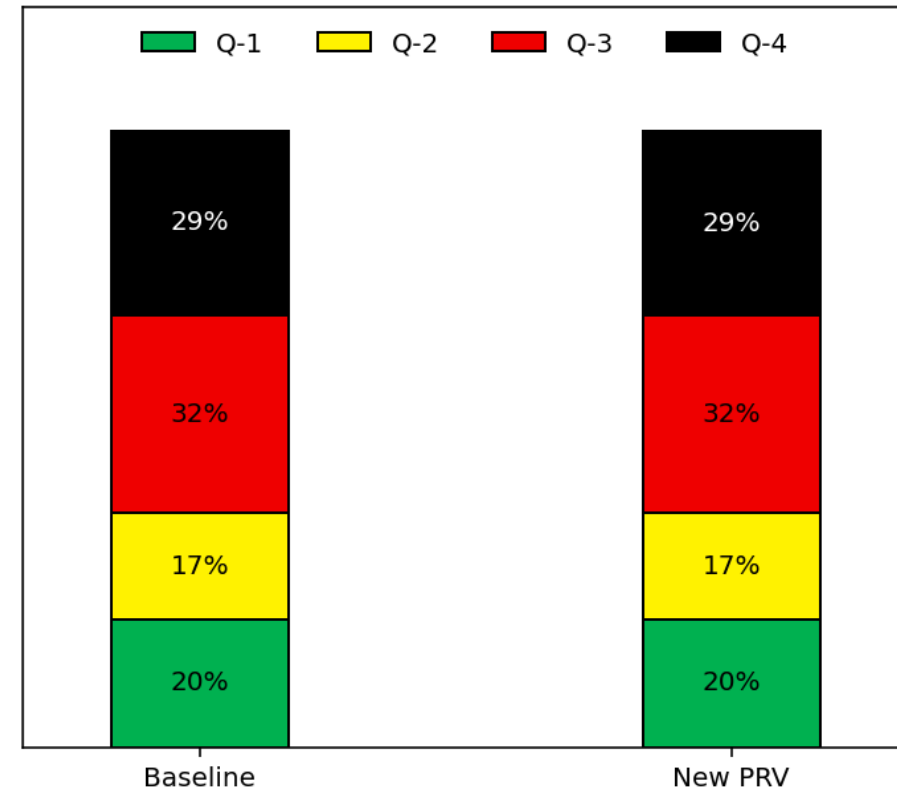
- No change in work.
- The FCIs will get worse if the was biased good.
- The FCIs will get better if the was biased bad.



