AEO2019 vs. AEO2018 cases: Possible options for Future-Year Projections for the 2016v1 Emissions Modeling Platform

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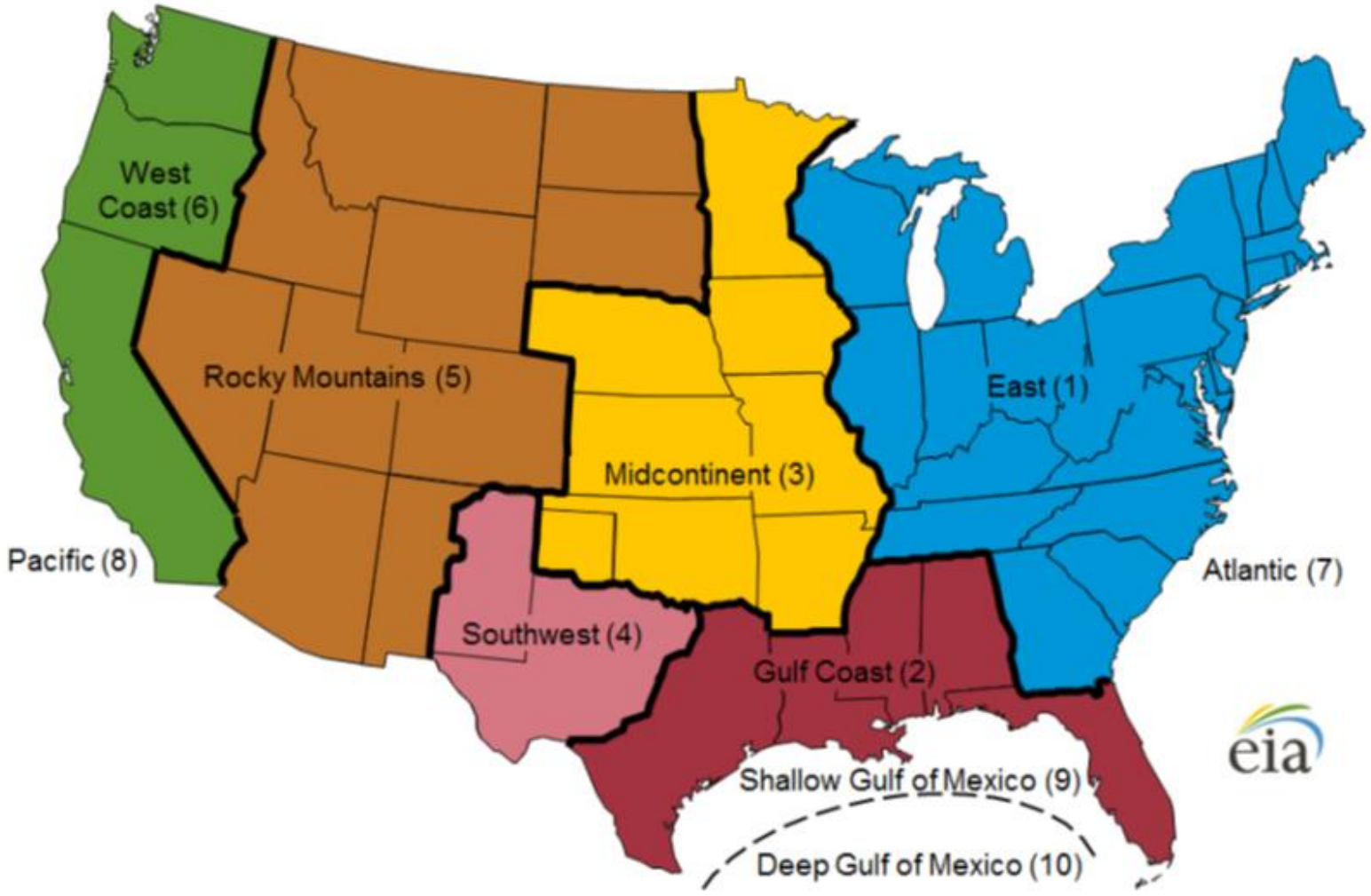
Overall approach summary for beta (non-point)

- For non-point sources:
  - Production-related sources (SCCs)
    - used state historical production data (EIA) to grow from 2016 to 2017
    - used **AEO 2018 reference case** to grow from 2017 to 2023/2028
    - End result is state growth factors
  - Exploration-related sources (SCCs)
    - Used exploration activity data from 2014 and 2016 and compute county averages
    - Used county averages in Oil and Gas Tool to generate new 2014-2016 averaged emissions

Overall approach summary for beta (point)

- For point sources:
  - Production-related NAICS codes
    - used state historical production data (EIA) to grow from 2016 to 2017
    - used **AEO 2018 reference** case to grow from 2017 to 2023/2028
    - End result is state growth factors
  - For other NAICS
    - Assume no growth for beta platform

