Bad BCI, Good FCI. Normal or Abnormal?

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Agenda

Looking for a visual that explains:

1. BCI.
2. FCI.
3. The relationship between BCI and FCI.

Use those visuals to answer the question:

1. What combinations of BCI and FCI are normal?

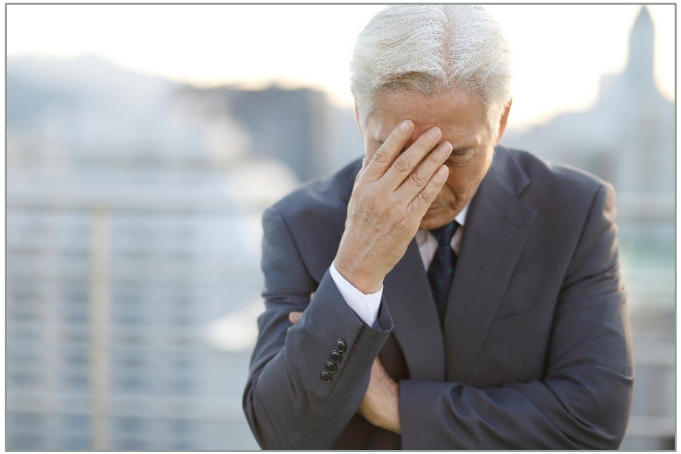
Part 1. BCI and FCI Visuals

Why Visuals?

FCI is easy to explain using just words.

BCI is not easy to explain or determine what it means in layman's terms.

It is not easy to show how BCI and FCI are related.



FCI

FCI = 100 * (1 – Work / PRV)

FCI is a financial metric, it is based on work required.

Essentially means what % of my building DOESN’T need replacement right now.

Works best when the sum of the CRV = PRV.

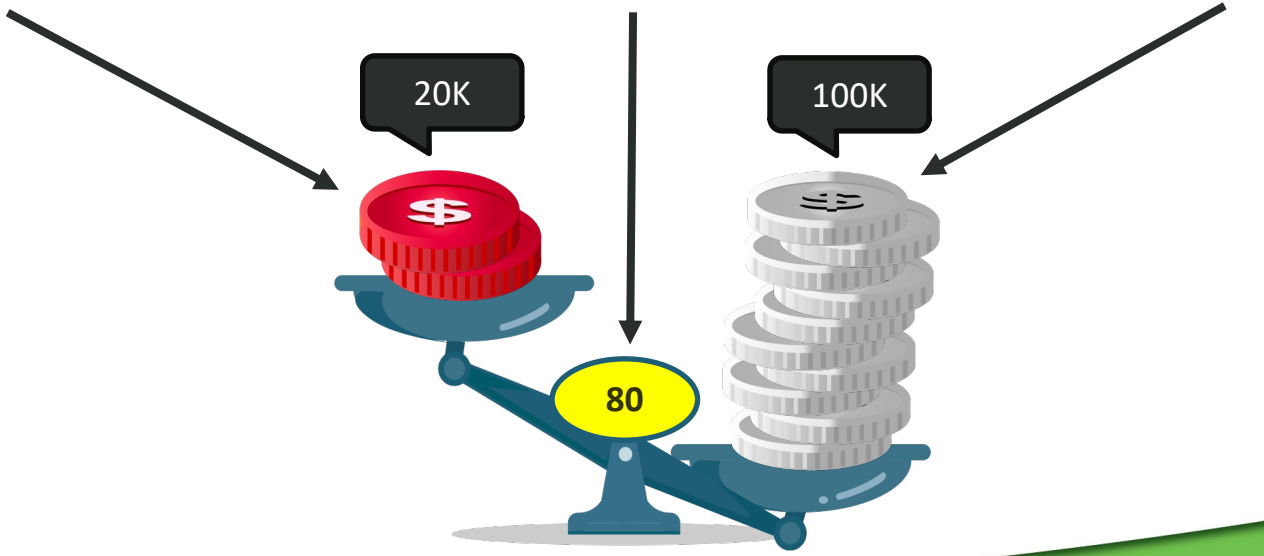
FCI Visual: Balance Scale Plot

FCI = 100 * (1 – Work / PRV)

Work is on the Left.

FCI shown in the Middle.

PRV is on the Right.



FCI Warning for the DoD

Work is inventory based.

PRV is not based on the inventory.

PRV is a parametric calculation.

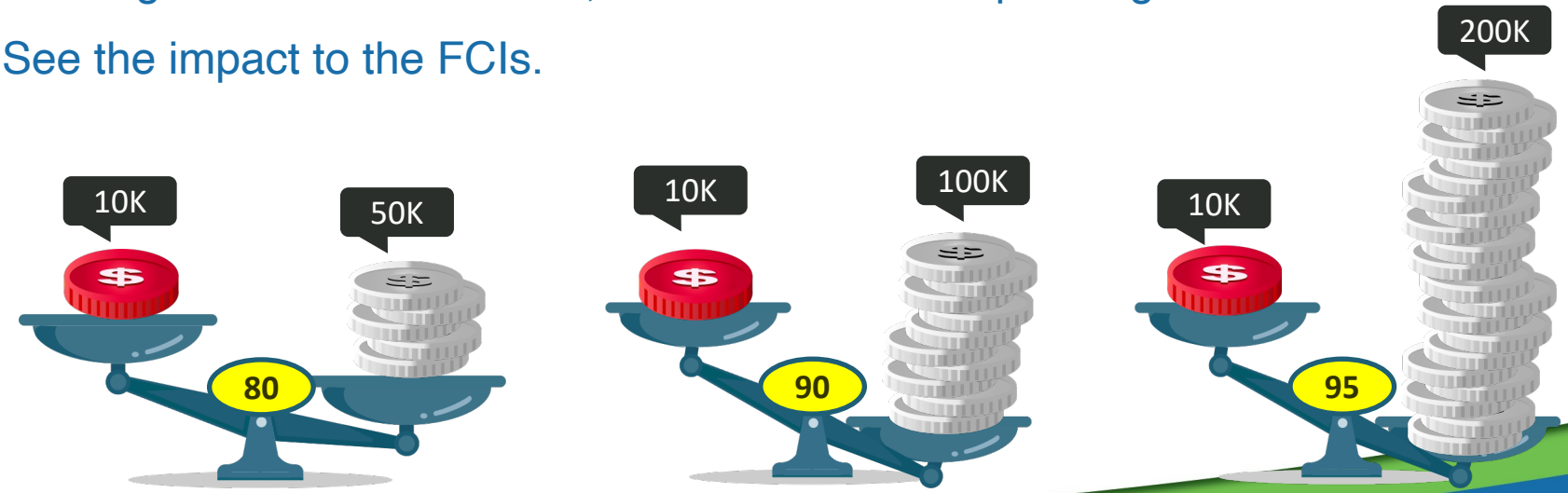
PRV is based on the GSF of the building and the average cost/GSF to build a building of that FAC.

FCI Warning for the DoD

A Building with total CRV = $100K and $10K needed replacement.

Building PRVs could be $50K, $100K or $200K depending on the FAC.

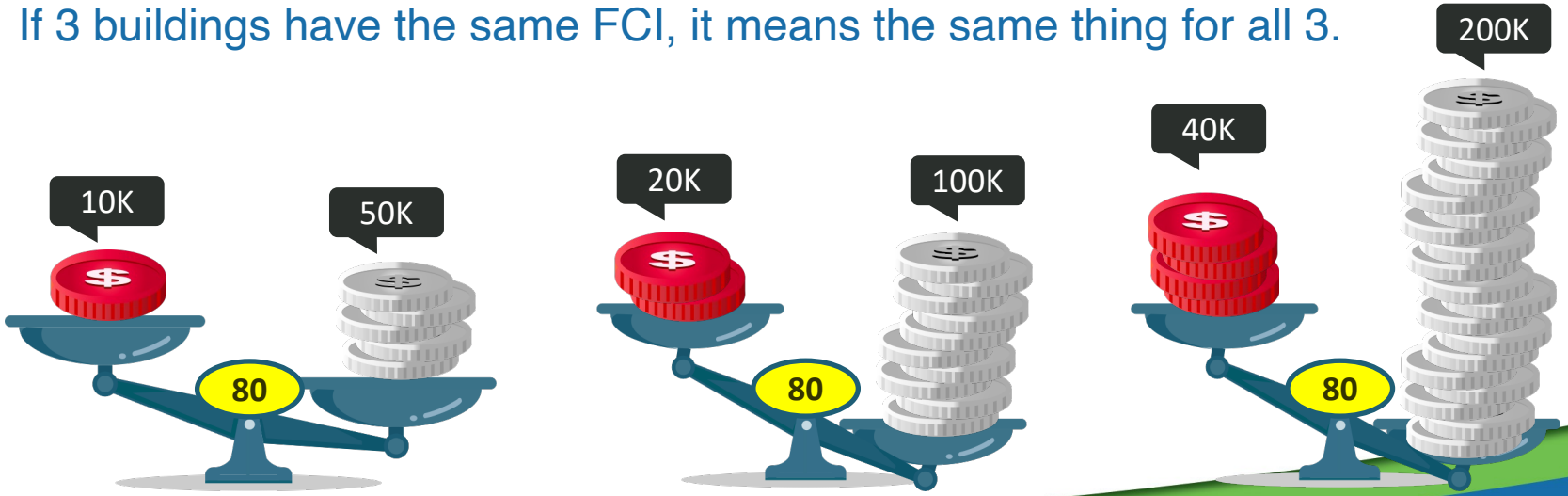
See the impact to the FCIs.



FCI Fun Fact

FCI is a ratio.

If 3 buildings have the same FCI, it means the same thing for all 3.

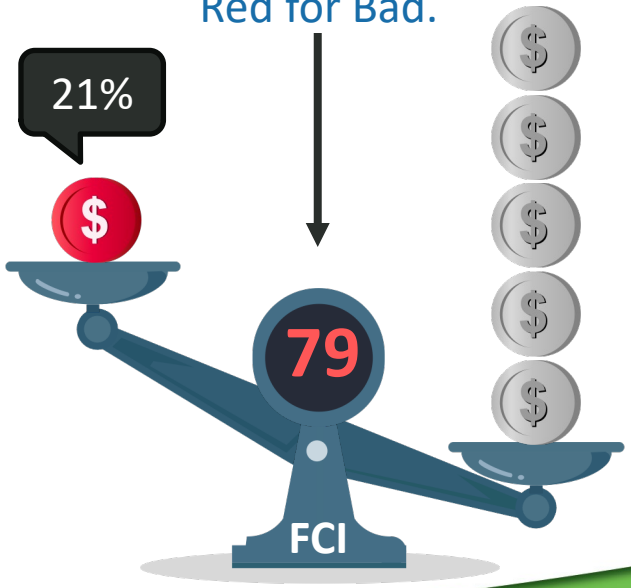


What is a Good FCI?