# Client 1 – Using the CRV in FCI



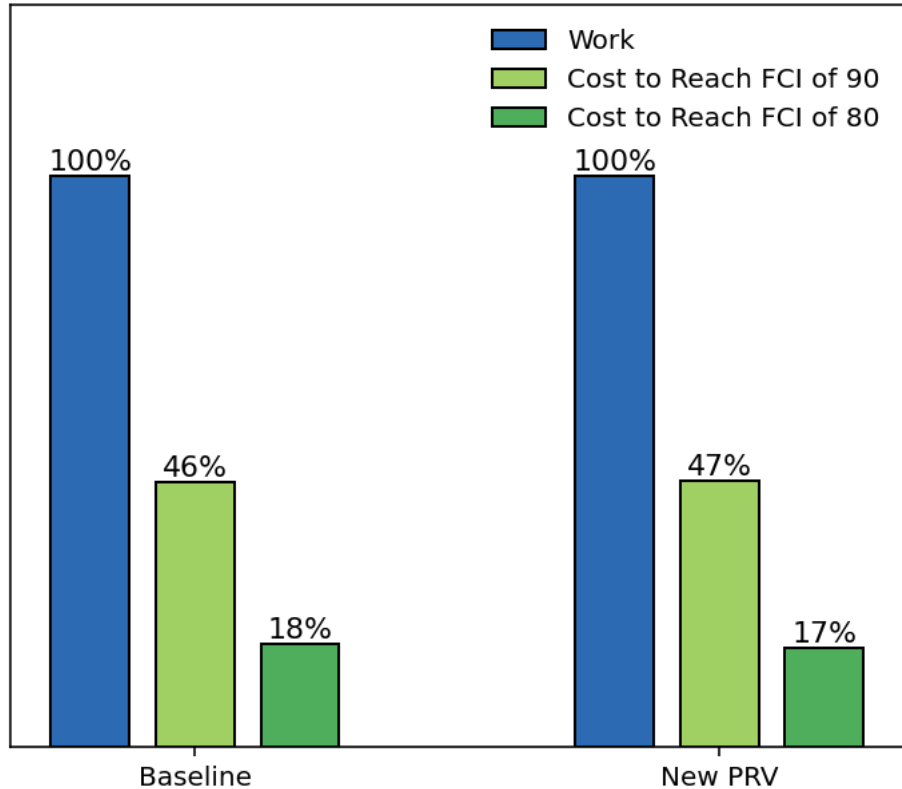
No Drop in Costs



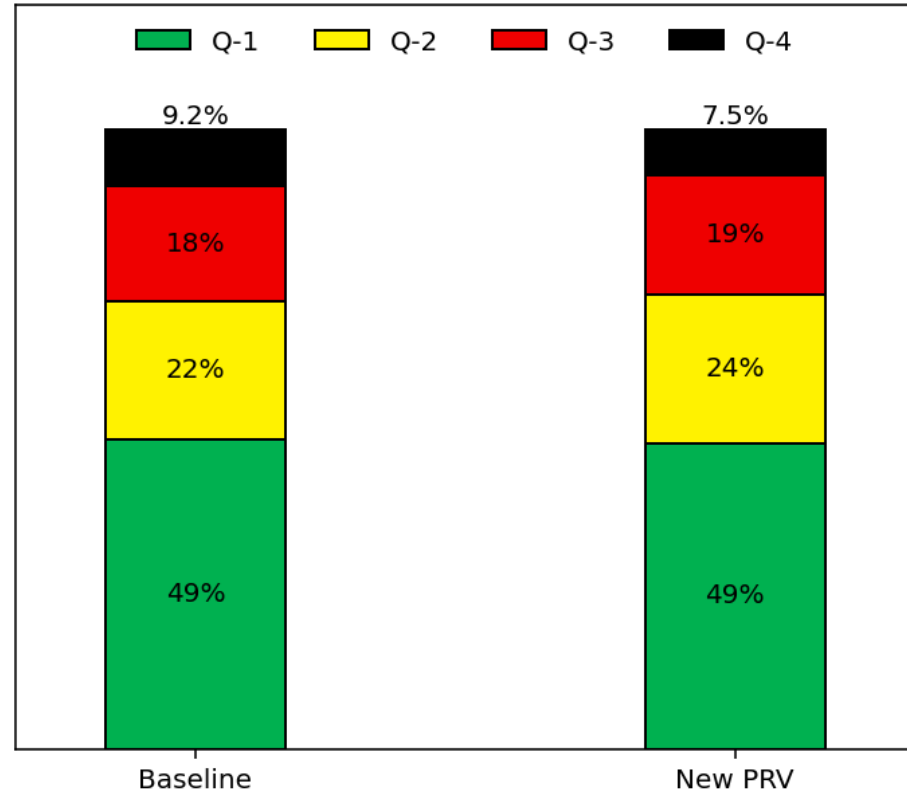
No Q-Rating Changes



# Client 2 – Using the CRV in FCI



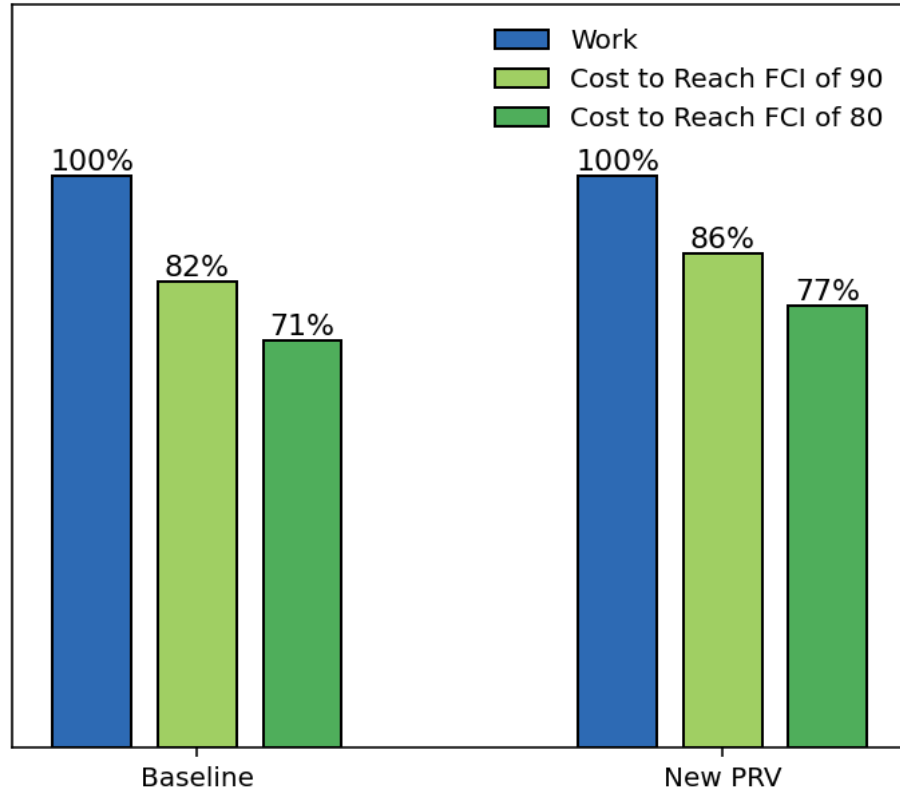
No Drop in Costs



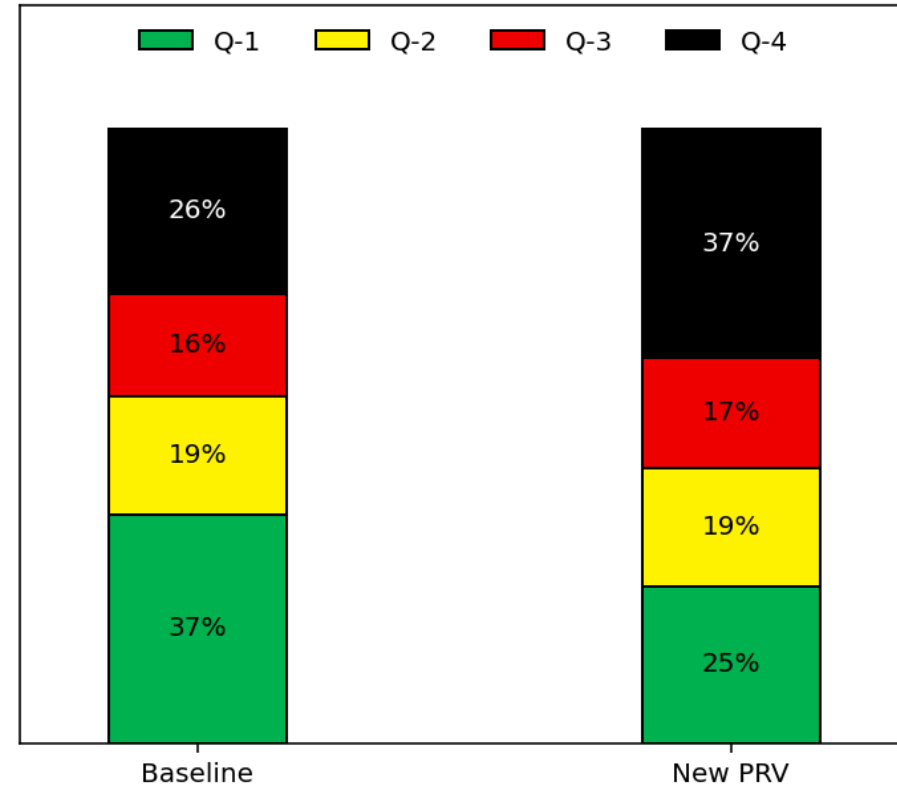
2% Drop in Q-4  
0% Gain in Q-1



# Client 3 – Using the CRV in FCI



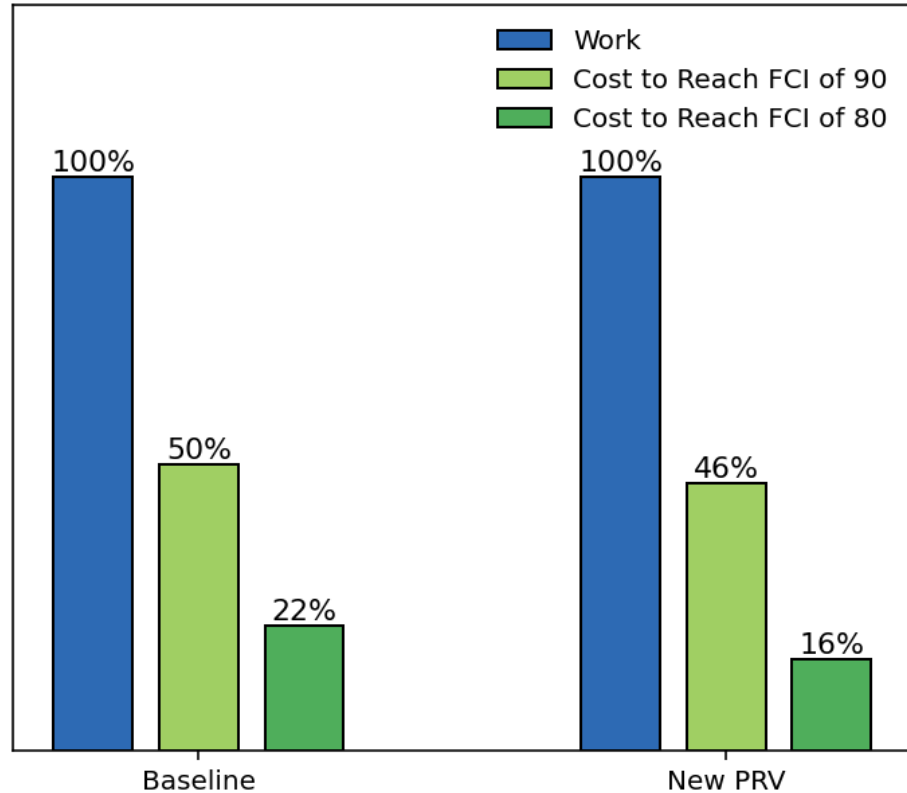
No Drop in Costs  
Increased cost to hit Target FCIs