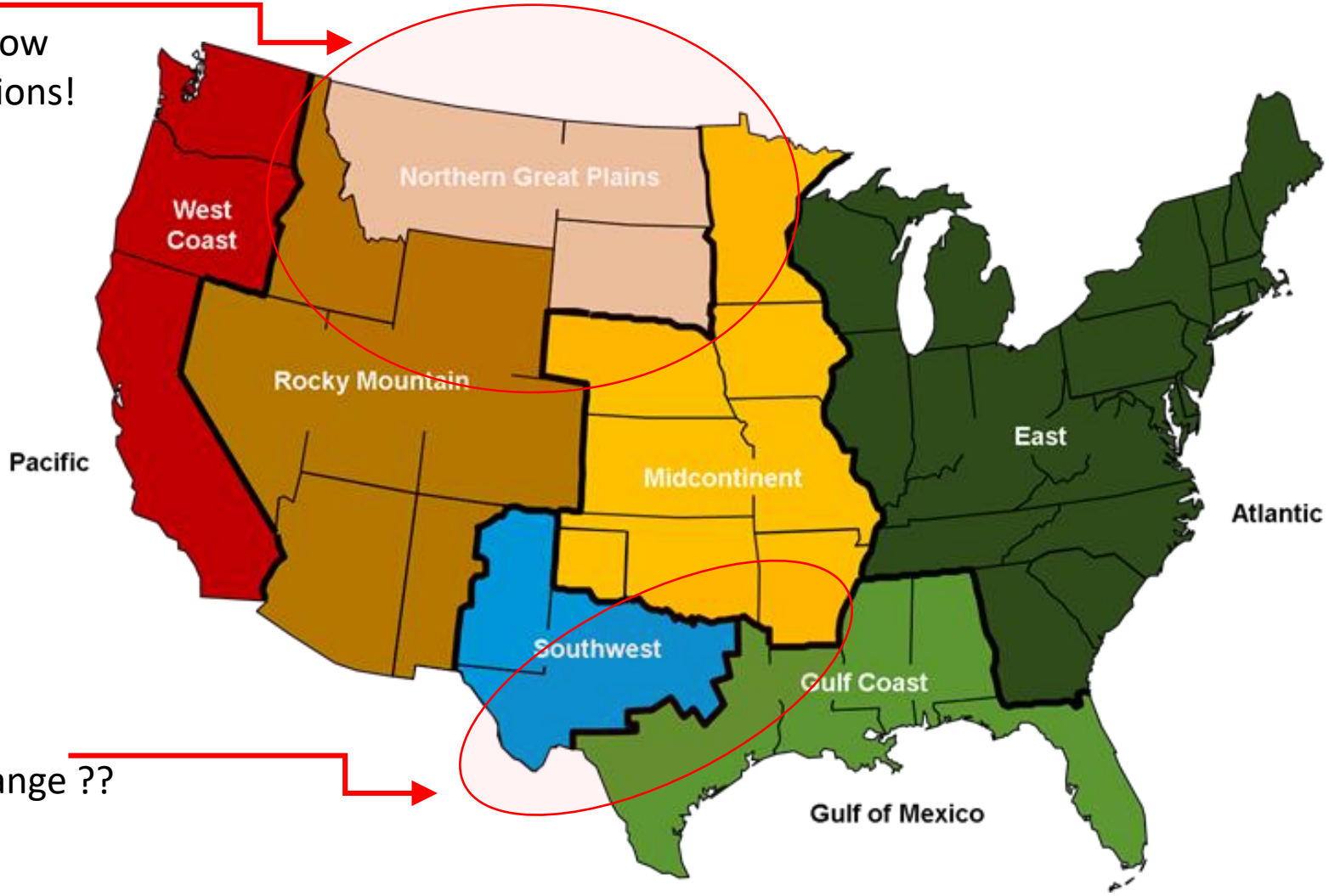
EIA 2018 Oil and Gas Supply Regions



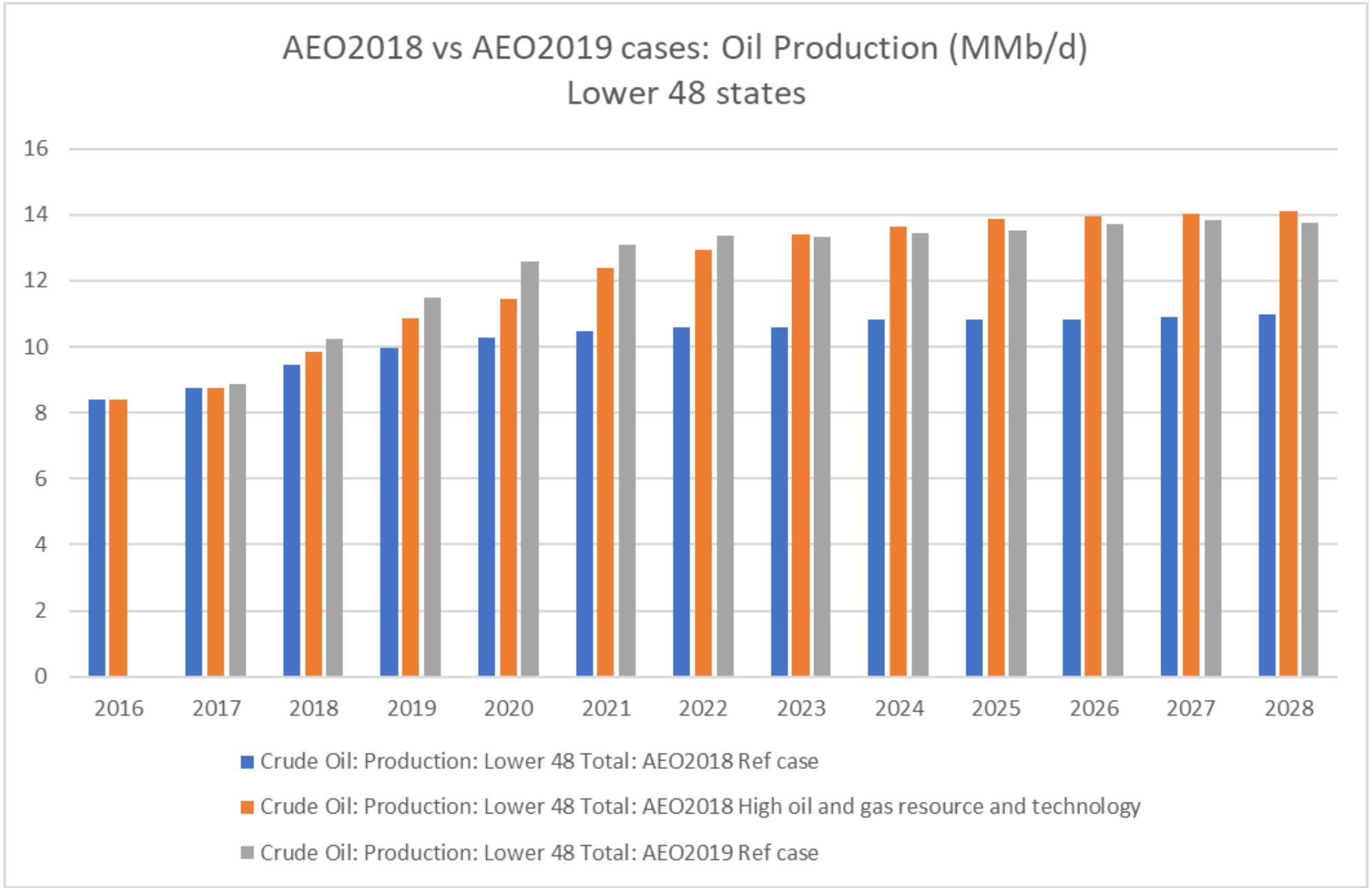
Source: U.S. Energy Information Administration.

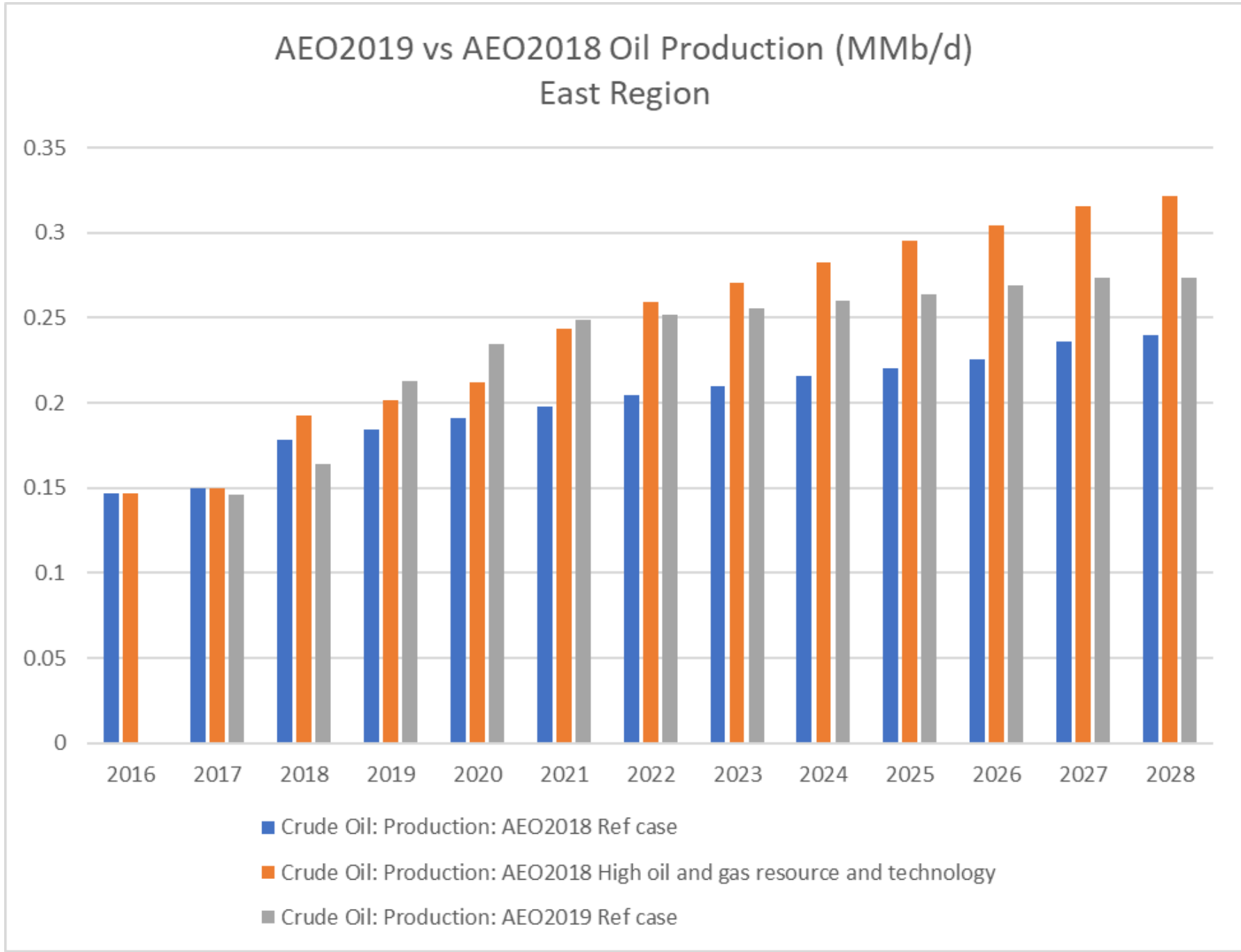
EIA 2019 Oil and Gas Supply Regions

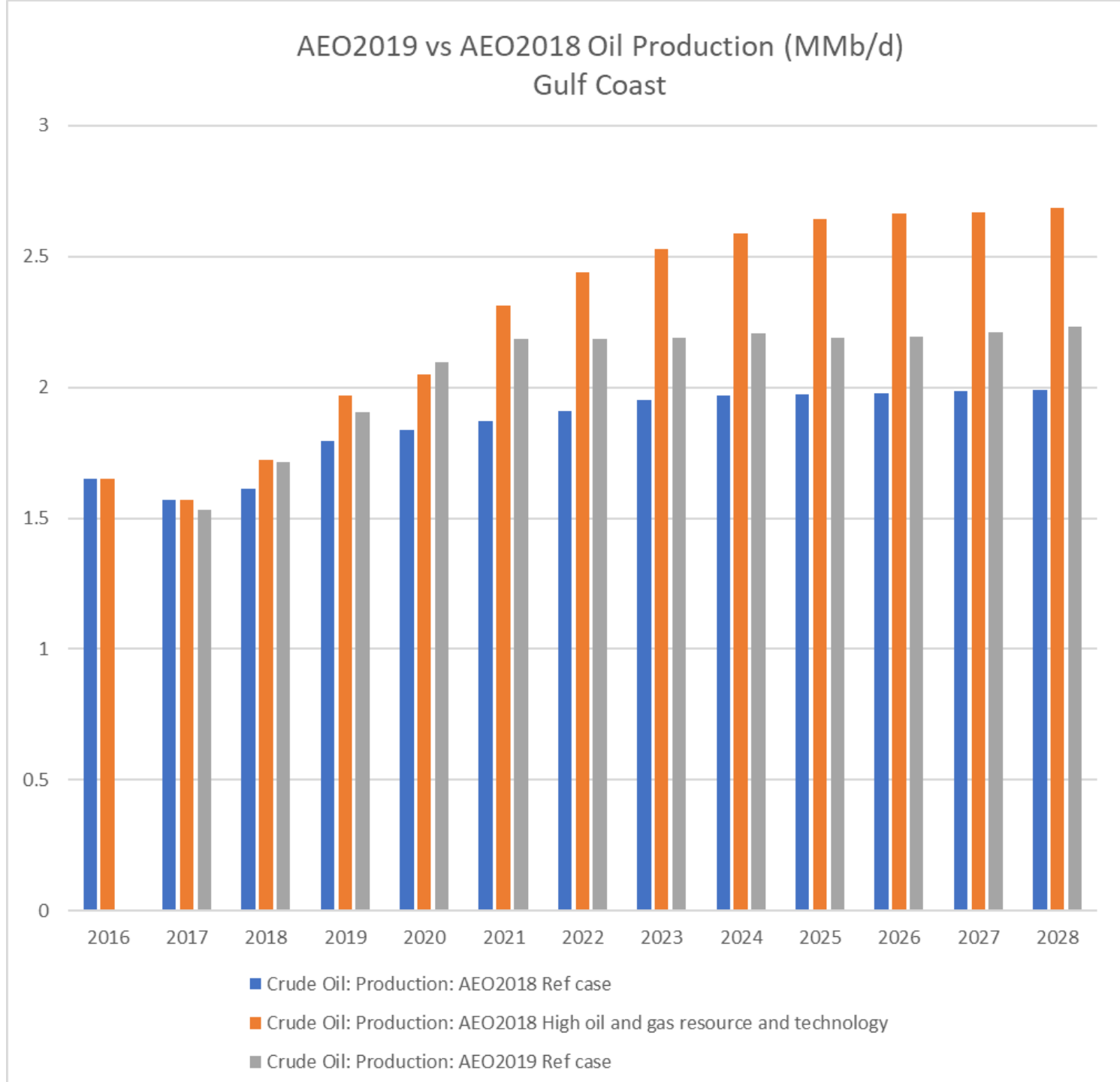
Rocky Mtn/Dakota region in AEO2018 now broken up into 2 regions!