DoD uses an FCI of 80 or above.

Green for Good.

Red for Bad.



BCI

BCI is the average CSCI weighted by its CRV.

CSCI is a condition metric.

Buildings have on average about 100 sections.

$$BCI = \frac{CSCI1 \times CRV\ 1 + CSCI2 \times CRV2 \ldots CSCI100 \times CRV100}{CRV\ 1 + CRV\ 2 + \ldots\ldots CRV100}$$

You cannot look at the data and get a feel if the BCI is good or bad.

Hard to visualize what a specific BCI means.

How Can You Make BCI Easier to Understand?

Can we relate it grades?

In college, typically had just 3 Grades:

Final (40%): 80

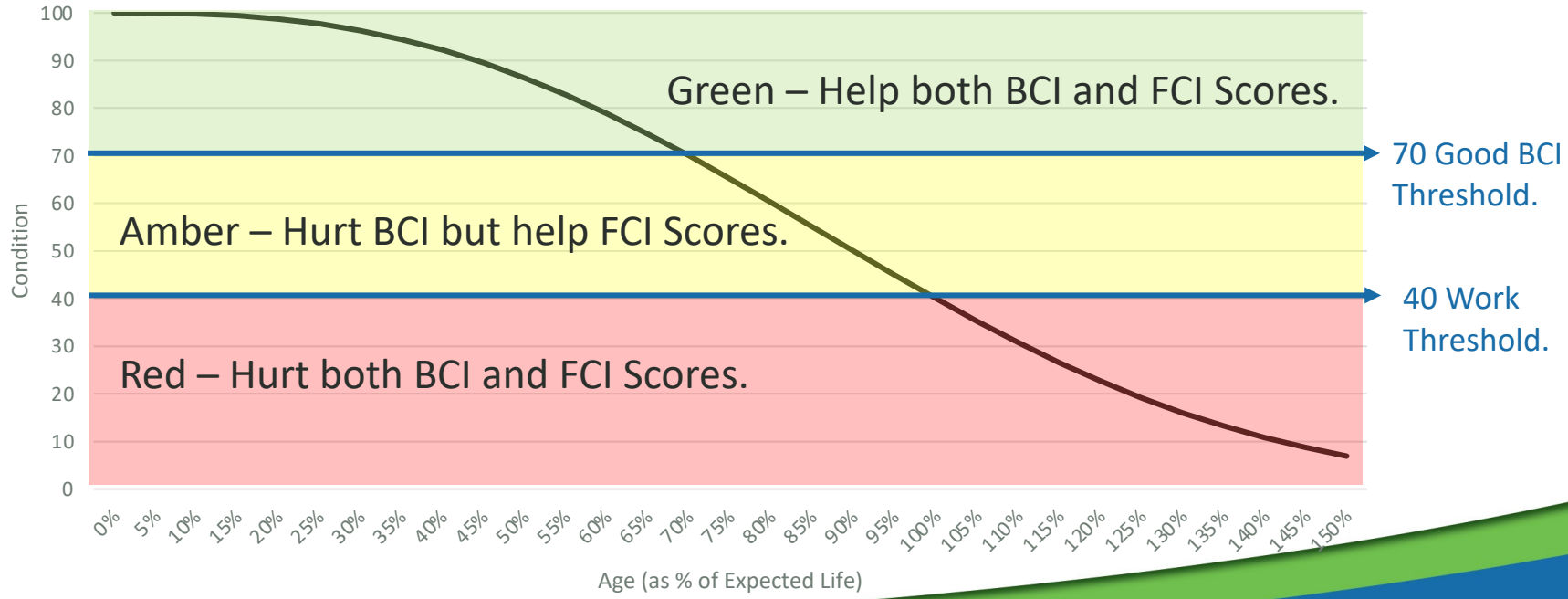
Tests (2 each at 30%): 90, 70

$$\text{Avg} = \frac{80 \times 0.4 + 90 \times 0.3 + 70 \times 0.3}{0.4 + 0.3 + 0.3} = 80$$

This isn't too bad.

How Do You Convert CSCI to a Grade?

Default BUILDER Curve Subdivided into 3 Categories and Calculate a BCI for Each



Why 70 For Good BCI?

Need a threshold between a good BCI and a bad BCI for this presentation.

BUILDER uses 69.5 as the start of a red BCI.

A CSCI above 70 will improve the average (BCI).

A CSCI below 70 will degrade the average (BCI).

Why 40 For Good CSCI for the FCI?

Wanted a CSCI that could be related to replacement work.

A CSCI of 40 always has an RSL of 0.

Even if the curve has been modified by ratings.

Set the Maximum RSL For Replacement to 0 for all the buildings.

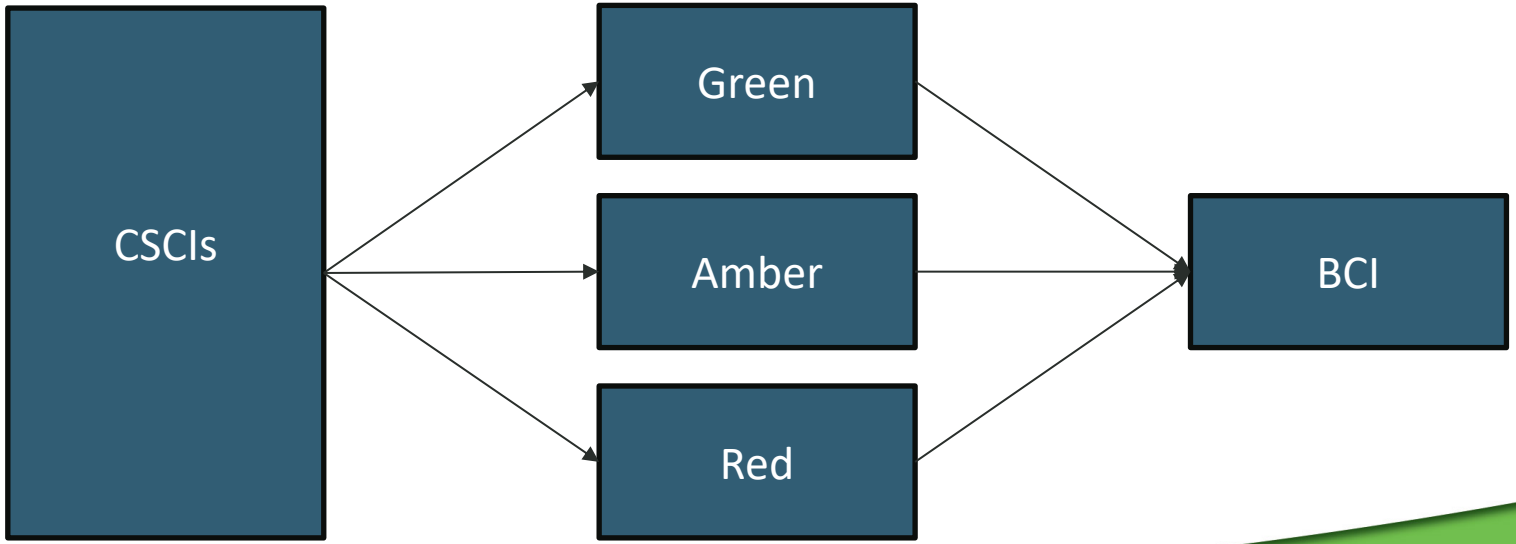
Can use CSCI to determine if replacement work is required.

How to Turn 100 CSCIs to 3 Values?

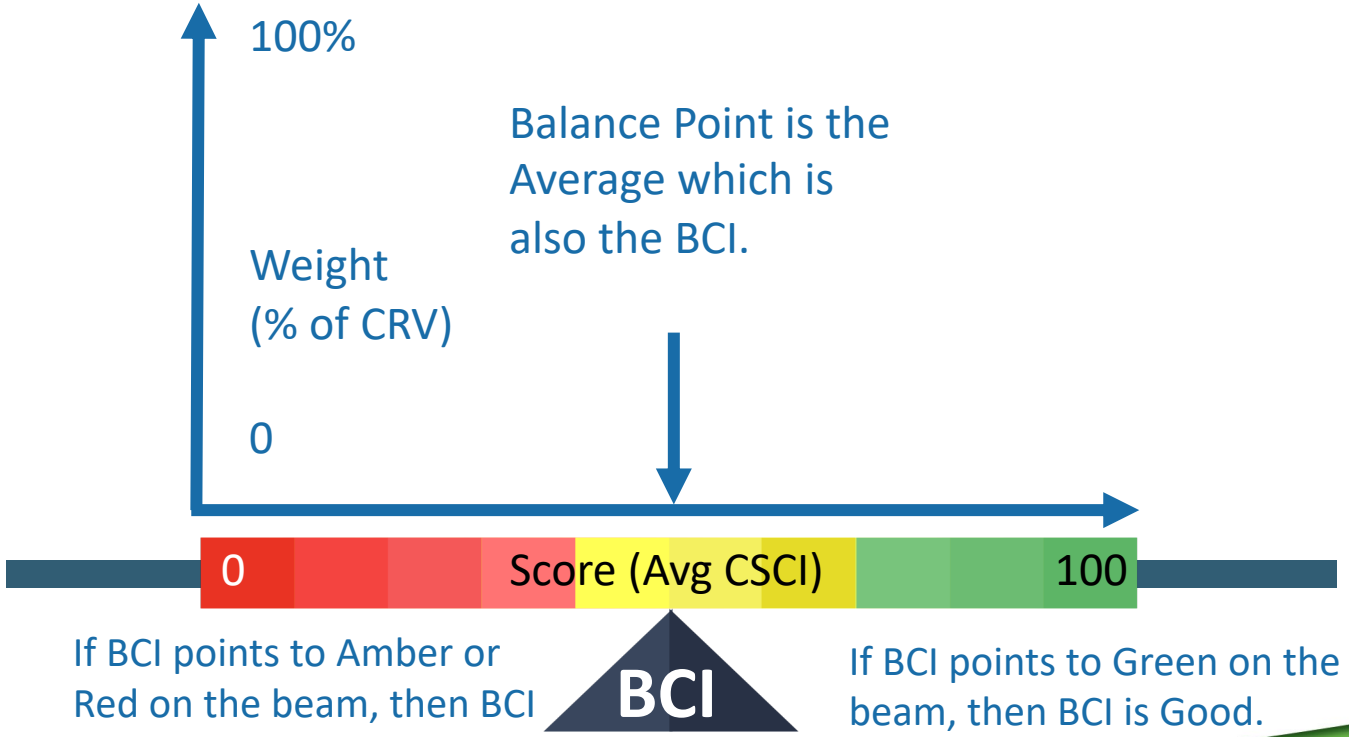
Sort into 3 Categories.

Calculate Intermediate BCI Values.

Calculate Final Value.