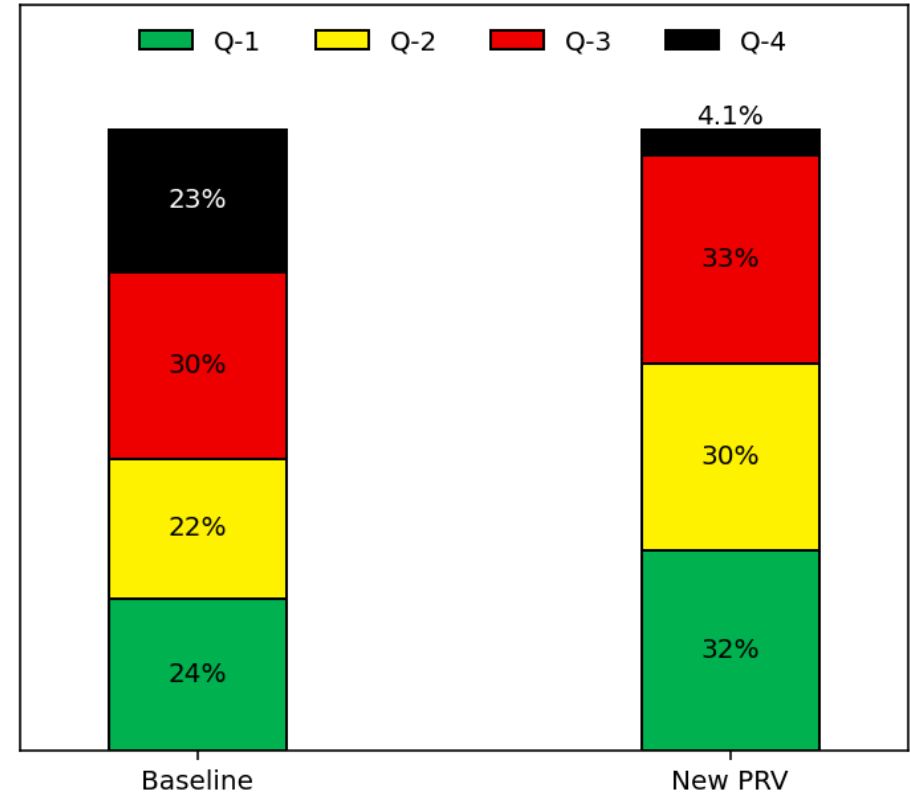
11% Gain in Q-4  
12% Drop in Q-1



# Client 4 – Using the CRV in FCI



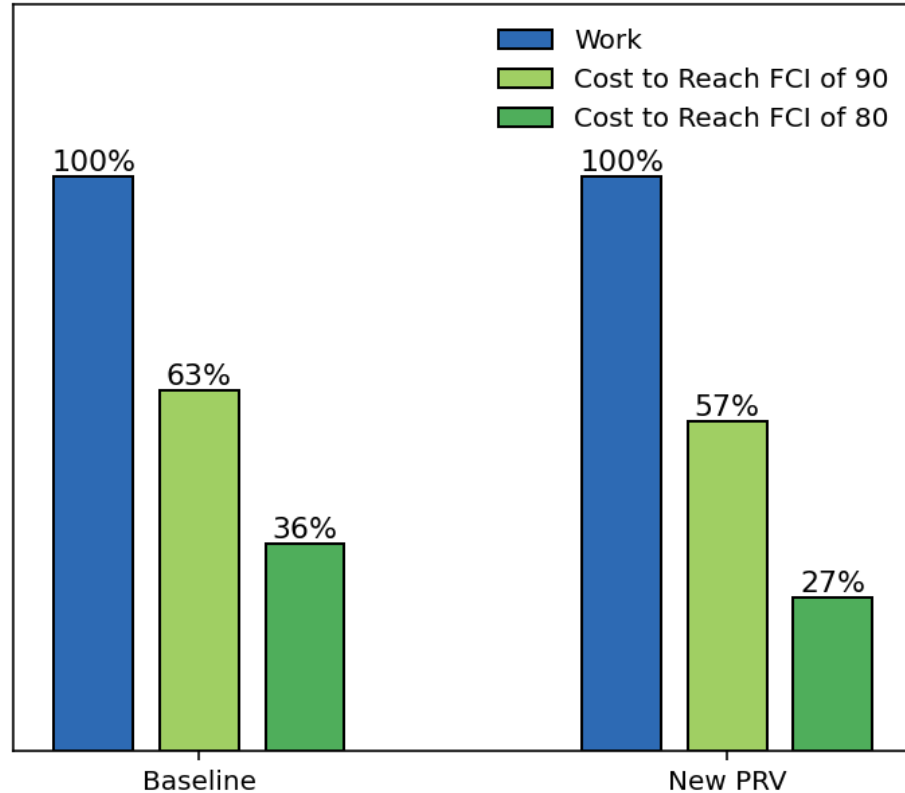
No Drop in Costs  
Reduced cost to hit Target FCIs



