



# Carbon emissions intensity of electricity generation in Alberta

IPCAA Workshop

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# Presentation outline

- Mandate of the Market Surveillance Administrator
- Carbon pricing in Alberta's electricity market
- Emission performance of electricity generation
- Summary and looking forward

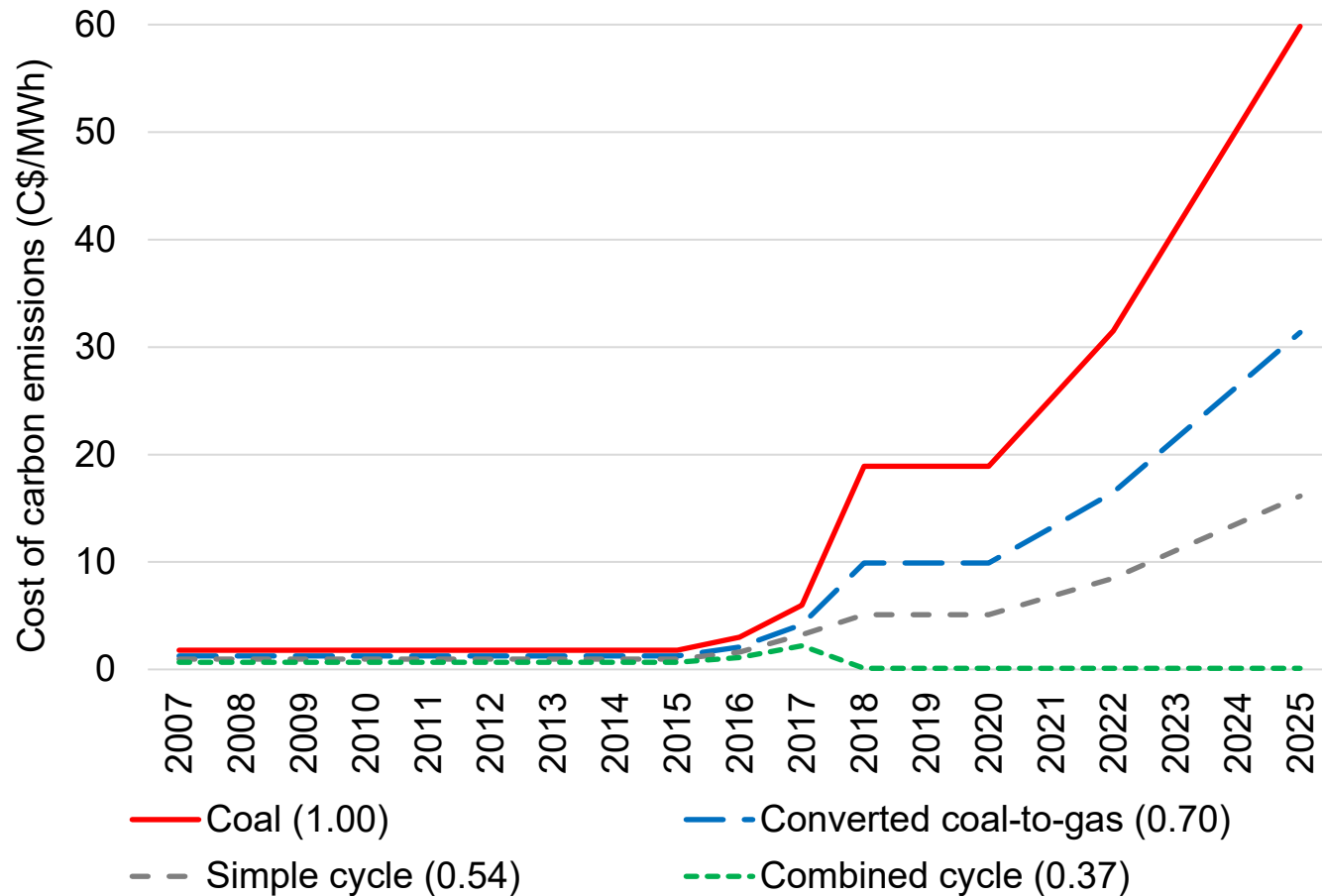
# Mandate of the Market Surveillance Administrator