Possible Small change ??


AEO2018 vs AEO2019 cases: Oil Production (MMb/d)
Lower 48 states
16
14
12
10
8
6
4
2
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Crude Oil: Production: Lower 48 Total: AEO2018 Ref case
Crude Oil: Production: Lower 48 Total: AEO2018 High oil and gas resource and technology
Crude Oil: Production: Lower 48 Total: AEO2019 Ref case


AEO2019 vs AEO2018 Oil Production (MMb/d)
East Region
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Crude Oil: Production: AEO2018 Ref case
Crude Oil: Production: AEO2018 High oil and gas resource and technology
Crude Oil: Production: AEO2019 Ref case


AEO2019 vs AEO2018 Oil Production (MMb/d)
Gulf Coast
3
2.5
2
1.5
1
0.5
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Crude Oil: Production: AEO2018 Ref case
Crude Oil: Production: AEO2018 High oil and gas resource and technology
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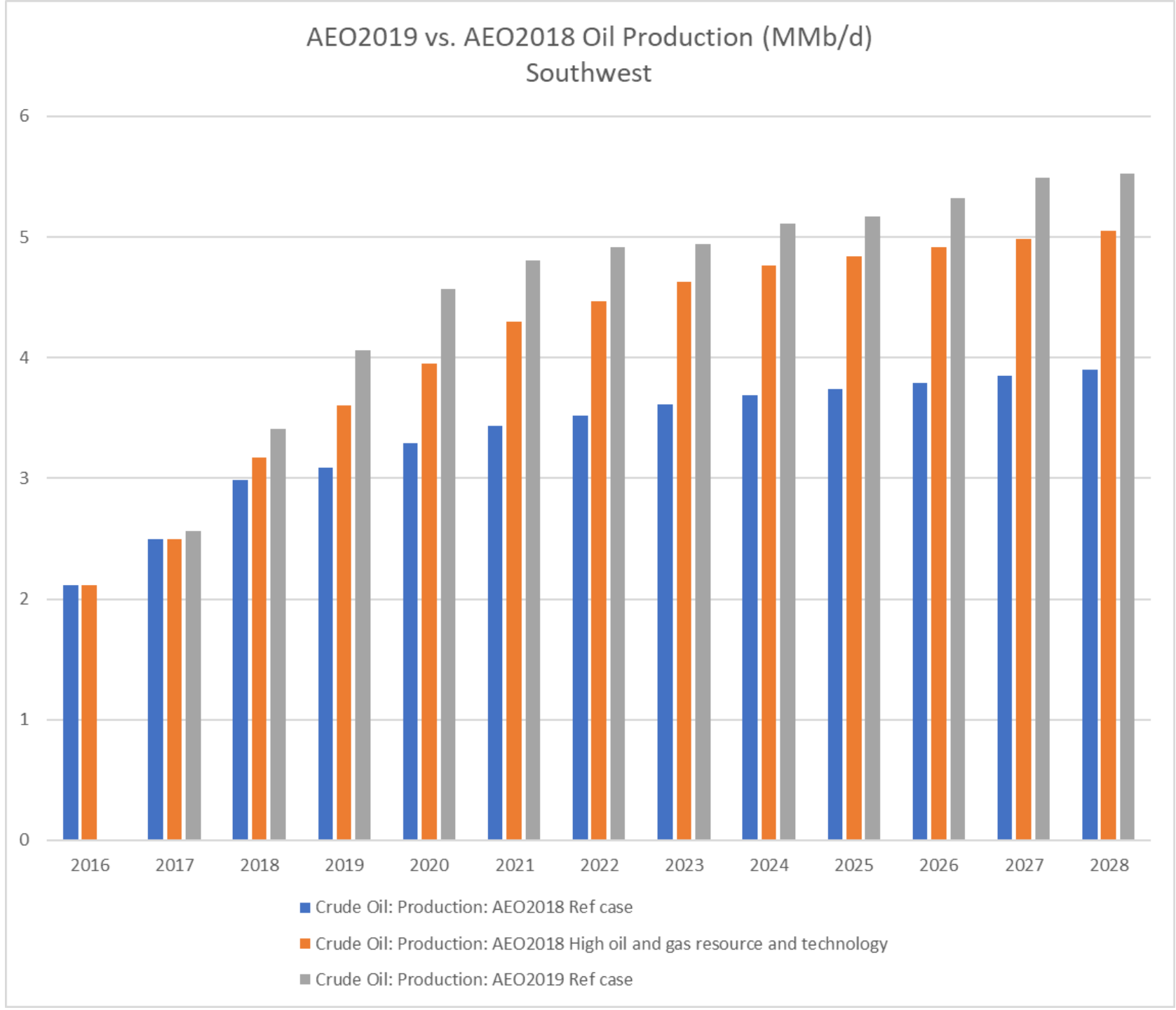
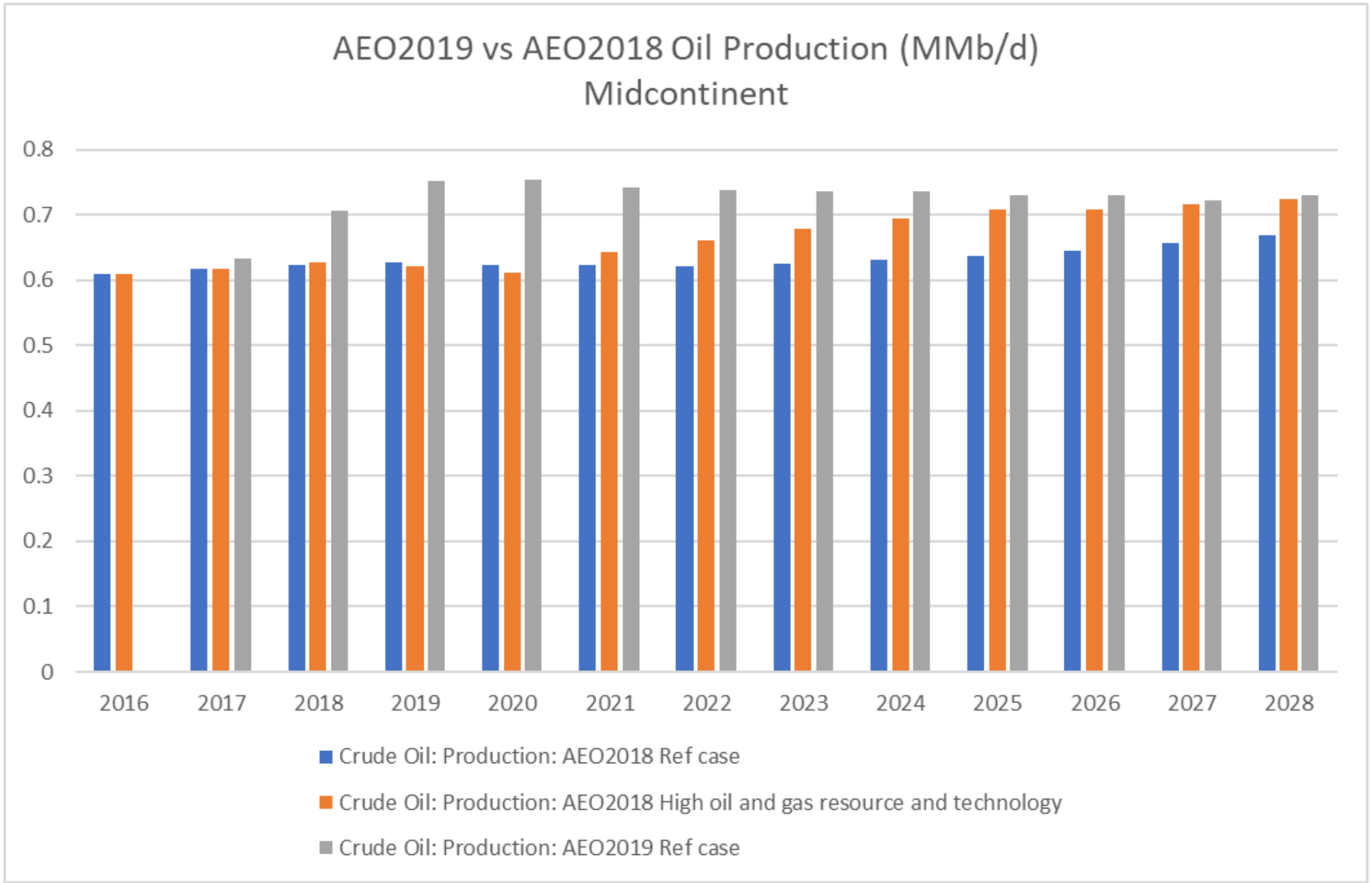
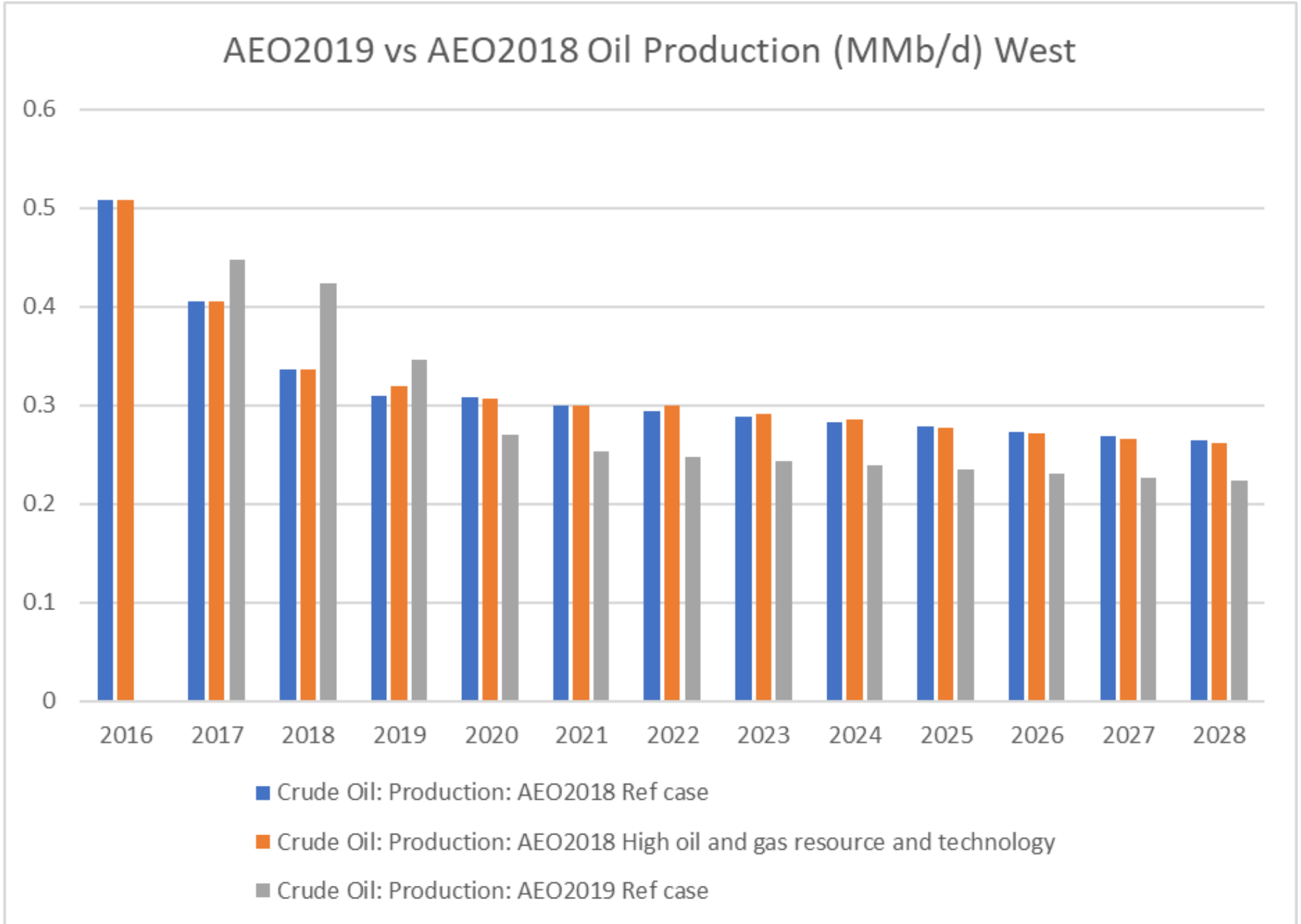
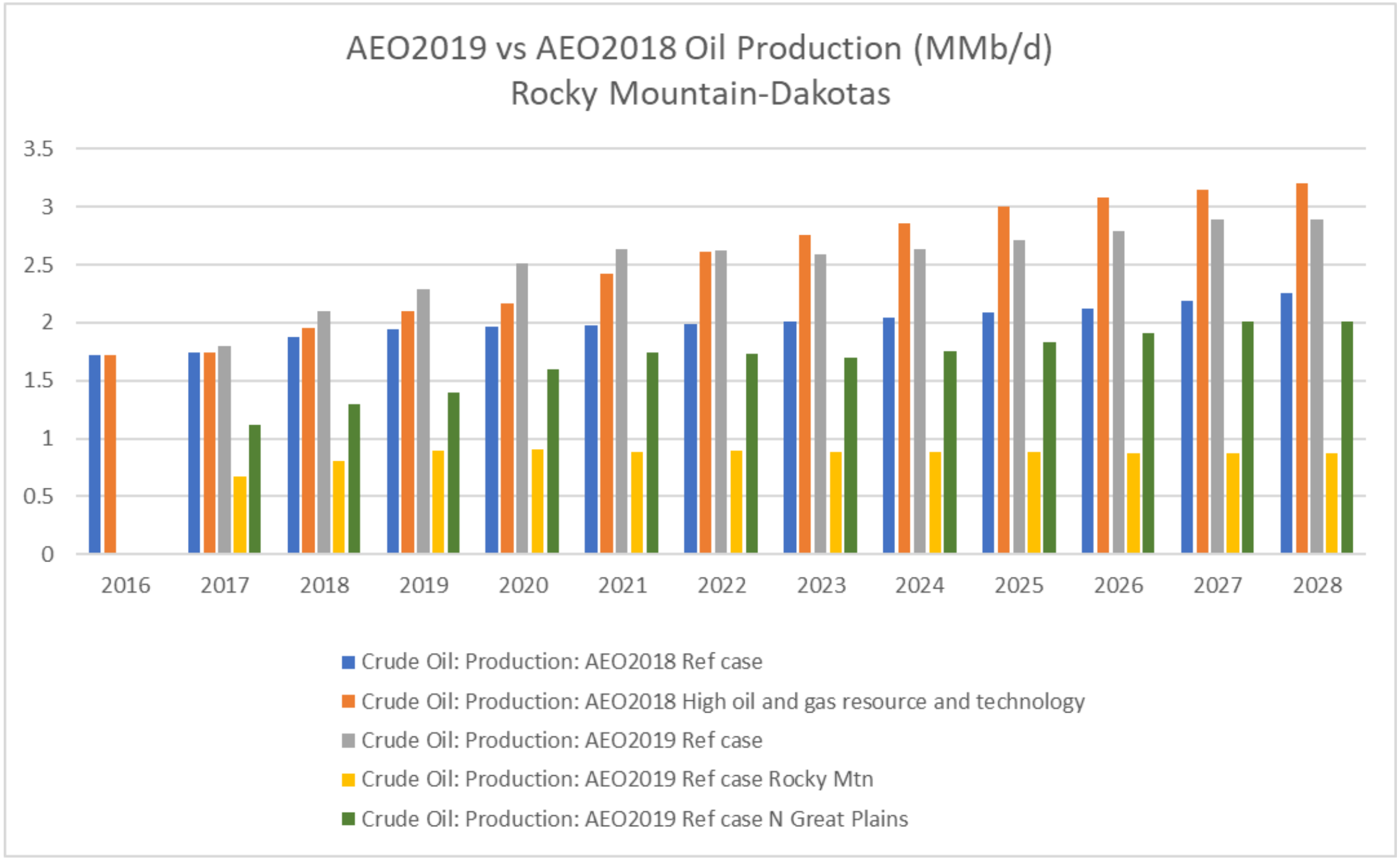
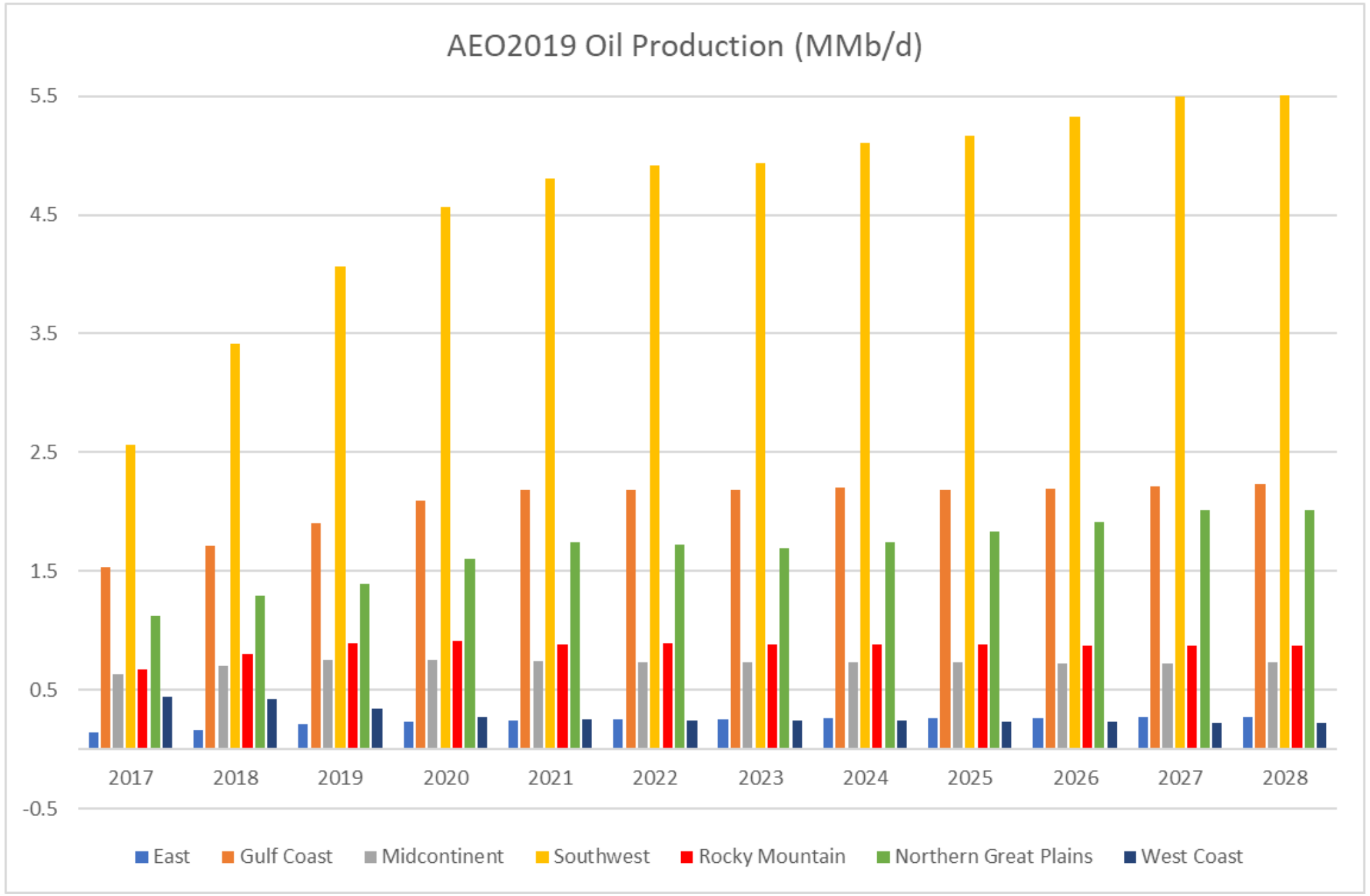
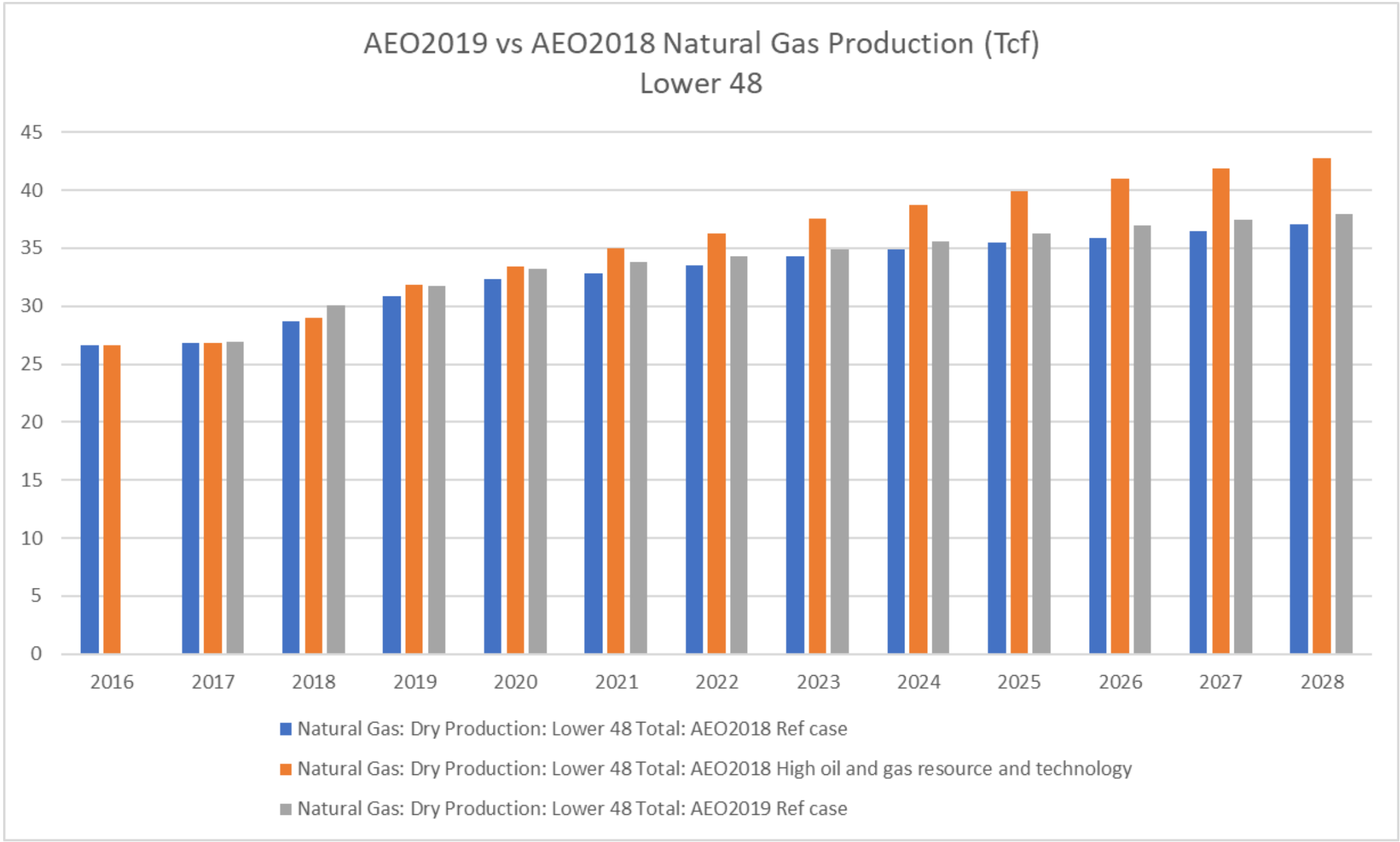