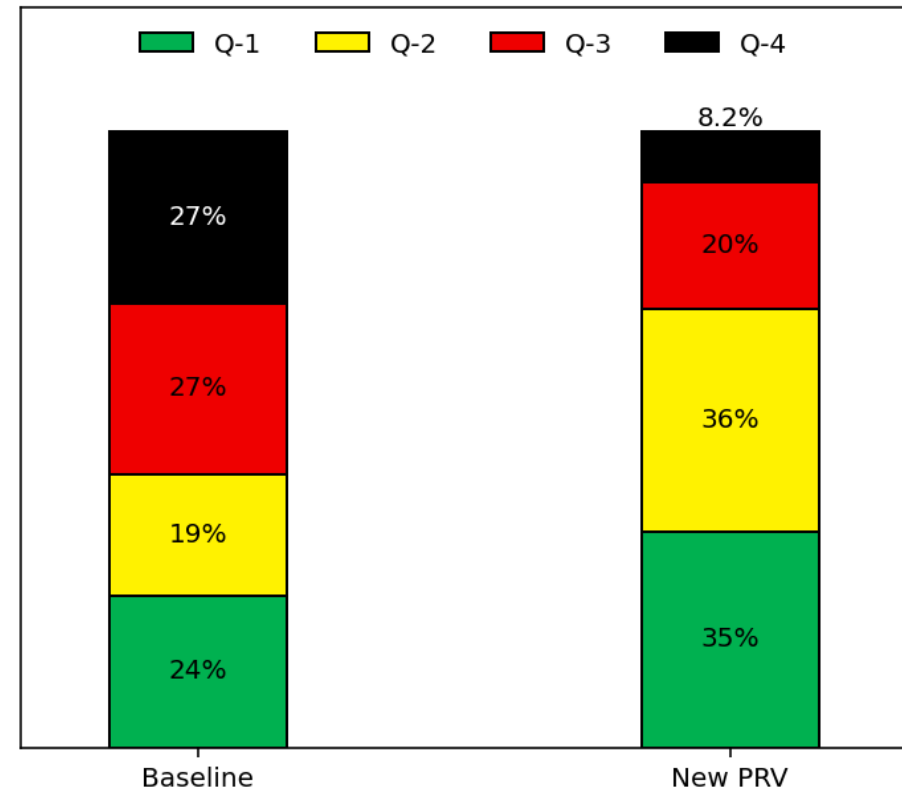
19% Drop in Q-4  
8% Gain in Q-1



# Client 5 – Using the CRV in FCI



No Drop in Costs  
Reduced cost to hit Target FCIs



19% Drop in Q-4  
11% Gain in Q-1



# Using the CRV in FCI – Summary

Client	Cost Change	Target FCI Cost Change	Q-1 Change	Q-4 Change
1	0%	No Change	0%	0%
2	0%	No Change	0%	-2%
3	0%	Increase	-12%	11%
4	0%	Reduction	8%	-19%
5	0%	Reduction	11%	-19%



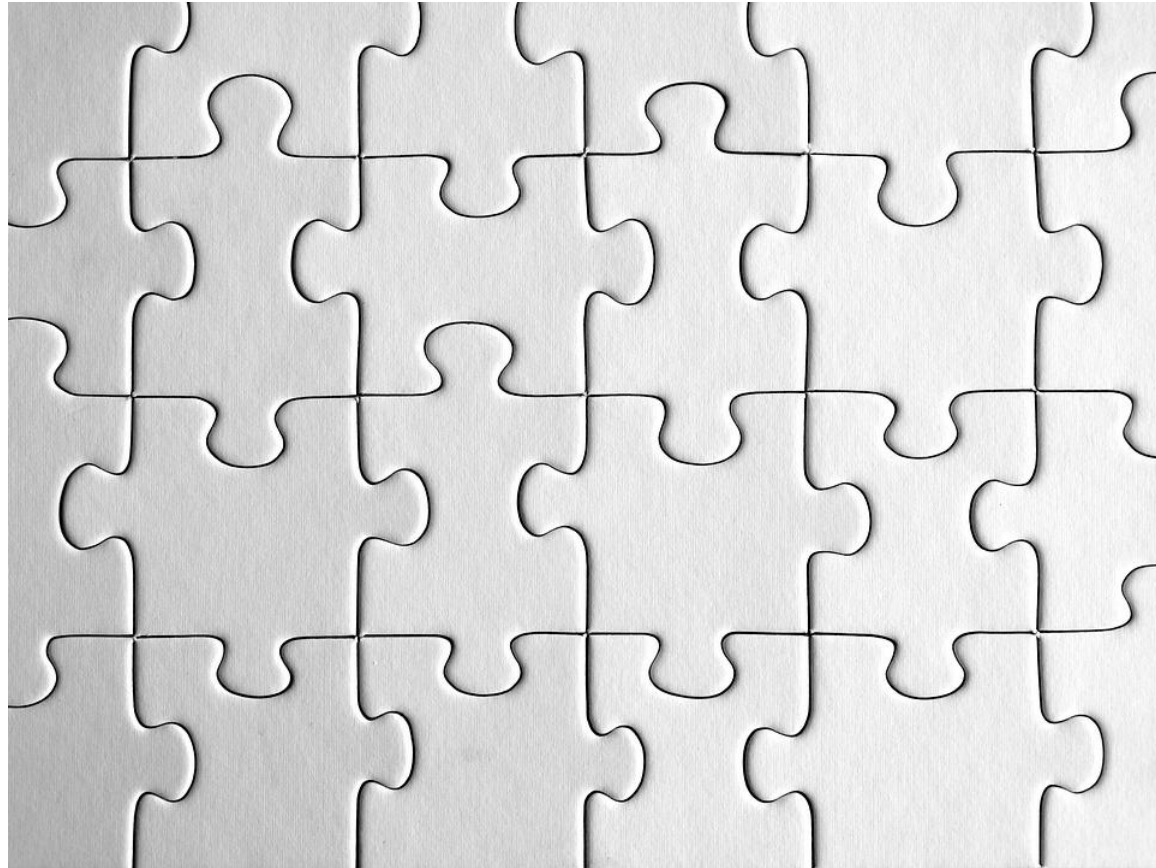


All the Above



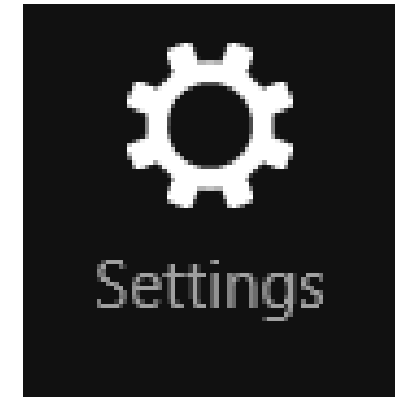
# All the Above

- Put it all together.
  - Ignore Beta-Shift.



# All the Above- Settings

- Create new
  - Policy Sequence.
  - Policy.
  - Copy the Standards from the current Standards.
  - Change the Standards to the below.
- Run a scenario with this Policy Sequence and you can see the impact.
  - Don't change the production Policy Sequence, Policy or Standards.



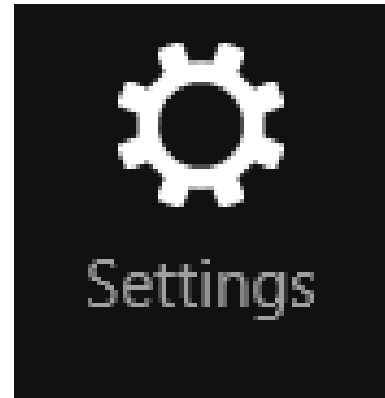
# All the Above - Settings

Who	Systems	Min CII for Repair Paint	Min CI for Repair	Max RPL for Replacement	Max RSL for Replacement
Client Settings	A10, A20, B10	75 to 0	80 to 1	1 to -50	2 to -50
Commercial Settings	A10, A20, B10	0	0	-99	-99
Client Settings	All Others	80 to 0	85 to 0	4 to -99	3 to -4
Commercial Settings	All Others	0	0	-99	0



# All the Above - Settings

- Recalculate the FCI using the sum of the CRV.
- Convert the FCI to a Q-Rating.
- Calculate the cost for each building to reach an FCI of 80.
- Calculate the cost for each building to reach an FCI of 90.