- To carry out surveillance in respect of the supply, generation, transmission, trade, exchange, purchase or sale of electricity, electric energy, electricity services or ancillary services
  - carbon emission performance is an increasingly important aspect of the market
  - the MSA began publishing detailed carbon emission data in our QRs
- To investigate matters, on its own initiative or on receiving a complaint or referral from any person, the Alberta Electric System Operator (ISO), or the Alberta Utilities Commission, and to undertake activities to address:
  - contraventions of the *Electric Utilities Act*, the regulations under that act, the ISO rules, and Alberta Reliability Standards
  - “conduct that does not support the fair, efficient and openly competitive operation of the electricity market” and
  - “any other matters that relate to or affect the structure and performance of the electricity market”

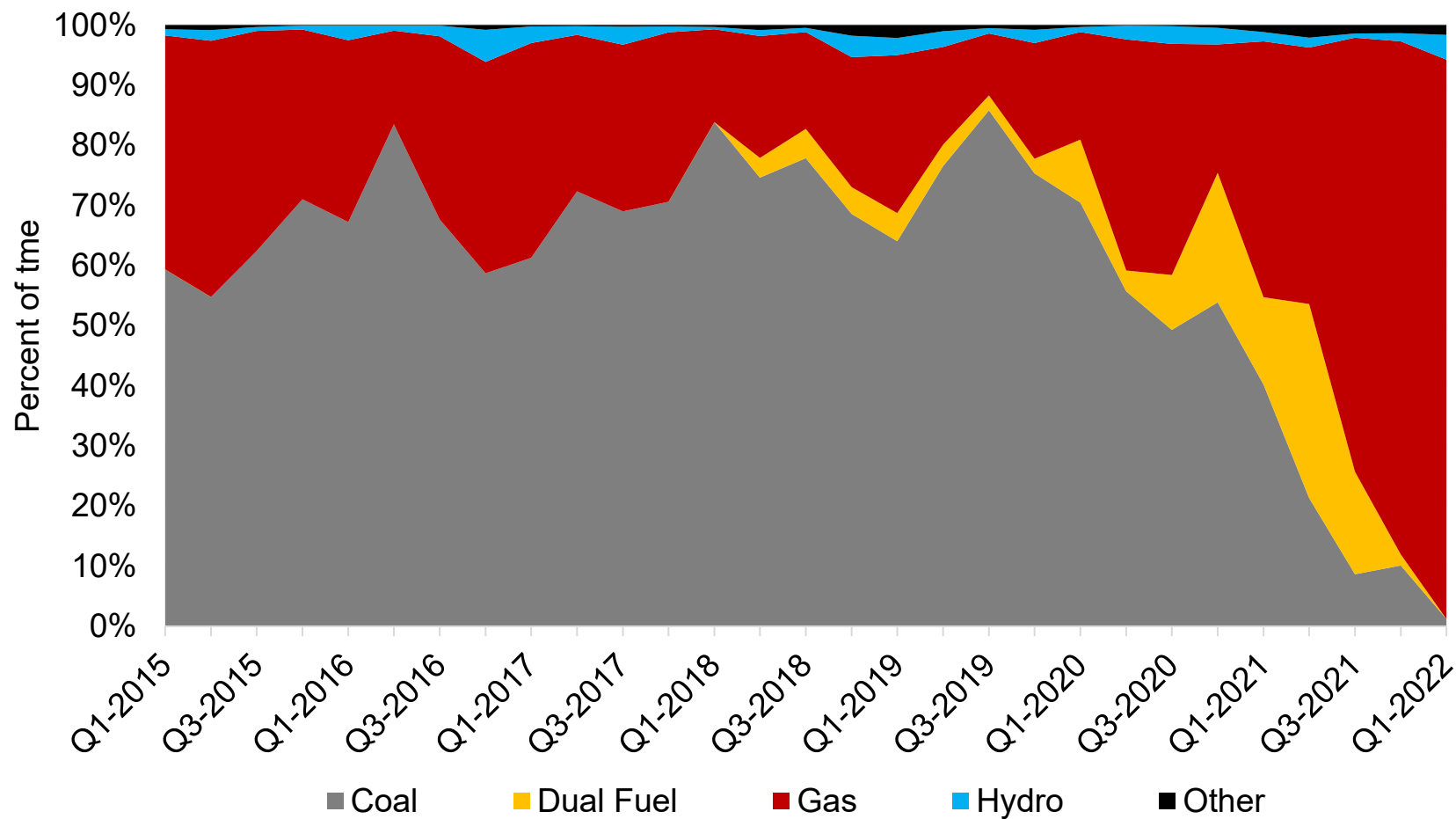
# Carbon pricing in Alberta's electricity market

