Overview of the MCPS* “CIP SuperTool”

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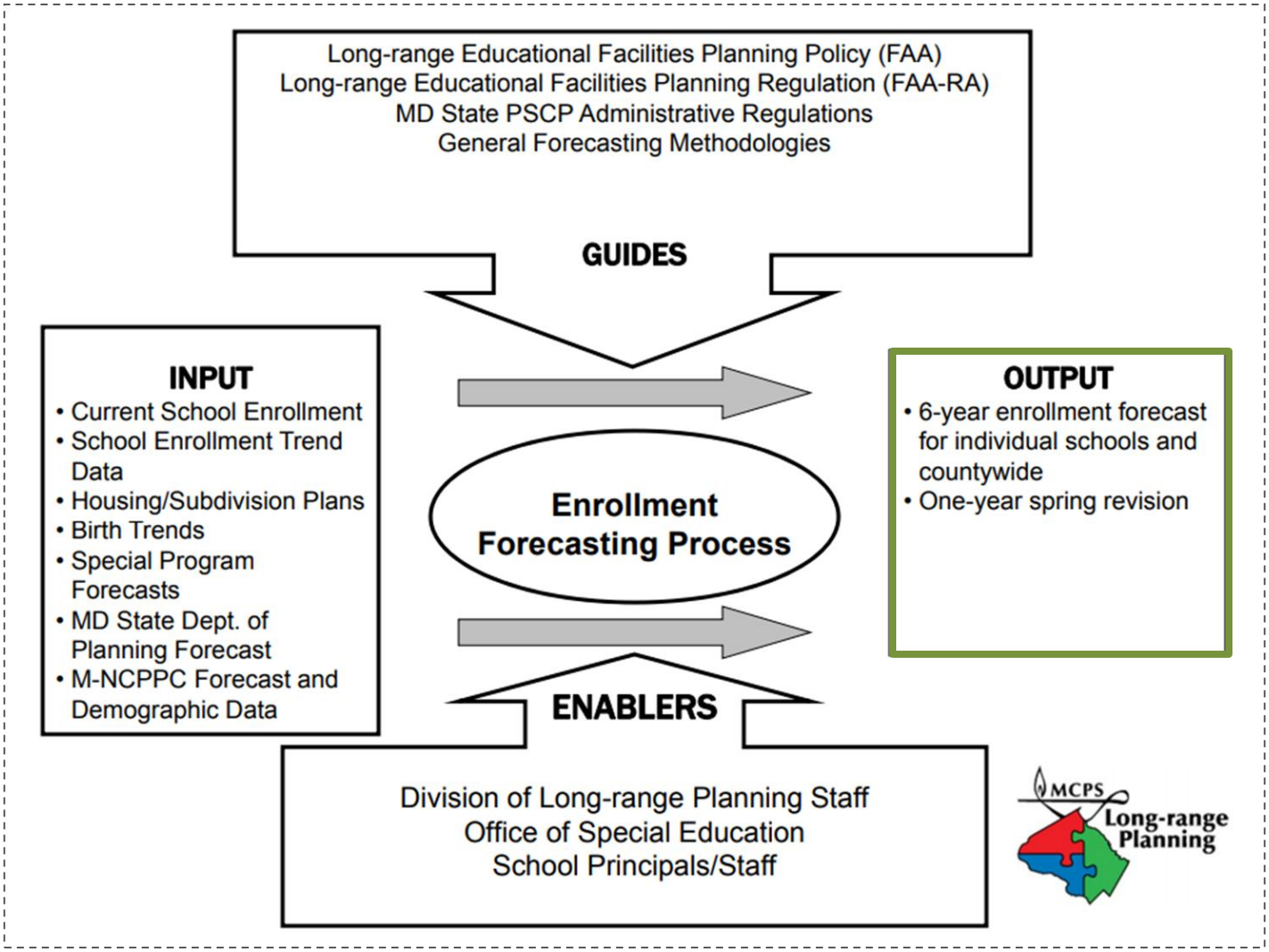
MCCF Meeting Dec 9, 2019

*** The CIP SuperTool is a community/individual effort, not produced by MCPS**

Background

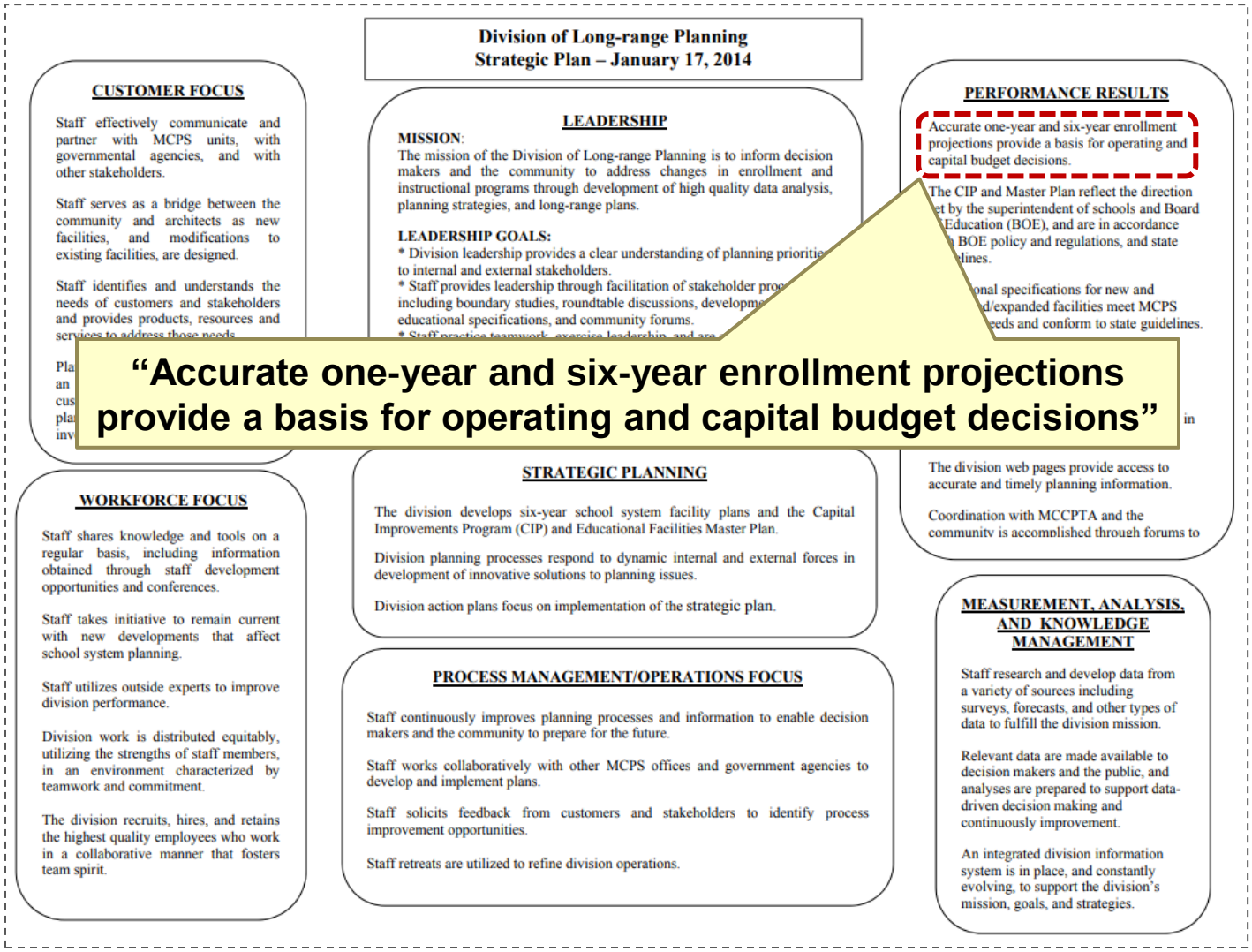
MCPS Enrollment Forecast Process Map[1]