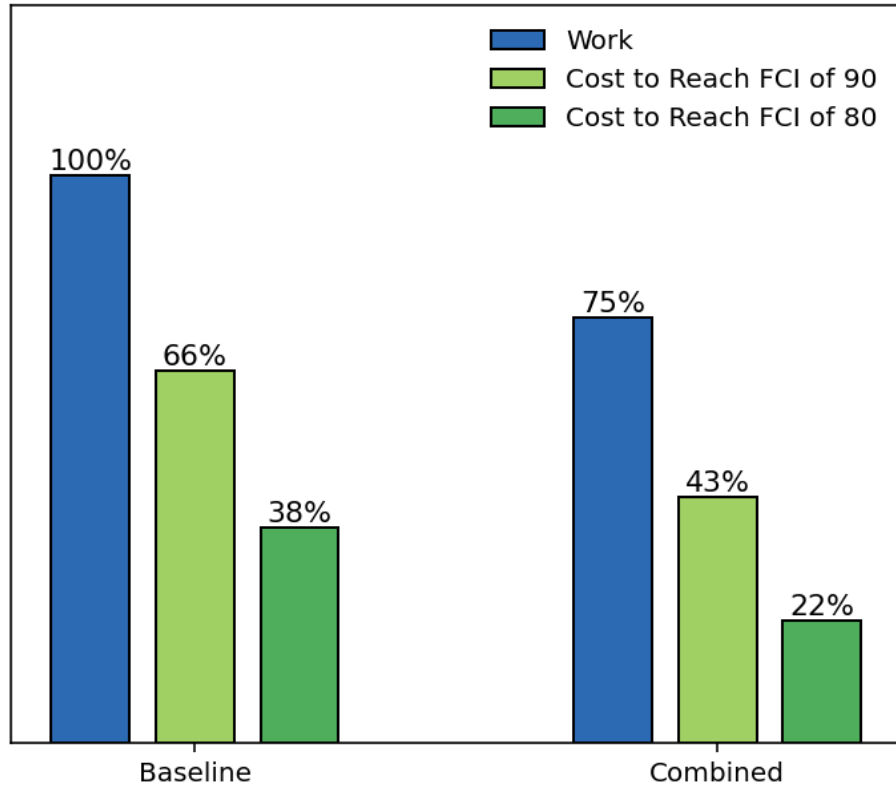


# All the Above – Predicted Impact

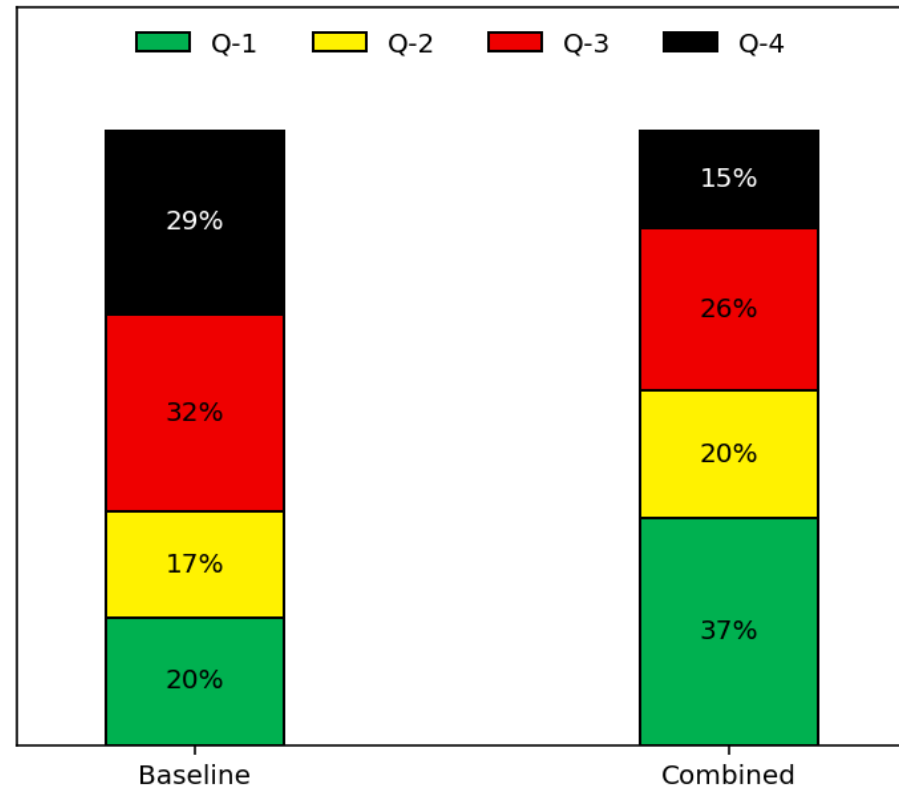
- Most of the individual tests reduced work, so expect less work.



