Central Iowa Regional Water Working Group

Status Quo Forecasts

June 2018

FCS GROUP
Solutions-Oriented Consulting

Agenda

- **Review of Phase 2 Objectives**
- **Overview of Long-Range Regional Demand**
- **Overview of Long-Range Regional Capacity Investments**
- **Status Quo Forecasts**
  - Des Moines Water Works
  - Total Service and Wholesale
  - Producers
- **Next Steps**

Your Team

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Review of Phase 2 Objectives

Phase 2 is a Business Case Evaluation

PHASE 2

ANSWERS

2

BIG

QUESTIONS

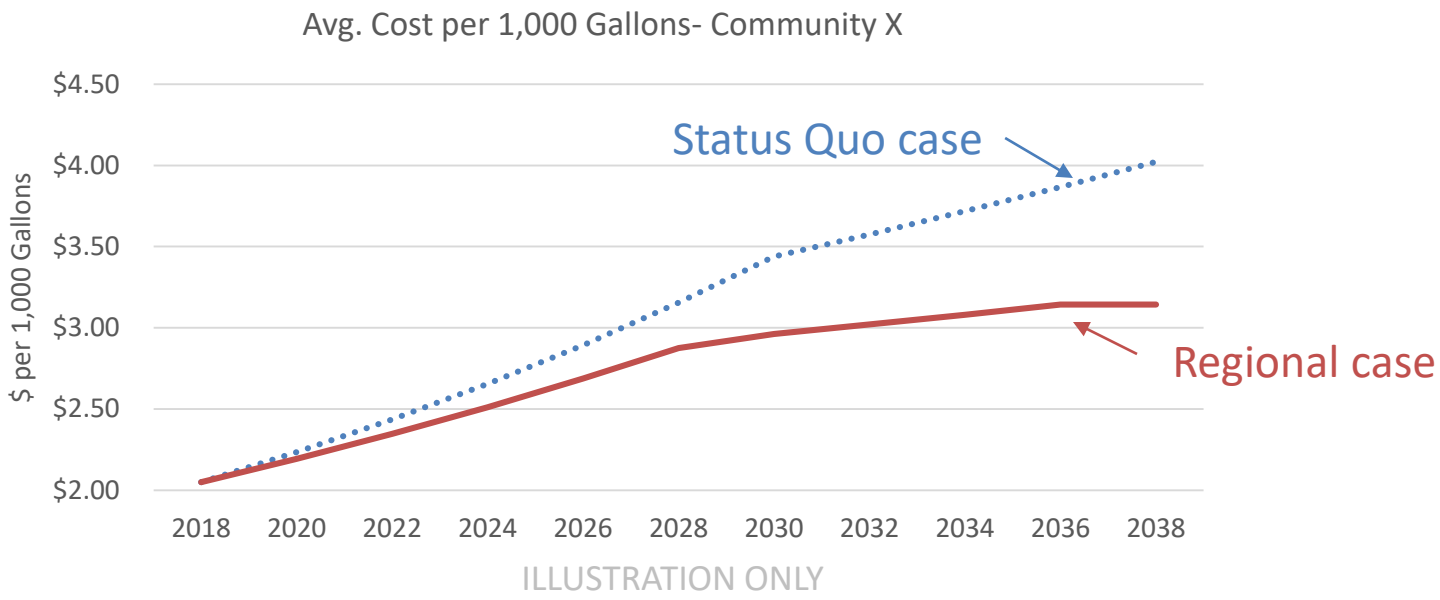
Question 1

What are the costs of producing with the current structures and approaches?

Question 2

What is the expected cost of producing assuming the presence of a regional Authority?

Quantify the Net Costs/Benefits



The difference between the total average cost per unit of production defines the net cost or benefit in the business case

Before we Begin…

- **This is a business case evaluation**
  - Our goal is to help you make an evidence-based decision on regionalizing
  - We have immersed ourselves in the details so you won't have to

- **Things you should watch out for:**
  - Consider all the facts, be aware of confirmation bias
  - Understand the difference between "accurate" , "precise" , and "material'
  - The answers will come, but patience is necessary

- **How we will handle questions**

Long-Range Regional Demand

Demands by Customer Type

- **We are using the below customer types in our analysis**

Producers	Potential Producers	Total Service*	Wholesale
DMWW	Ankeny	Polk County	Bondurant
Altoona	Urbandale	Windsor Heights	Clive
Polk City	Waukee	Pleasant Hill	Johnston
WDMWW		Runnells	Norwalk
Grimes		Cumming	Warren
		Alleman	Xenia
		Berwick	

**Note: Total service customer demands are consolidated with DMWW in our forecast*

Our Forecast of Regional Demand

- **Base data source is the Long Range Plan**
- **Added / Subtracted the adjustments requested by members**
- **Extended the forecast to 2060 using trend analyses for each member**
  - The LRP only goes to 2040
  - Our forecast goes to 2060

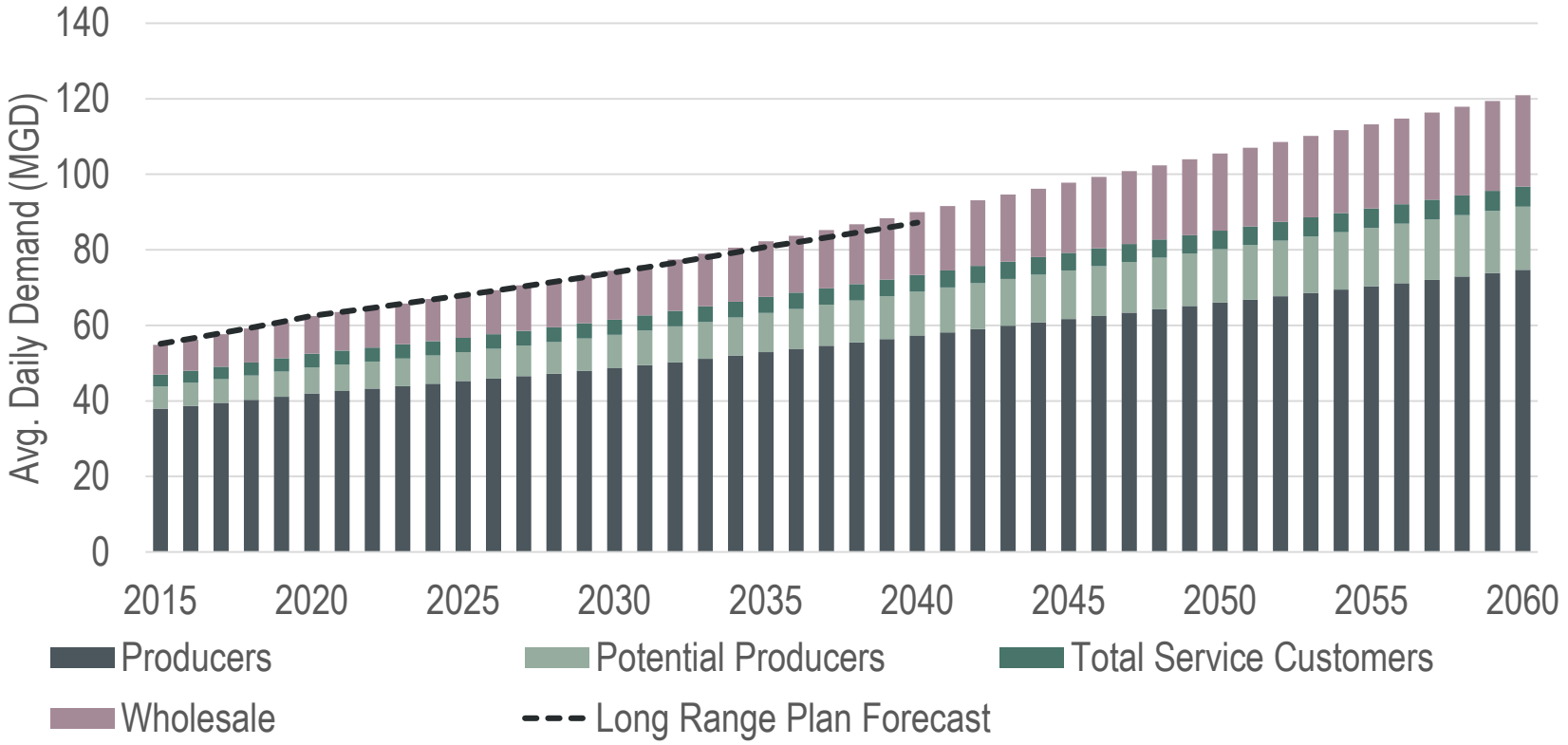
Adjustments to the LRP Demands

- **We asked members to provide us with their adjustments to the demand forecast presented in the Long Range Plan**

Member	Changed Avg. Day	Changed Max. Day
Bondurant	Yes	Yes
Clive	Yes	Yes
Norwalk	Yes	Yes
Warren	Yes	No
Grimes	Yes	Yes

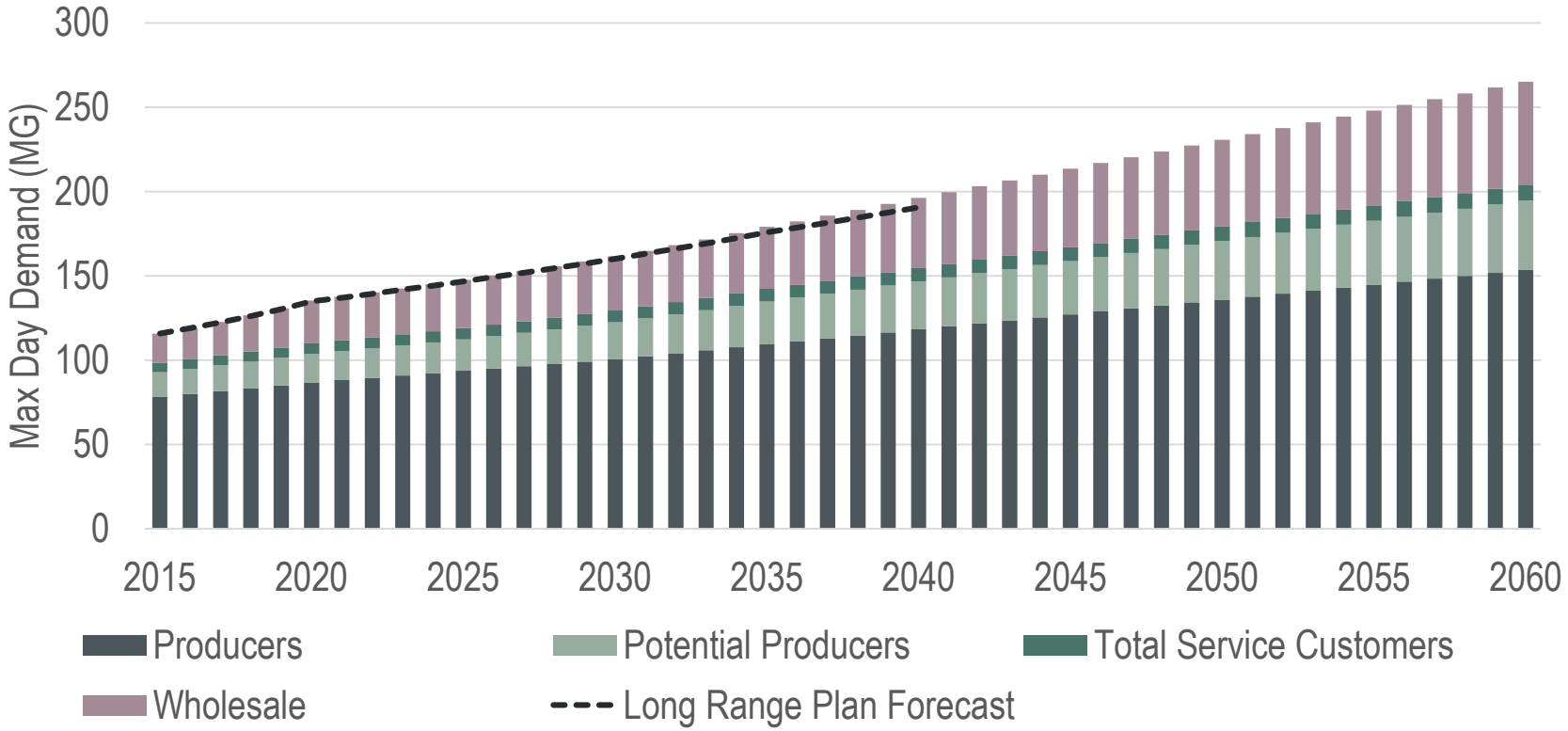
The sum of all changes results in an increase of 3% by 2040; an increase of 7% to the extended forecast to 2060

Average-Day Demand by Customer Type



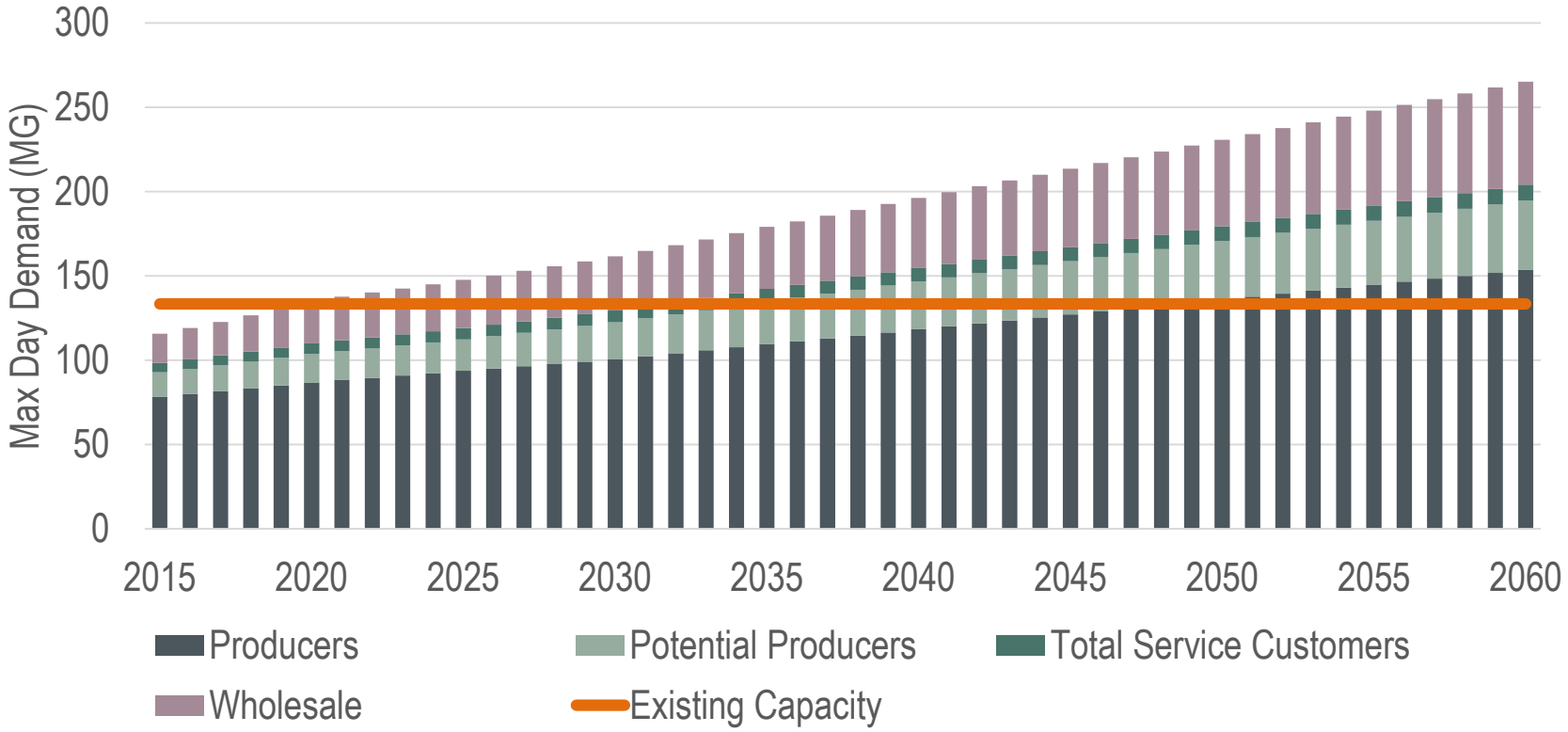
Despite some differences among individual demand levels, our total regional forecast matches the LRP very closely

Maximum-Day Demand by Customer Type



Our forecast of max-day demand uses the same factors as the LRP and achieves similar results

Max-Day Demand vs. Current Capacity



The region will need additional capacity as early as 2021 and needs to add at least 131 MGD in the long term