- From 2007 to 2017: *Specified Gas Emitters Regulation (SGER)*
- From 2018 onward: *Carbon Competitiveness Incentive Regulation (CCIR)* and *Technology Innovation and Emissions Reduction Regulation (TIER)*; interaction with federal policy
- Electricity generators are directly responsible for satisfying carbon compliance obligations
- Carbon costs are like any other generator cost and must be recovered from the power pool or not incurred; this was the point of the policy
  - key component of marginal cost (to varying degrees)
  - short-run merit order effect (changing dispatch)
  - long-run investment effect (coal and renewable investment)
- Aside: carbon treatment of natural gas consumption is very different

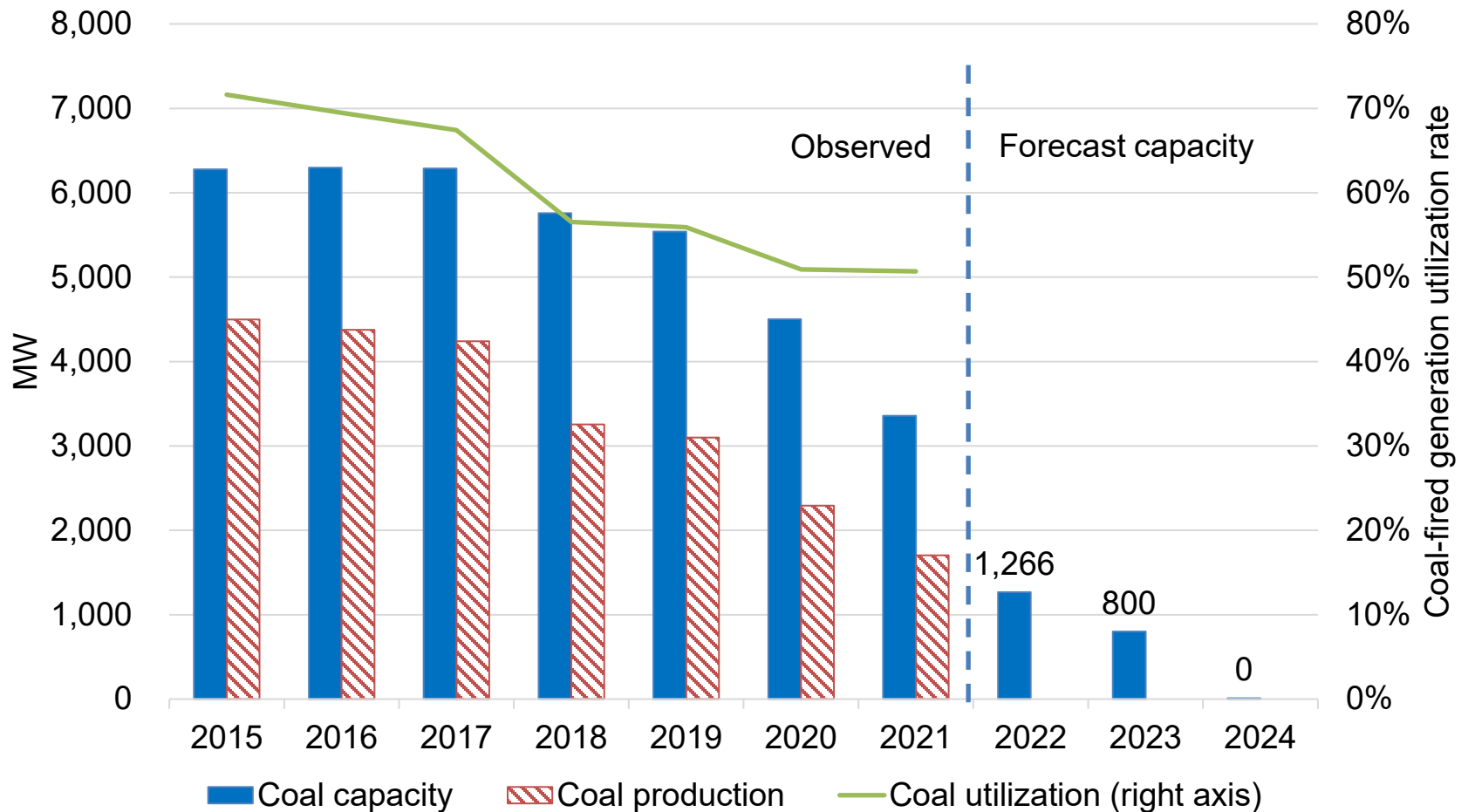
# Impact on marginal cost: Cost of carbon emissions over time