# Client 1 – All the Above



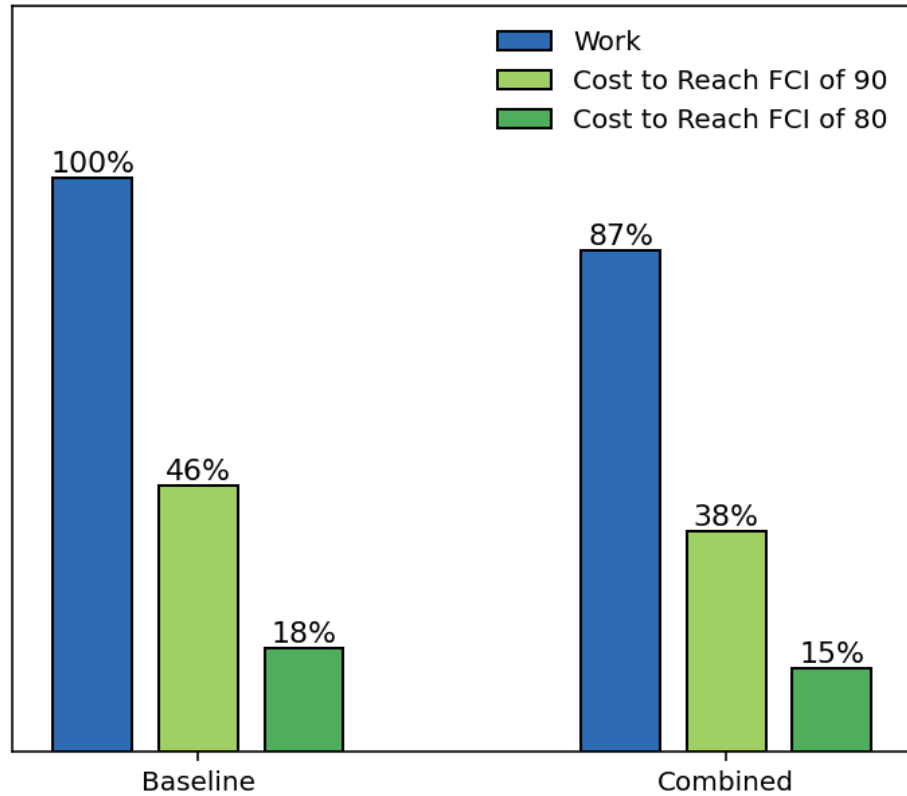
25% Drop in Costs



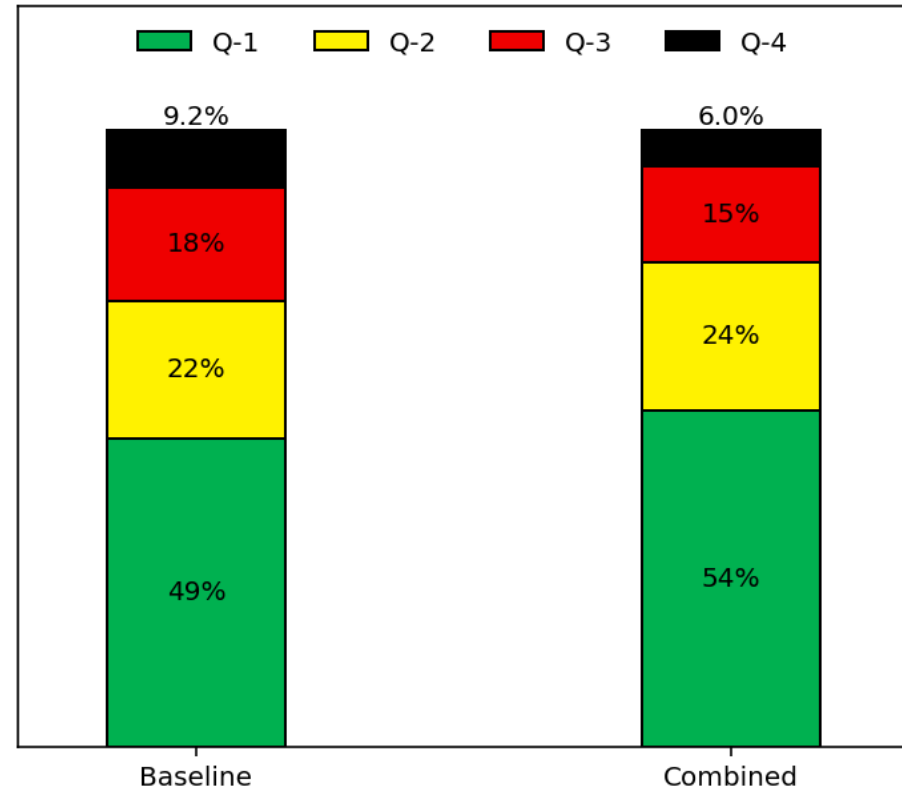
14% Drop in Q-4  
17% Gain in Q-1



# Client 2 – All the Above



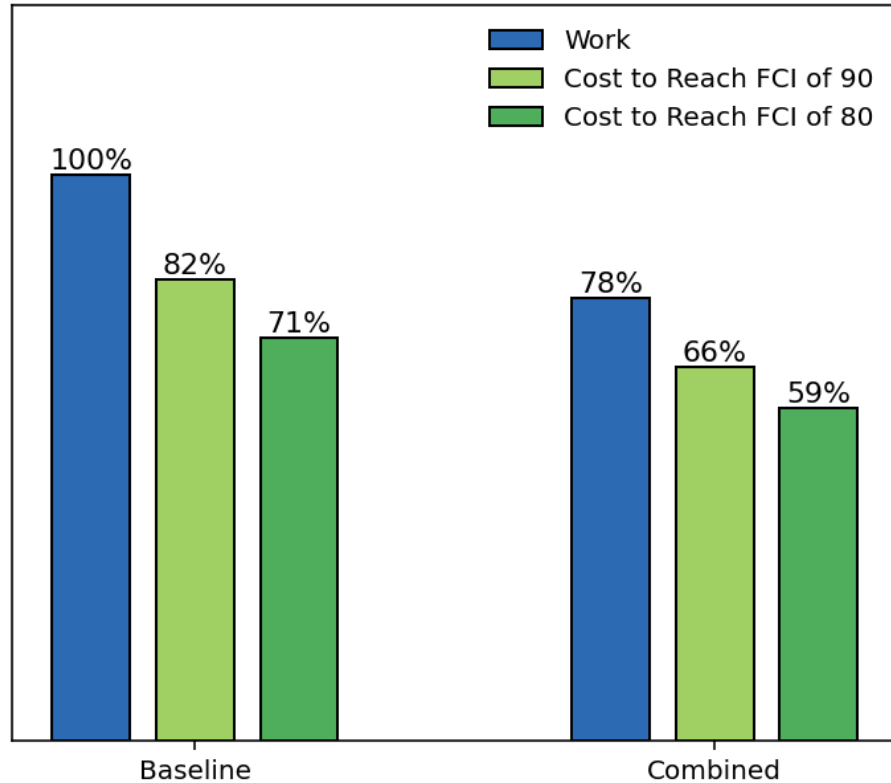
13% Drop in Costs



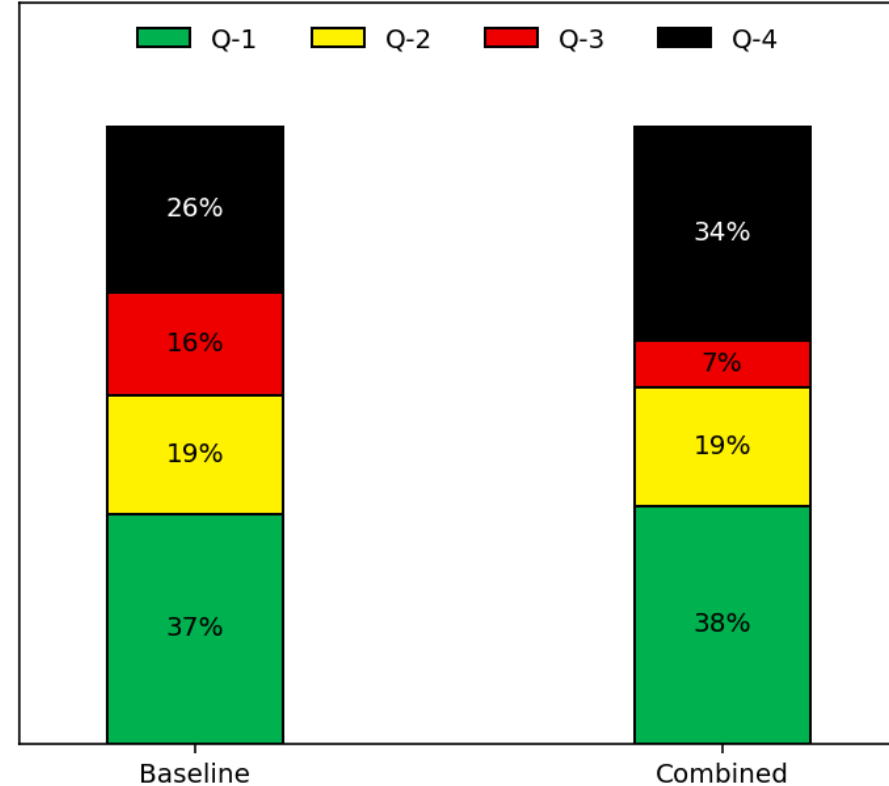
3% Drop in Q-4  
5% Gain in Q-1



# Client 3 – All the Above



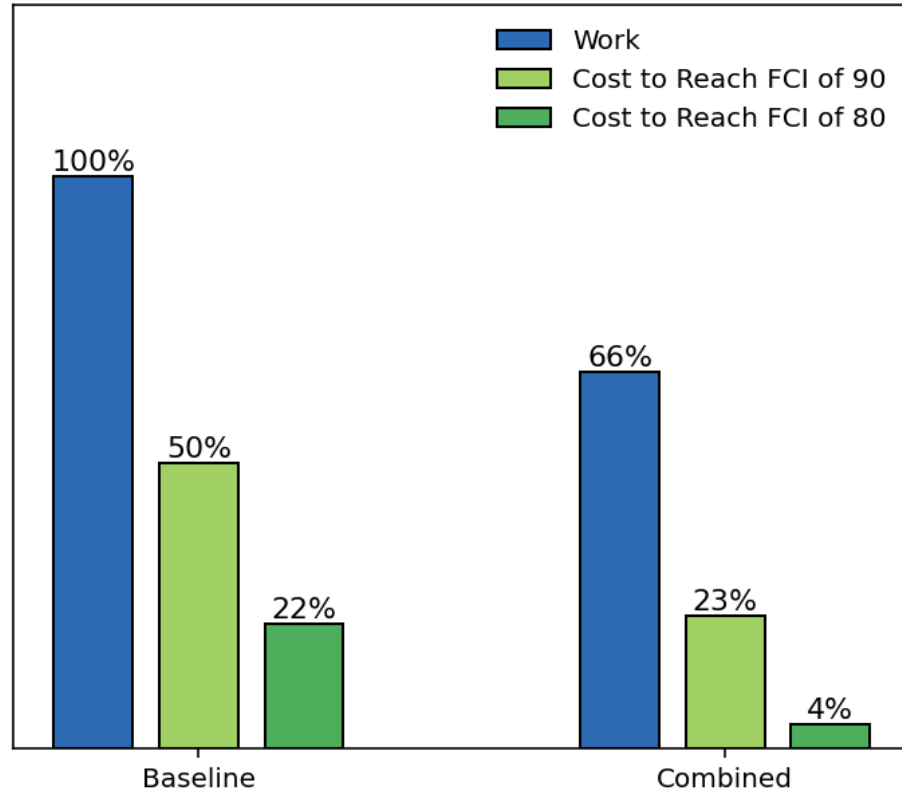
22% Drop in Costs



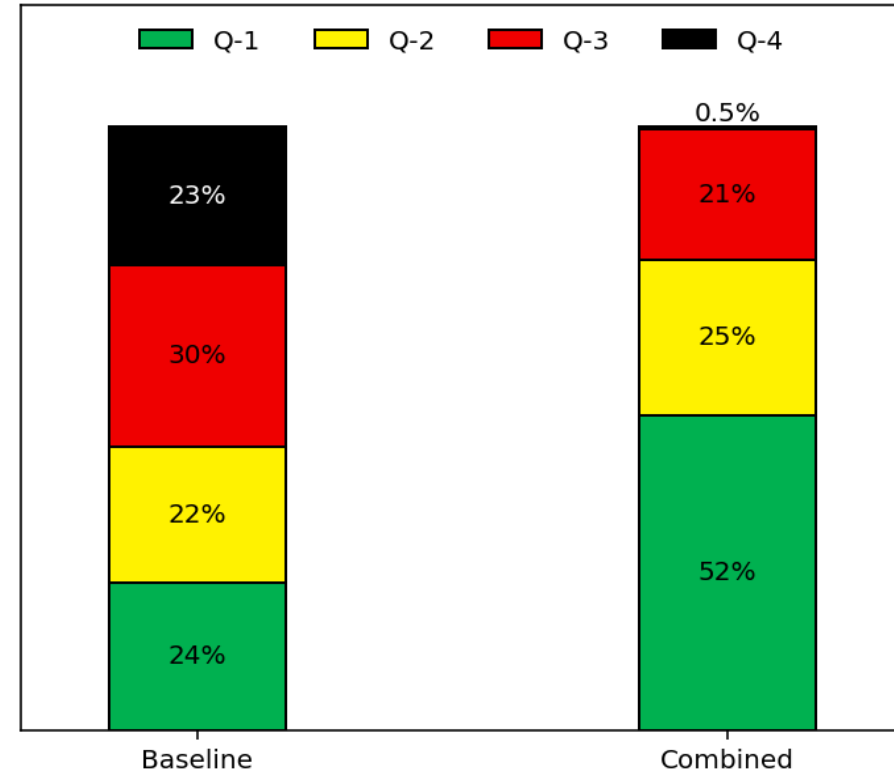
8% Gain in Q-4  
1% Gain in Q-1



# Client 4 – All the Above



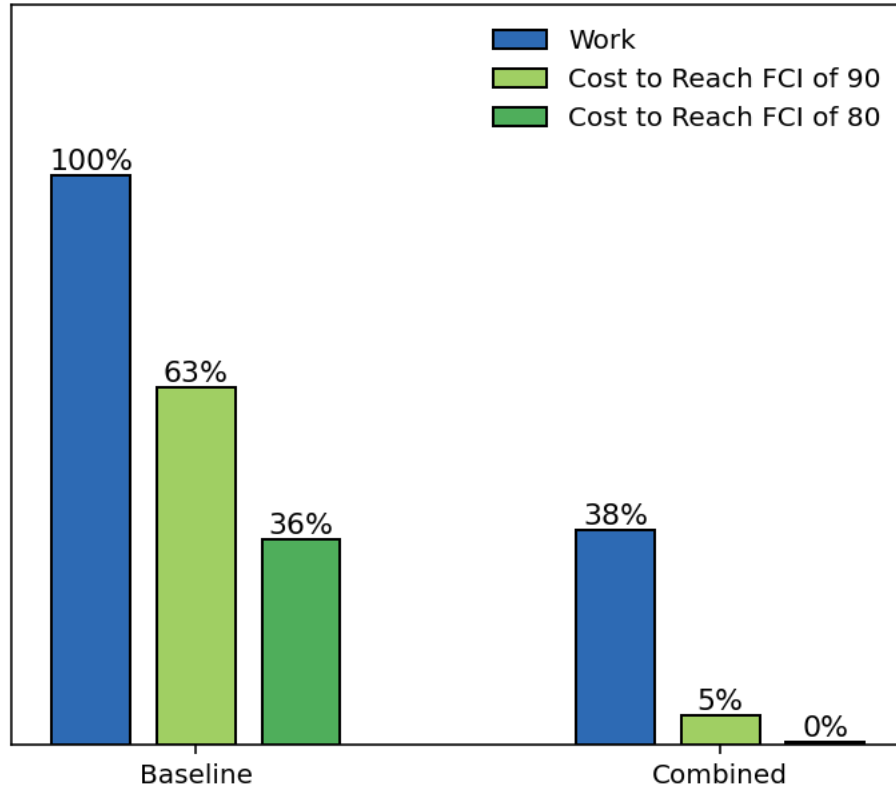