[1] http://gis.mcpsmd.org/processdocspdfs/ProcessDocs_EnrollmentForecast.pdf

Background

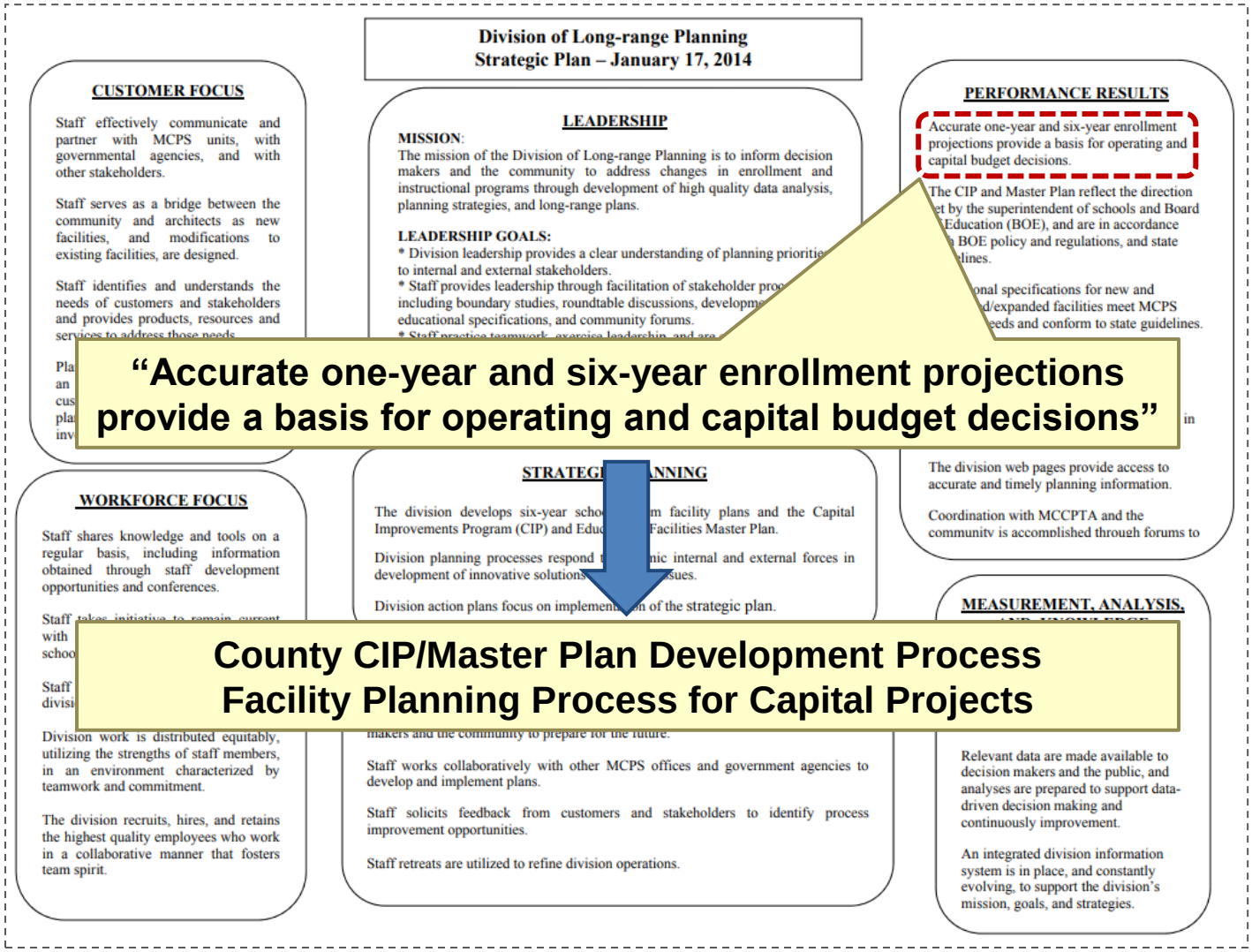
MCPS DLRP Linkages Chart[1]



[1] http://gis.mcpsmd.org/processdocspdfs/LinkagesChart_1_17_14.pdf

Background

MCPS DLRP Linkages Chart[1]

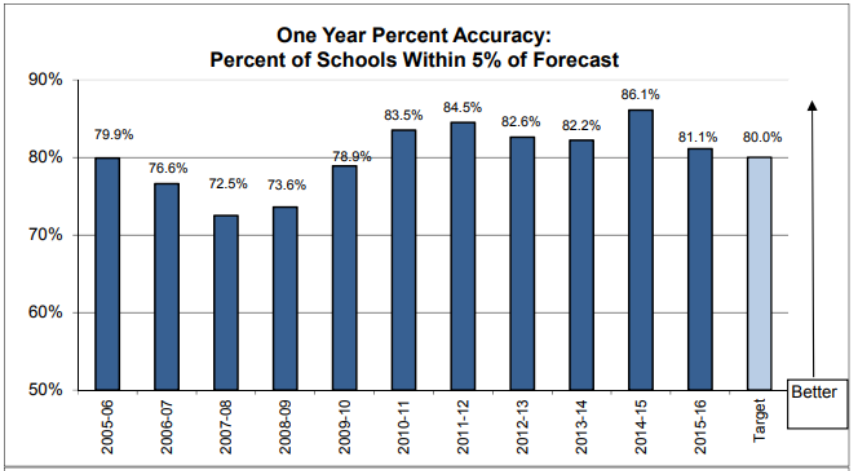


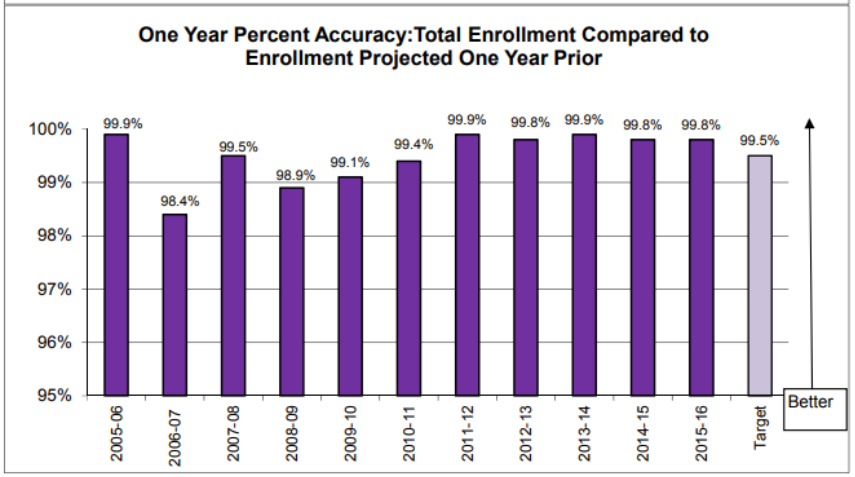
[1] http://gis.mcpsmd.org/processdocspdfs/LinkagesChart_1_17_14.pdf

Background

Accuracy of Enrollment Forecasts: as Reported by MCPS Division of Capital Planning[1]

- **The only publicly-available self assessment are these two charts: neither have been updated in over four years**
  - **For each school year, the percentage of the 200+ MCPS schools where the 1-year forecast predicted enrollment within 5%**
  - **For each school year, the accuracy of total MCPS enrollment as predicted by the 1-year forecast**
- **Insufficiencies (besides being outdated)**
  - **No metric for the 6-year forecast, which is used for longer-term capital planning (and Subdivision Staging Policy)**
  - **No "close-look" at the individual school forecast performance**
  - **No cluster-level metrics**
  - **No information regarding the *distribution* of forecasting errors**
  - **Etc., etc., etc.**





Forecasts Play a Prominent Role in Planning, but MCPS does not appear to Sufficiently Review Forecast Performance

[1] http://gis.mcpsmd.org/processdocspdfs/AccuracyOfEnrollmentForecast.pdf

Purpose

Why Develop the MCPS CIP SuperTool?

- **Can't rely on MCPS to assess themselves: puts MCPS CIP Data in the hands of community advocates and activists**
- **Provides quantitative support for hearing testimony**
- **Could be used to help improve forecasting methodologies**
- **A template-based approach allows the same set of charts to be generated for any school, just by clicking a button**

It's Hard to Believe, but it Appears that MCPS has No Means of Easily Assessing Their Own Forecasts in a Meaningful Way

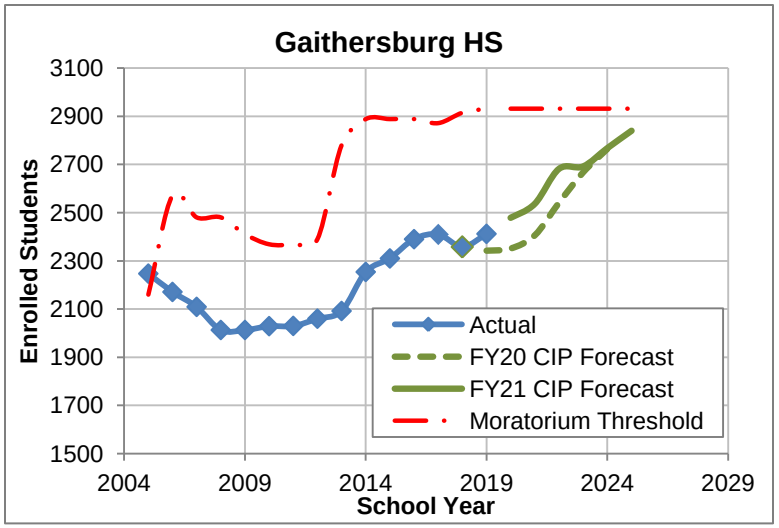
MCPS CIP SuperTool

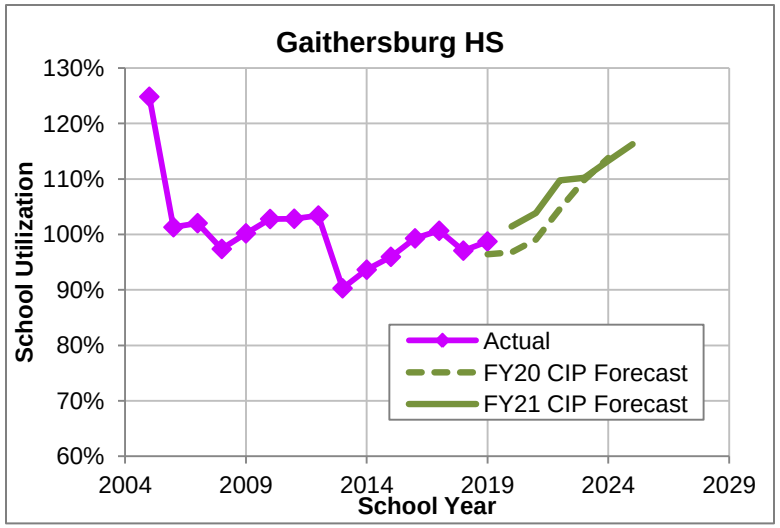
What is the CIP SuperTool?