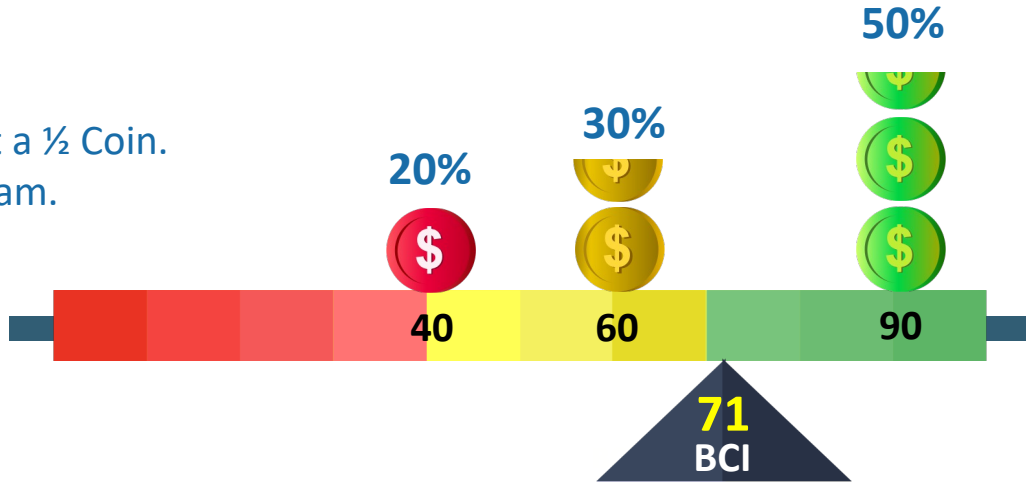


Balance Beam Plot



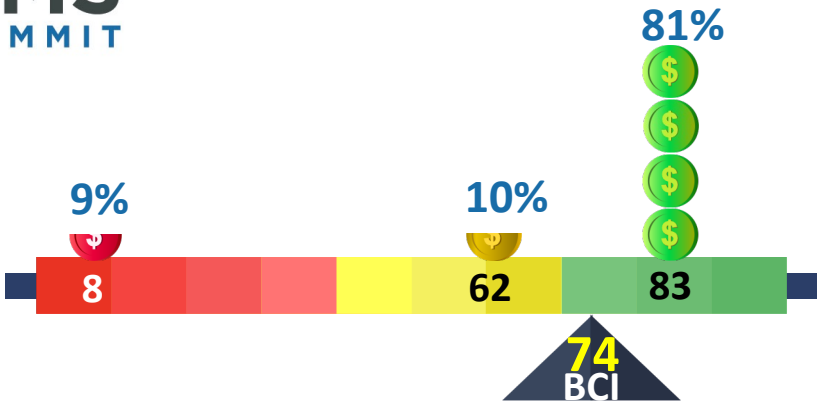
Balance Beam Plot

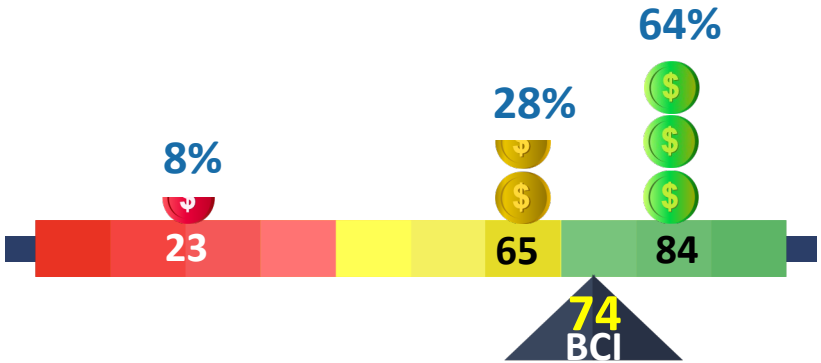
Show 3 intermediate values as Coins.
A Coin represent 20% of the CRV.
A ½ Coin represents 10% of the CRV.
If a color > 0% and < 5% it will still get a ½ Coin.
Scores (Avg CSCI) are listed on the beam.
Weights (%) are above the coins.

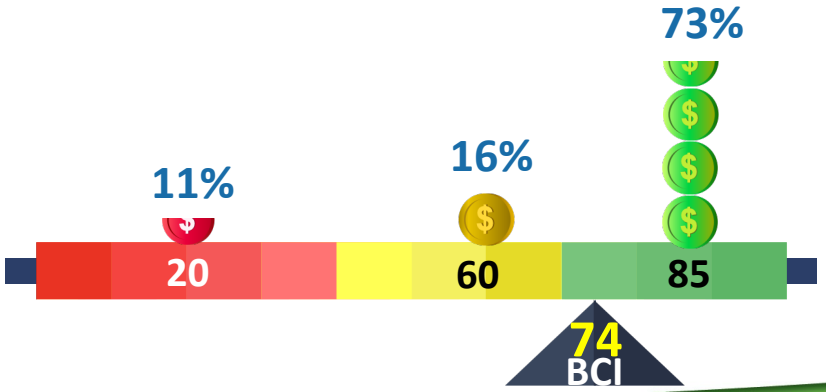


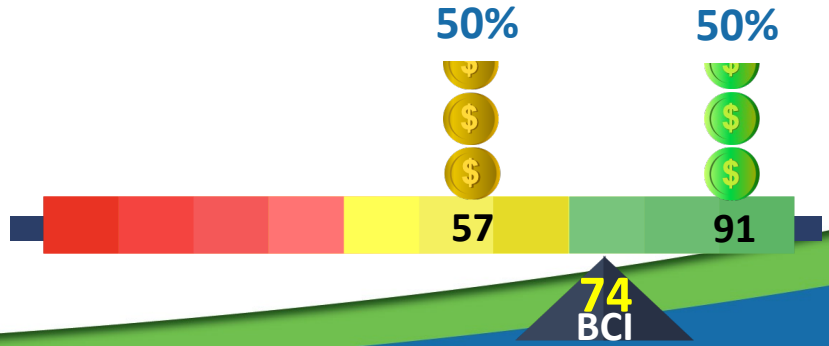
BCI = Red Score x Red % + Amber Score + Amber % + Green Score x Green %

Real World – 4 Buildings with Same BCI





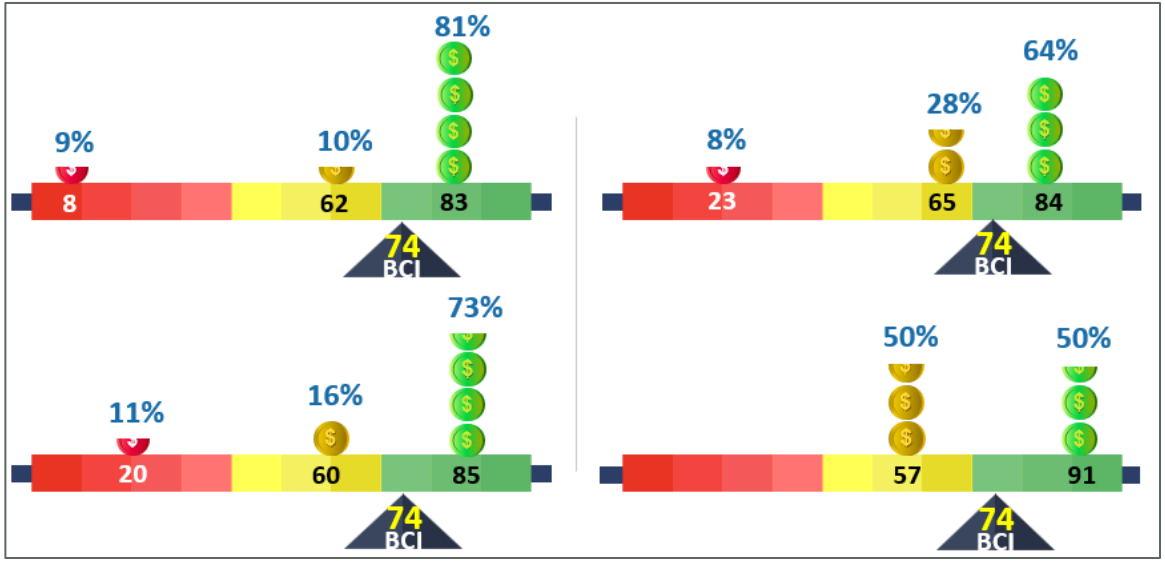




BCI Fun Fact

BCI is an average.

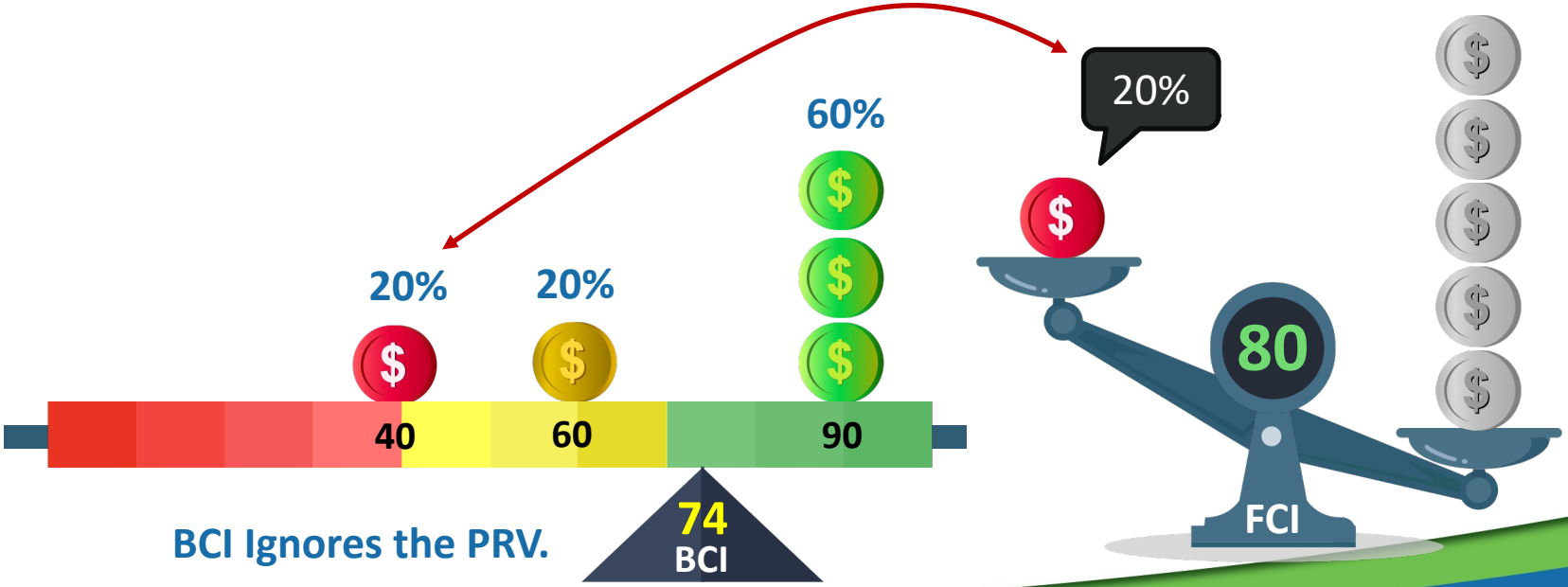
4 Buildings with the same BCI are not in the same condition.