Long-Range Capacity and Investments

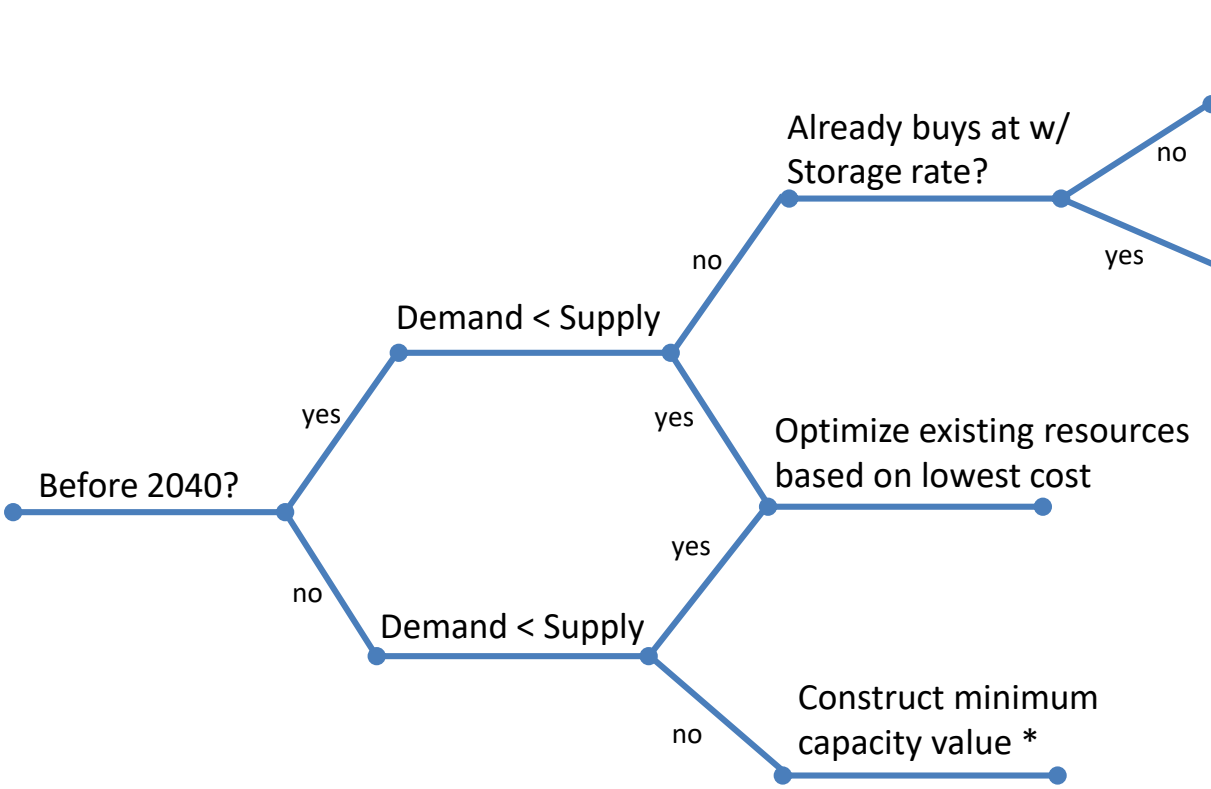
Our Forecast of Capacity and its Cost

- **Base data sources included:**
  - Long Range Plan
  - Urbandale Plan (Water Treatment & Supply Prelim. Engineering Rpt.)
  - West Des Moines Plan (Joint Waukee/WDM Study)

- **Input from individual members was used, if:**
  - The information was verifiable
  - Had reasonable timing and cost data

- **We made assumptions about additional expansion**
  - When forecasted demand > available capacity (i.e., supply)
  - Applied a set of business logic (see next)

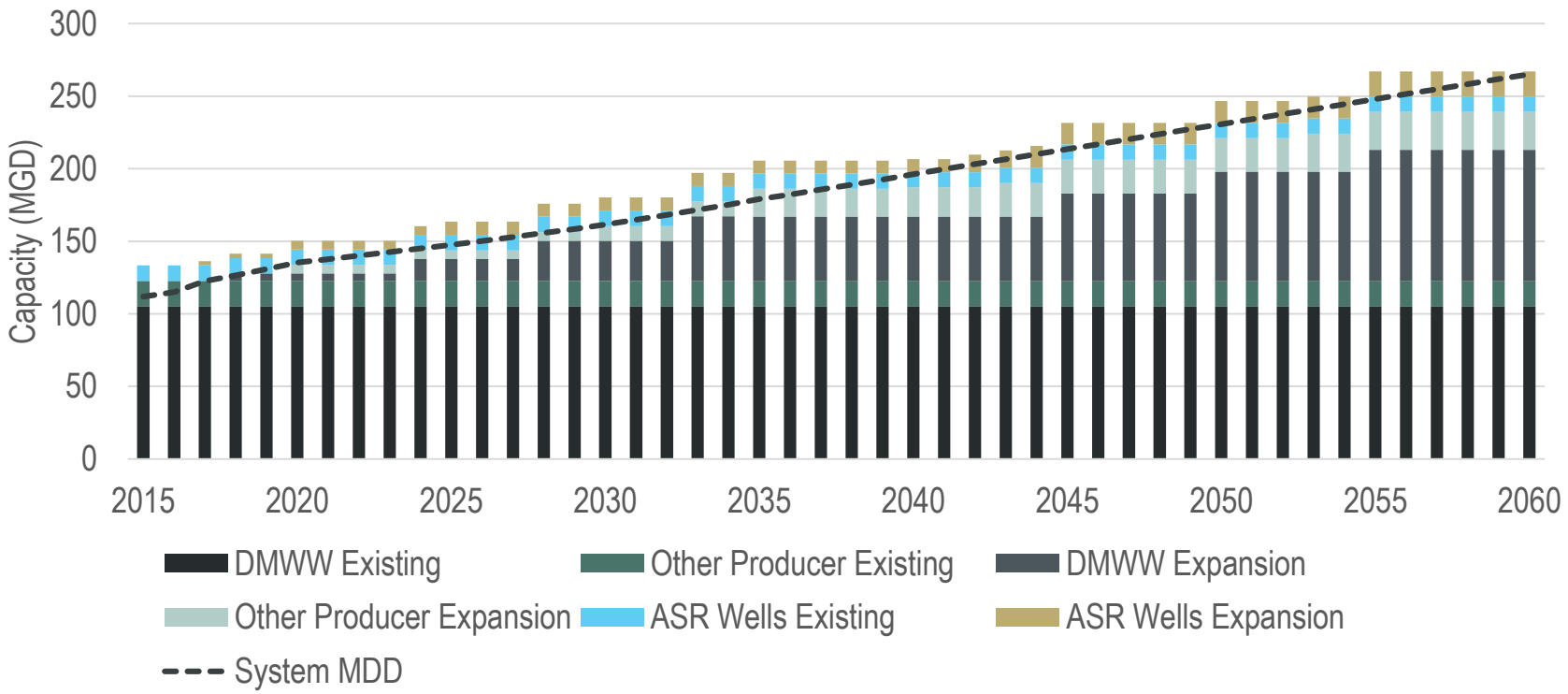
Business Logic for Capacity Gaps



Note:
Logic applies only to producers. Others meet their supply needs by purchasing from DMWW at applicable rate at that time.

* ***Minimum capacity value***: sufficient capacity to meet next 5 years of forecasted max-day demand; at average cost per MGD adjusted for cost escalation (inflation) based on the most recent expansion cost within the regional model.

Regional Capacity Forecast



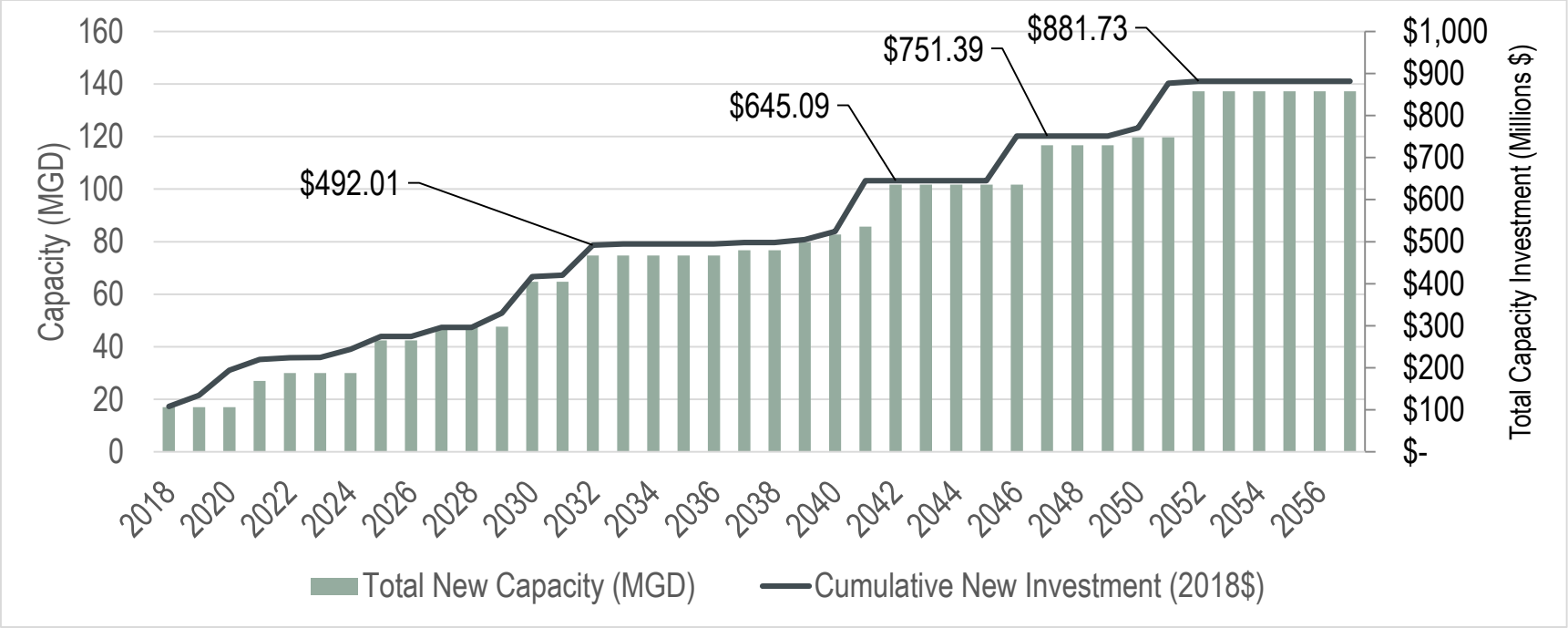
The needs of the region are met through individual efforts of water producing agencies

Regional Capacity Investments to 2060

Responsible Agency	Capacity Added	Estimated Cost
Des Moines Water Works	99.5 MGD	$679.8M
West Des Moines WW	7.5 MGD	$25.8M
Urbandale	8.0 MGD	$67.5M
Waukee	7.5 MGD	$25.8M
Grimes	12.2 MGD	$77.8M
Ankeny	2.5 MGD	$4.9M
Total	**137.2 MGD**	**$881.7M**

In total the region will add 138 MGD at an estimated cost of $882 million (2018 dollars)

Regional Capacity Investment Costs



Year	Capacity Added (Total)	$ / MGD
2032	74 MGD	$6.65
2041	27 MGD (101 MGD)	$5.67
2046	16 MGD (117 MGD)	$6.63
2052	20 MGD (137 MGD)	$6.54

DRAFT – PRELIMINARY RESULTS

Status Quo Forecasts

Key Term: Average Cost per Unit

$$\frac{\text{Total Annual Cost}}{\text{Units of Water Delivered}} = \text{Avg. Cost per Unit}$$

"Total Annual Cost" – *the sum of all operating and capital costs incurred to produce the water in relevant period.*

"Units of Water Delivered" – *the sum of all gallons of water delivered to customers during the same period.*

Example: Average Cost per Unit

- **Community A has two water treatment facilities. The cost of operating plant No. 1 (10MGD plant) is $5m and the cost of operating plant No. 2 (14 MGD plant) is $4m. The annualized capital cost is $2m and $4m for Plant No. 1 and 2, respectively. Plant No. 1 delivered 3.65 billion gallons, and Plant No. 2 delivered 2.92 billion gallons. What's the total average cost per unit for Community A?**

Cost	Plant 1	Plant 2	Total
O&M	$5m	$3m	$8m
Capital	$2m	$4m	$6m
Total	$7m	$7m	$14m
Water Delivery	3.65	2.92	6.57
Avg. Cost per 1,000 Gallons	$1.91	$2.40	$2.13

Capital Costs

Capital costs are the those costs incurred to acquire assets, including the costs of capital used, and investments to maintain, preserve, and extend the assets' lives.

Activity	Cost	Period
Purchased an asset	$20M	1
Extended asset life	$5M	6
Repaired the asset	$2M	10
Expanded capacity	$10M	12

Question: how much capital cost in year 8?

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Quantifying Capital Costs in Forecasts

Step 1: Amortize the Asset Investments

Activity	Cost	Period	Useful Life	Annual Cost
Purchased an asset	$20M	1	40	$500,000
Extended asset life	5M	6	40	125,000
Total	$25M			**$625,000**

Step 2: Recognition of Cost of Capital

Activity	Original Cost	Acc. Depreciation	Balance in Year 8
Purchased an asset	$20M	$4M	$16M
Extended asset life	5M	0.25M	4.75M
Total	$25M	$4.25M	$20.75M
Cost of Capital			X 6%
$ Cost of Capital			**$1.25M**

$1.9M
total

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FAQ on Capital Costs

Q: What if all the investments are paid in cash? Aren't annual capital costs zero then?

A: The best way to recognize capital costs is to match the portion of the investment used in the year (period) in which the water is produced.

Q: If we pay for assets in cash with no debt financing, aren't the costs of capital zero?

A: The best way to recognize the cost of capital for making an economic decision is to assign cost to all capital used, including the retained earnings (i.e. equity, or cash reserve) of the utility.

Q: We don't charge customers for use of our cash reserves, so why include those "imaginary costs" in your forecast?

A: The costs are not imaginary. Customers were charged when they paid rates above and beyond annual costs. There is an economic cost with that source of capital just like there is for any source of capital.