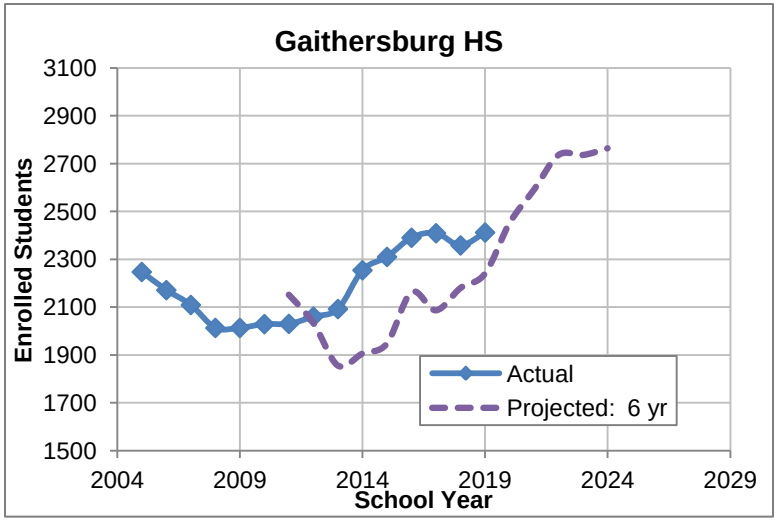
- **Dataset implemented in Microsoft Excel: common and readily available**
- **Contains data from all electronically available MCPS CIPs: FY2007-FY2021 (2005-2006 school year through present)**
- **CIP SuperTool dataset includes:**
  - **Actual, 1-yr, 2-yr-, 3-yr, 4-yr, 5-yr and 6-yr forecasts for enrollment and capacity:**
    - **Individual schools**
    - **MCPS System Grade Levels**
- **Contains a set of built-in template charts, and also calculates trends and forecasting accuracy for:**
  - **Individual schools**
  - **MCPS Grade Levels**
  - **Cluster-Levels**
  - **Cluster MS and ES Levels**
- **Recreates/updates the MCPS Performance Metrics**
- **Potential for anyone to use for their own analyses**

MCPS CIP SuperTool Output Examples

Explicit Examples: CIP SuperTool Outputs





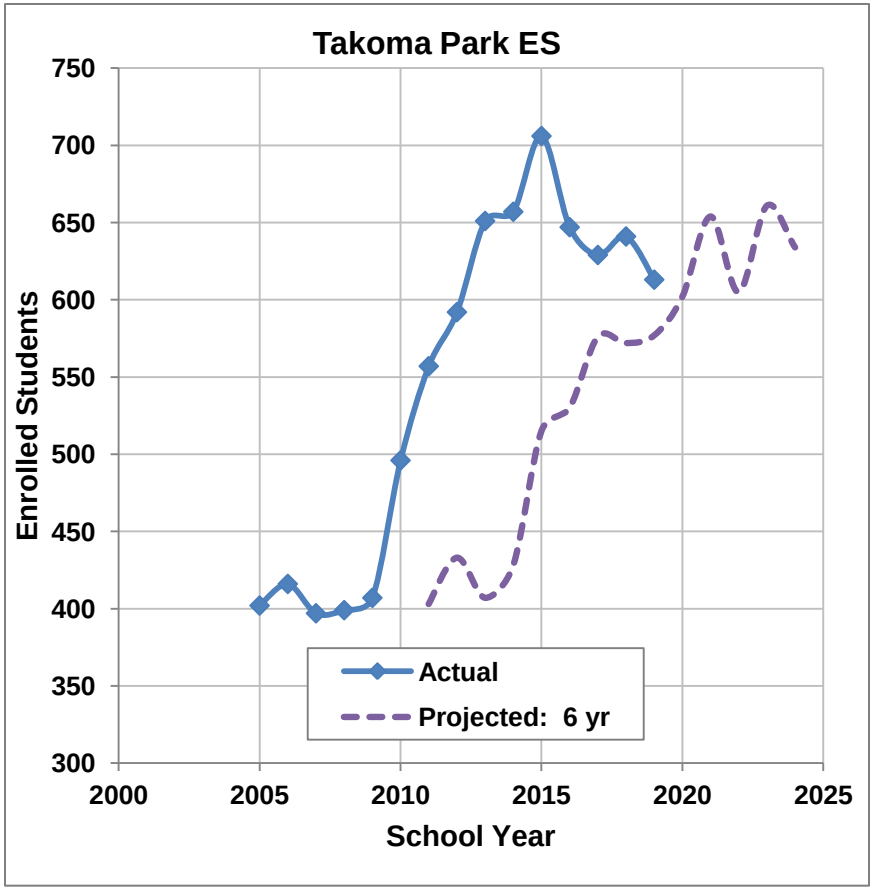


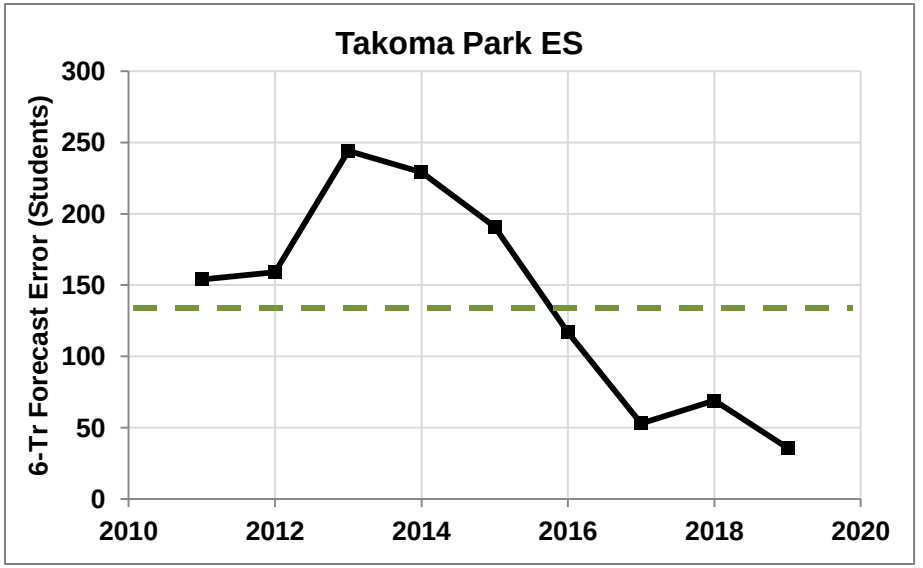
Forecast: Gaithersburg HS	For All Data: 2005+			
	# of Estimates		Average Error	
	Under Actual	Over Actual	(Students)	(%)
1-year	6	8	0.6	0.0%
2-year	8	5	14.4	0.7%
3-year	7	4	62.2	2.8%
4-year	9	2	122.8	5.6%
5-year	9	1	164.1	7.5%
6-year	8	1	194.2	8.9%