AEO2019 vs. AEO2018 Oil Production (MMb/d)
Southwest
6
5
4
3
2
1
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Crude Oil: Production: AEO2018 Ref case
Crude Oil: Production: AEO2018 High oil and gas resource and technology
Crude Oil: Production: AEO2019 Ref case

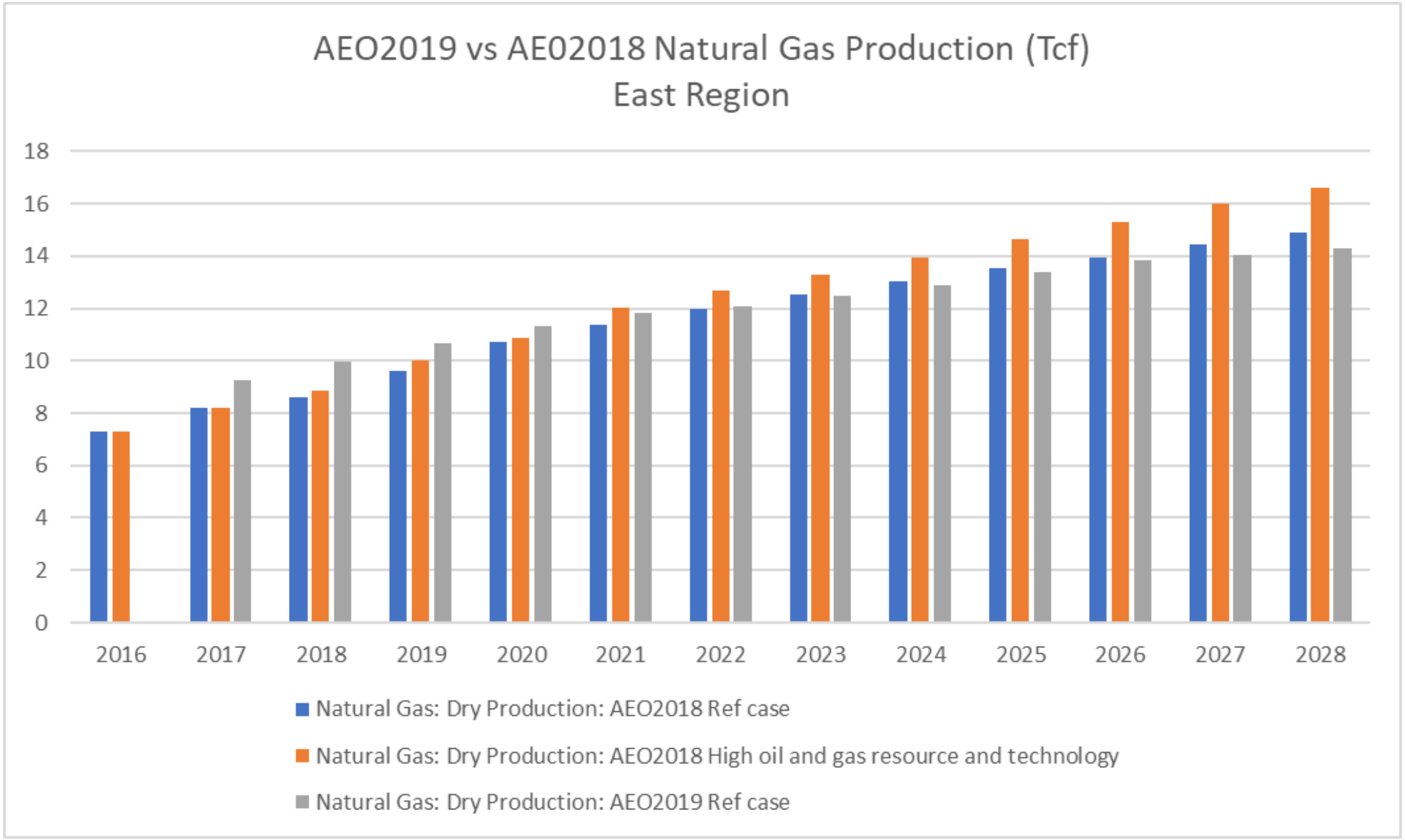

AEO2019 vs AEO2018 Oil Production (MMb/d)
Midcontinent
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Crude Oil: Production: AEO2018 Ref case
Crude Oil: Production: AEO2018 High oil and gas resource and technology
Crude Oil: Production: AEO2019 Ref case


AEO2019 vs AEO2018 Oil Production (MMb/d) West
0.6
0.5
0.4
0.3
0.2
0.1
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Crude Oil: Production: AEO2018 Ref case
Crude Oil: Production: AEO2018 High oil and gas resource and technology
Crude Oil: Production: AEO2019 Ref case


AEO2019 vs AEO2018 Oil Production (MMb/d)
Rocky Mountain-Dakotas
3.5
3
2.5
2
1.5
1
0.5
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Crude Oil: Production: AEO2018 Ref case
Crude Oil: Production: AEO2018 High oil and gas resource and technology
Crude Oil: Production: AEO2019 Ref case
Crude Oil: Production: AEO2019 Ref case Rocky Mtn
Crude Oil: Production: AEO2019 Ref case N Great Plains


AEO2019 Oil Production (MMb/d)
5.5
4.5
3.5
2.5
1.5
0.5
-0.5
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
East
Gulf Coast
Midcontinent
Southwest
Rocky Mountain
Northern Great Plains
West Coast


AEO2019 vs AEO2018 Natural Gas Production (Tcf)
Lower 48
45
40
35
30
25
20
15
10
5
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Natural Gas: Dry Production: Lower 48 Total: AEO2018 Ref case
Natural Gas: Dry Production: Lower 48 Total: AEO2018 High oil and gas resource and technology
Natural Gas: Dry Production: Lower 48 Total: AEO2019 Ref case