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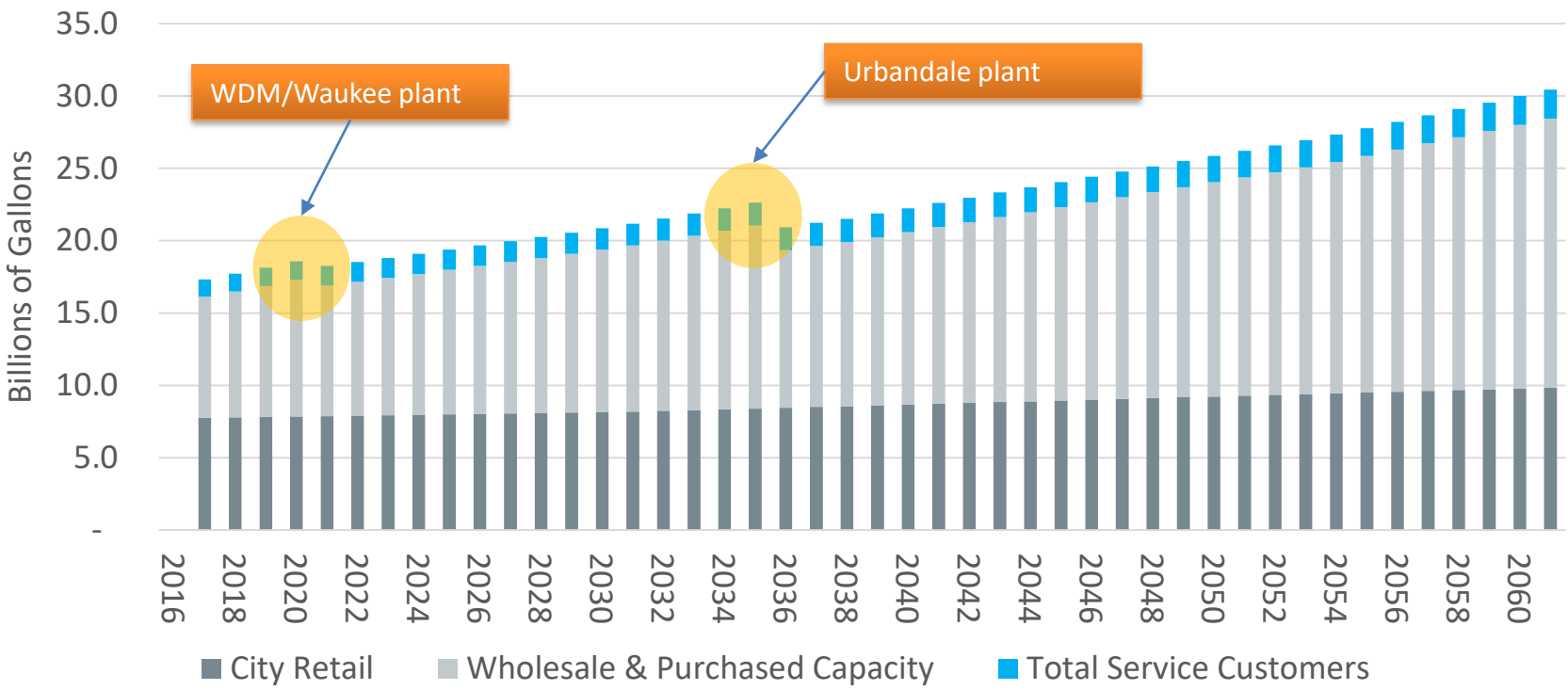
Des Moines Water Works and Total Service Customers

Des Moines Water Works

- **DMWW's Long Range Plan calls for increasing capacity levels to meet regional demands with important exceptions**
  - If Urbandale constructs capacity, DMWW plan changes
  - We have also assumed that when WDM/Waukee constructs that the DMWW plan would also change
  - Both cause a change in timing for DMWW planned additions to capacity
- **DMWW sets prices for all retail, total service, and wholesale (including purchased capacity) deliveries**
  - We followed existing DMWW cost-of-service methodologies
  - Those forecasts are linked to all others
- **Total Service customers are those communities served under contract with DMWW and will continue receiving that service**

Demands Met by DMWW Facilities



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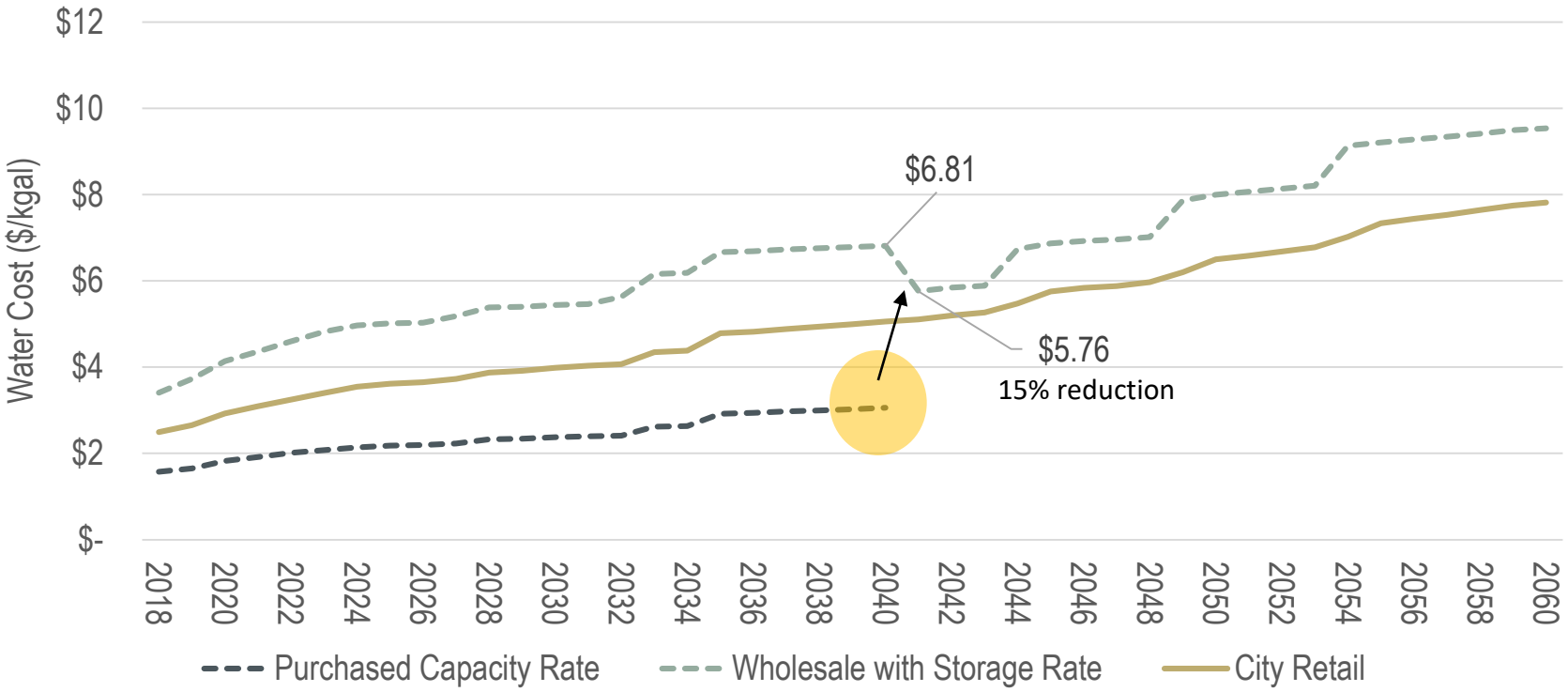
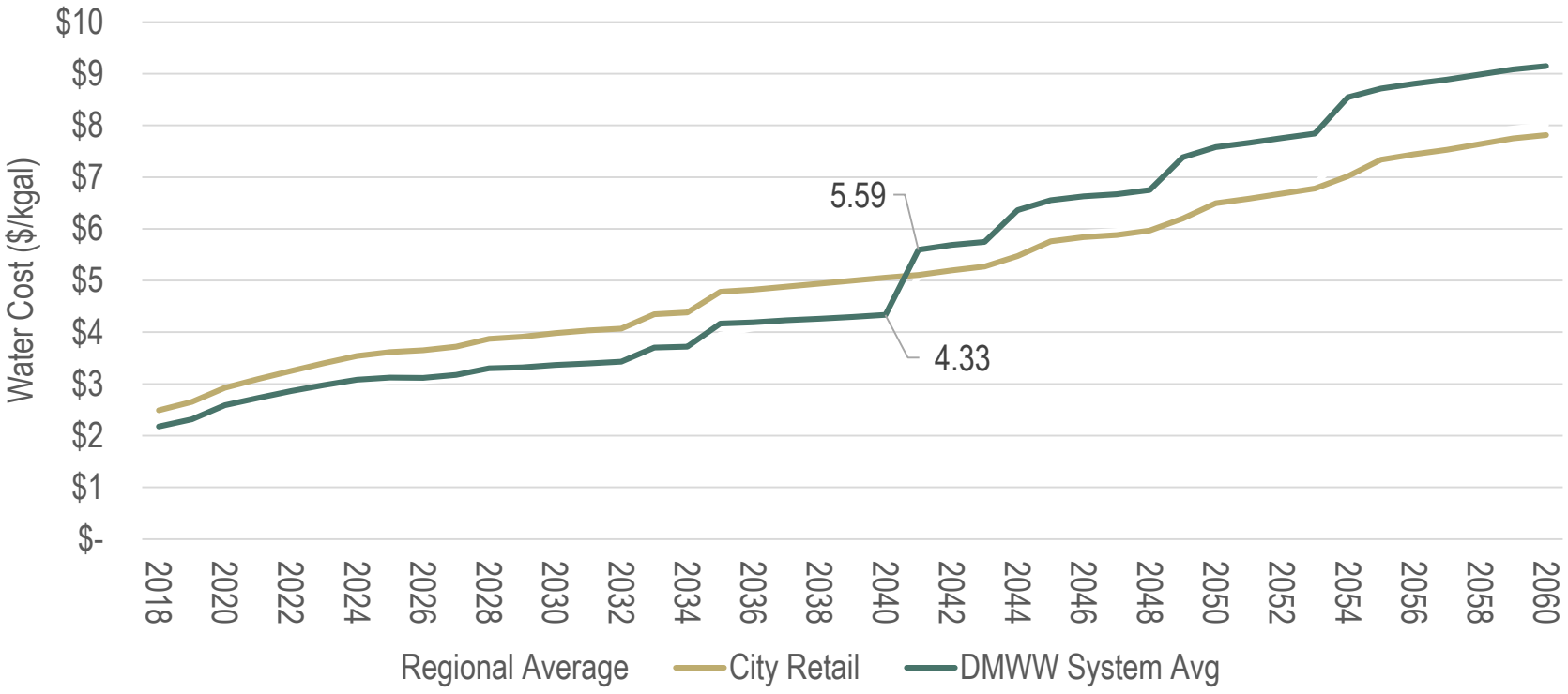
DMWW – Avg. Costs



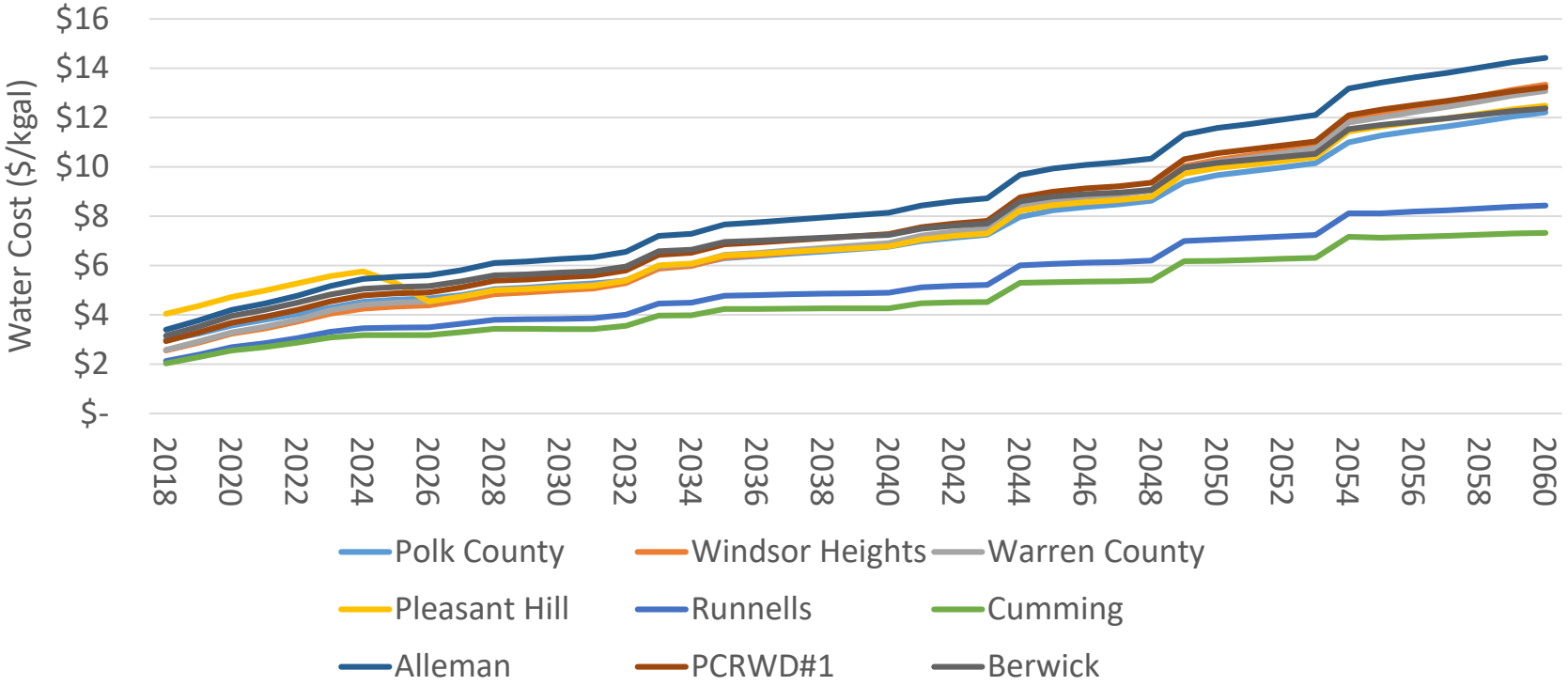
A significant assumption at this point is that the purchased capacity rate would end at the expiration of the contracts, to be replaced by the wholesale rate

DMWW – Avg. Costs



Average cost per unit for Des Moines deliveries jumps 30% even while the avg. cost of wholesale service decreases.

Total Service Avg. Costs per Unit



Differences in rates for Total Service customers depend on multiple factors including peaking factors and fire protection needs – all of which we have included in our model

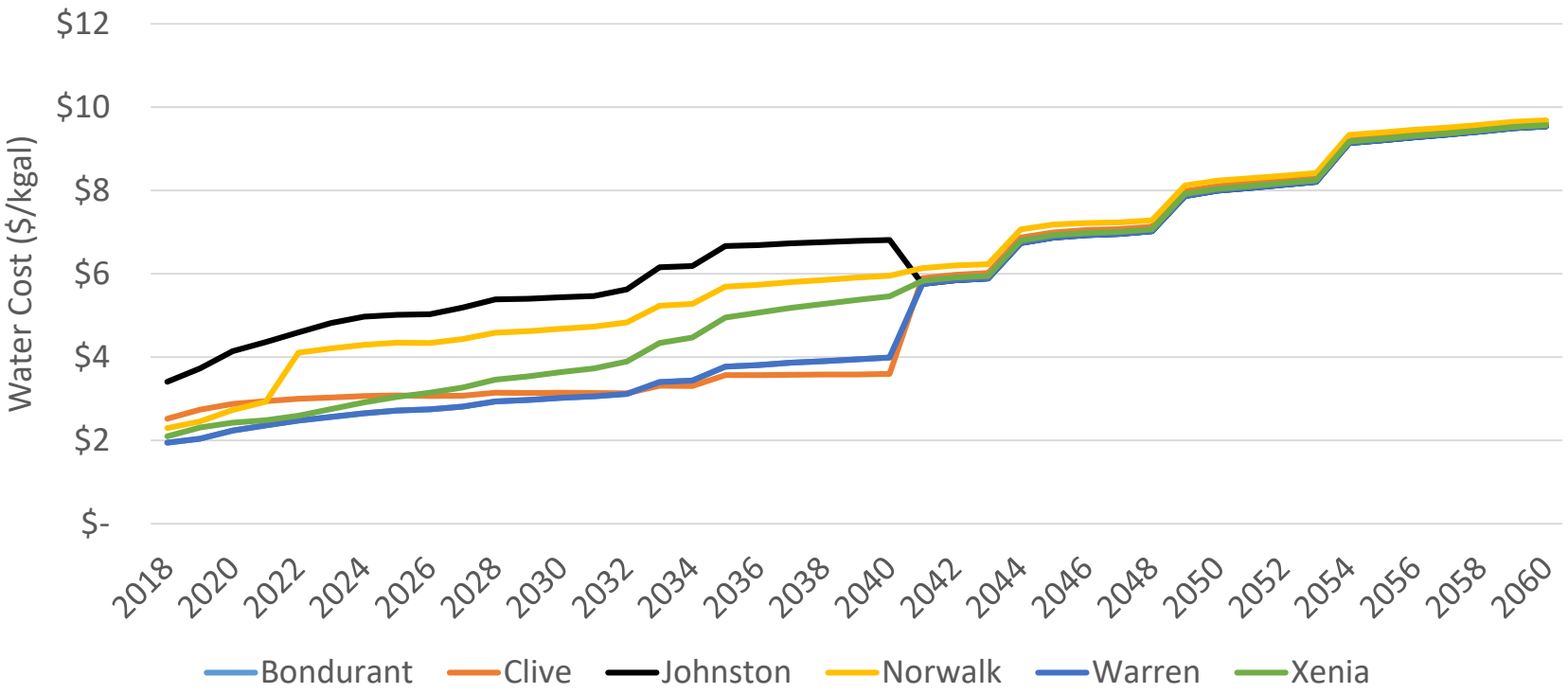
Wholesale

Wholesale Customers

- **Wholesale customers are those communities who**
  - Do not own physical production now
  - Have not announced any plans for owning production in the future
  - Currently buy from DMWW at either purchased capacity or wholesale rate

- **Wholesale communities meet all demands by purchasing from DMWW**
  - Before 2040 – maximize purchased capacity, if any, and buy remainder at full wholesale rate
  - Expiration of purchased capacity agreements effectively merges the purchased capacity and full wholesale rates

Wholesale Avg. Cost per Unit



Differences in average cost up to 2040 are the result of different mixes of purchased capacity and wholesale rates unique to each community.