MCPS CIP SuperTool Output Examples

Interesting Examples: CIP SuperTool Outputs

Template Chart/Data Examples:
6-Year Forecast Performance for Takoma Park ES



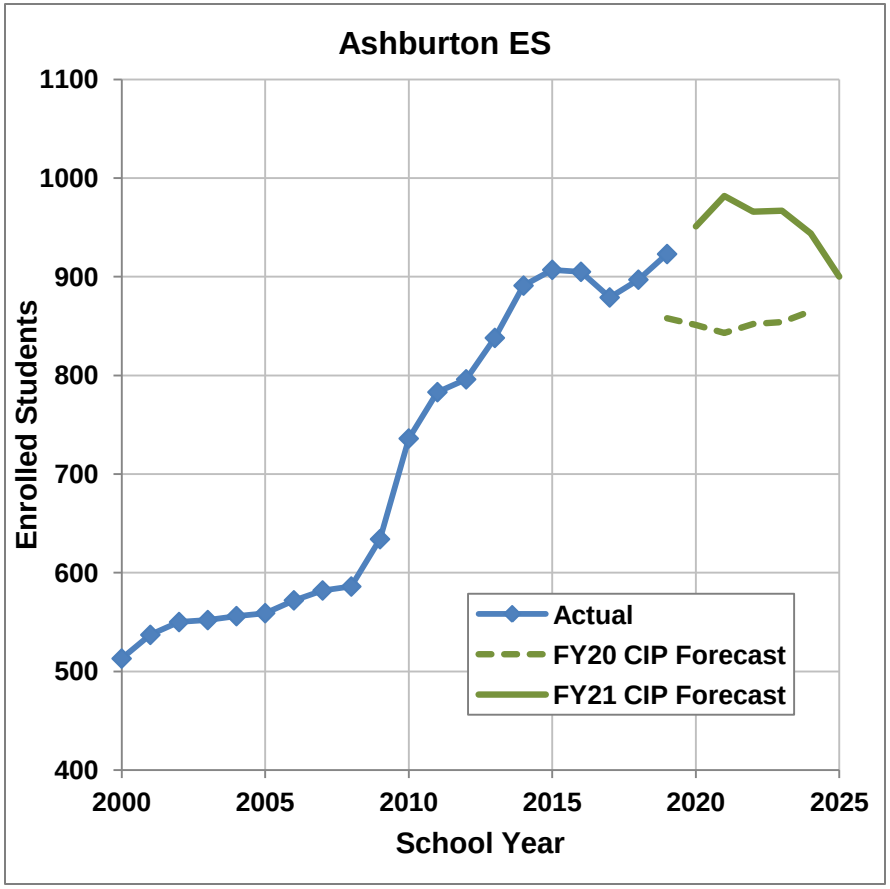


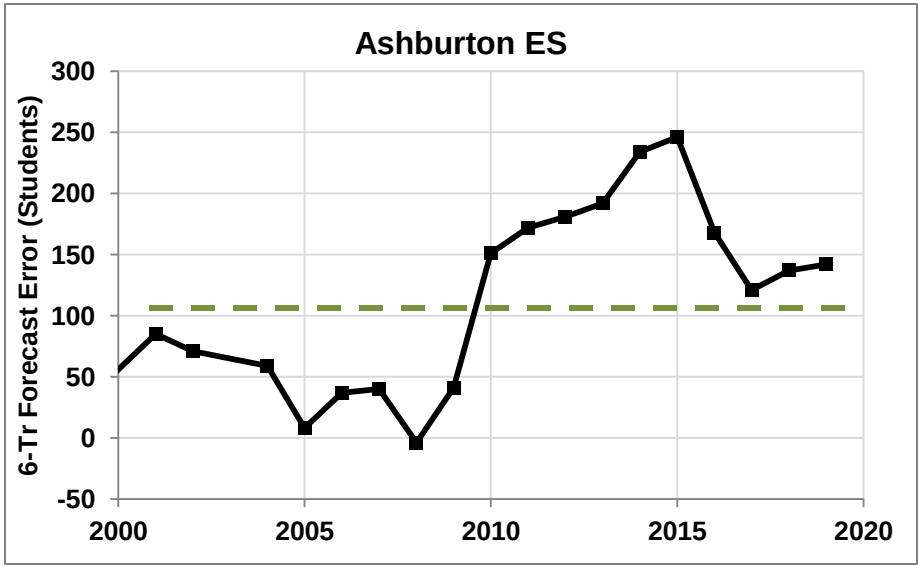
Forecast: Takoma Park ES	For All Data: (2005+)			
	# of Estimates		Average Error	
	Under Actual	Over Actual	(Students)	(%)
1-year	7	7	2.4	0.4%
2-year	10	3	21.9	4.0%
3-year	9	2	55.8	10.2%
4-year	10	1	81.3	14.8%
5-year	10	0	114.5	20.9%
6-year	9	0	**139.1**	25.4%

MCPS CIP SuperTool Output Examples

Interesting Examples: CIP SuperTool Outputs

Template Chart/Data Examples:
Visualizing Current Forecast against Historical Enrollment for Ashburton ES





Forecast: Ashburton ES	For All Data: (1990+)			
	# of Estimates		Average Error	
	Under Actual	Over Actual	(Students)	(%)
1-year	8	17	-0.8	-0.1%
2-year	15	8	11.1	1.7%
3-year	15	6	35.0	5.5%
4-year	19	3	56.4	8.8%
5-year	20	2	77.8	12.2%
6-year	20	1	103.2	16.1%

MCPS CIP SuperTool Output Examples

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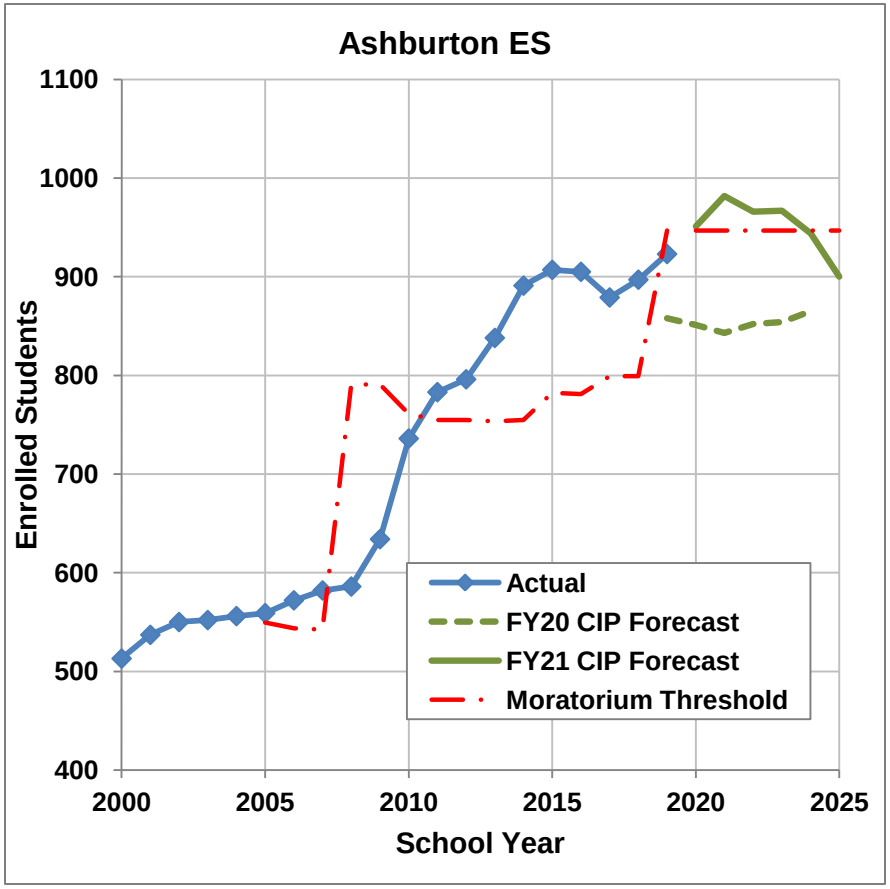