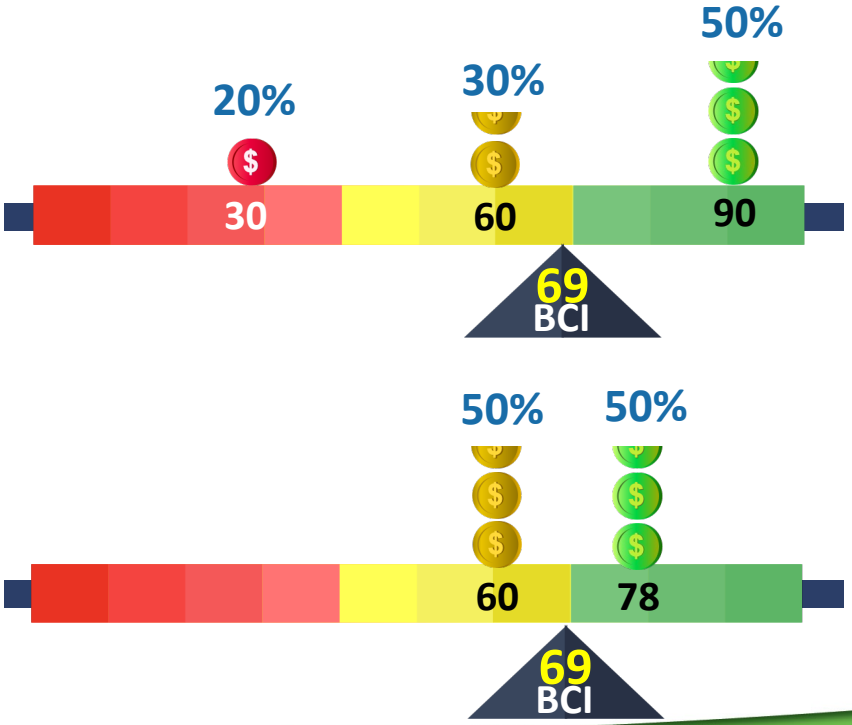
How BCI and FCI are Related

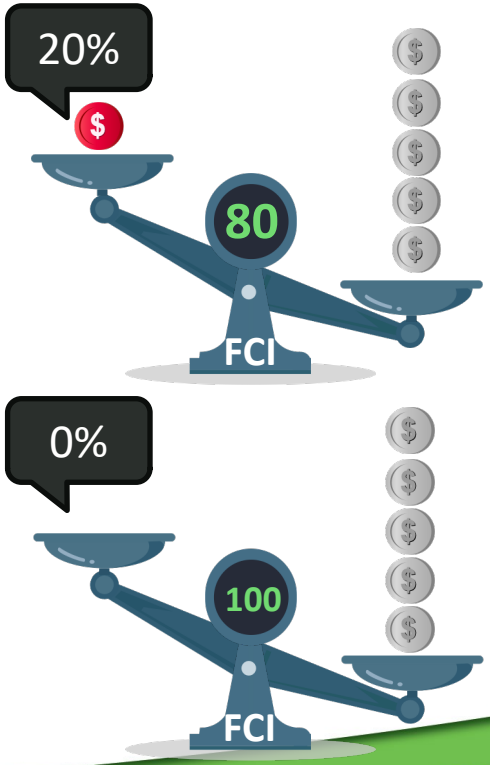
They share the Red Percent (Weight) value.

FCI ignores Red Scores value and all Amber and Green values.

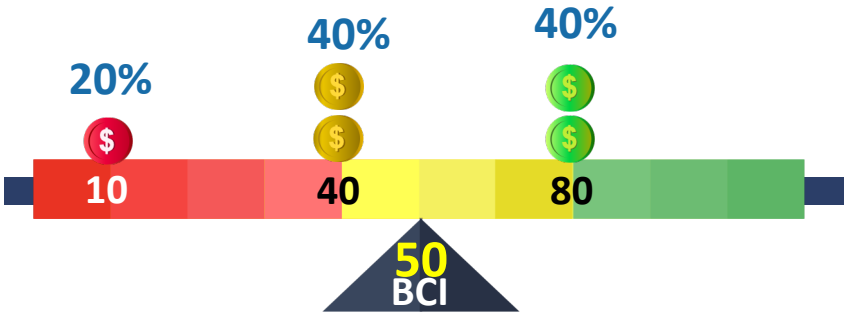


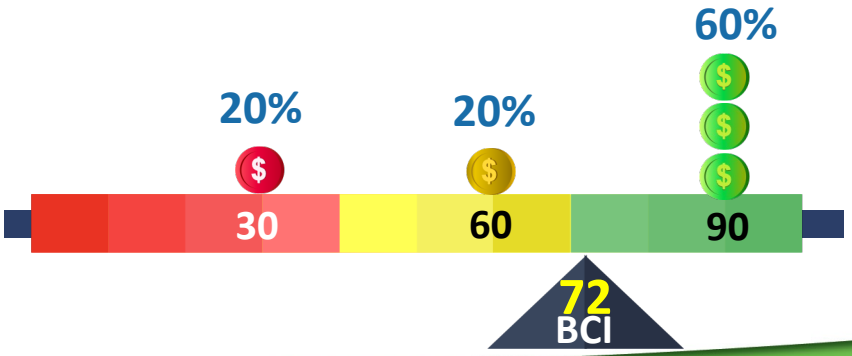
Same BCI, Different FCI

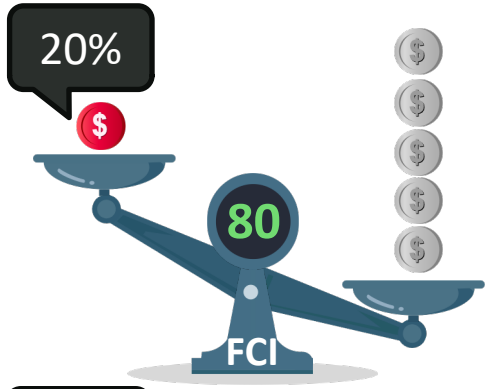


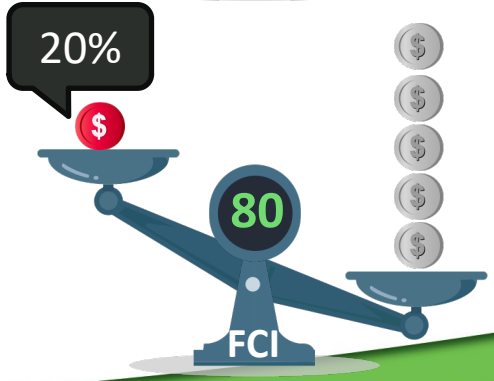


Same FCI, Different BCI









Part 2. BCI Bad, FCI Good?

BCI vs FCI – What is Normal?

	BCI Good (>= 70)	BCI Bad (< 70)
FCI Good (>= 80)	Is this a normal state?	Is this a normal state?
FCI Bad (< 80)	Is this a normal state?	Is this a normal state?

Approach to Answer the Questions

Using the visuals in the preceding section.

Show the combinations of BCI and FCI using a simulated building.

Show the combinations of BCI and FCI using real data.

For this presentation:

- PRV = CRV.
- Max RSL for Replacement = 0 (All sections will be replaced at a CI <= 40).
- All buildings are complete inventories.

Using Simulations

Simulations let you try ideal asset management practices.

Business rules for this sim:

- Unlimited budget.
- Spend the budget in the year after FCI < 80.
- Fix everything that needs to be replaced.

Simulation Set Up

Took a real 30K GSF admin building.

Reset all the components to an age of 0.

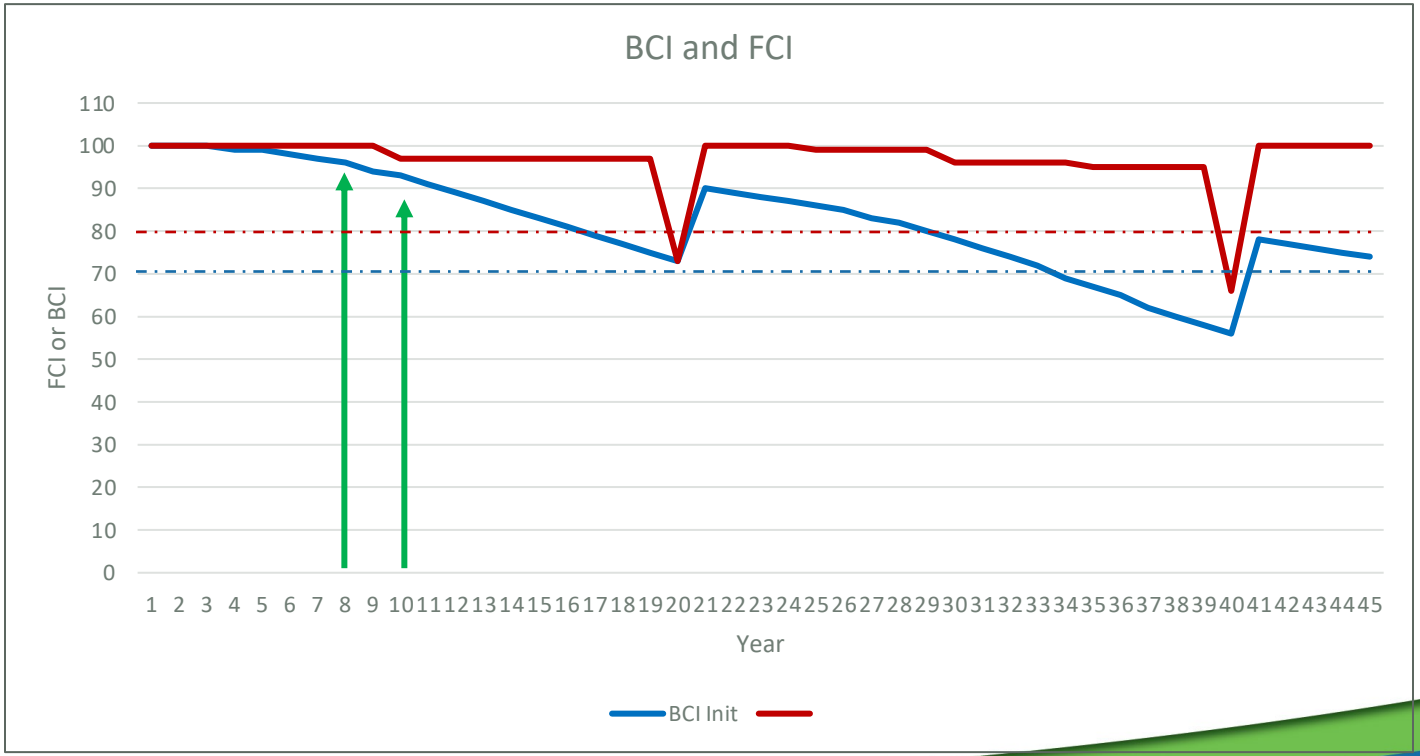
Reset all the components to the default curve.