34% Drop in Costs



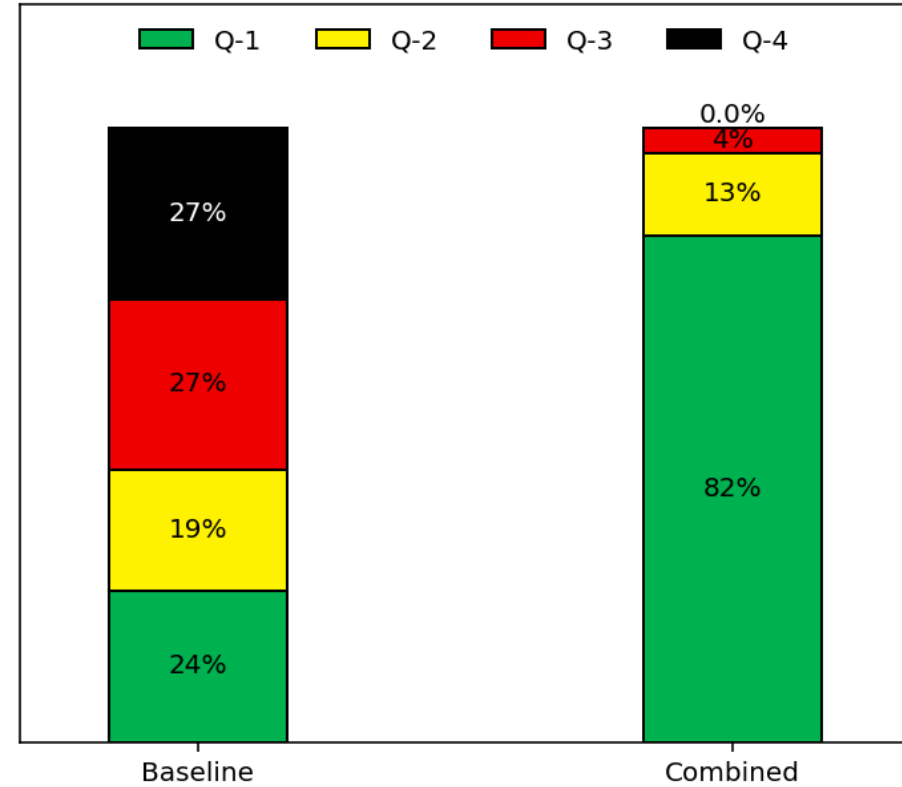
23% Drop in Q-4  
28% Gain in Q-1



# Client 5 – All the Above



62% Drop in Costs



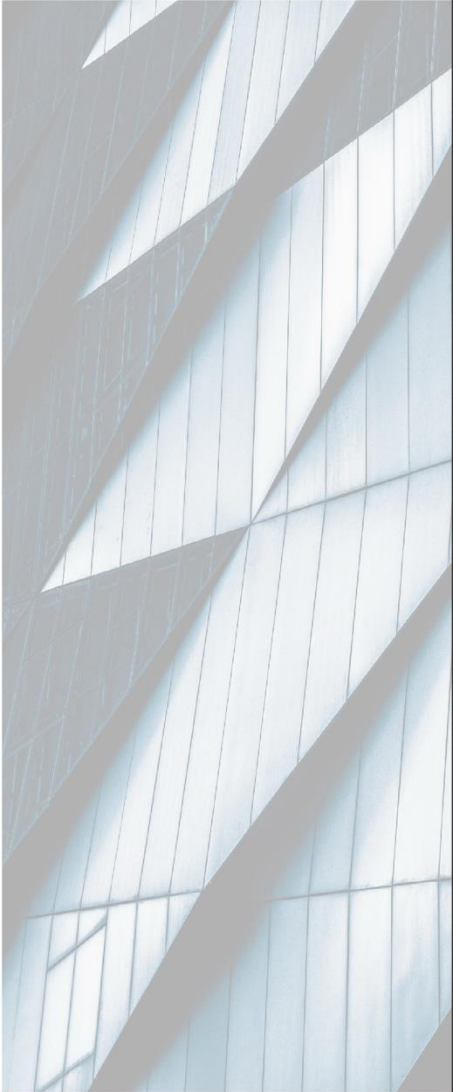
27% Drop in Q-4  
58% Gain in Q-1



# All the Above – Summary

Client	Cost Change	Target FCI Cost Change	Q-1 Change	Q-4 Change
1	-25%	Reduction	17%	-14%
2	-13%	Reduction	5%	-3%
3	-22%	Reduction	1%	8%
4	-34%	Reduction	28%	-23%
5	-62%	Reduction	58%	-27%





BCI



# BCI

- Changes to the Standards have no effective on BCI.