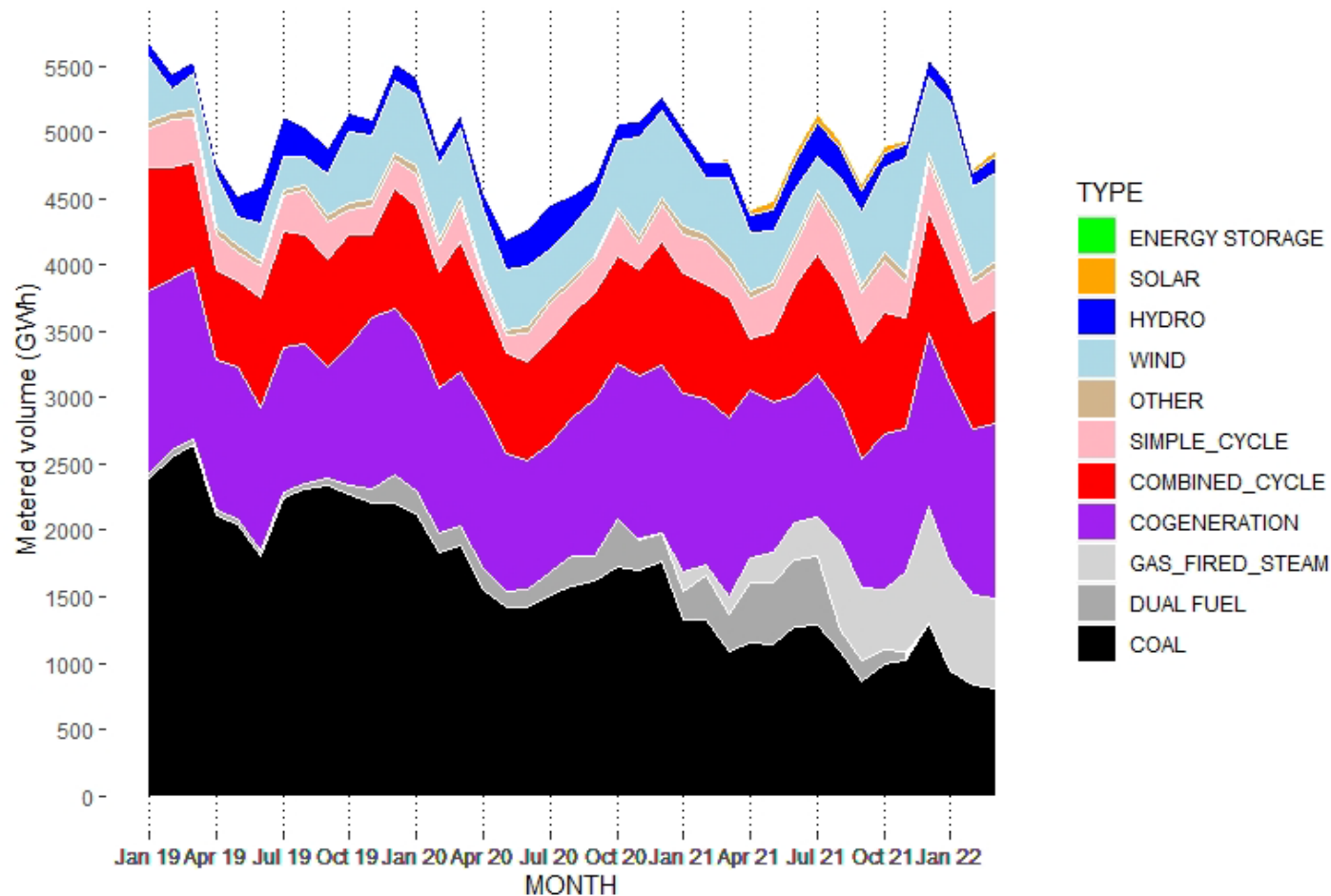
# Short-run merit order effect: Percent of time different asset types set system marginal price