Created the appropriate settings.

Max RSL = 0 (CSCI <= 40 means replacement).

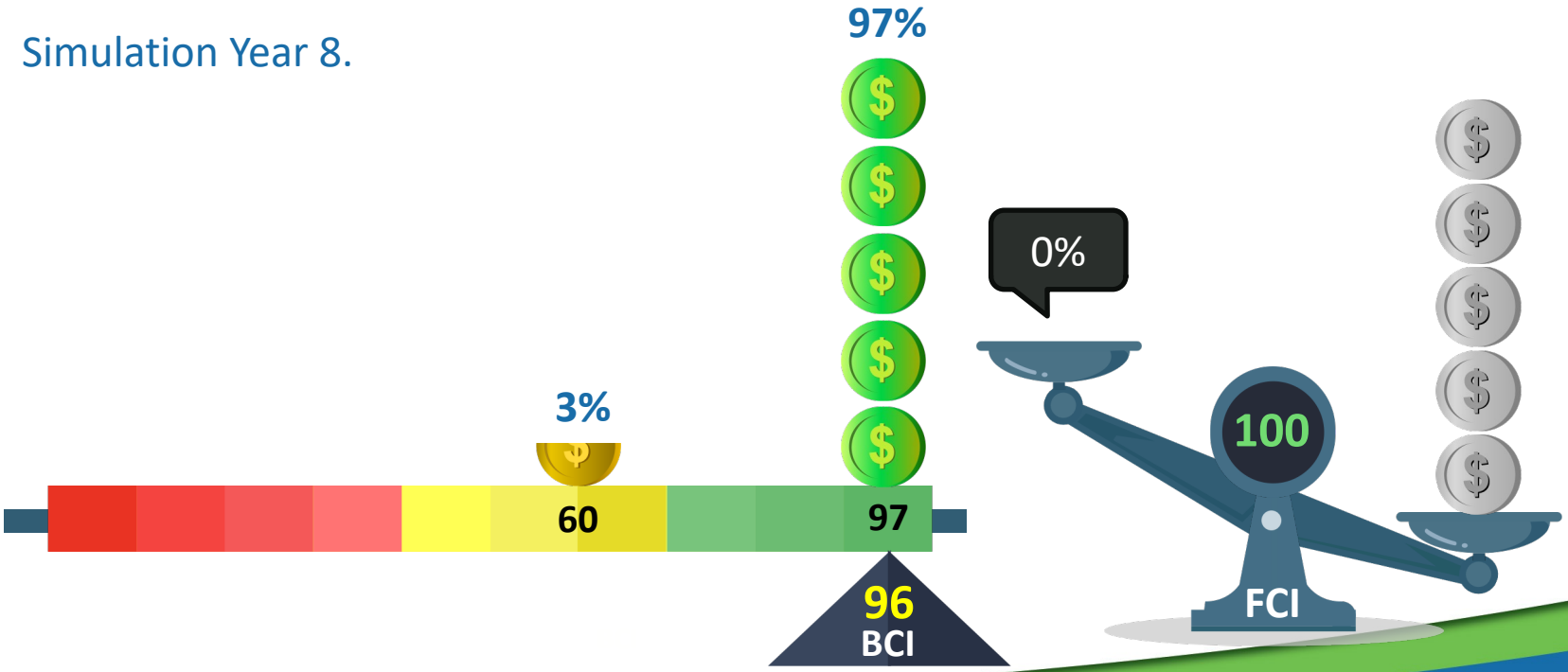
Run the simulation to see what happens.

Sim – Good BCI, Good FCI



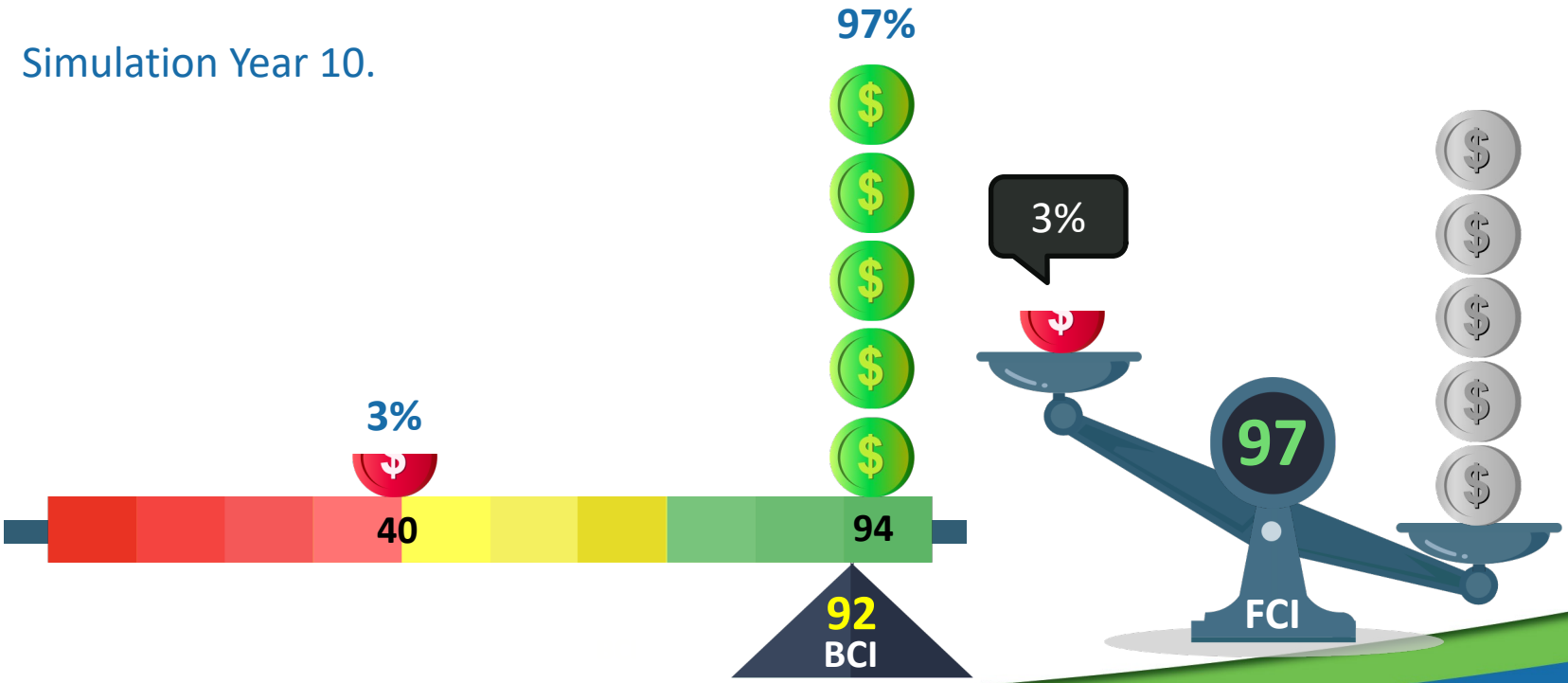
Sim – Good BCI, Good FCI

Simulation Year 8.