  - They don't change the BUILDER curves for a section.
- Using the Sum of the CRV instead of the PRV has no impact on the BCI.
  - BCI does not use PRV in its calculation.
- Changing the Beta-Shift factor will impact the BCI.
  - This will change all the curves.
  - The impact will be different for each building.



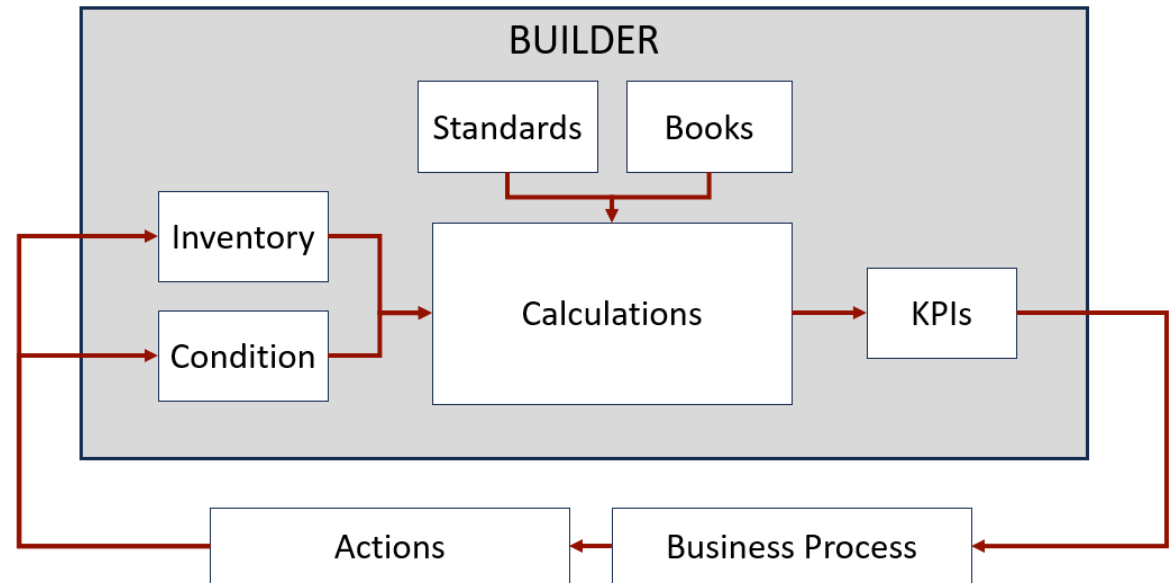


# Conclusion



# Conclusion

- The results can be very different with the Commercial Standards.
- Changing to any of these Standards may require you to review the rest of your asset management process.



Thank You!