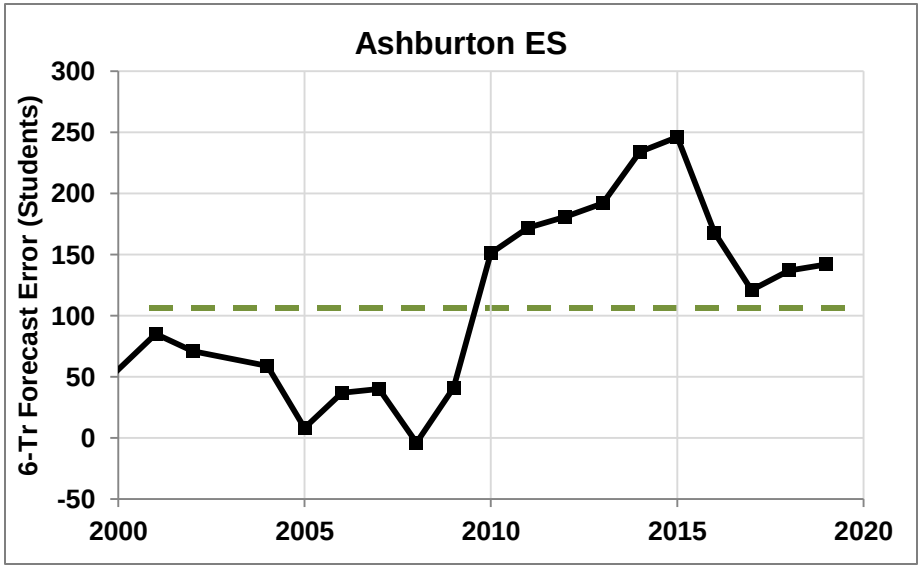

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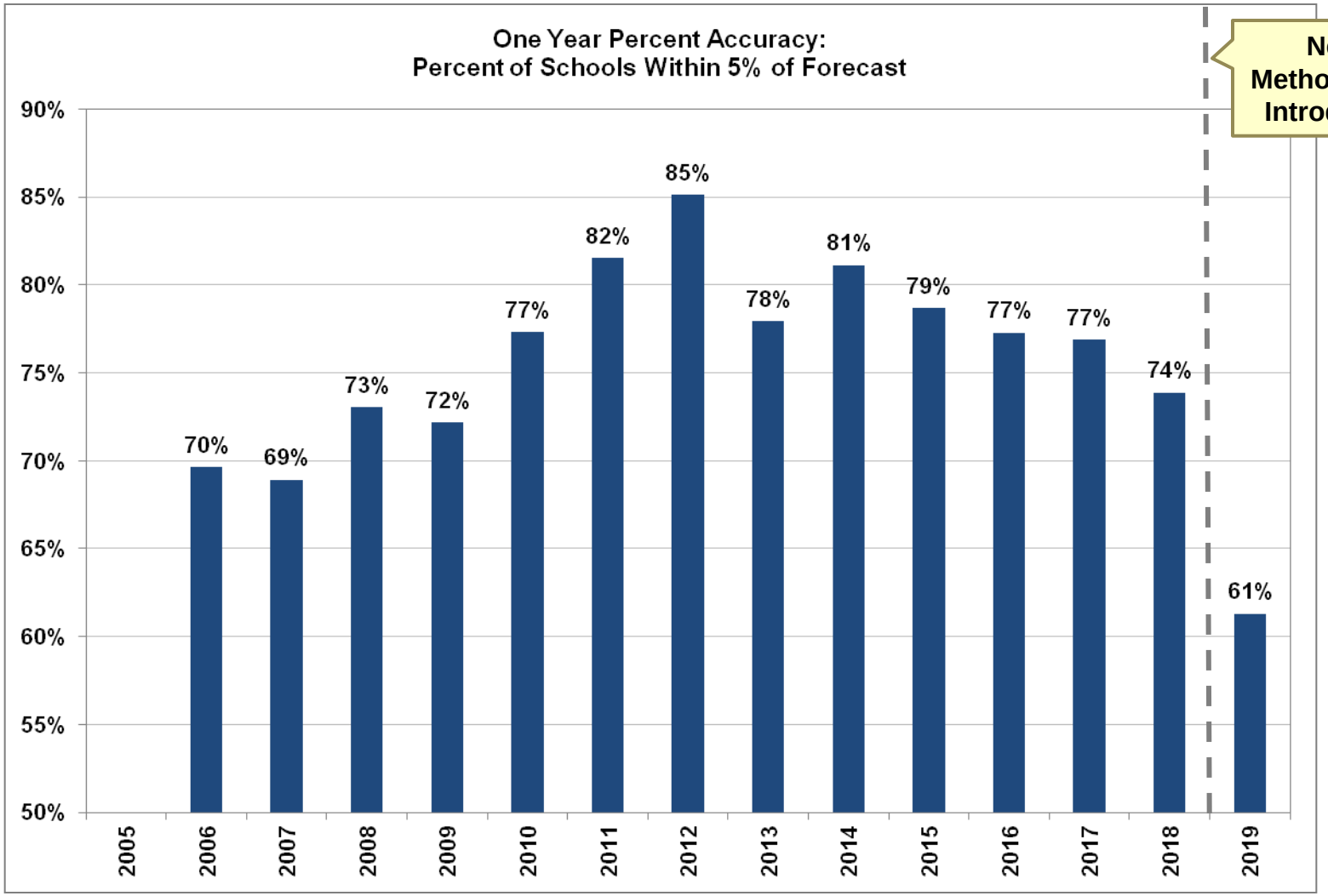
MCPS CIP SuperTool Output Examples