AEO2019 vs AE02018 Natural Gas Production (Tcf)
East Region
18
16
14
12
10
8
6
4
2
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Natural Gas: Dry Production: AEO2018 Ref case
Natural Gas: Dry Production: AEO2018 High oil and gas resource and technology
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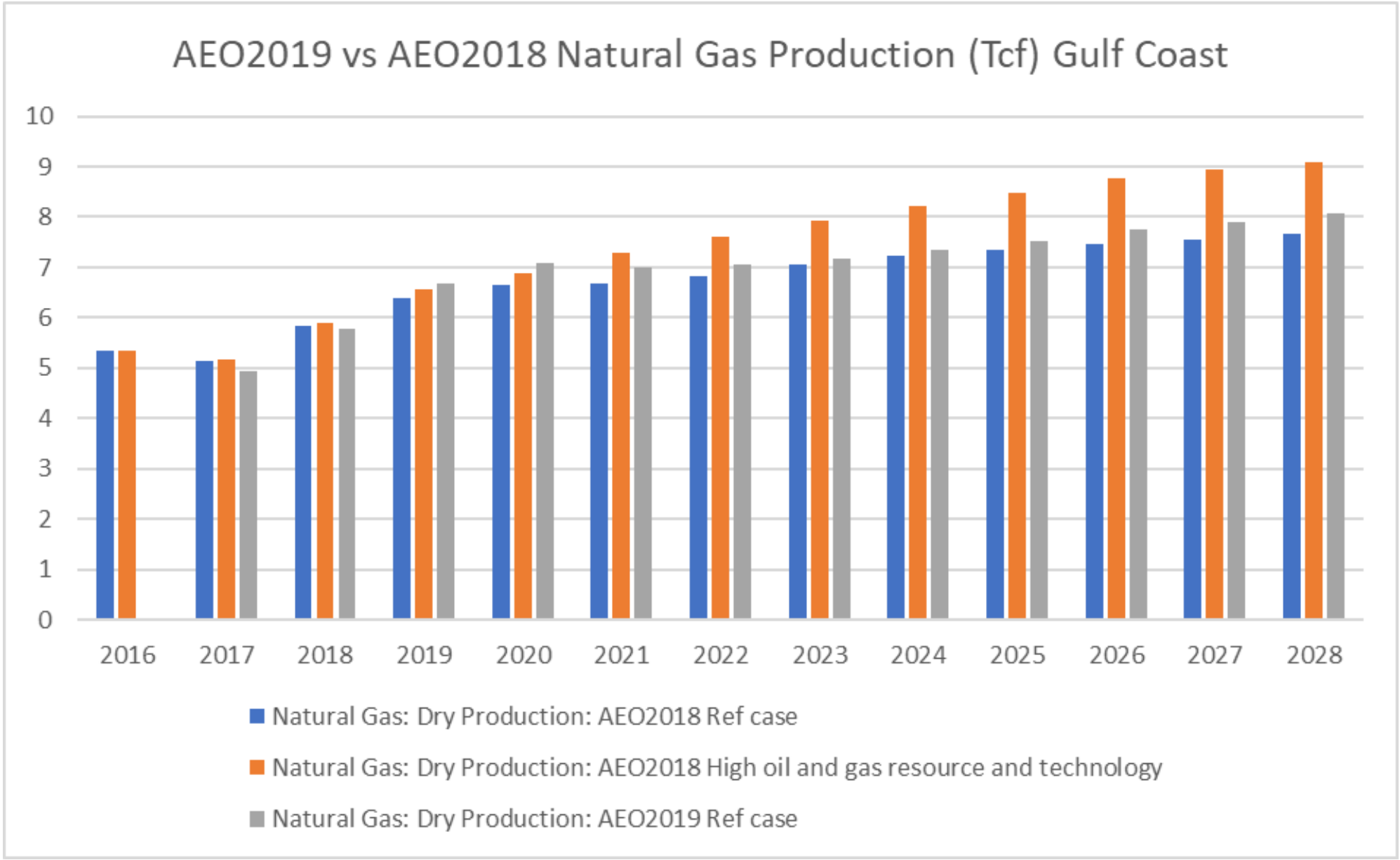
AEO2019 vs AEO2018 Natural Gas Production (Tcf) Gulf Coast
10
9
8
7
6
5
4
3
2
1
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Natural Gas: Dry Production: AEO2018 Ref case