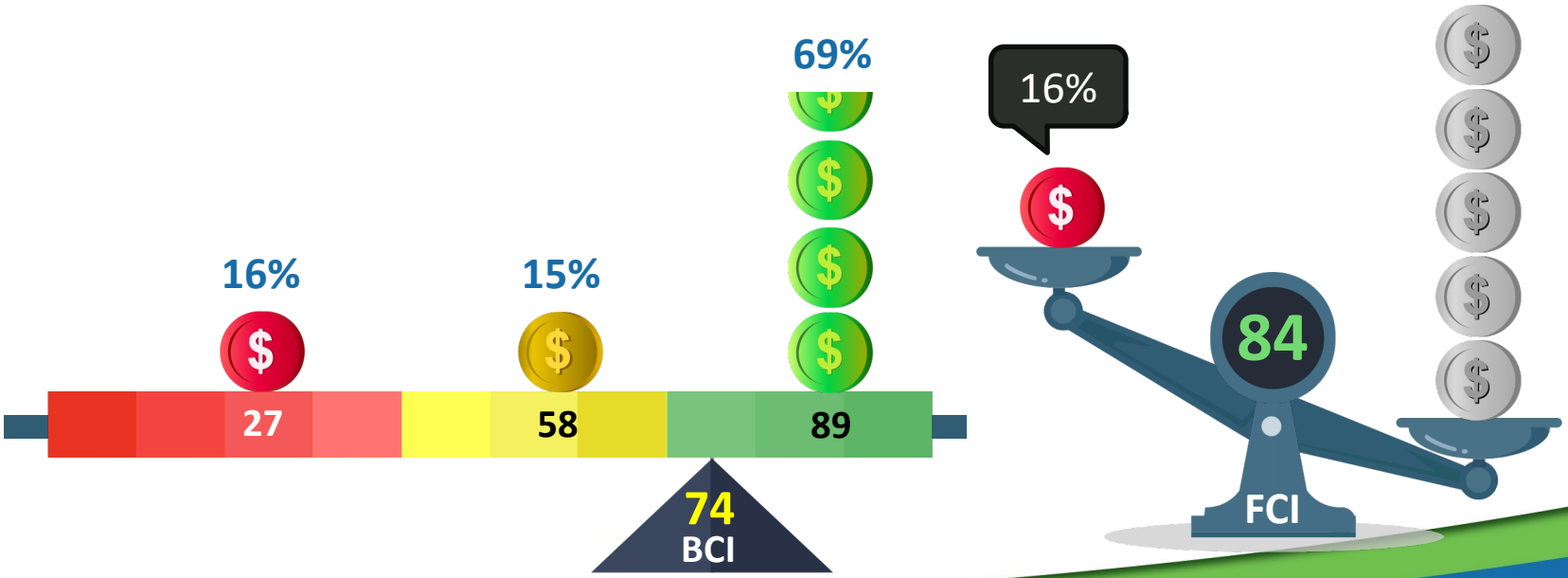


Sim – Good BCI, Good FCI

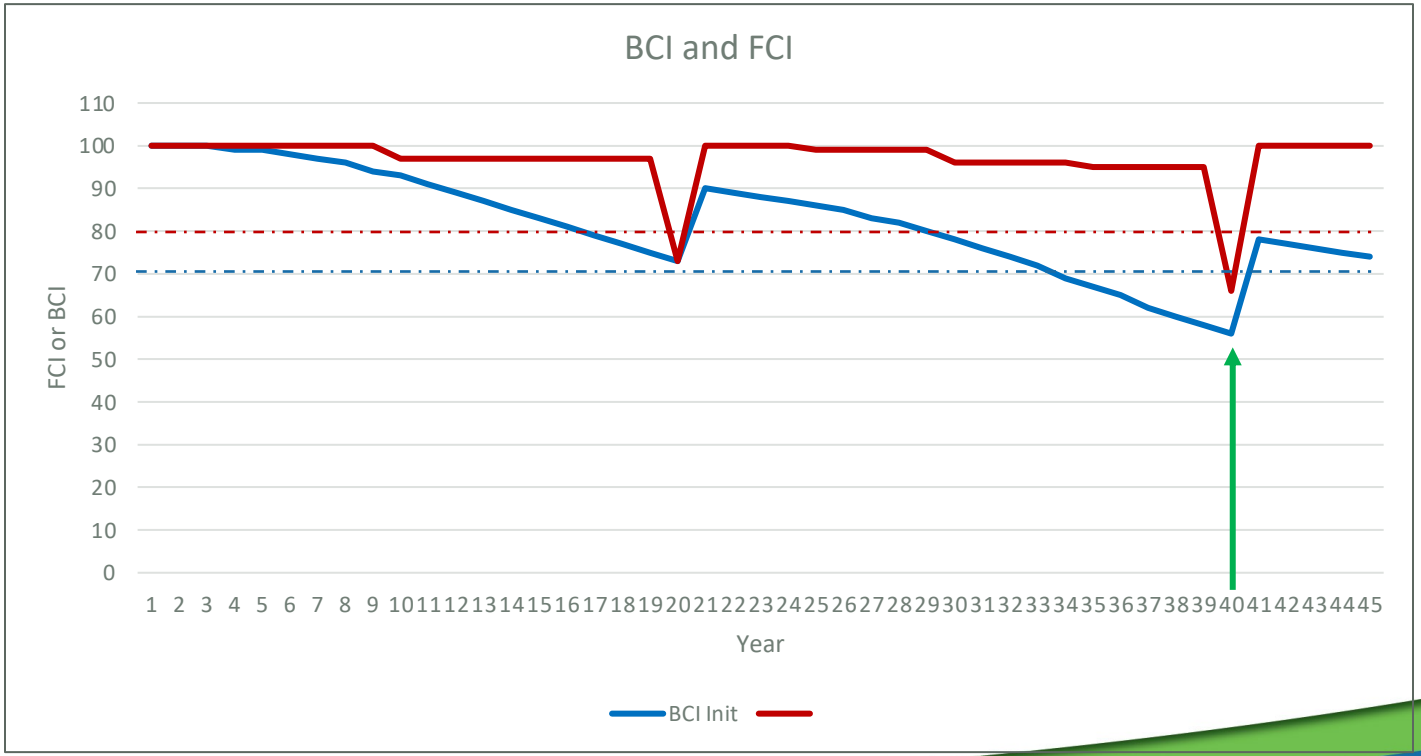
Simulation Year 10.