# Long-run investment effect: The case of coal

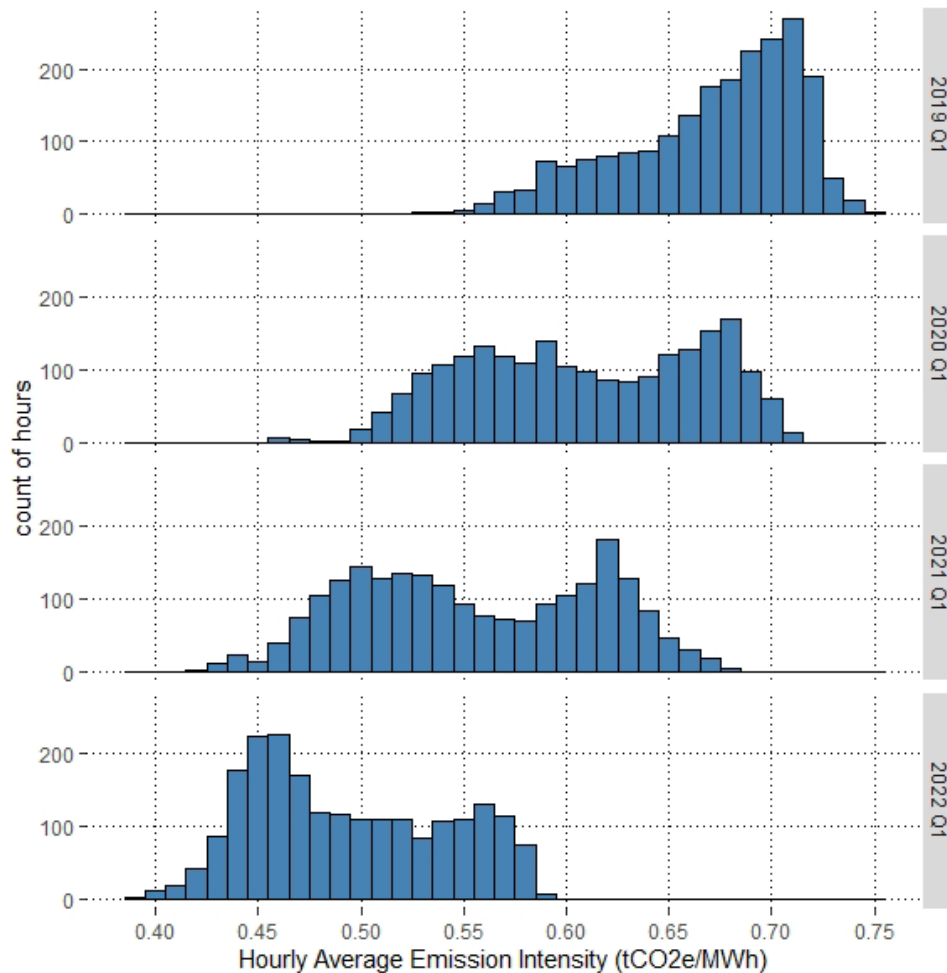