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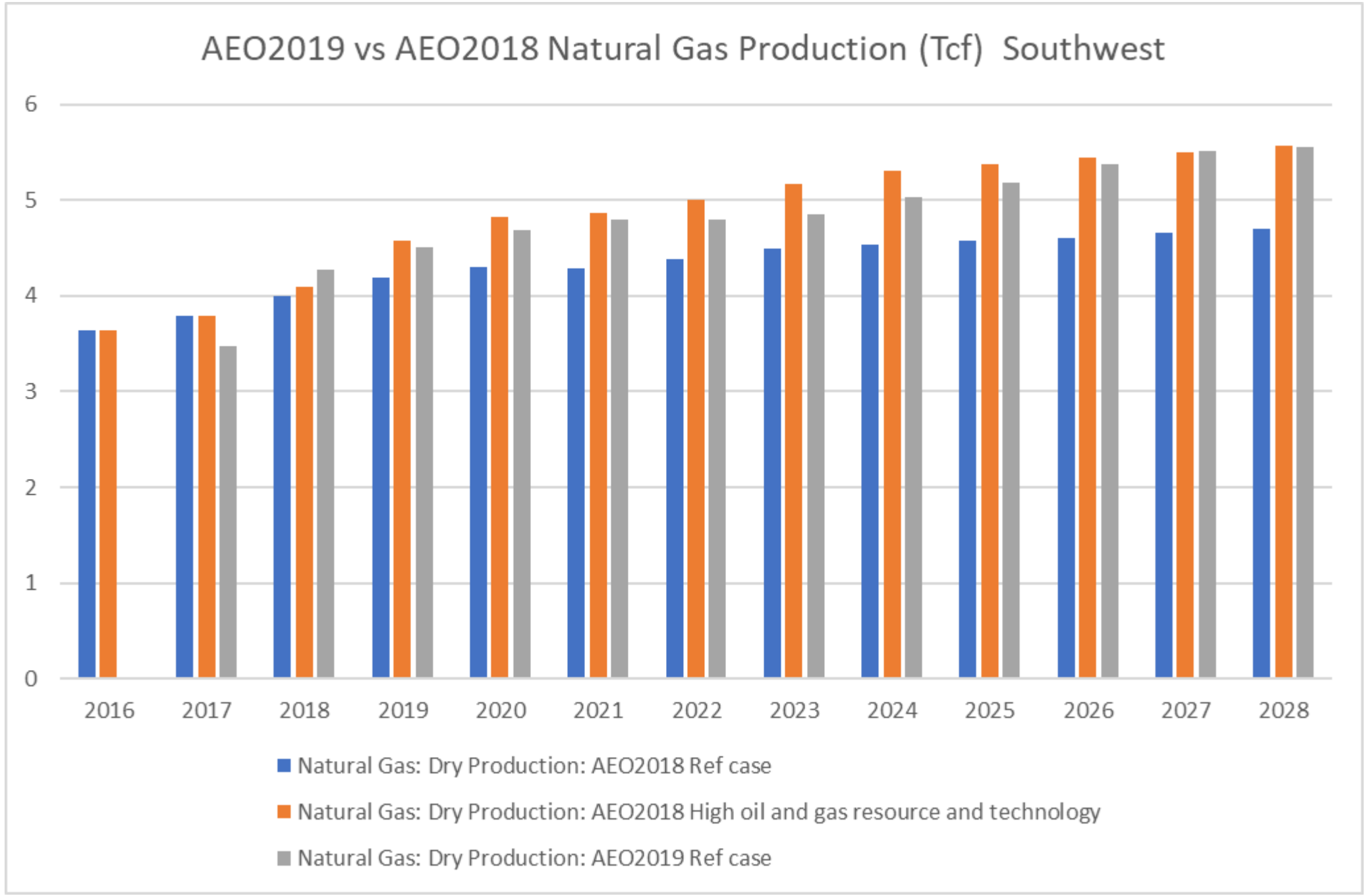
AEO2019 vs AEO2018 Natural Gas Production (Tcf) Southwest
6
5
4
3
2
1
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Natural Gas: Dry Production: AEO2018 Ref case
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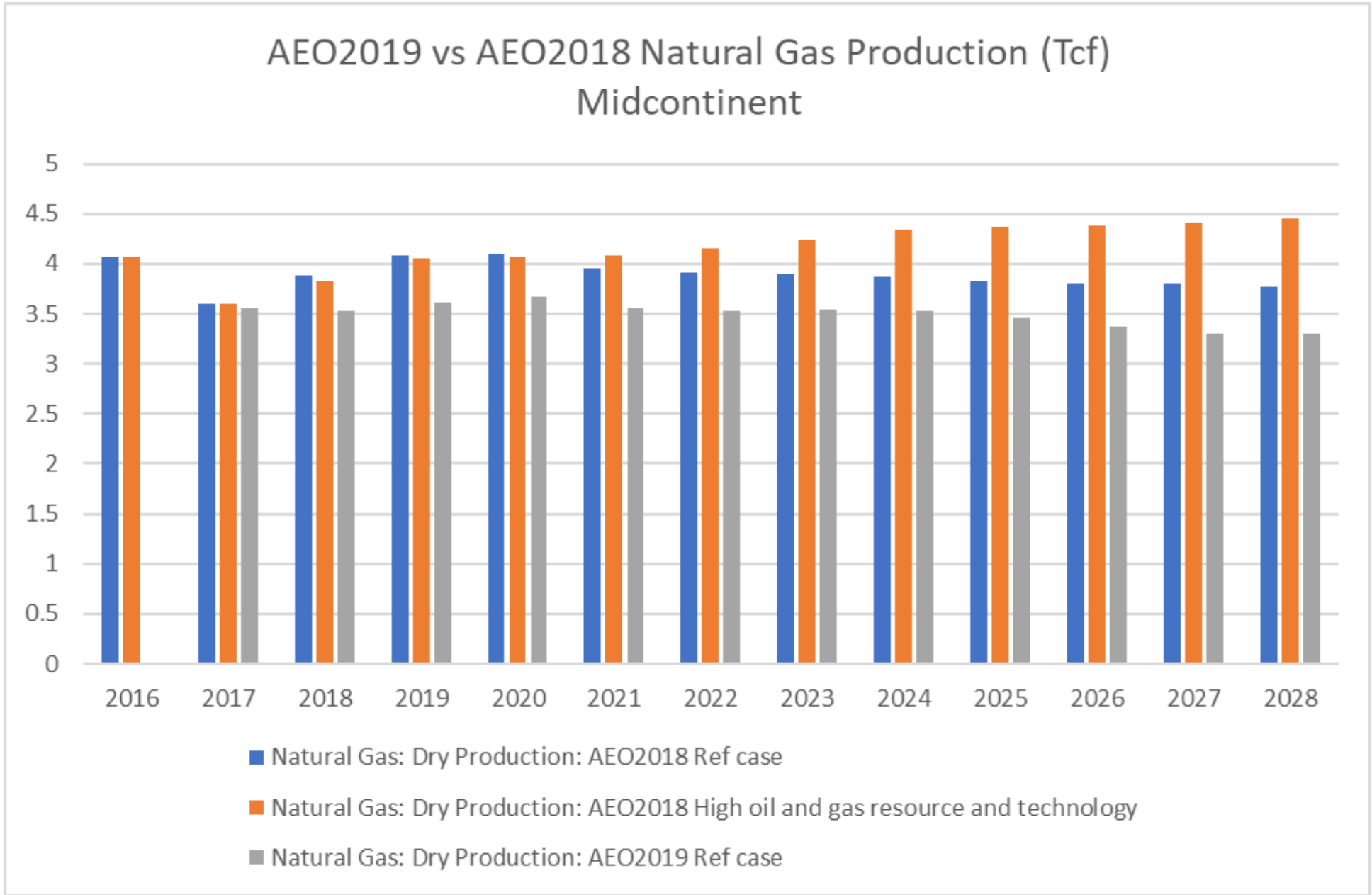
AEO2019 vs AEO2018 Natural Gas Production (Tcf)
Midcontinent
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
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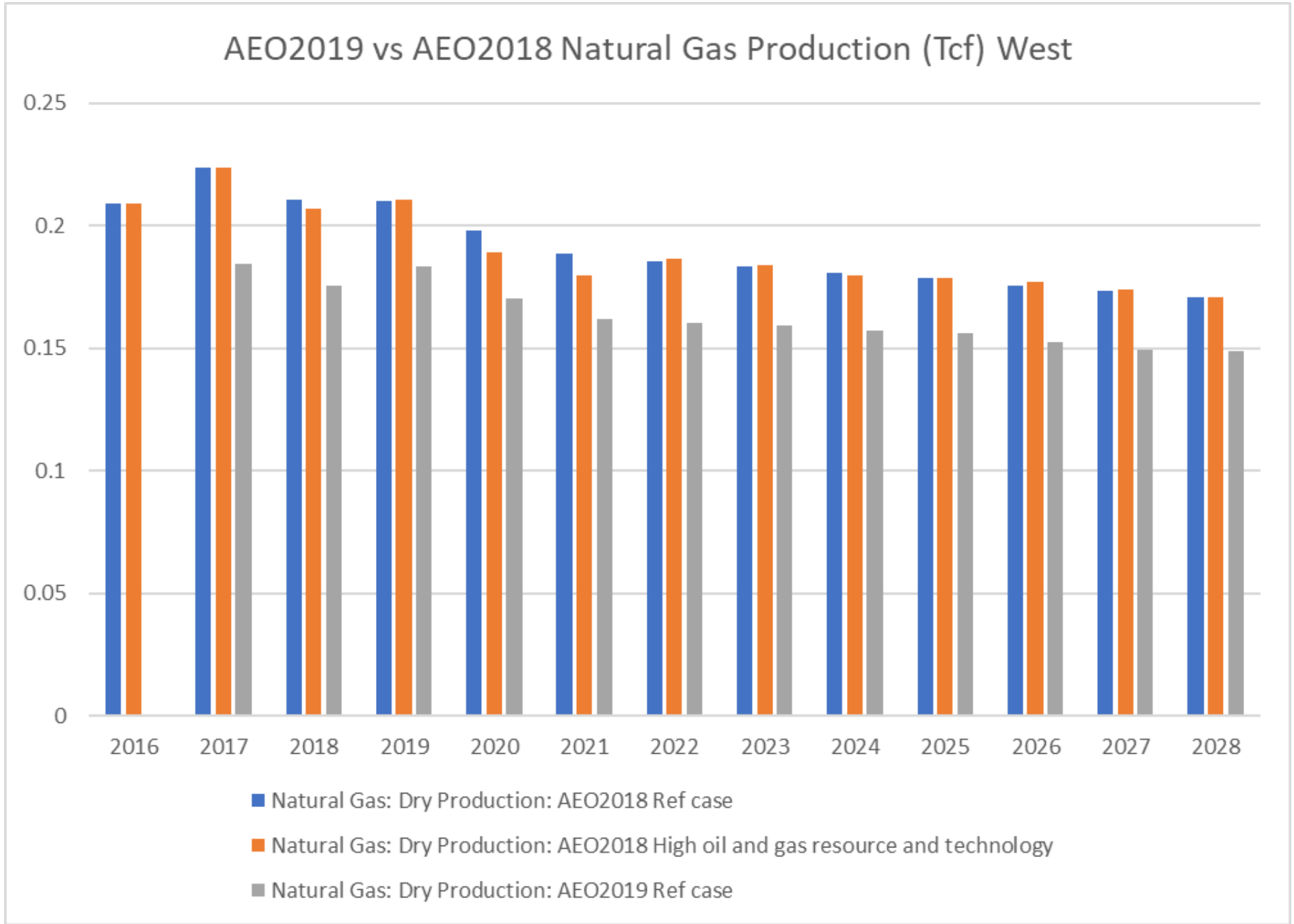
Natural Gas: Dry Production: AEO2019 Ref case