Explicit Examples: CIP SuperTool Outputs

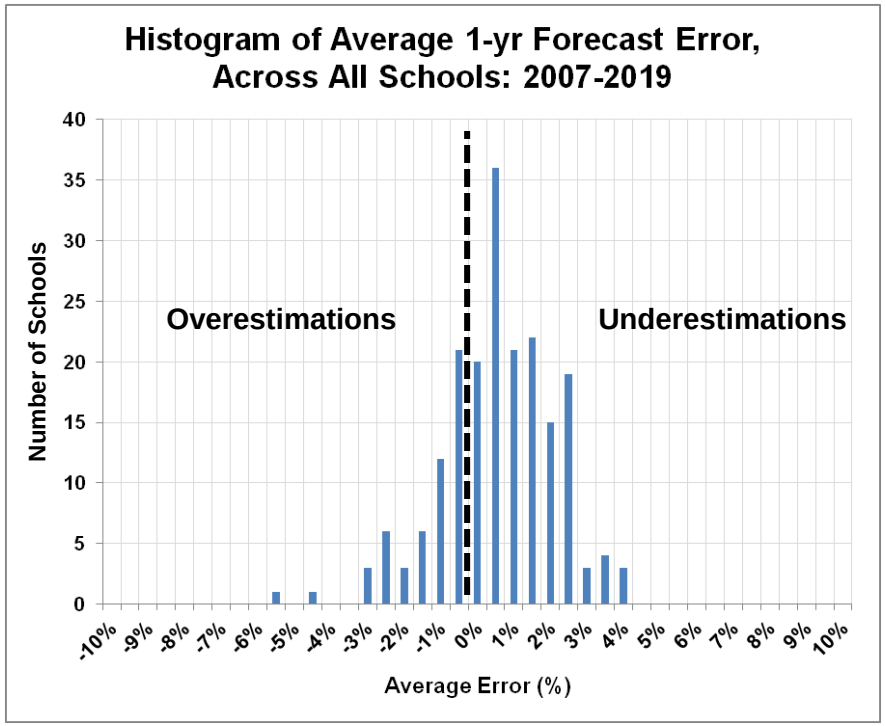
Updated MCPS "5%" Metric



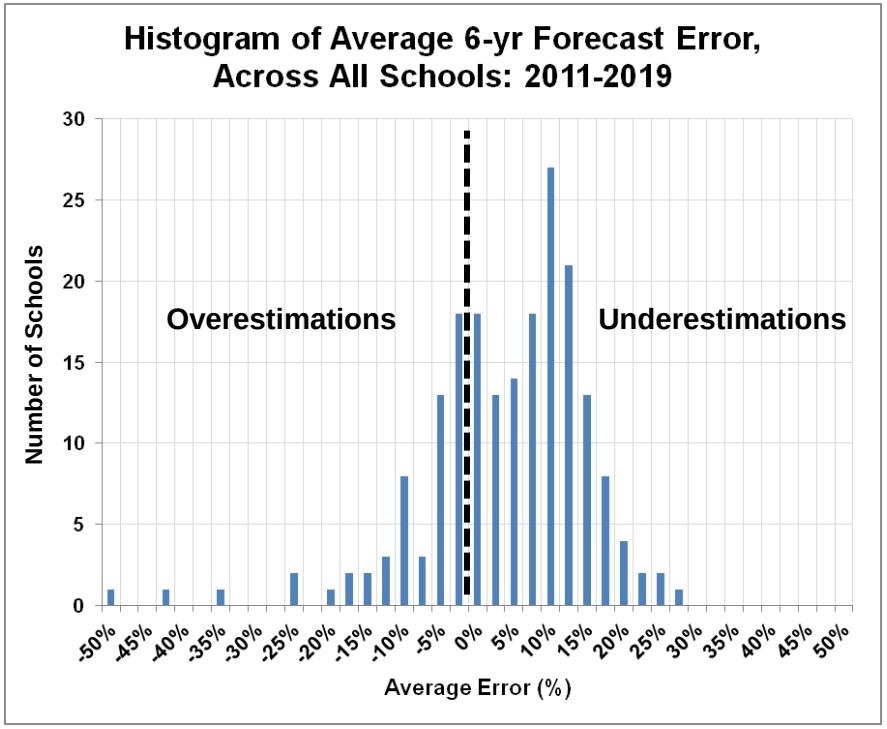
MCPS CIP SuperTool Output Examples

Implicit Examples: CIP SuperTool Outputs

Histograms of Forecasting Errors



Mean (Error %)	0.3%
Std (Error %)	1.6%



Mean (Error %)	2.8%
Std (Error %)	11%

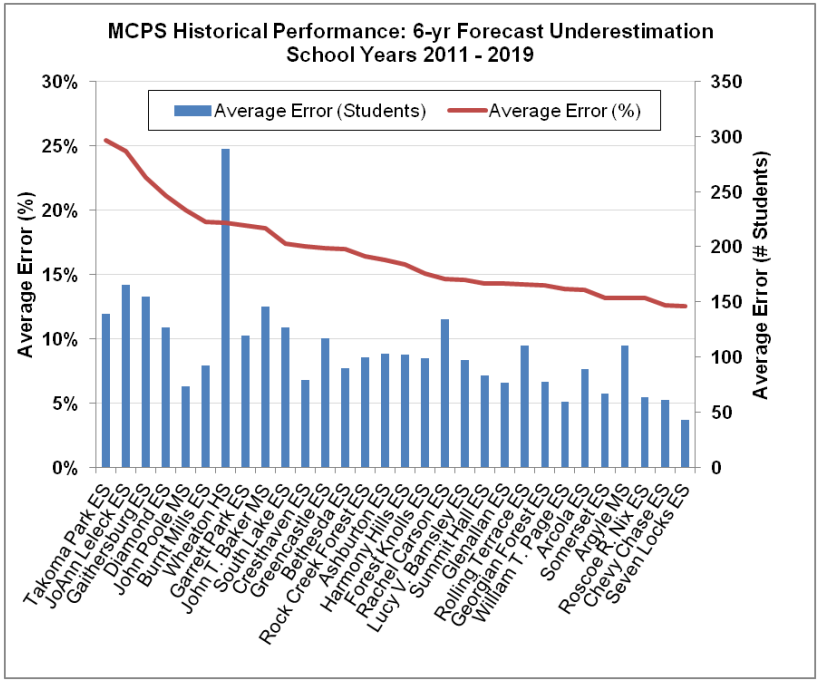
Examining Distributions of Forecast Errors
Demonstrates Statistical Biases Towards Underestimating Enrollment

MCPS CIP SuperTool Output Examples

Implicit Examples: CIP SuperTool Outputs

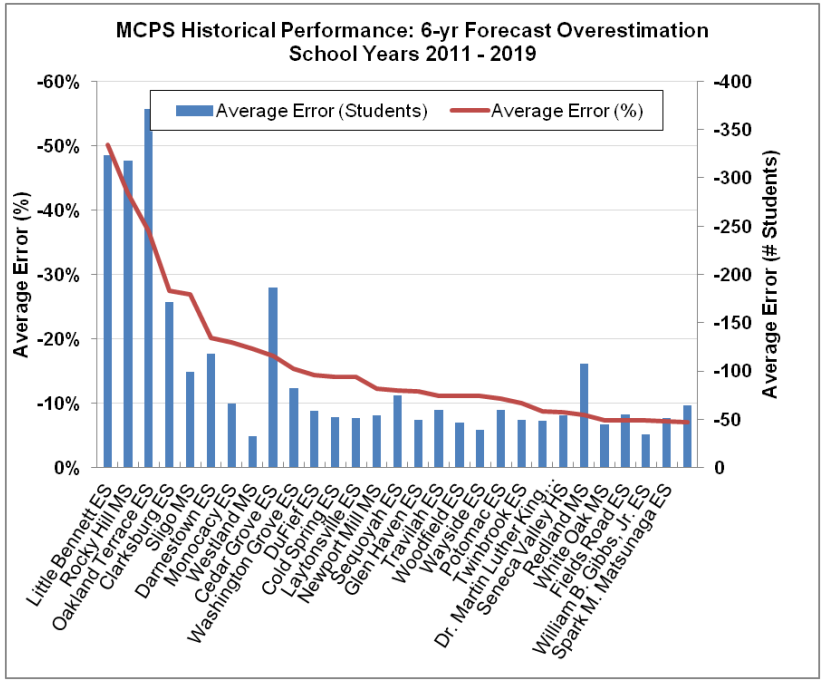
What Are the Worst-Forecasted Schools?