Producers & Potential Producers

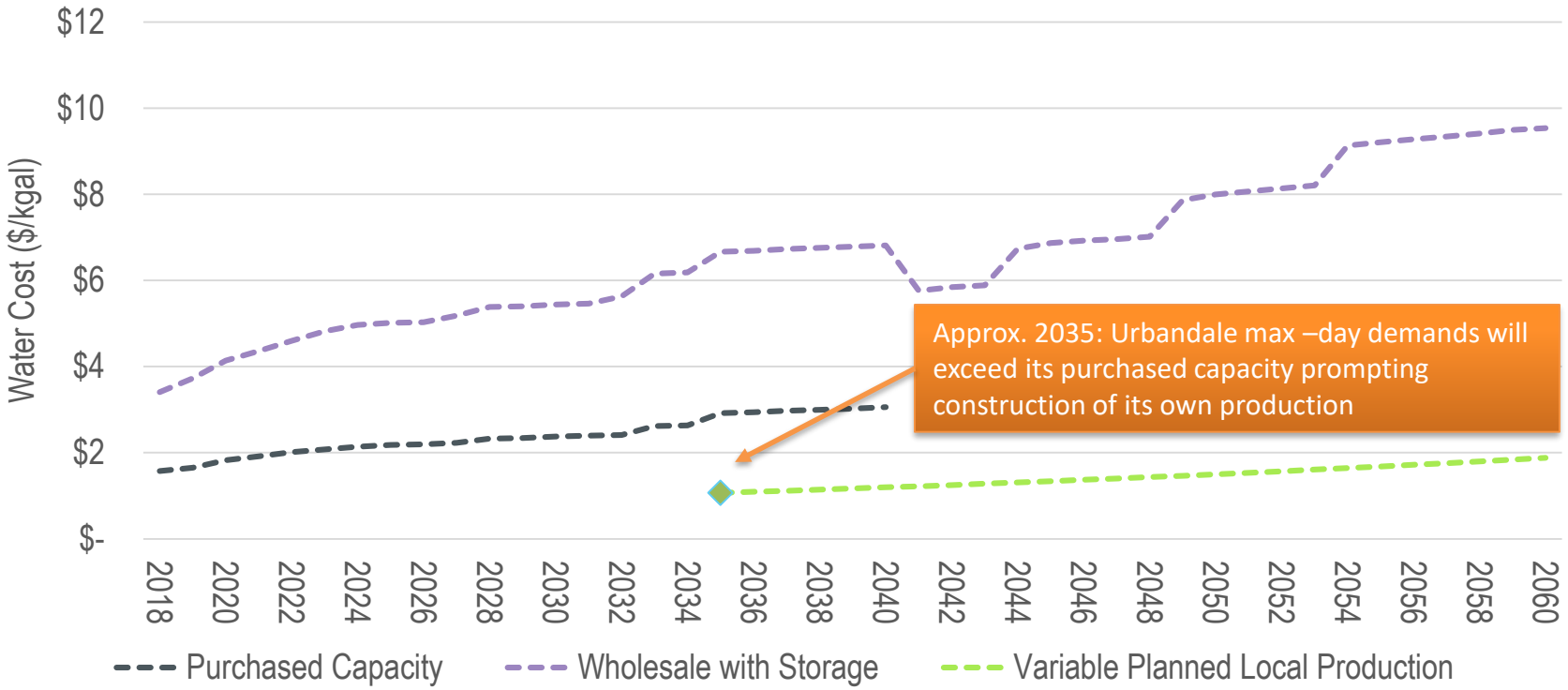
The Producers

- **Producers are those communities who**
  - Already own their own physical water production infrastructure, or
  - Have verified plans to own such production in the future

- **Producers face a different set of economic choices in the future than other communities**
  - Given a portfolio of known costs for different sources
  - Select the least expensive method of producing first, the next most expensive second, and so forth until all demands are satisfied

- **How we modeled these decisions?**
  - New plant timing based on avoiding wholesale w/ storage rate
  - Then, each period, select the source with the lowest variable cost per unit
  - Maximize that supply until exhausted before selecting the next most expensive

Urbandale – Variable Costs by Supply Source



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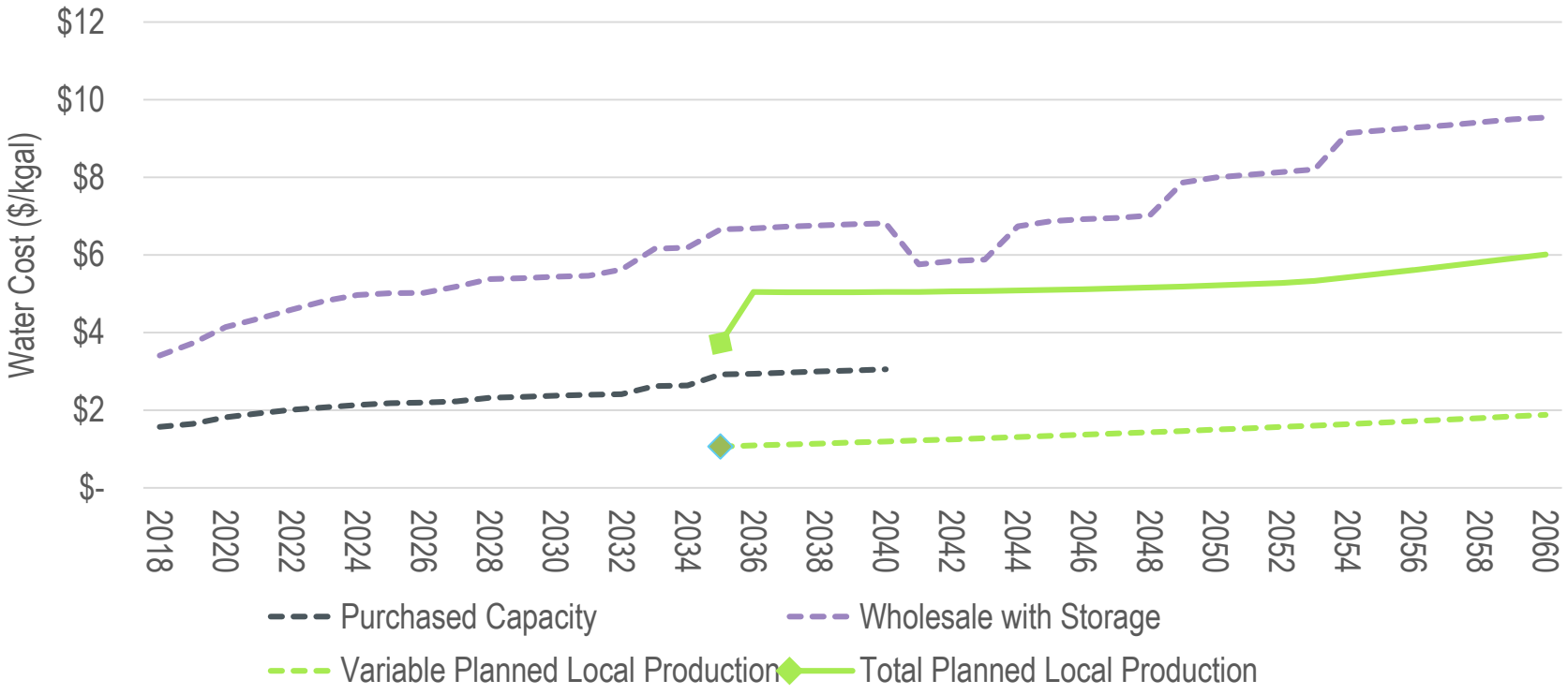
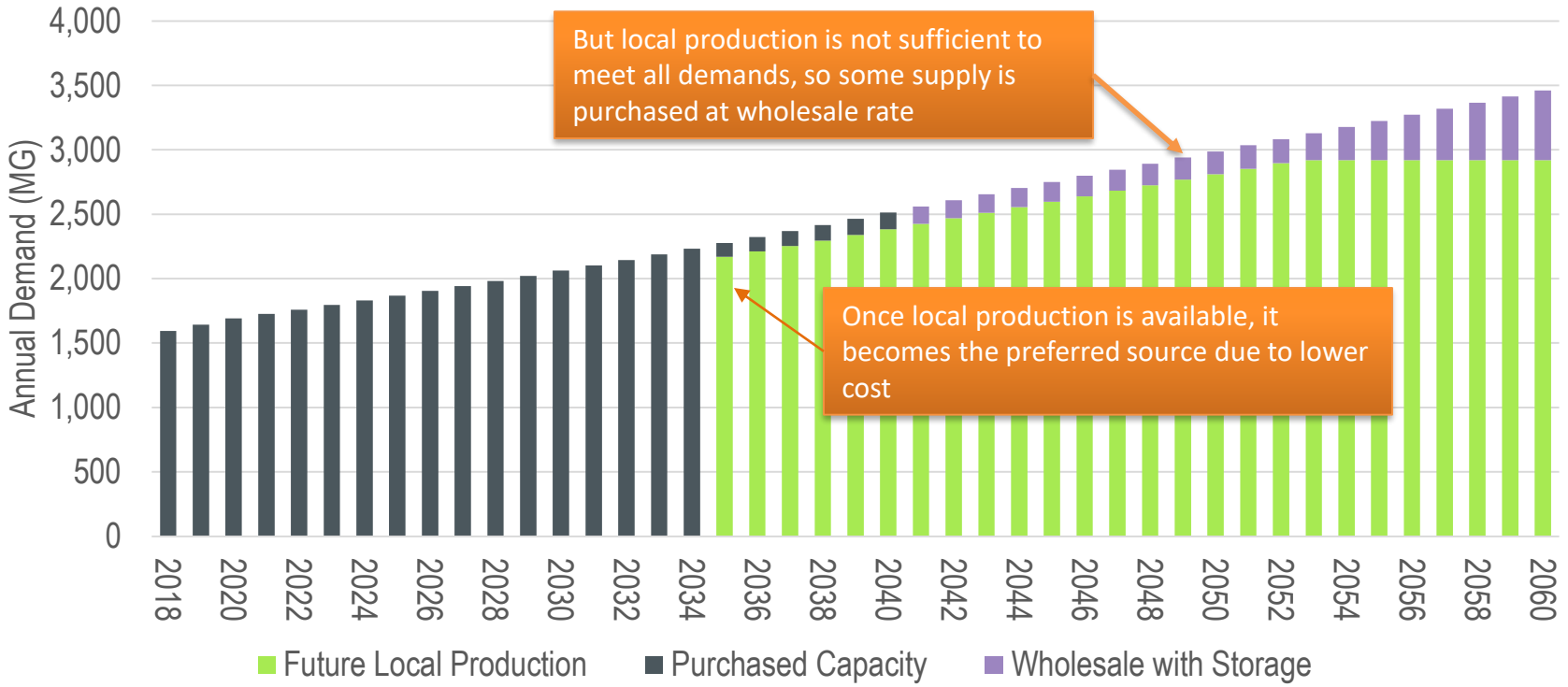
Urbandale – Full Cost by Supply Source

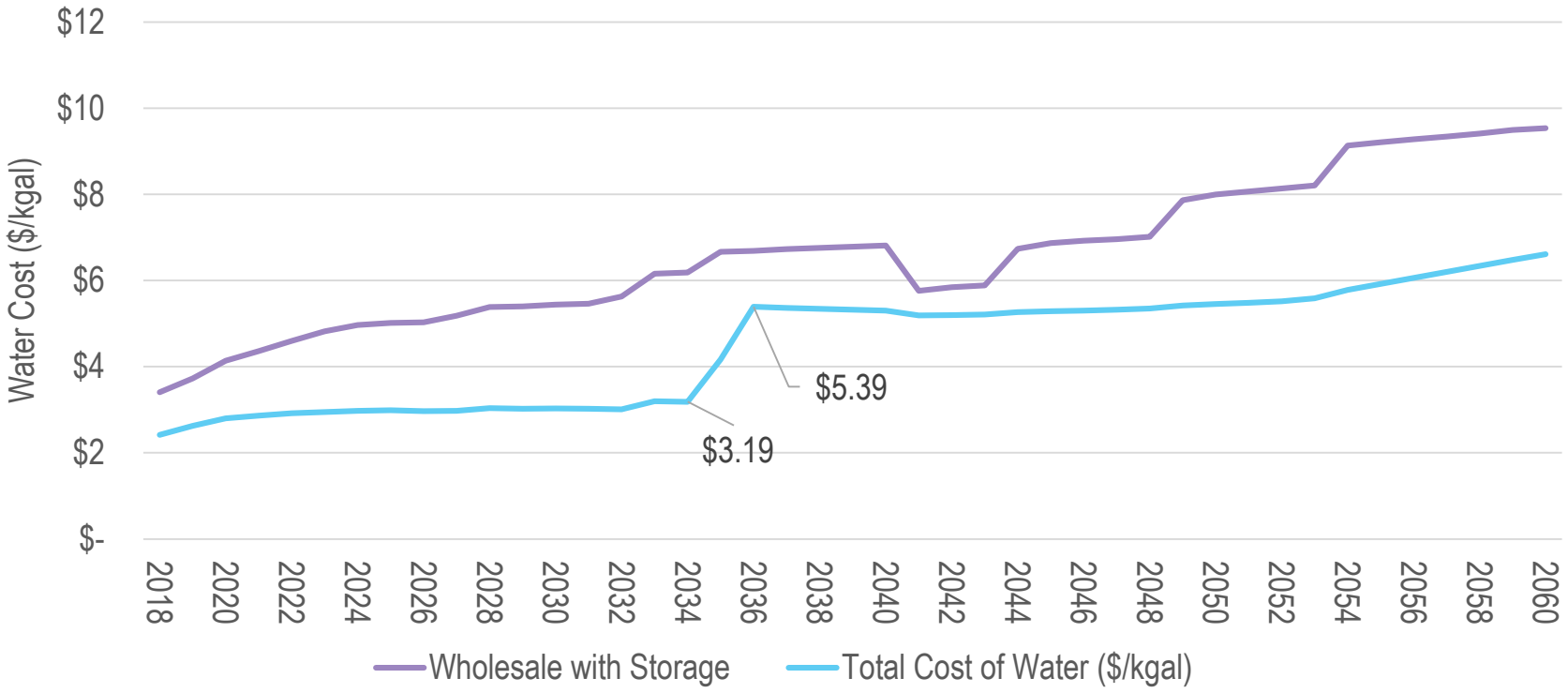


The amortized capital cost and fixed operating costs of Planned Local Production raise the total cost above the forecast Purchased Capacity rate, but still below the Wholesale with Storage rate.