Real World – Good BCI, Good FCI

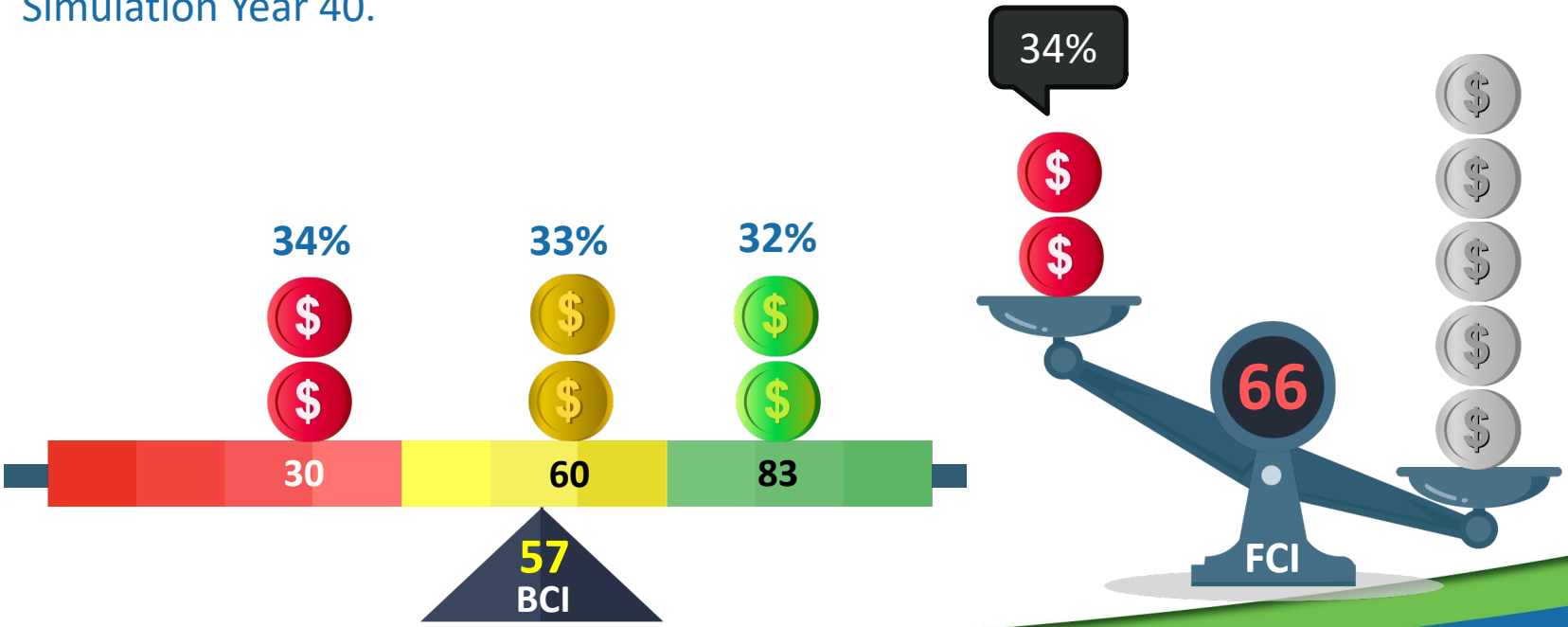


Sim – Bad BCI, Bad FCI

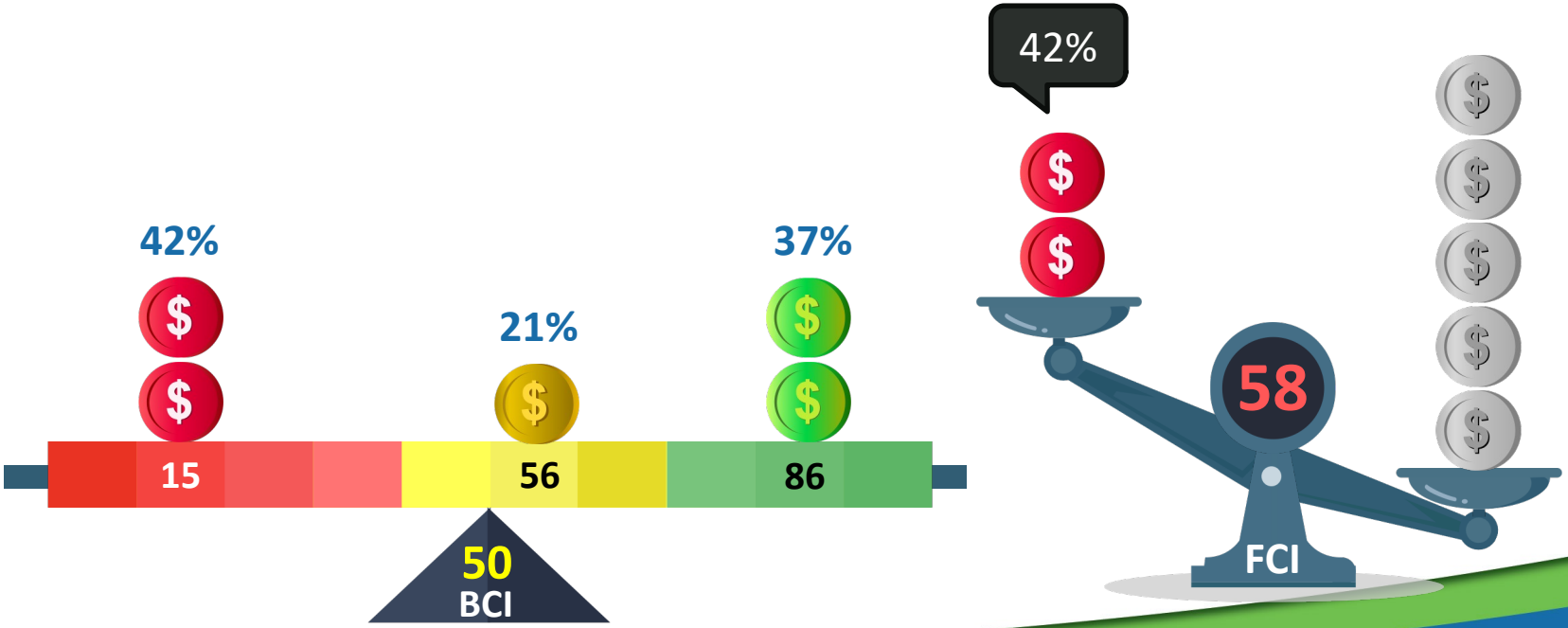


Sim – Bad BCI, Bad FCI

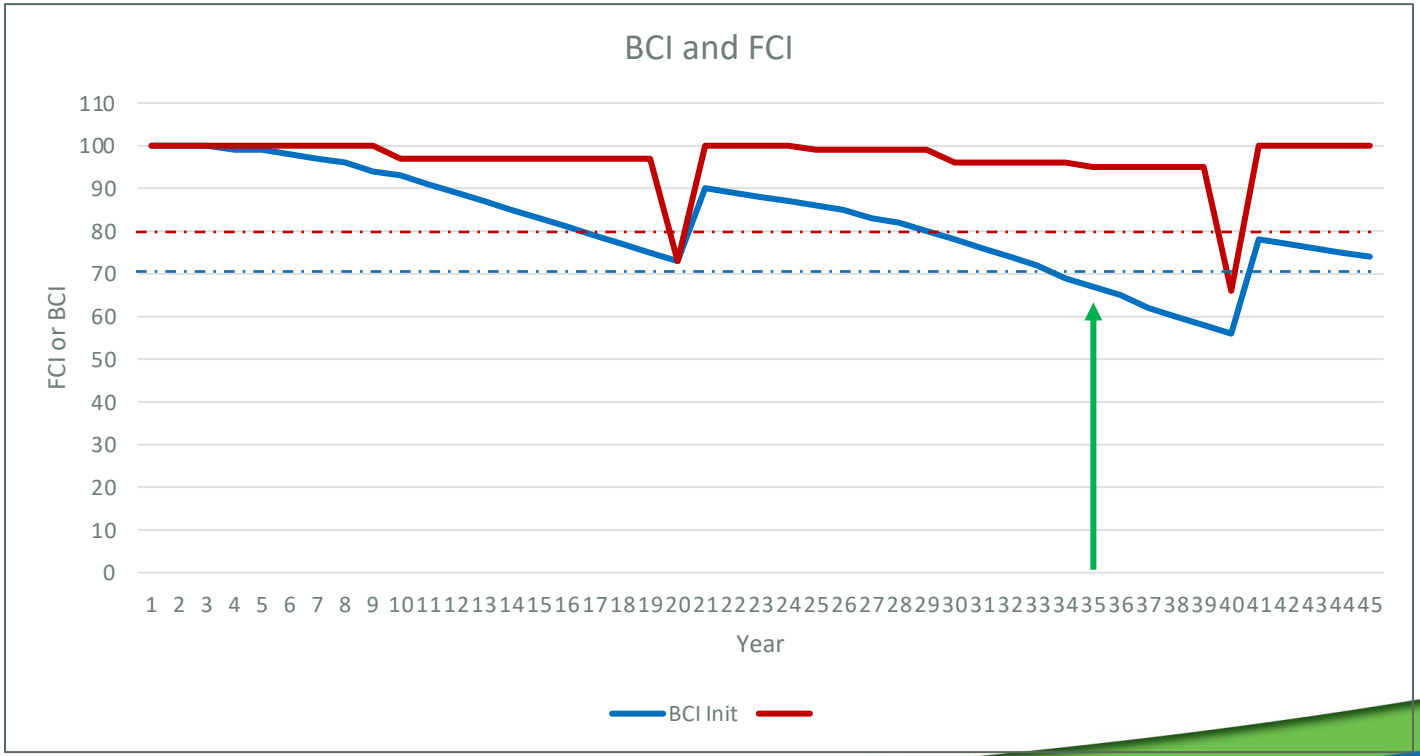
Simulation Year 40.



Real World – Bad BCI, Bad FCI

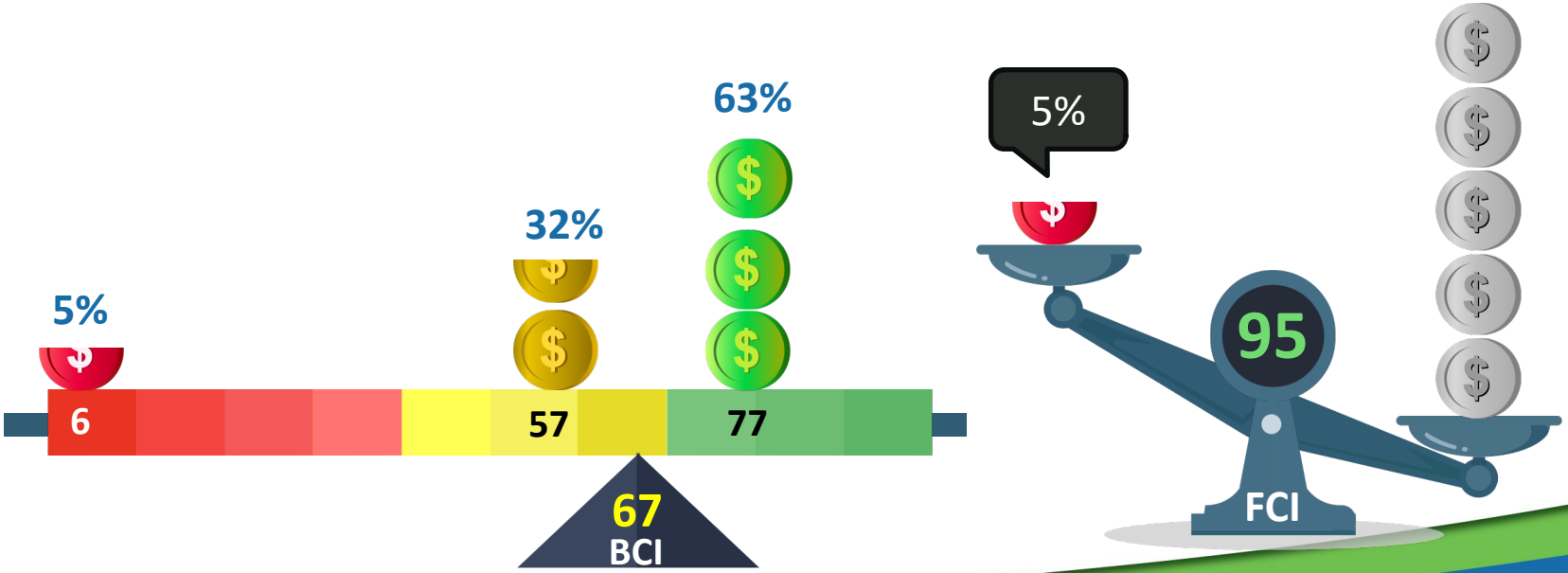


Sim – Bad BCI, Good FCI

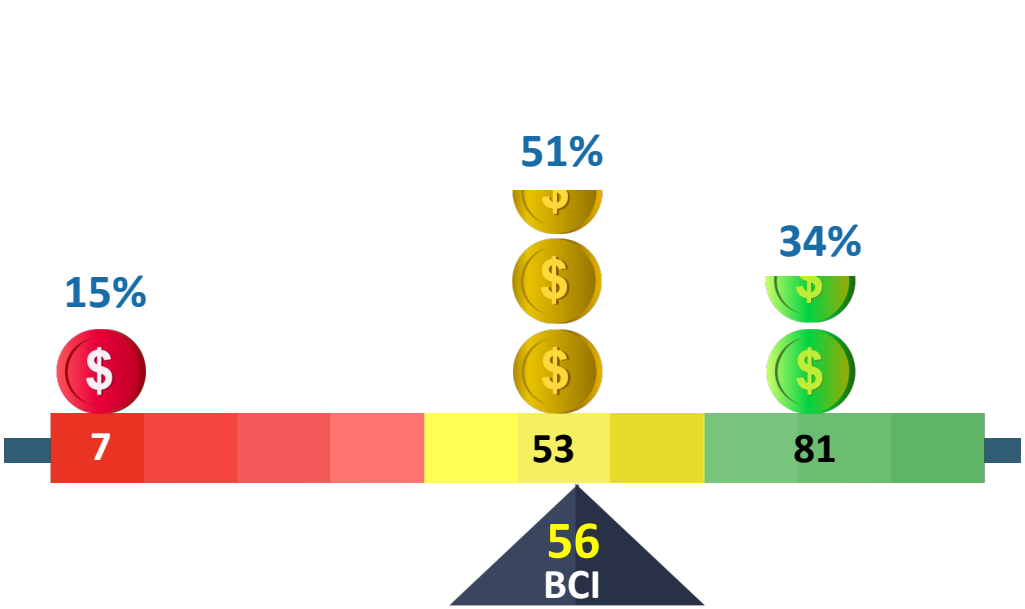


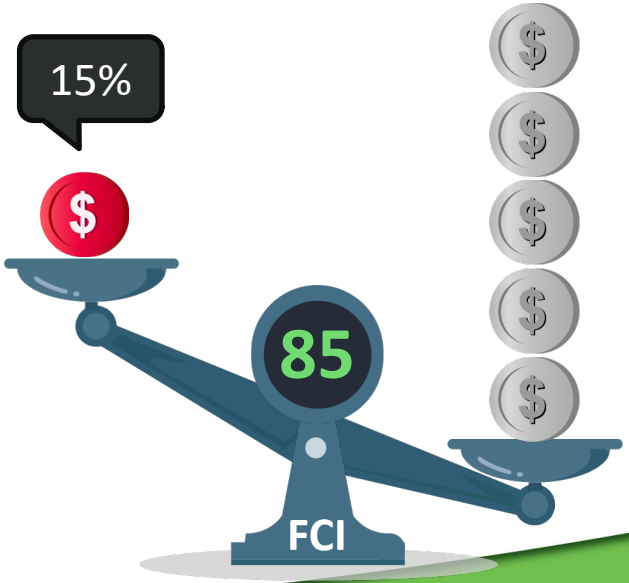
Sim – Bad BCI, Good FCI

Simulation Year 35.