Worst Average 6-yr Underestimations



About 18 (of ~200) Schools with >15% Average Underestimation

Worst Average 6-yr Overestimations

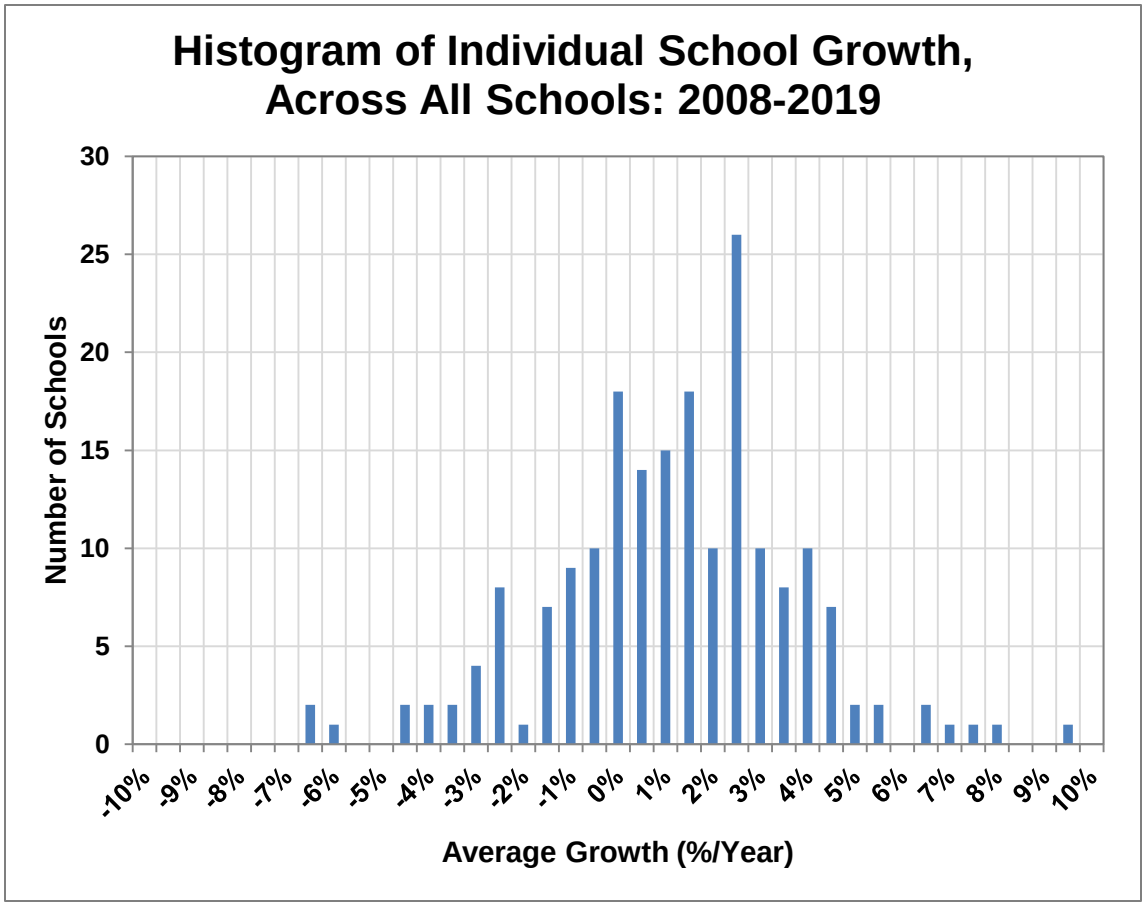


About 10 (of ~200) Schools with >15% Average Overestimation

MCPS CIP SuperTool Output Examples

School-Level Growth Analyses

Yearly % Growth, Based on Linear Trend

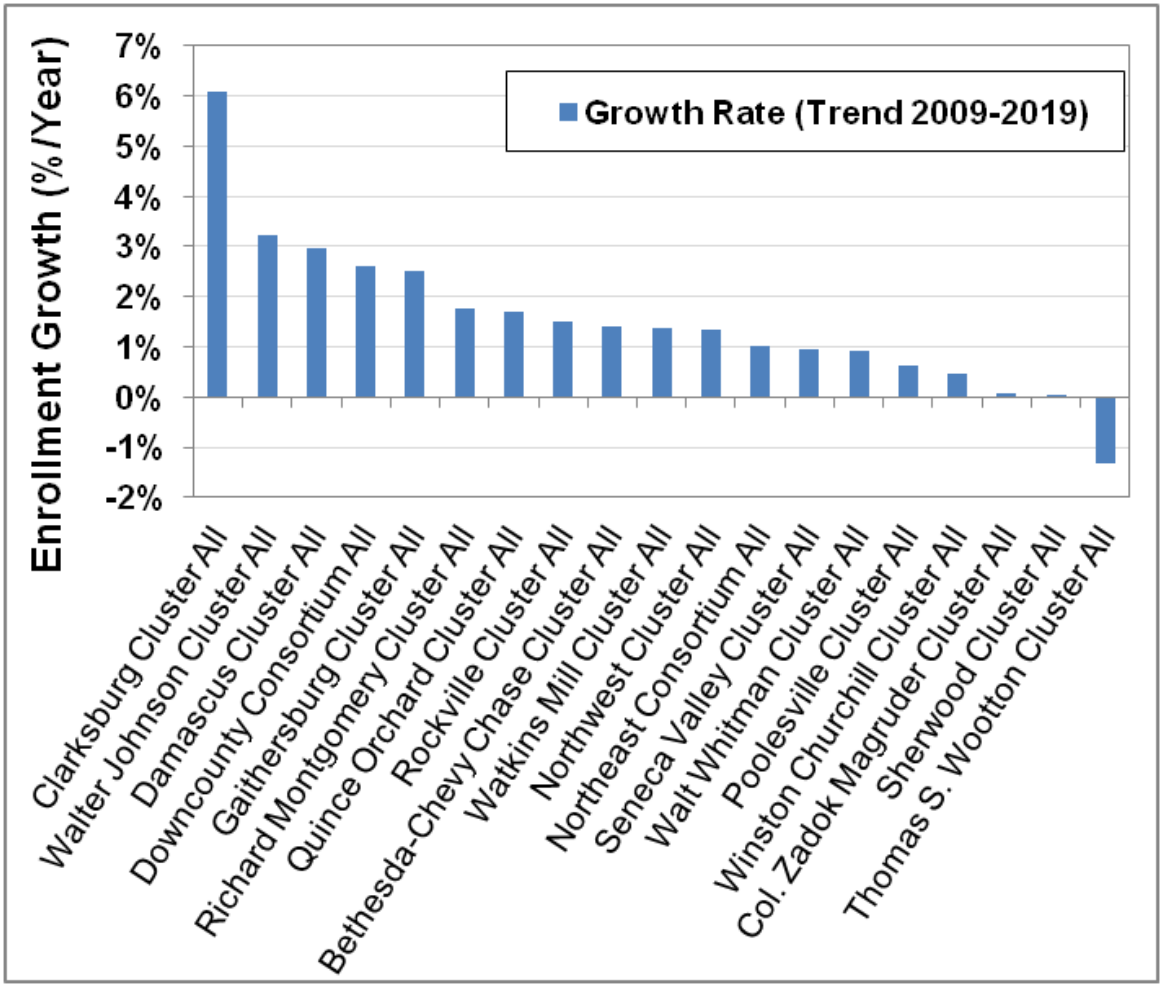


Mean (%/Year)	1.3%
Std Deviation (%/Year)	2.2%

MCPS CIP SuperTool Output Examples

Cluster-Level Growth Analyses

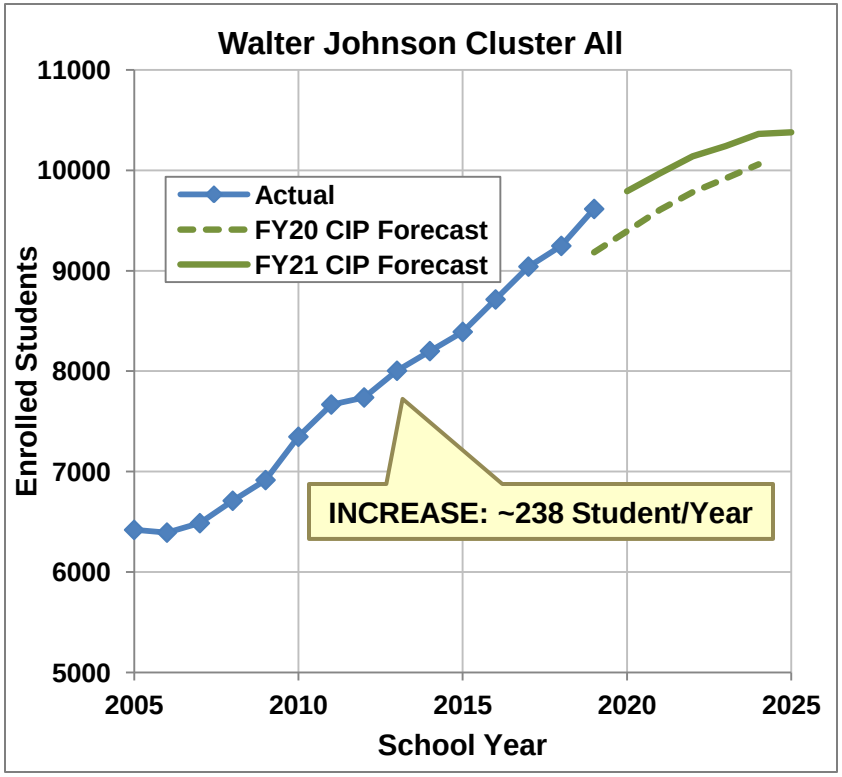
Yearly % Growth, Based on Linear Trend

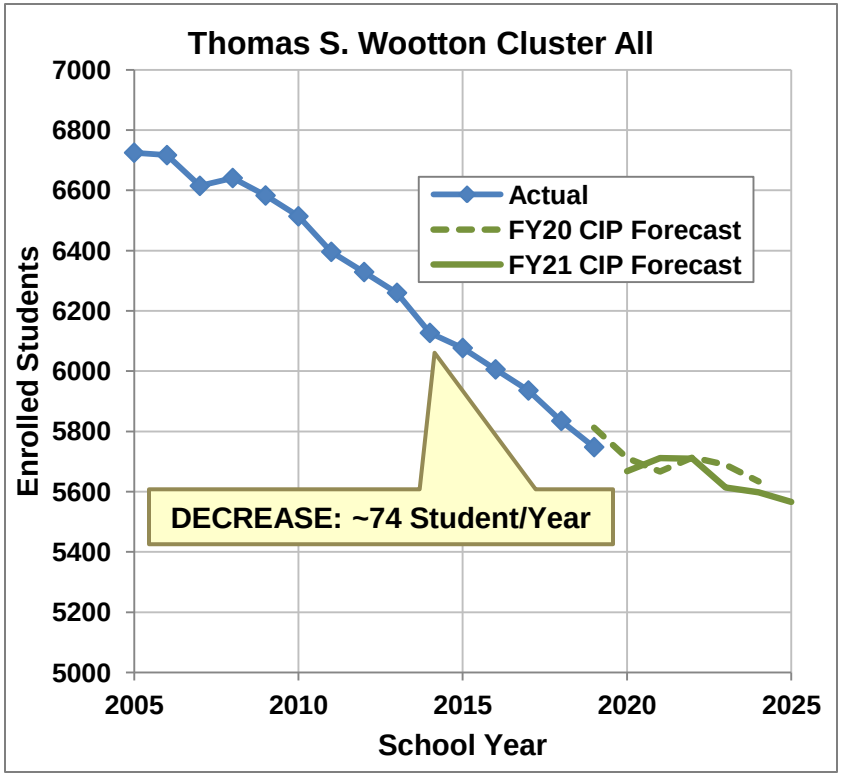


MCPS CIP SuperTool Output Examples

Growth Comparison: Walter Johnson versus Wootton Clusters

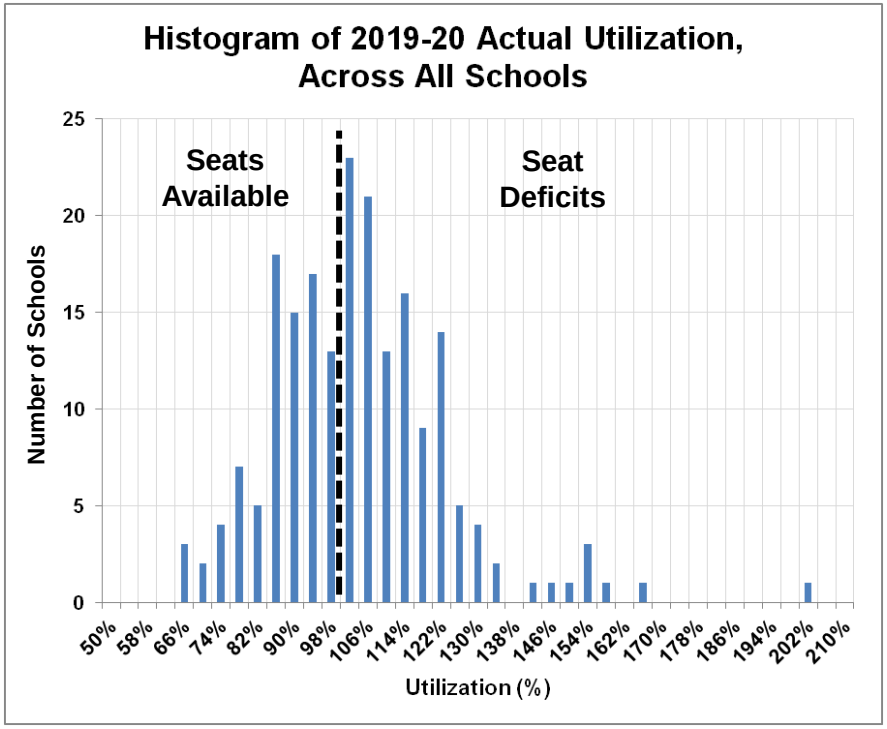
Historical Enrollment and FY20/21 Forecasts





MCPS CIP SuperTool Output Examples

Histograms of Actual Utilization



Mean (Error %)	**101.8%**
Std (Error %)	**19%**

Real-Time Demo of CIP SuperTool

[Real-Time Demo of CIP SuperTool]

Circling Back: Purpose

Why Develop the MCPS CIP SuperTool?