Urbandale – Usage by Source

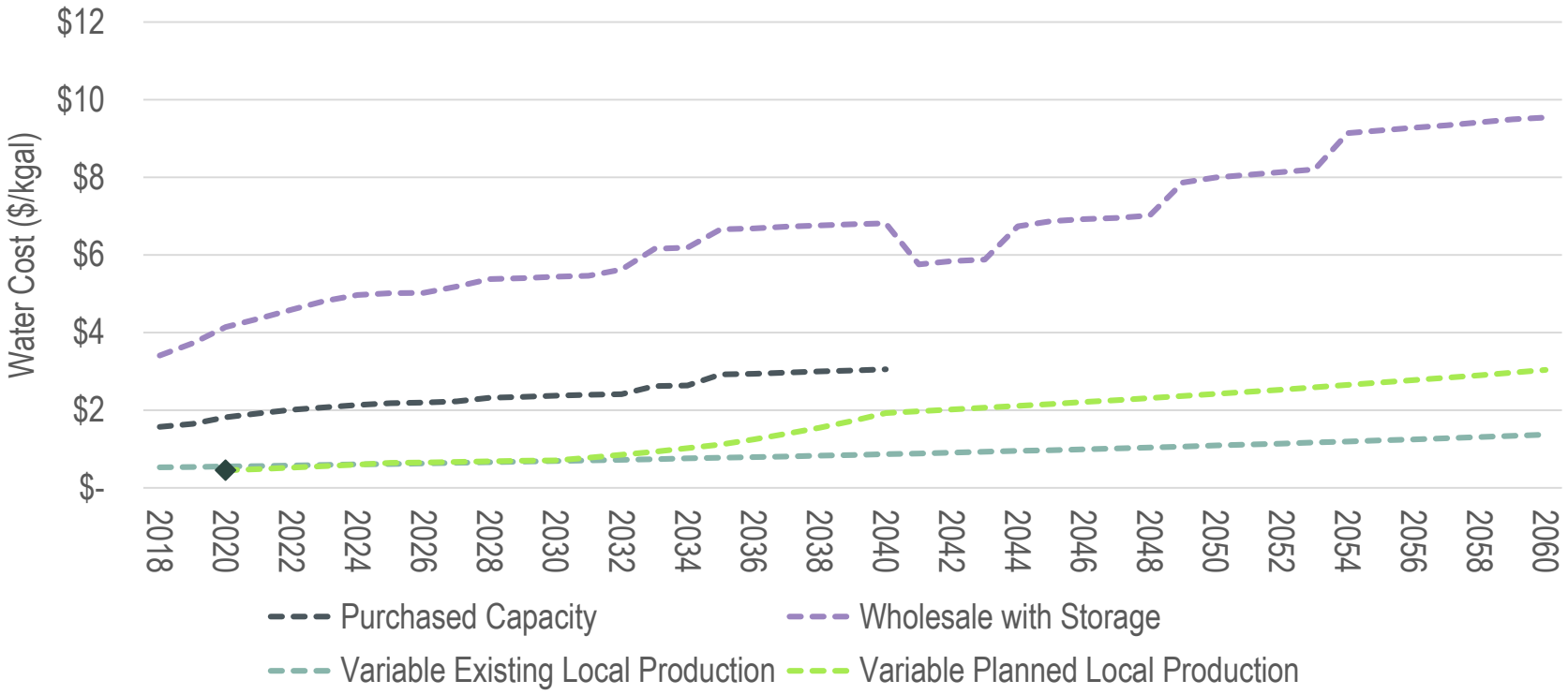


Urbandale – Total Avg. Cost per Unit



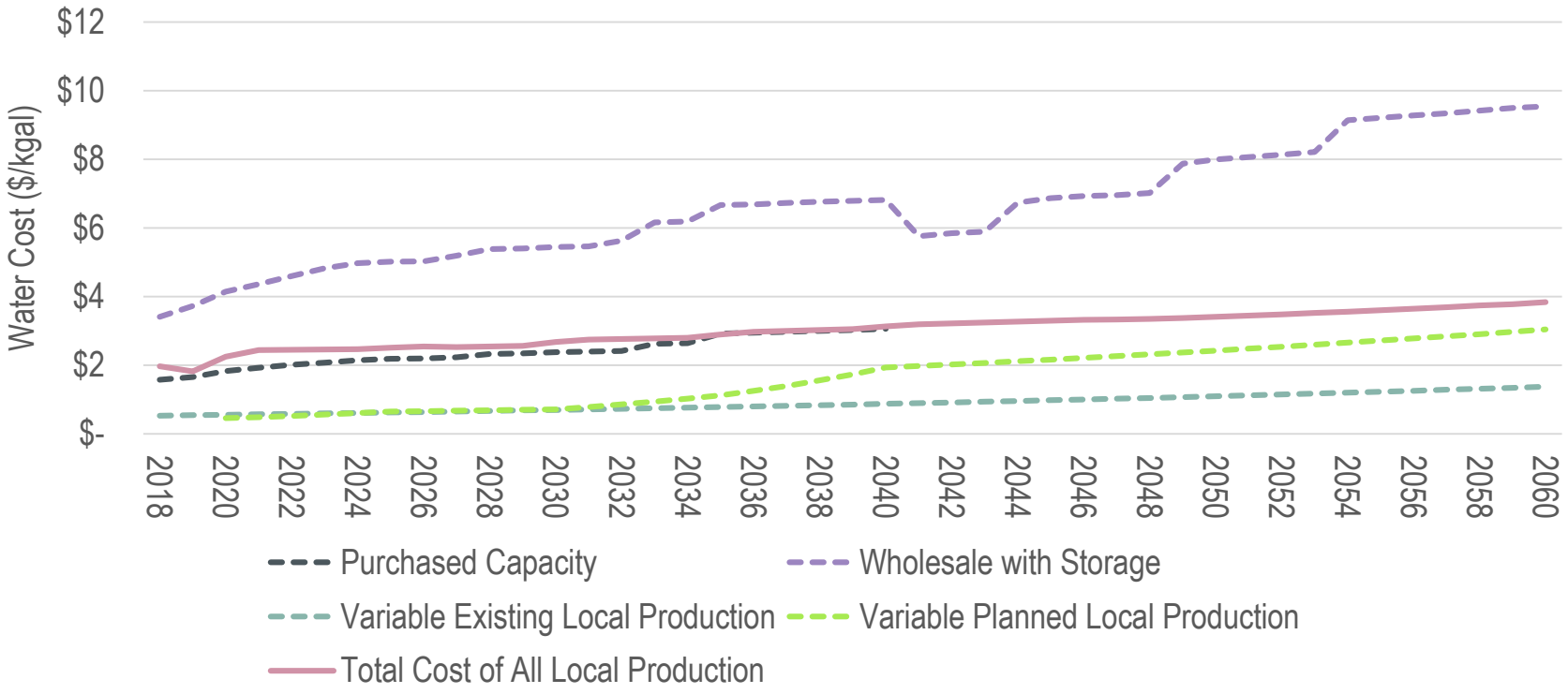
Shifting to local production increases avg. cost per unit due to increase in fixed cost – but avg. cost is still less than it would be otherwise.

West Des Moines – Variable Cost by Supply Source



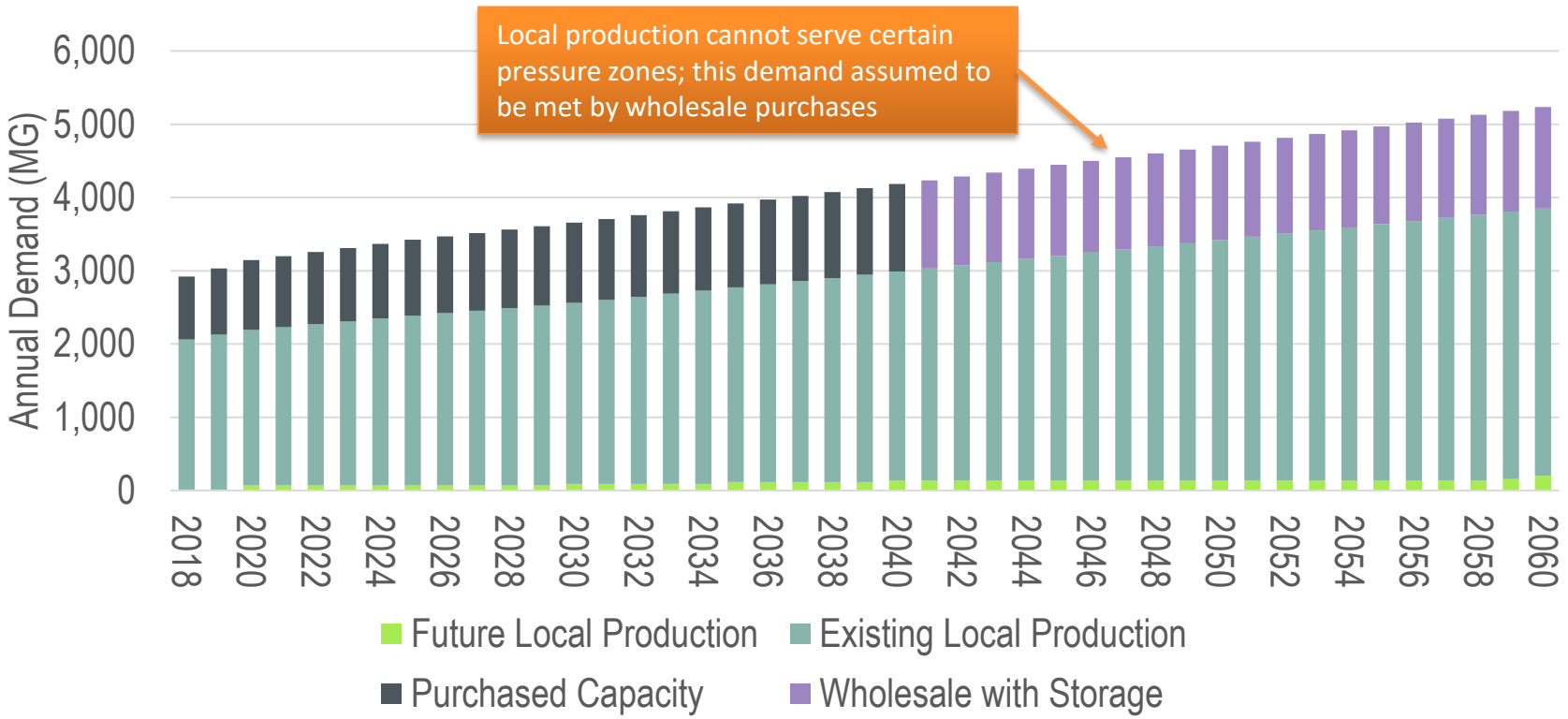
Joint WDM/Waukee plant comes online in 2020 because that timing avoids moving WDM into the wholesale w/ storage rate.

West Des Moines – Full Cost by Supply Source

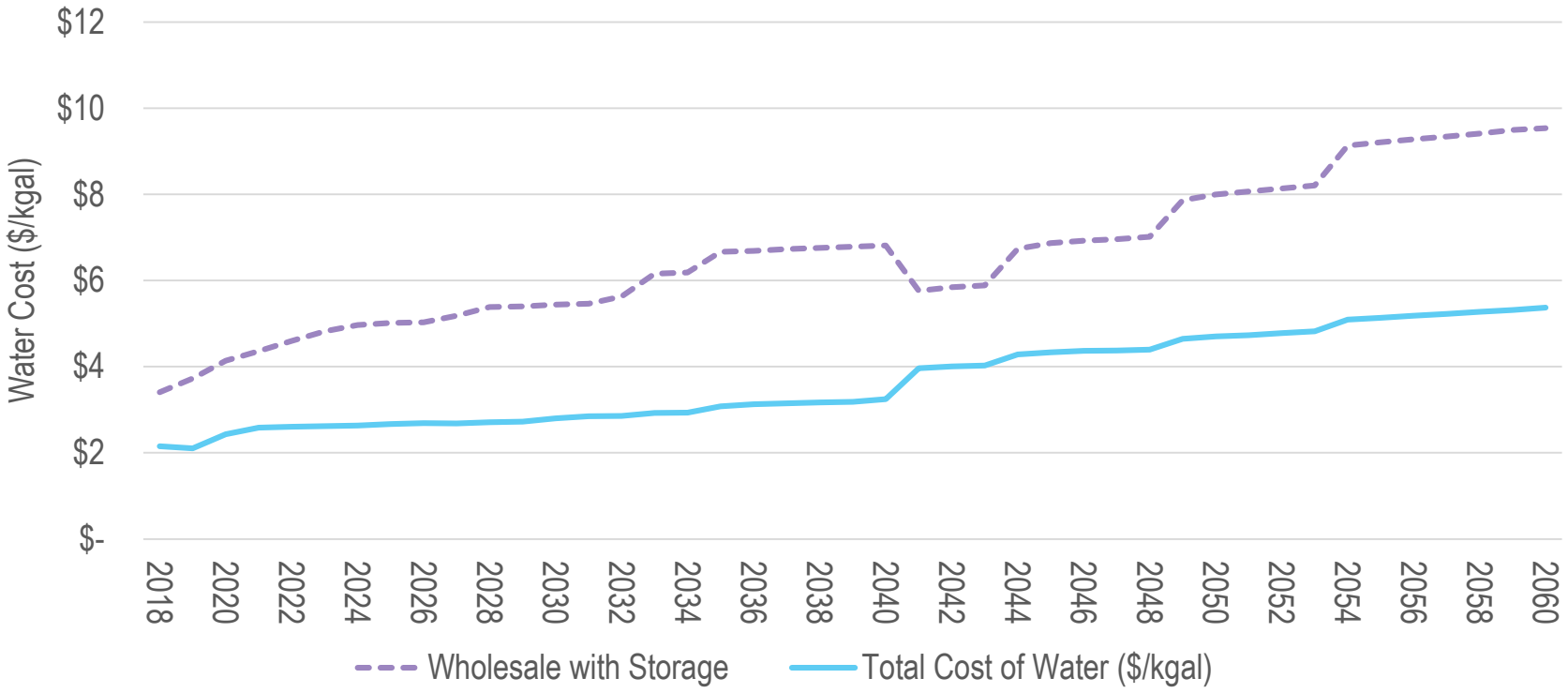


The amortized capital cost and fixed operating costs of Local Production raise the total cost above the forecast Purchased Capacity rate, but still below the Wholesale with Storage rate.