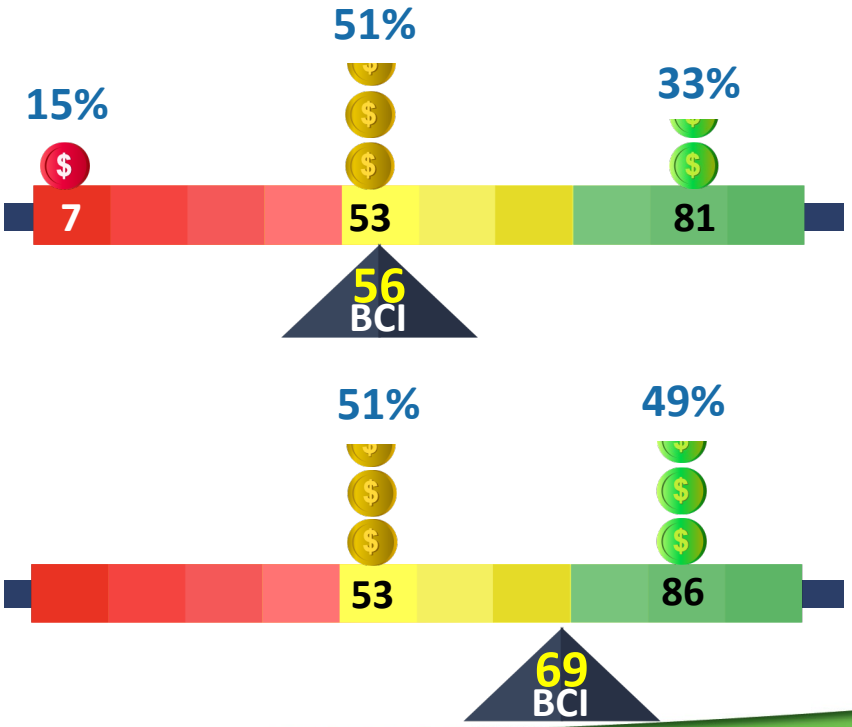


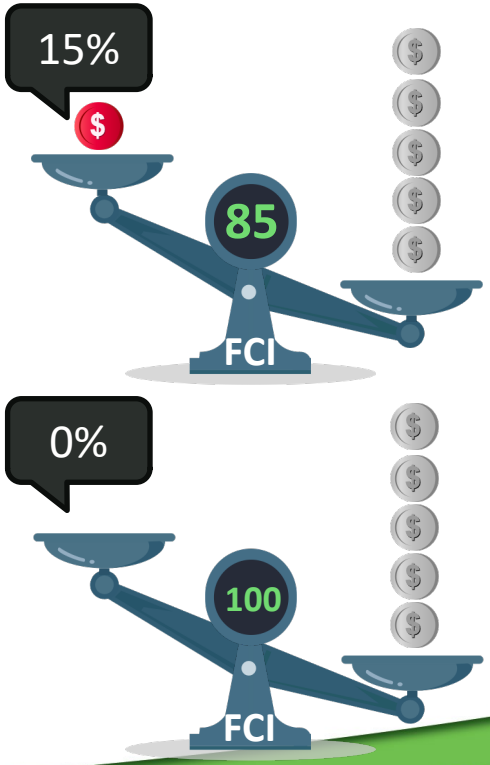
Real World – Bad BCI, Good FCI



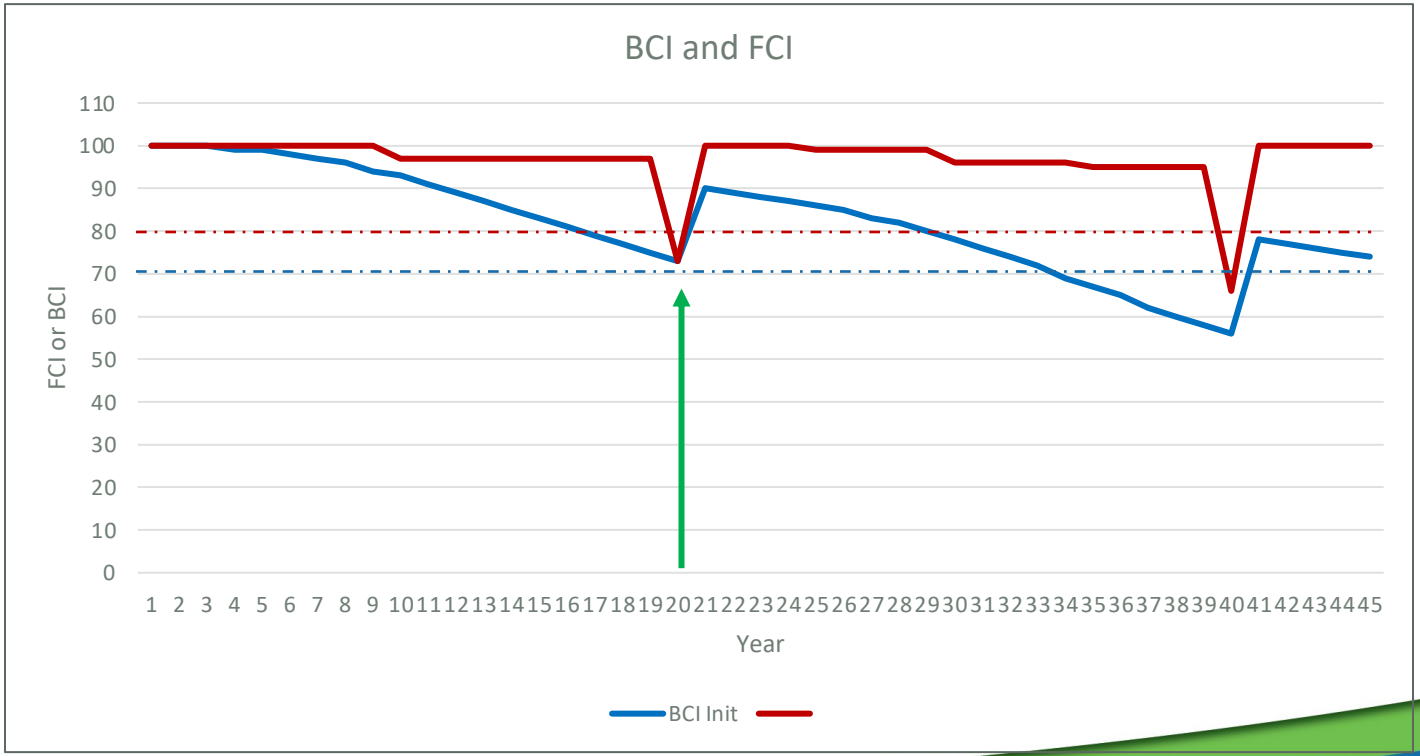


Real World – Bad BCI, 100 FCI



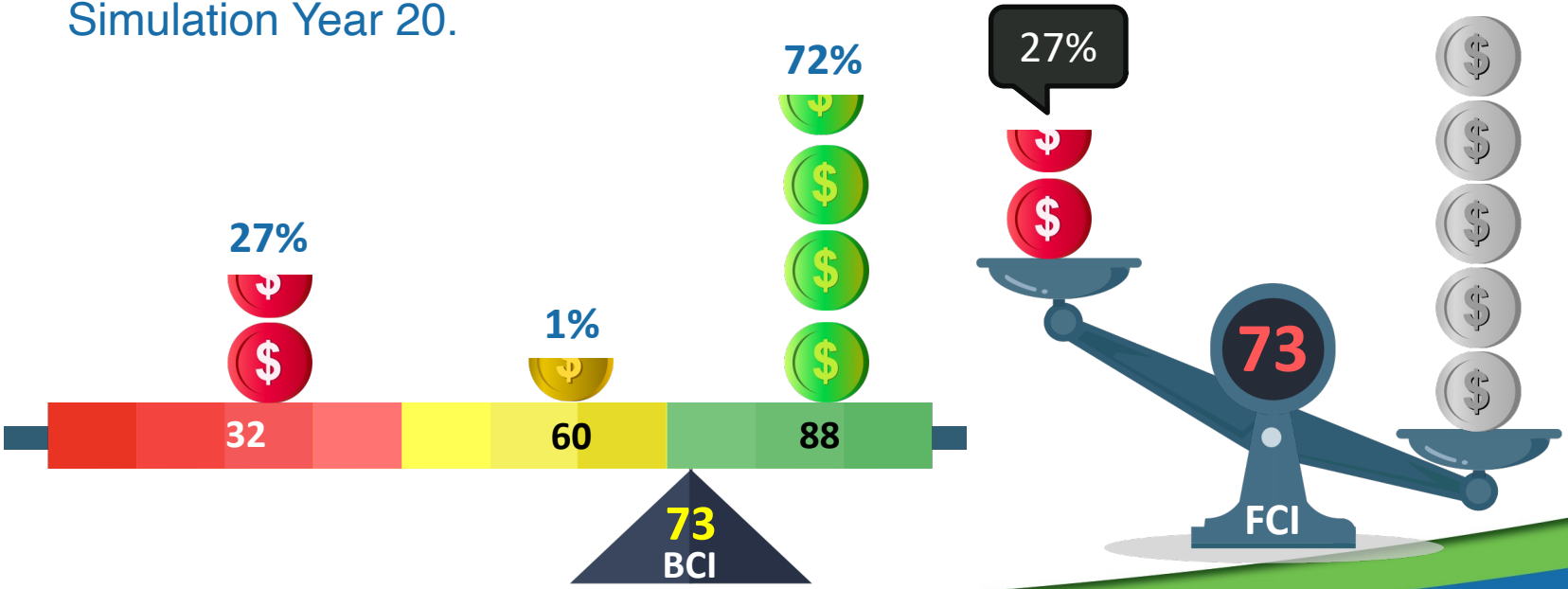


Sim – Good BCI, Bad FCI

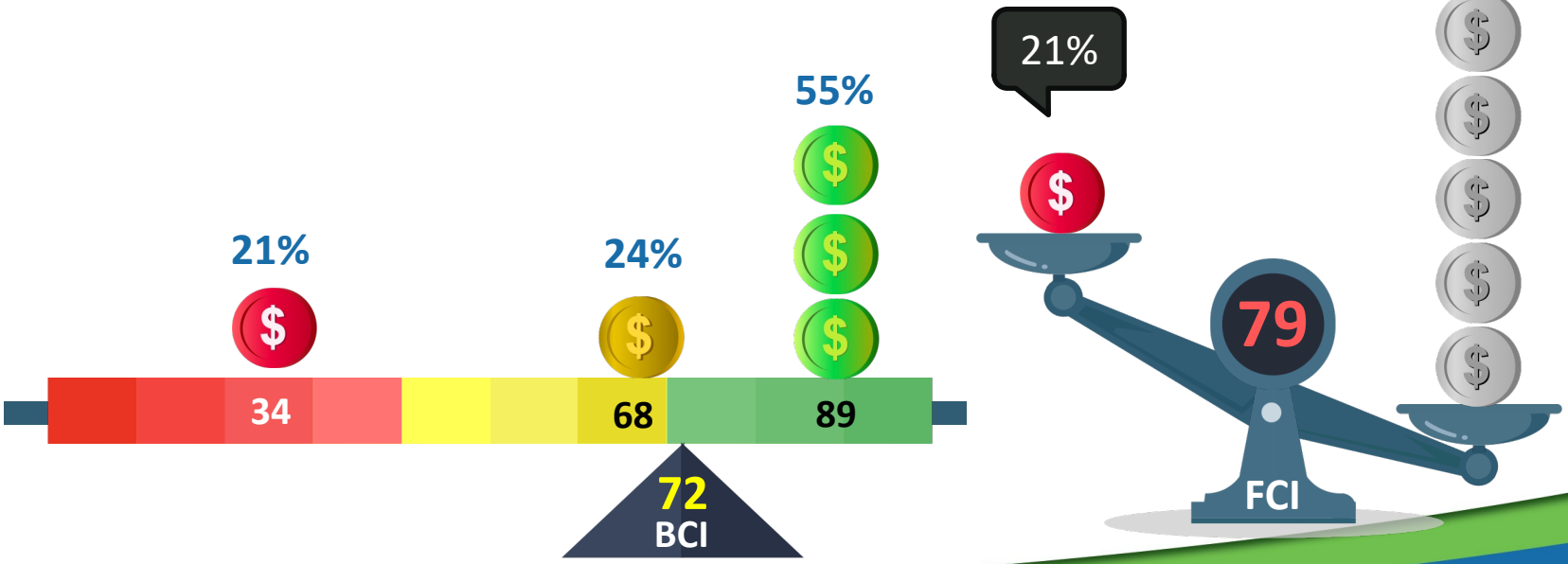


Sim – Good BCI, Bad FCI

Simulation Year 20.



Real World – Good BCI, Bad FCI



BCI vs FCI – What is Normal?

	BCI Good (>= 70)	BCI Bad (< 70)
FCI Good (>= 80)	Is this a normal state? YES	Is this a normal state? YES
FCI Bad (< 80)	Is this a normal state? YES	Is this a normal state? YES

Questions