AEO2019 vs AEO2018 Natural Gas Production (Tcf) West
0.25
0.2
0.15
0.1
0.05
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
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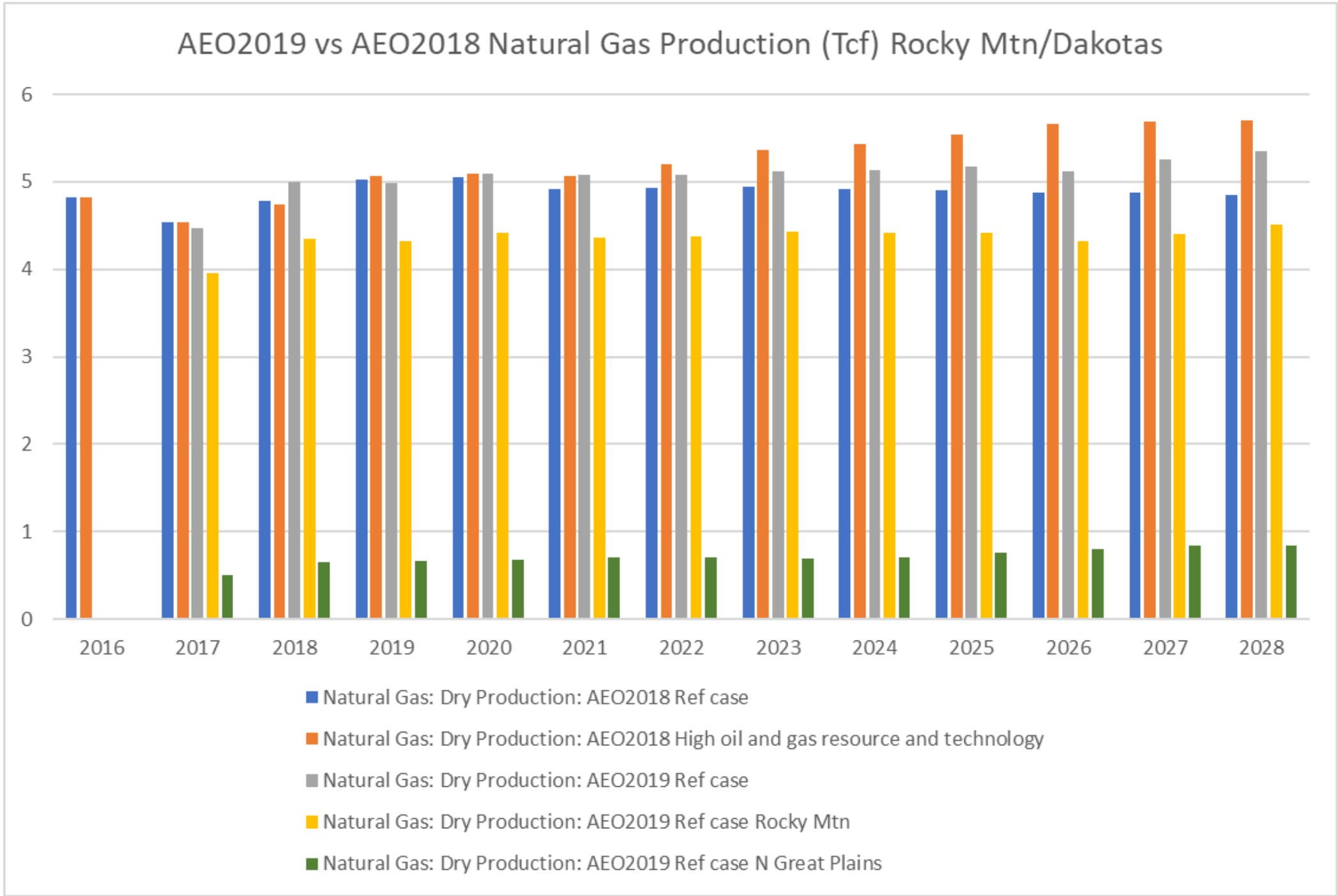
AEO2019 vs AEO2018 Natural Gas Production (Tcf) Rocky Mtn/Dakotas
6
5
4
3
2
1
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
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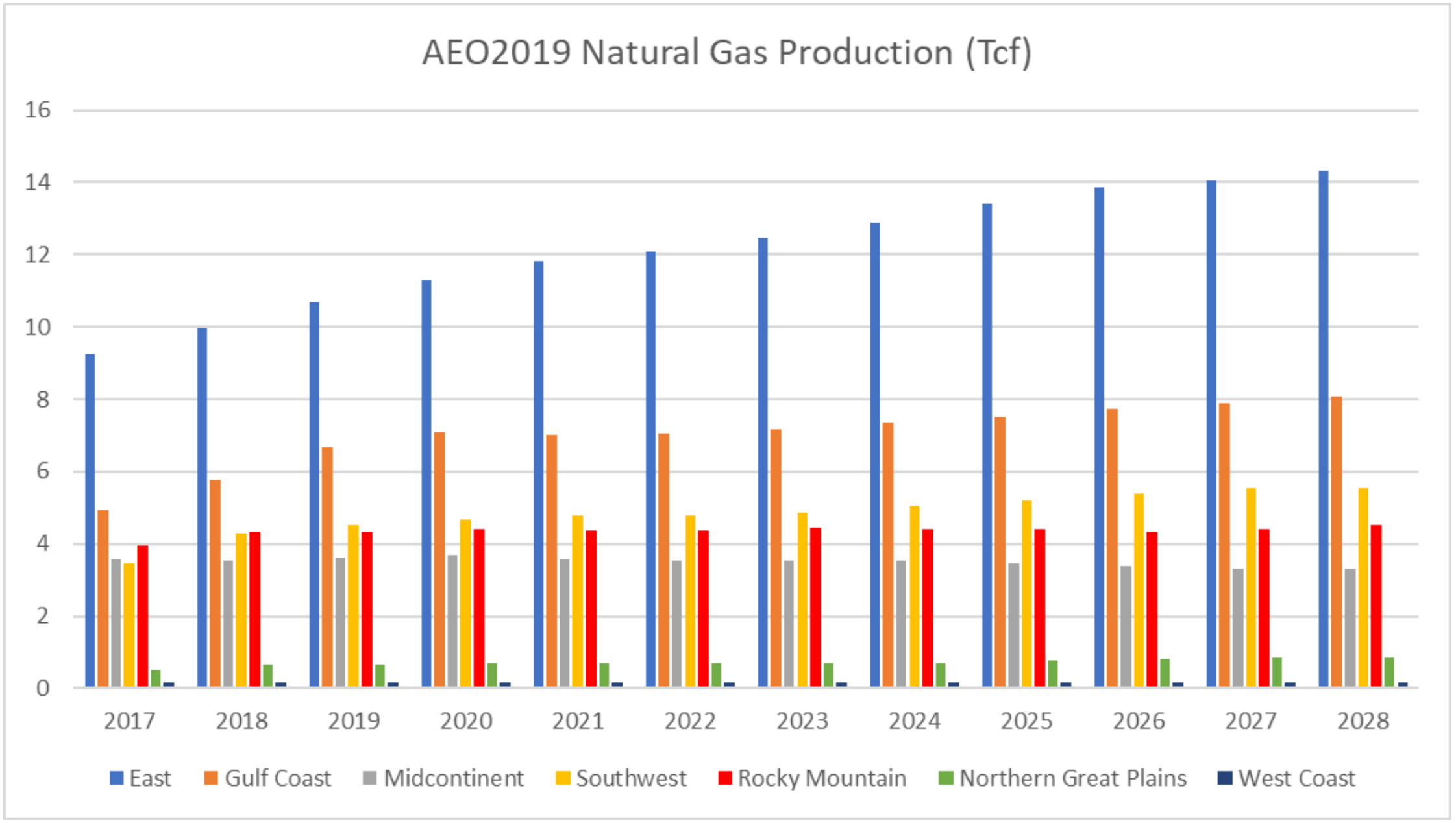
Natural Gas: Dry Production: AEO2019 Ref case N Great Plains


AEO2019 Natural Gas Production (Tcf)
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
East
Gulf Coast
Midcontinent
Southwest
Rocky Mountain
Northern Great Plains
West Coast

EIA 2019 Oil and Gas Tight Oil and Shale Gas Plays (basins) Reference case only available

Tight Oil Plays
Bakken
Eagle Ford
Woodford
Austin Chalk
Spraberry
Niobrara
Avalon/Bone Springs
Monterey
Wolfcamp
Utica

Shale Gas Plays
Barnett
Haynesville/Bossier
Fayetteville
Woodford
Eagle Ford
Antrim
Marcellus
Bakken
Utica

May allow for sub-regional/county projections for major basins