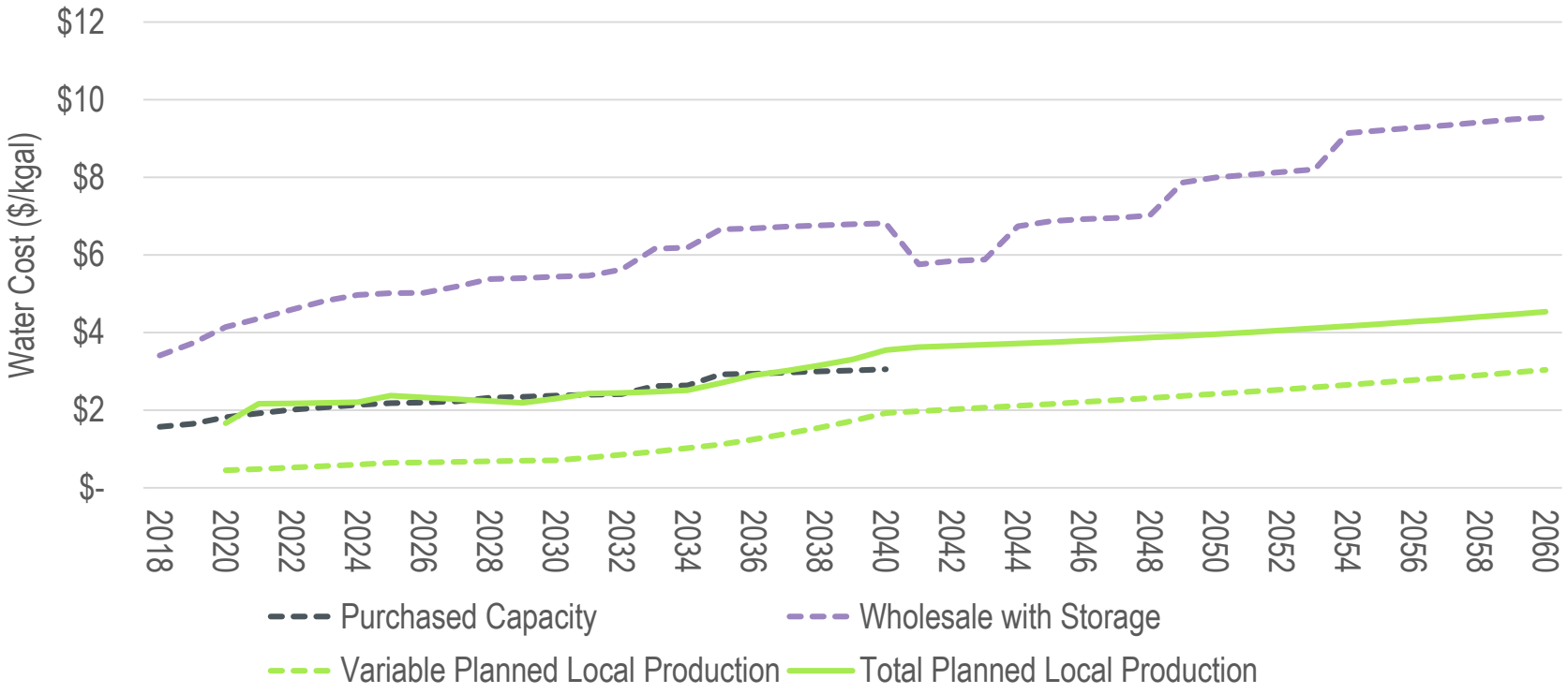
West Des Moines – Usage by Source



West Des Moines – Total Avg. Cost per Unit

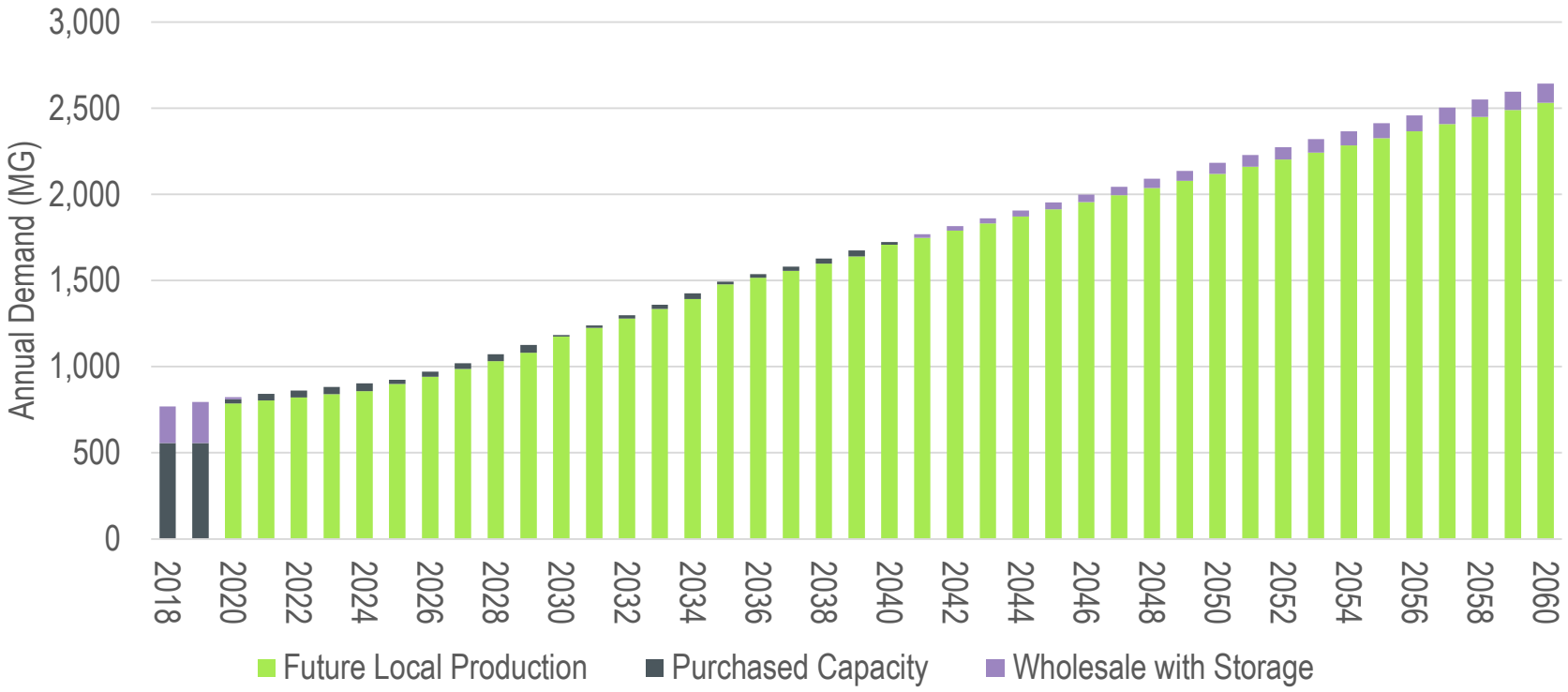


Waukee – Full Cost by Supply Source



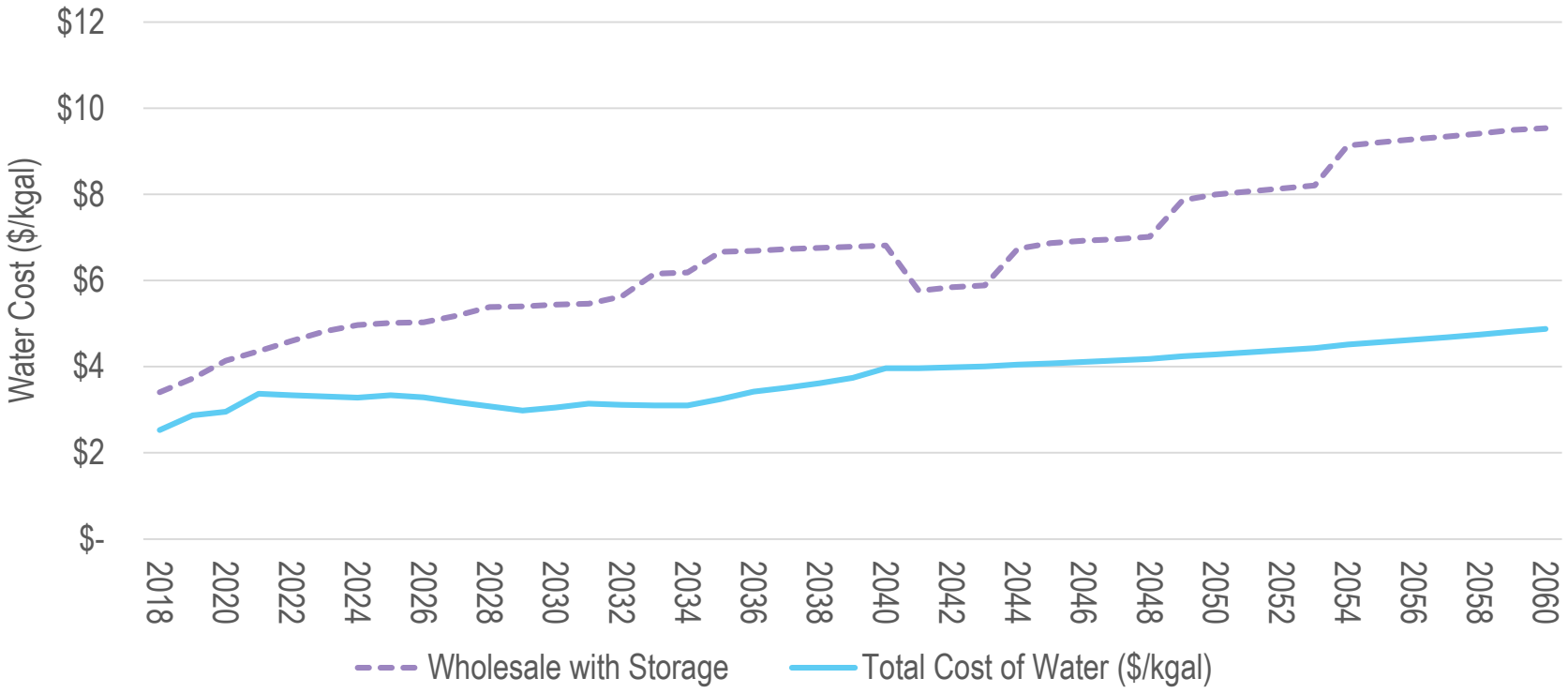
The amortized capital cost and fixed operating costs of Local Production raise the total cost above the forecast Purchased Capacity rate, but still below the Wholesale with Storage rate.

Waukee – Usage by Source

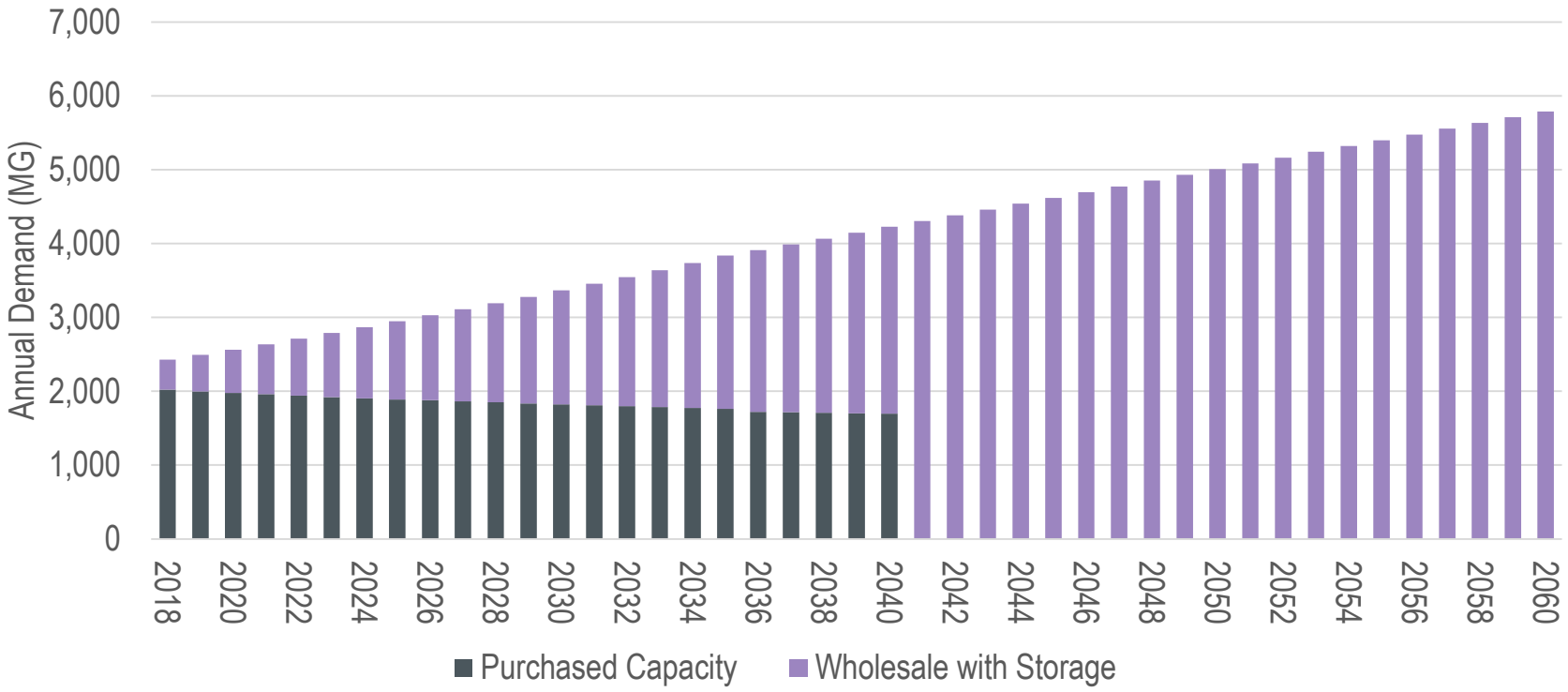


The joint WMD/Waukee plant goes into operation in 2020 based on timing driven by WDM, but after it's built, Waukee maximizes its share of the capacity