- **Can't rely on MCPS to assess themselves: puts MCPS CIP Data in the hands of community advocates and activists**
- **Provides quantitative support for hearing testimony**
- **Could be used to help improve forecasting methodologies**
- **A template-based approach allows the same set of charts to be generated for any school, just by clicking a button**

- **The CIP SuperTool can be a Powerful *Tool* (not an Analysis by Itself)**
- **Have Been Sharing SuperTool via Google Drive: will distribute Link to Latest Update**
- **Advocates need to Keep Pressure on MCPS to Fulfill *their* Responsibility to the Communities**
- **Current Forecasts are more Art than Science: Minimal Transparency, despite MCPS Claims**

Questions?

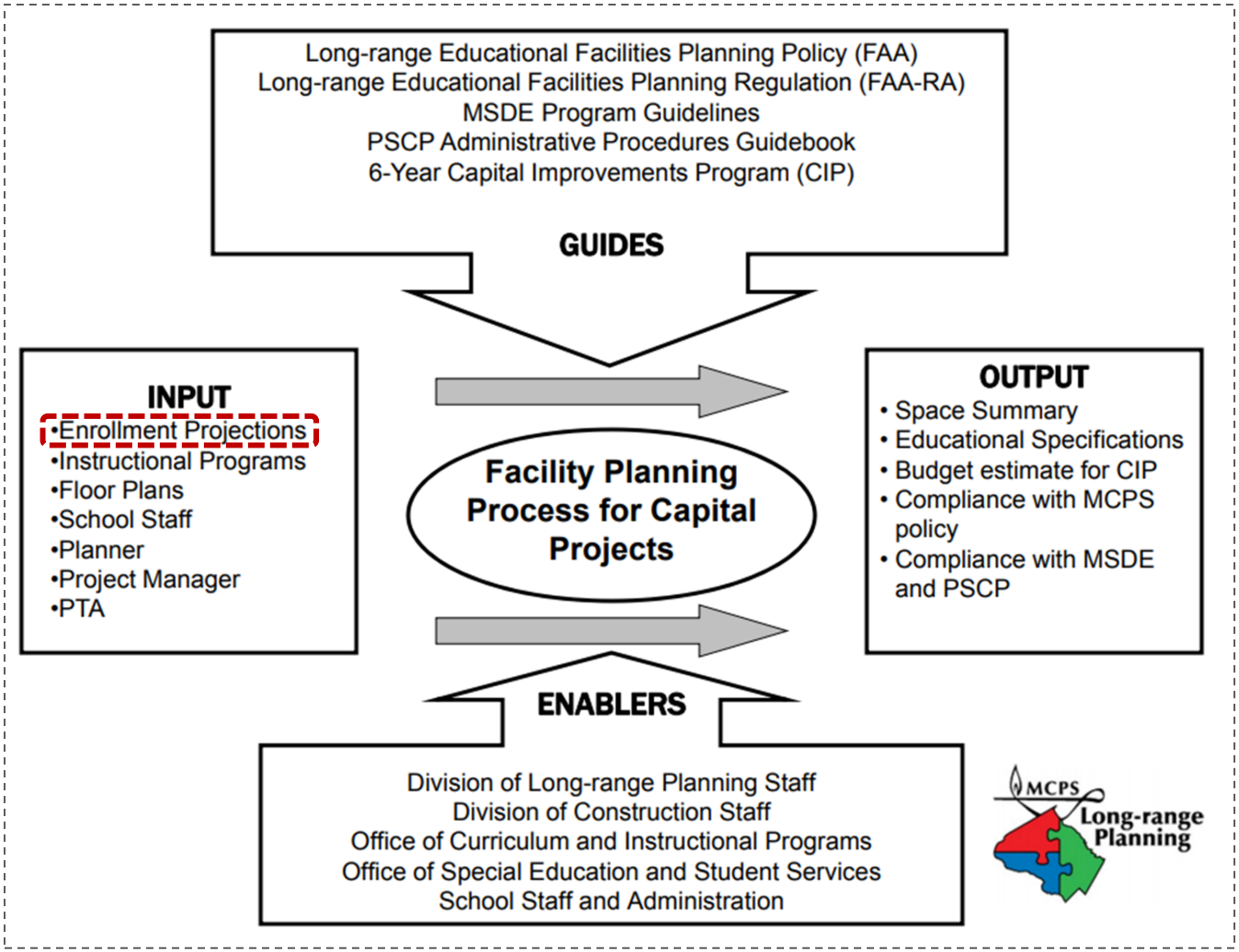
Thank You for Your Time and Interest

Back-Up/Support Slides

Back-Up and Support Slides

Background

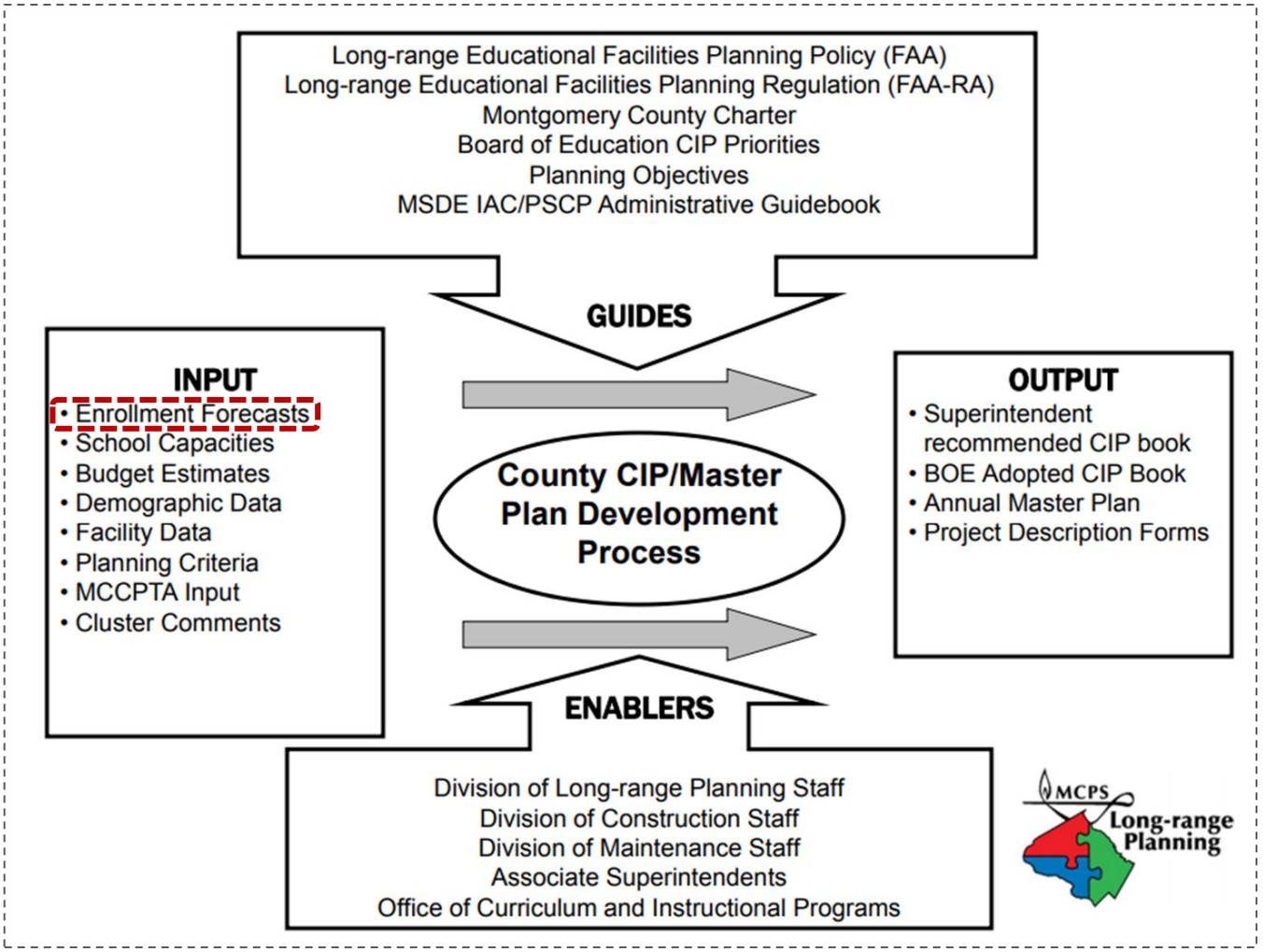
MCPS Facility Planning Process Map[1]



[1] http://gis.mcpsmd.org/processdocspdfs/ProcessDocs_FacilityPlanning.pdf

Background

MCPS CIP/Master Plan Development Process Map[1]



[1] http://gis.mcpsmd.org/processdocspdfs/ProcessDocs_CIPMasterPlanDevelopment.pdf