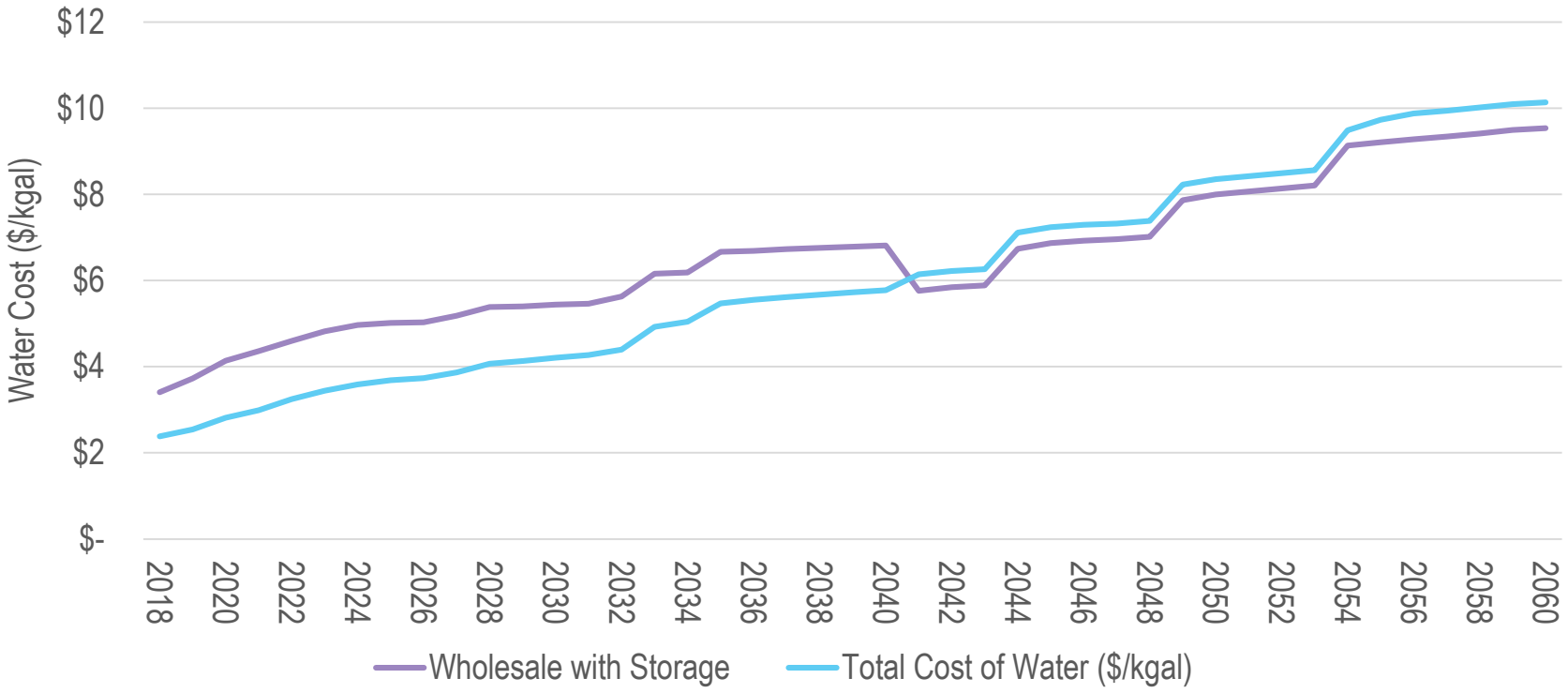
Waukee – Total Avg. Cost per Unit



Ankeny – Usage by Source

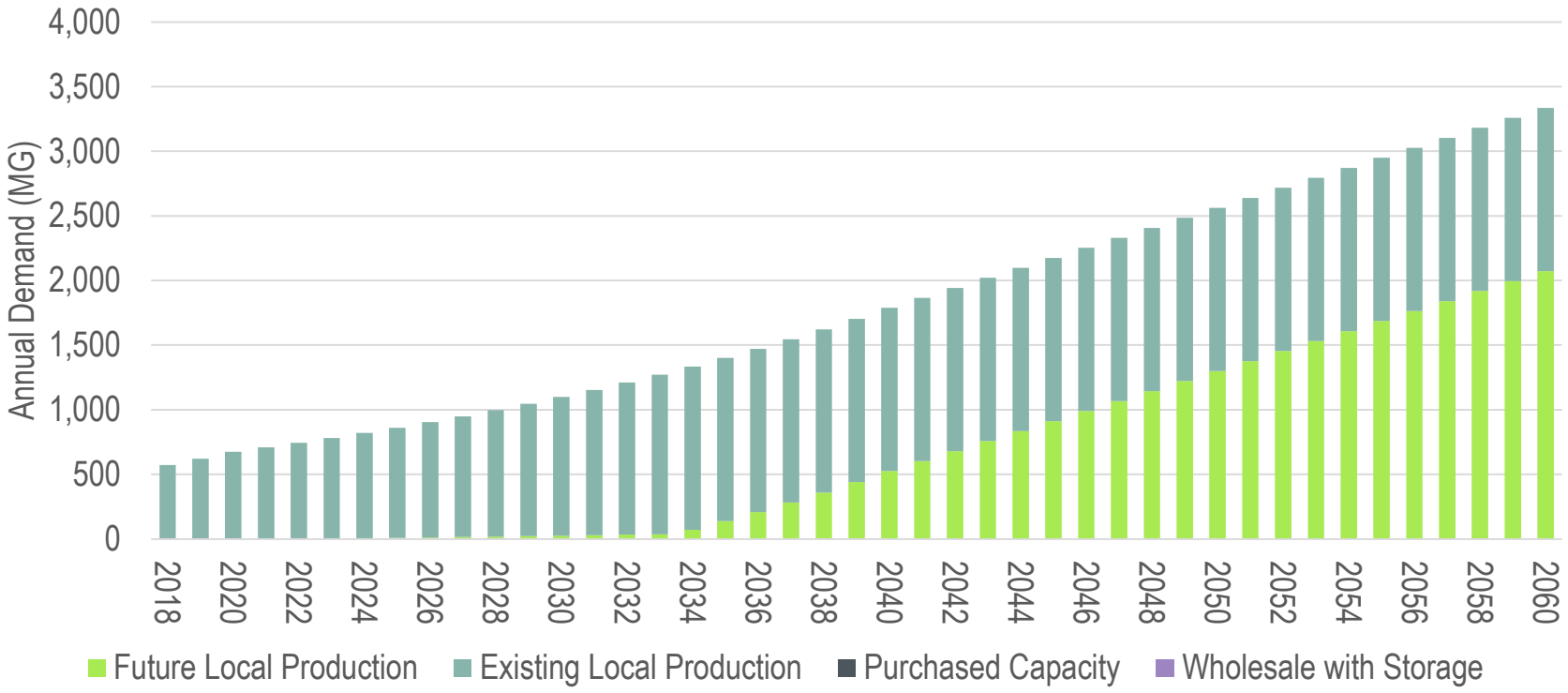


Ankeny –Total Avg. Cost per Unit



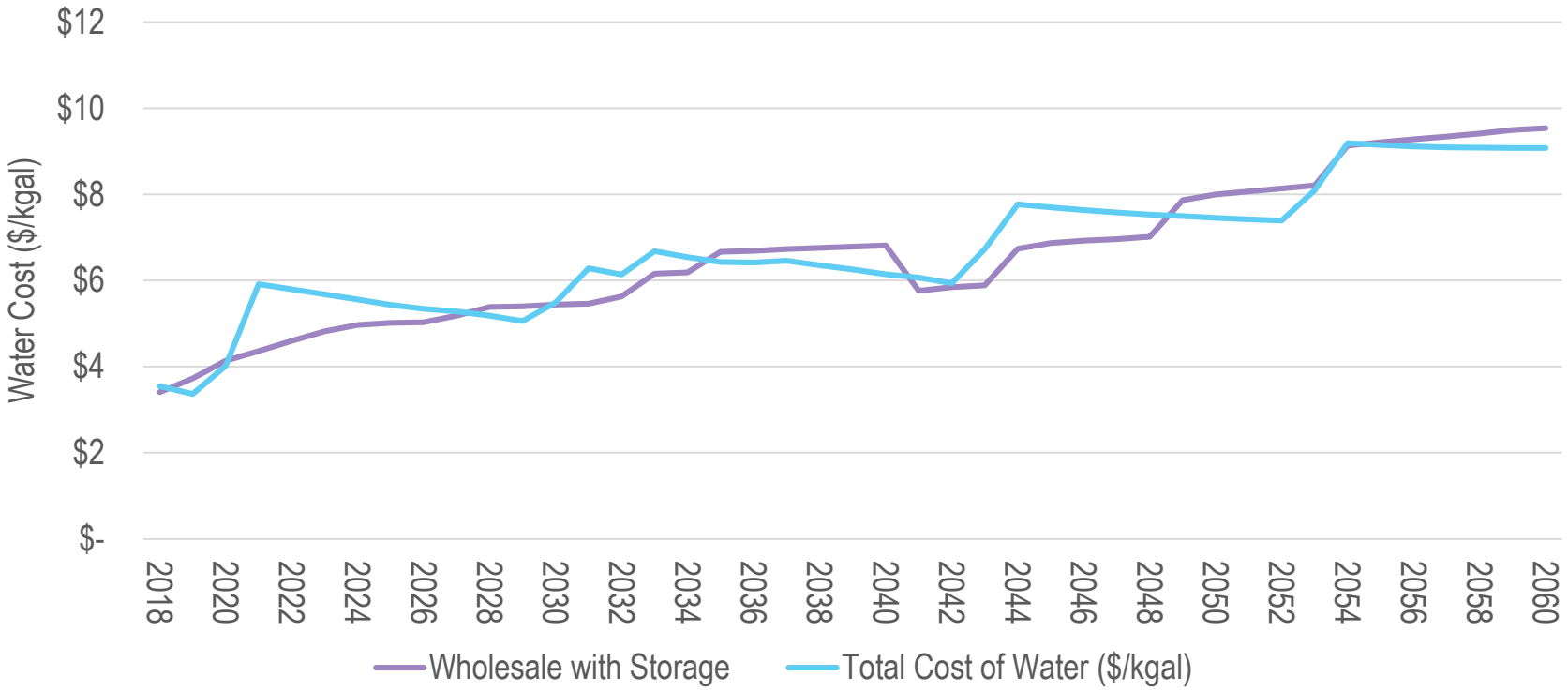
Up until 2040, the operation of Ankeny's ASR wells saves them money, but after 2040 there is no incentive to avoid the wholesale rate and the operating costs are extra

Grimes – Usage by Source



Grimes is an exception to our normal business logic because Grimes has made it clear that it will continue with its own production unless a regional model is adopted

Grimes – Total Avg. Cost per Unit



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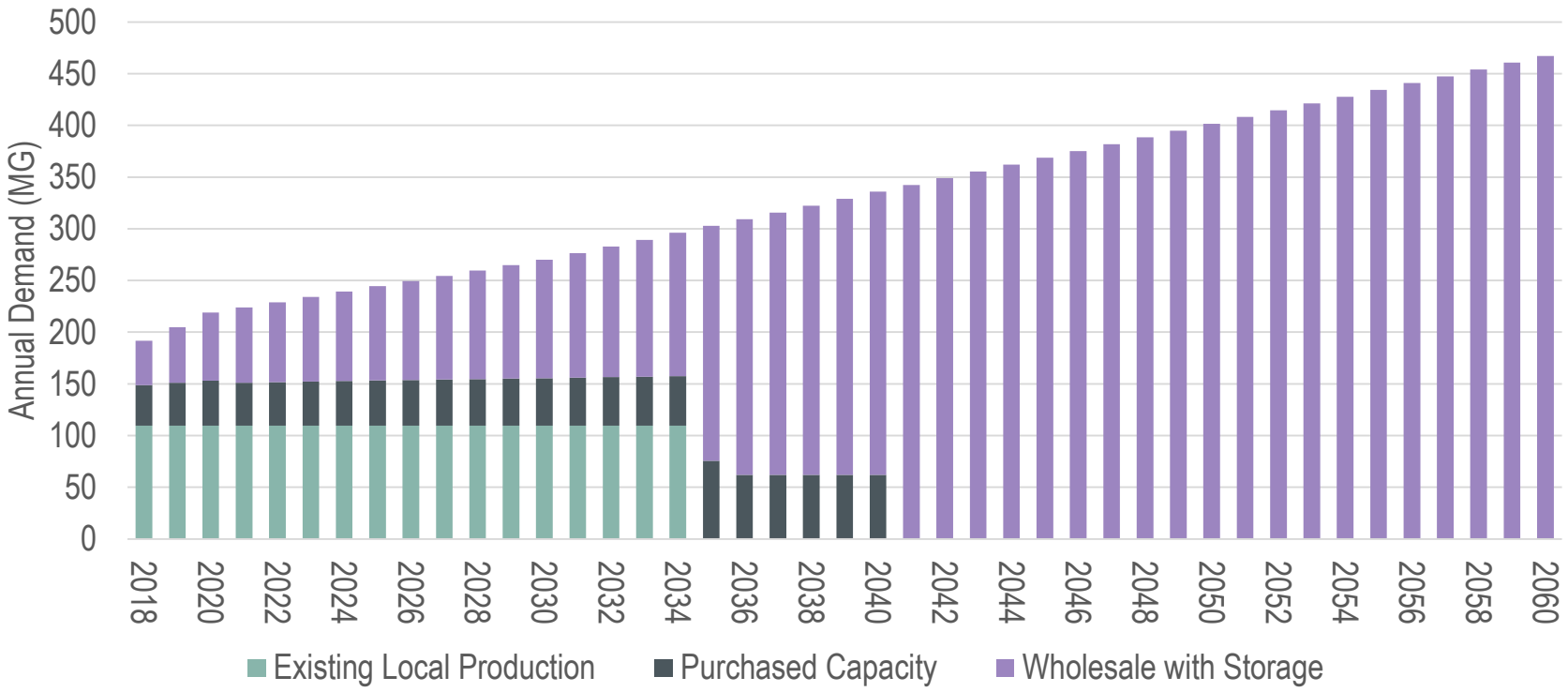
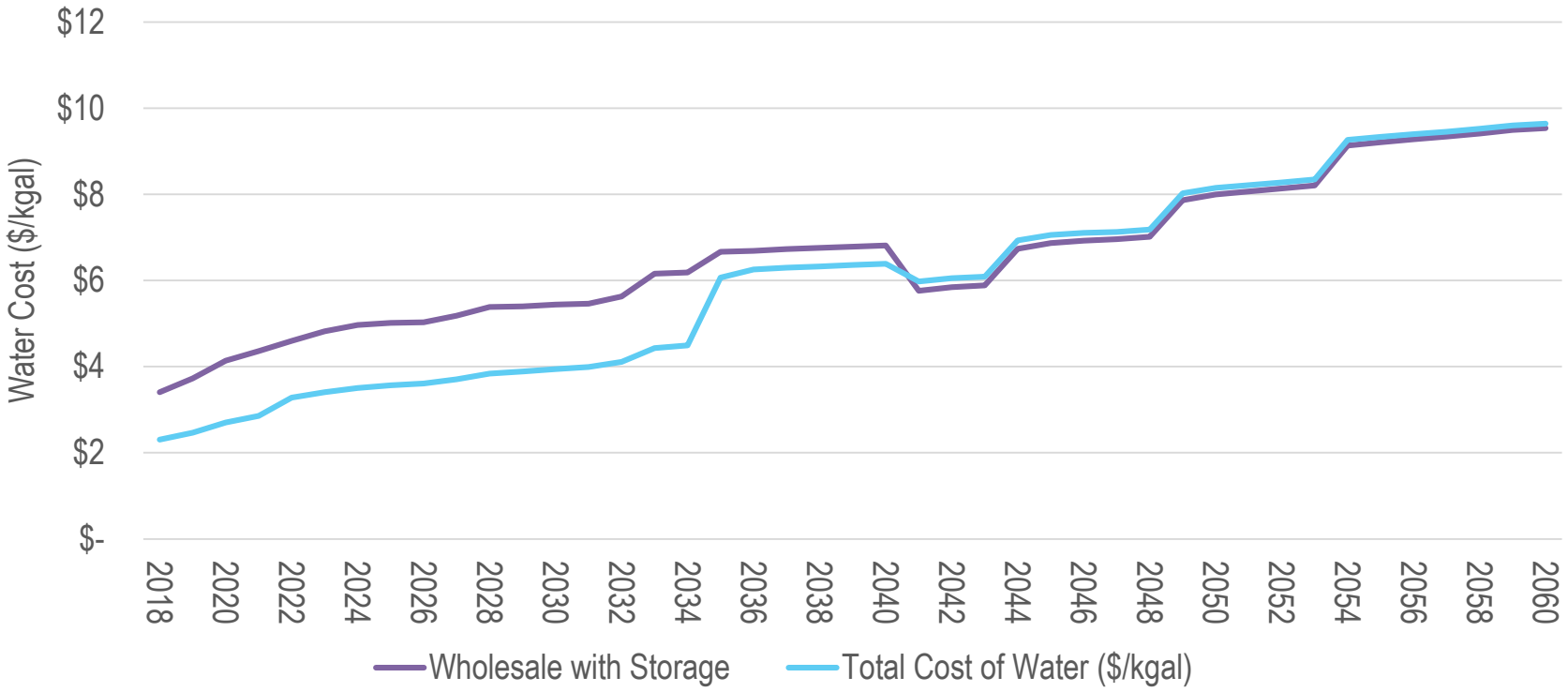
Polk City – Usage by Source

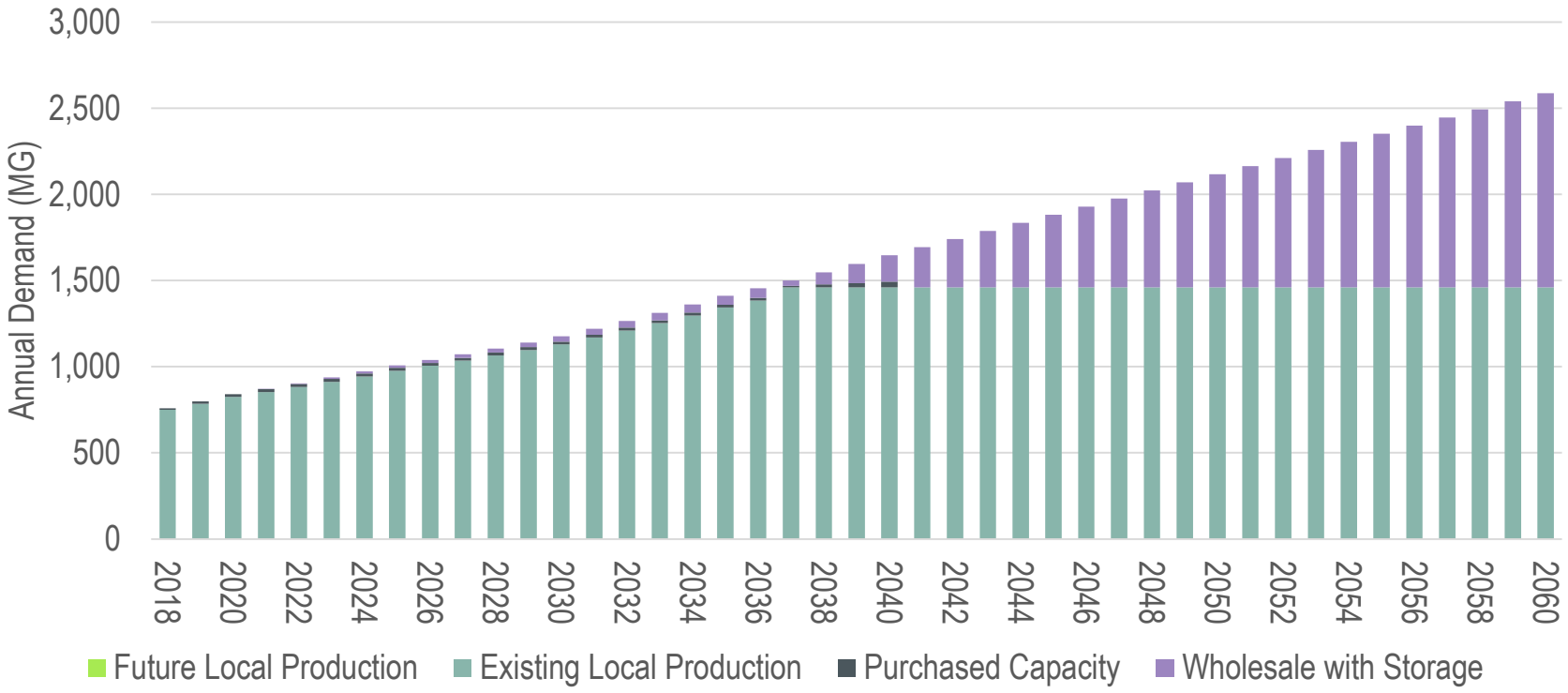


Local production capacity is taken out of service around 2034 according to statements made in the LRP; they then purchase from DMWW to meet demands

Polk City – Total Avg. Cost per Unit

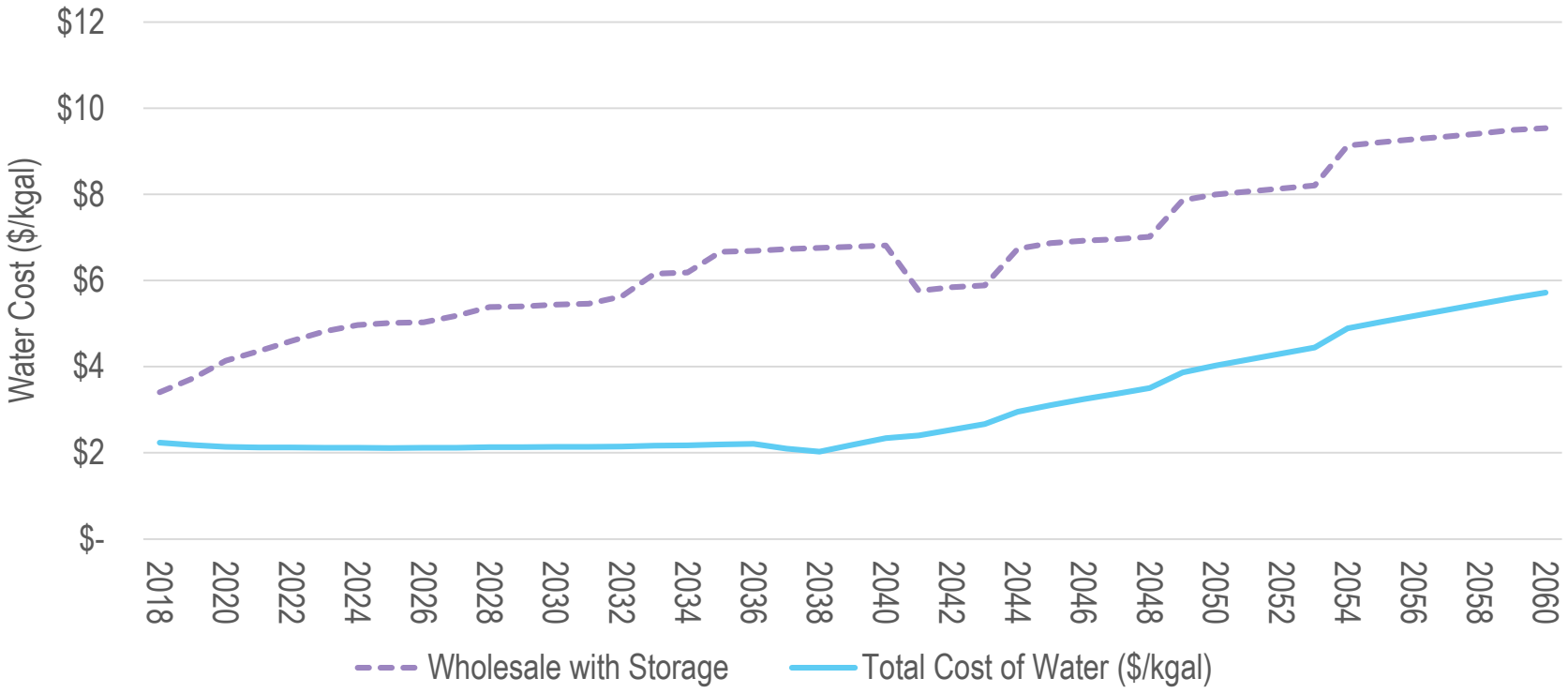


Altoona – Usage by Source



Altoona has its own production capacity and has said they would build more if it made sense to do so, but based on our evaluation there would not be a business case for it

Altoona – Total Avg. Cost per Unit



DRAFT – PRELIMINARY RESULTS

Producers - Observations

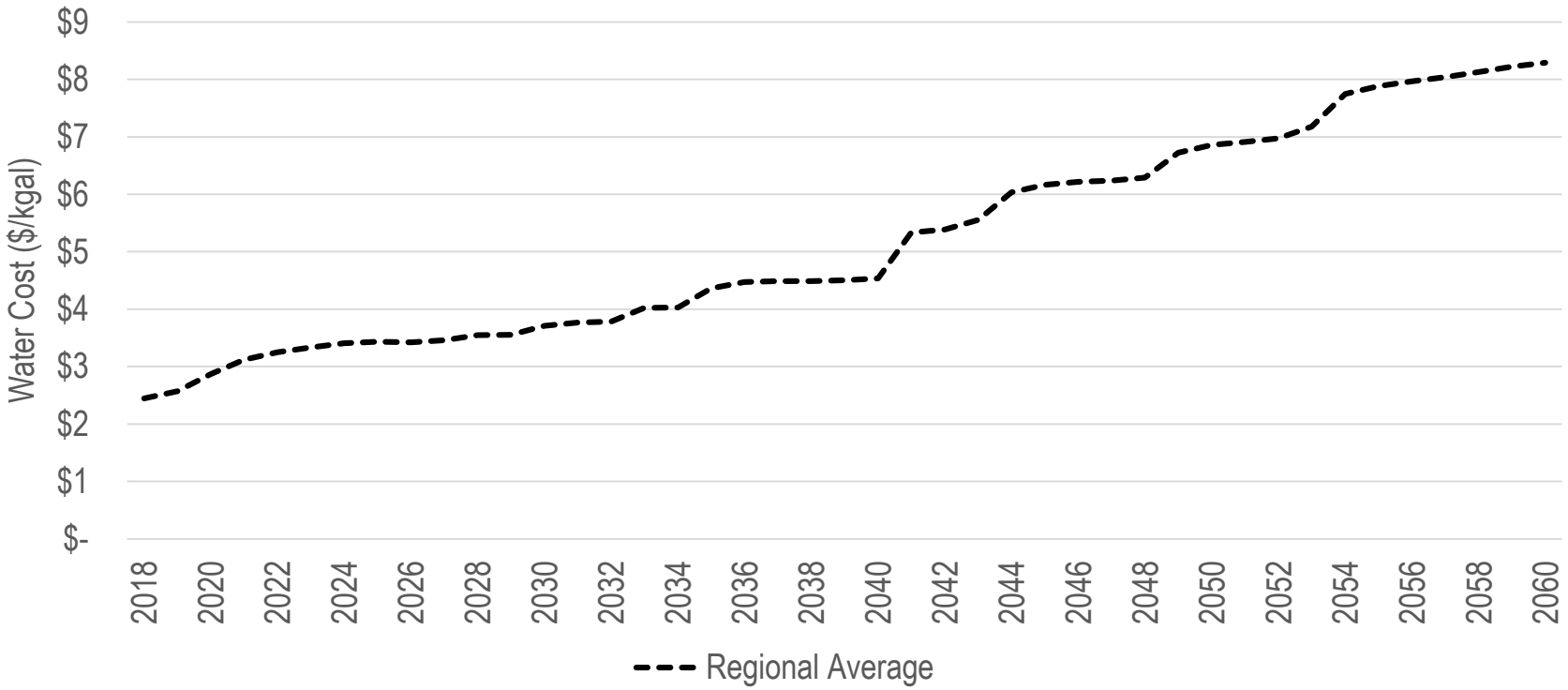
- **Expiration of the purchased capacity contracts will force individual economic decisions**

- **As these producers change the way they use the DMWW sources:**
  - It shifts DMWW from a base load source with relatively high avg. daily demand
  - To a peaking source with low to no avg. daily demand

- **Implications of shifting loads include stranded capacity with matching stranded fixed costs**
  - It means the costs absorbed by DMWW retail and TS customers are likely to increase in order to support the stranded capacity

Regional Totals

Regional Avg. Cost of Production



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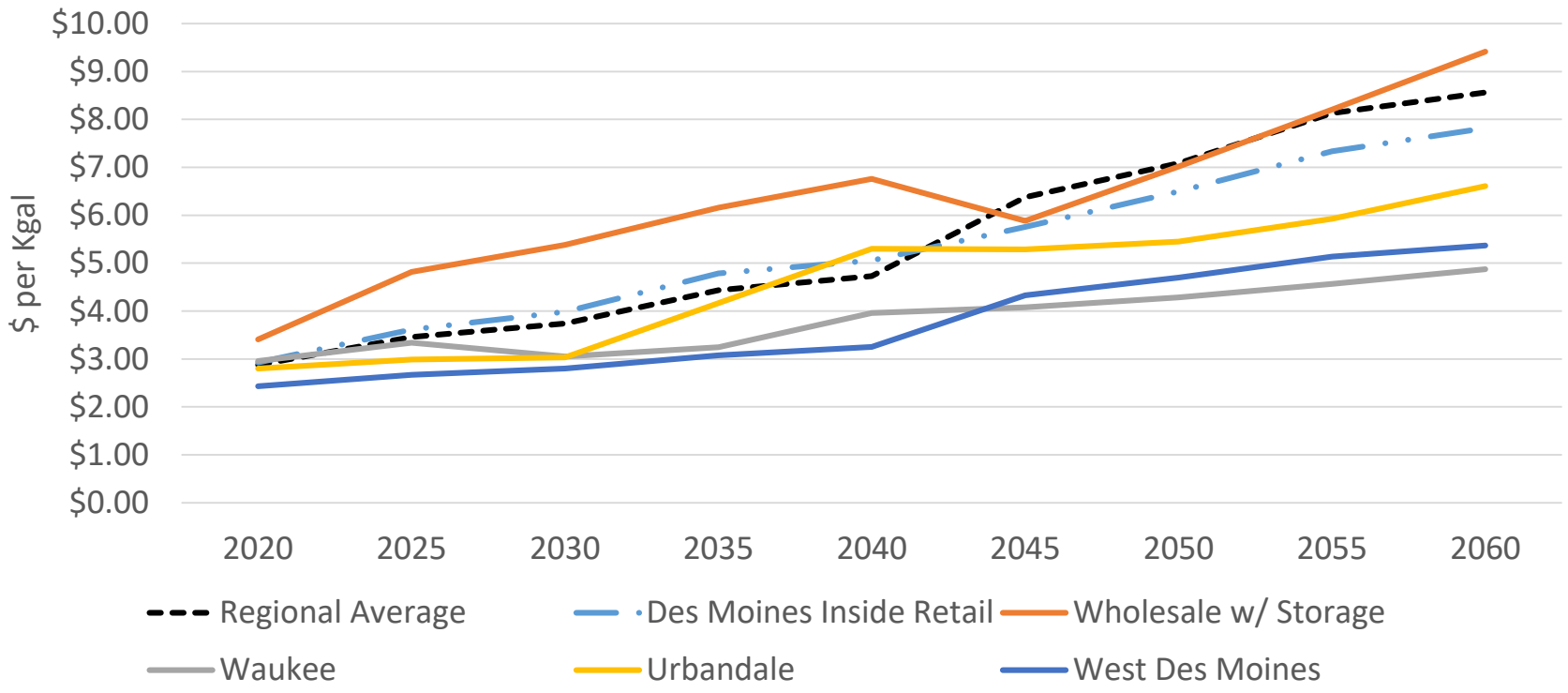
Regional Avg. Compared to Others



DRAFT – PRELIMINARY RESULTS

Take-Aways from This Analysis

Regional Opportunities

- Coordination of regional investments to minimize capacity costs
- Consolidation of regional base loads to maximize scale and avoid stranded investments
- Improvement to the regional cost-sharing formulas

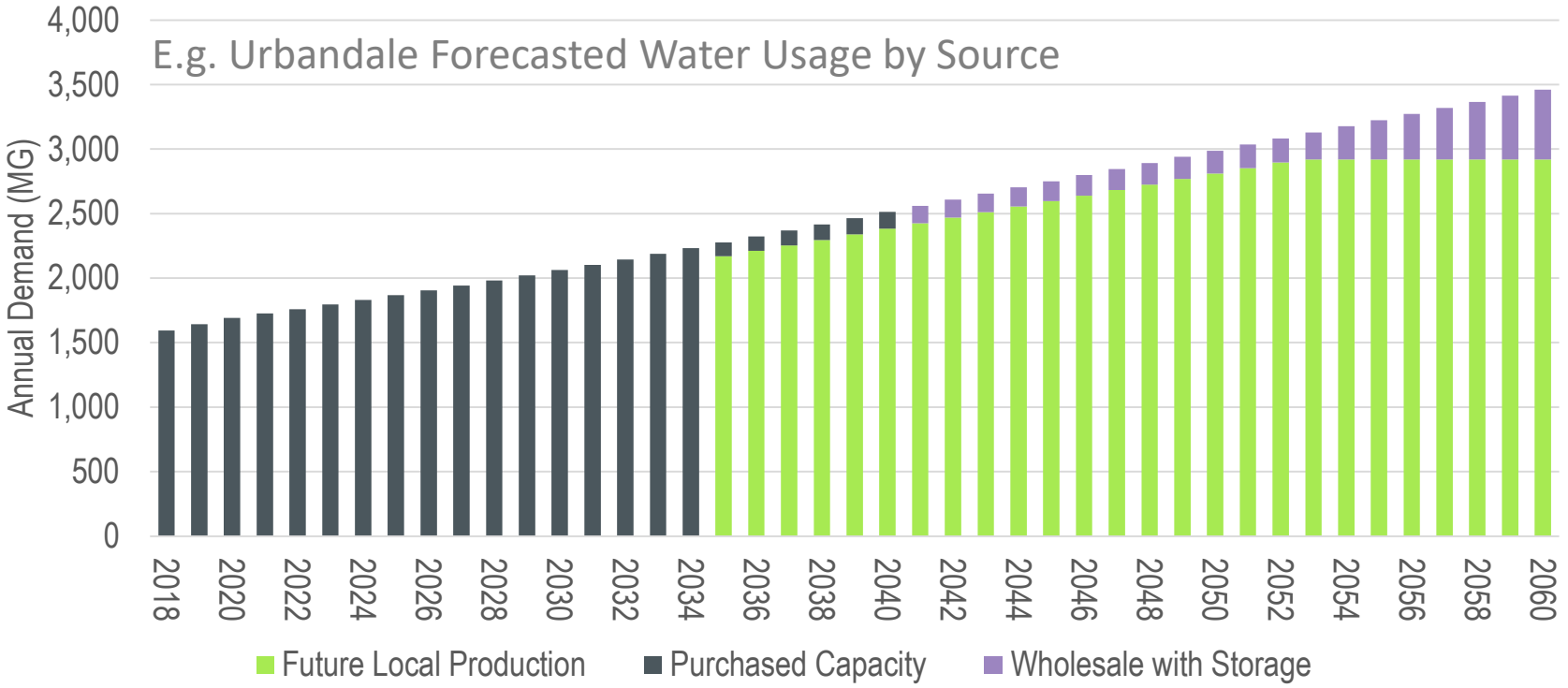
Coordination of Regional Investments

- **Urbandale's lower-cost facility constructed around 2034 +/- because that's what makes the most sense in their individual case – but region could benefit sooner**

- **West Des Moines' does not appear to be able to use the full capacity of both its existing and proposed plants – but that capacity could be used regionally**

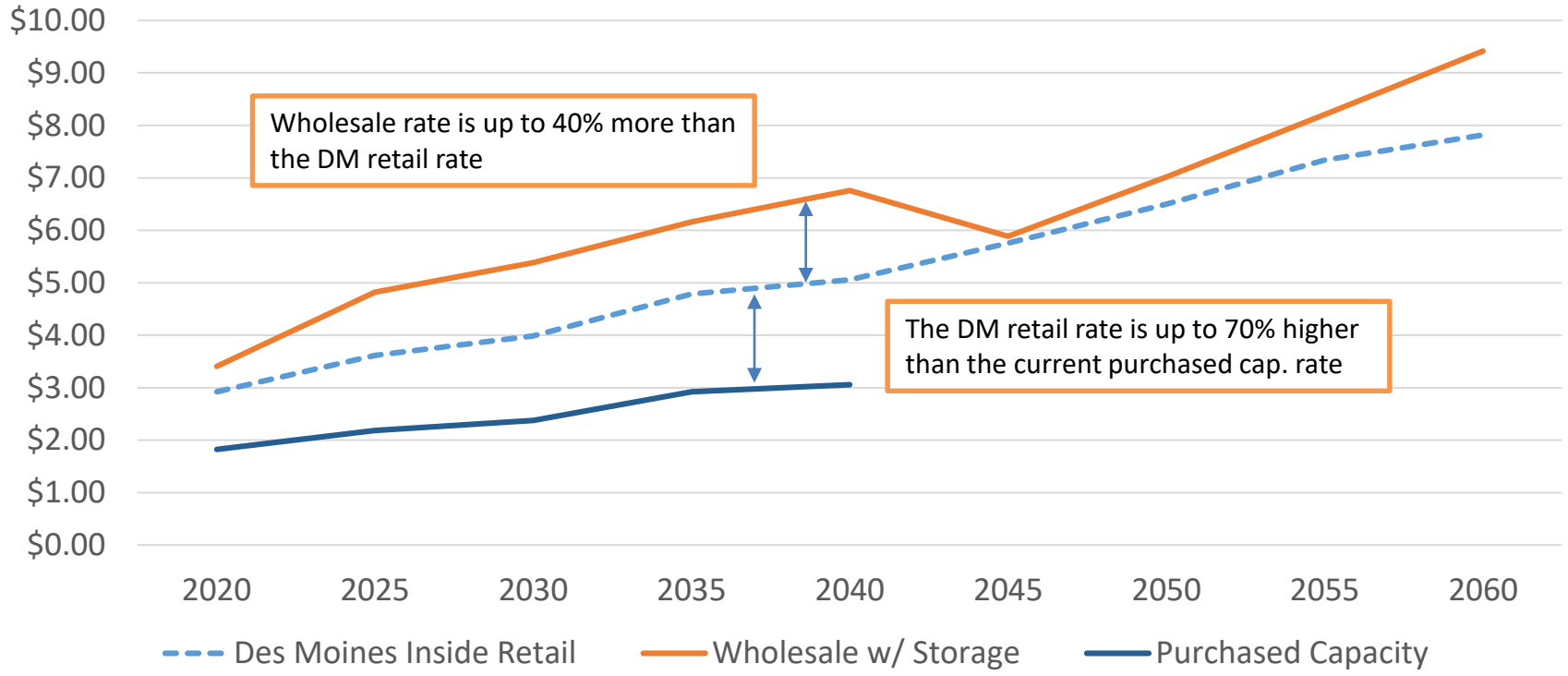
Total regional costs could possibly be reduced with additional coordination of capacity expansions at a regional level

Consolidation of Base Loads



For example, Urbandale will move up to 8 MGD of base load from DMWW to its own plant; reduces demand by 3 billion gallons per year – that's $5.8 million in costs that others need to absorb

Improve Regional Cost-Sharing



This is normal and reflects the investments in the system, but it would not work as well for a joint ownership model; a regional model should produce a standard (blended) rate for avg. and max-day demand, with explicit credits for cash and asset contributions.

Next Steps

The Steps to Get to the Answers

Status Quo Forecasts	Future Cost Sharing Plan	Authority Forecasts
June 27	July 30	August 27
How much can each community expect to pay for produced water based on today's production functions?	How will future costs be shared if the Authority assumes responsibility for rate setting and regional water production?	How much can each community expect to pay for produced water assuming the Authority is responsible for all delivery?