# Monthly total net-to-grid generation volumes by generation type

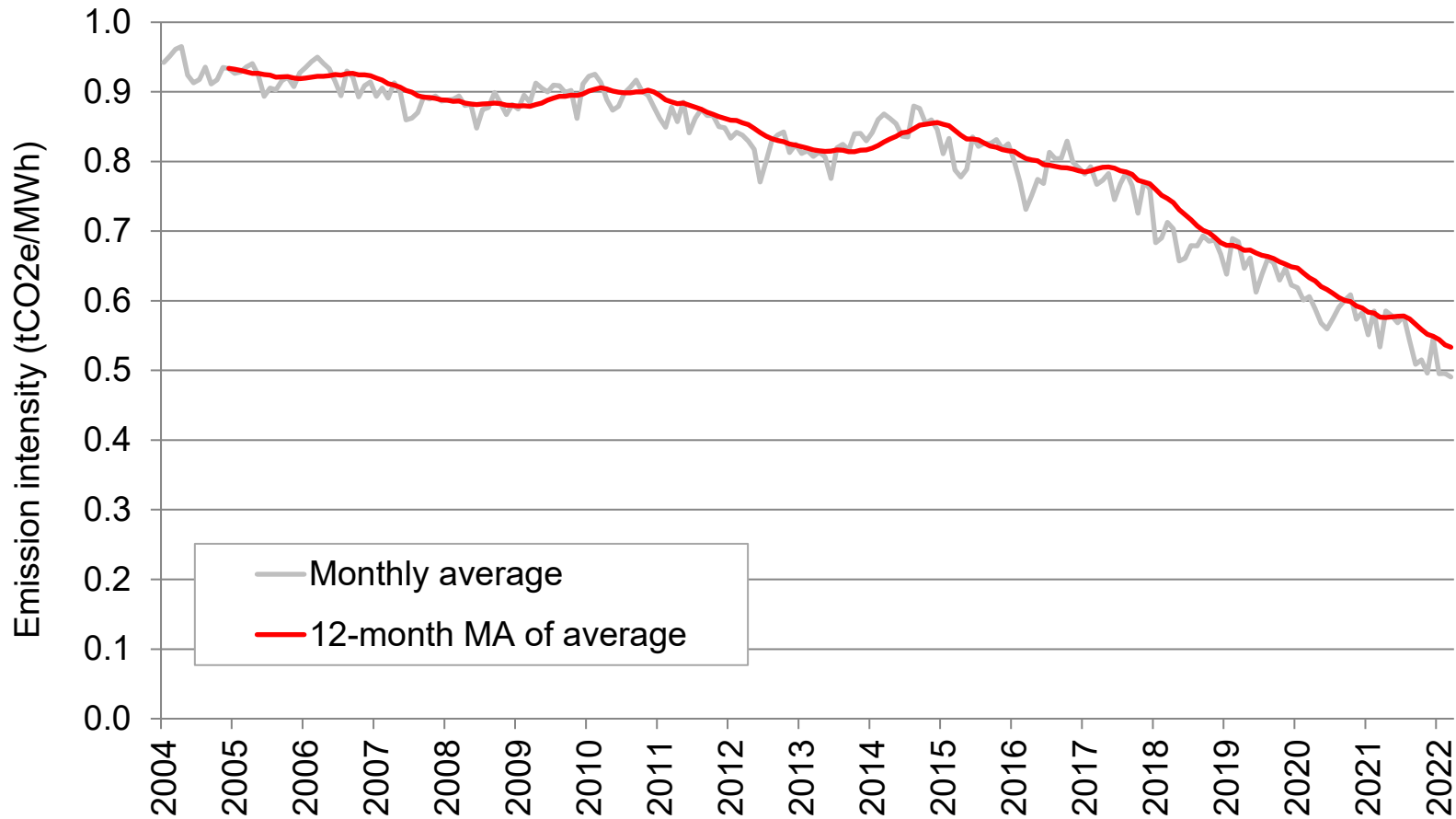




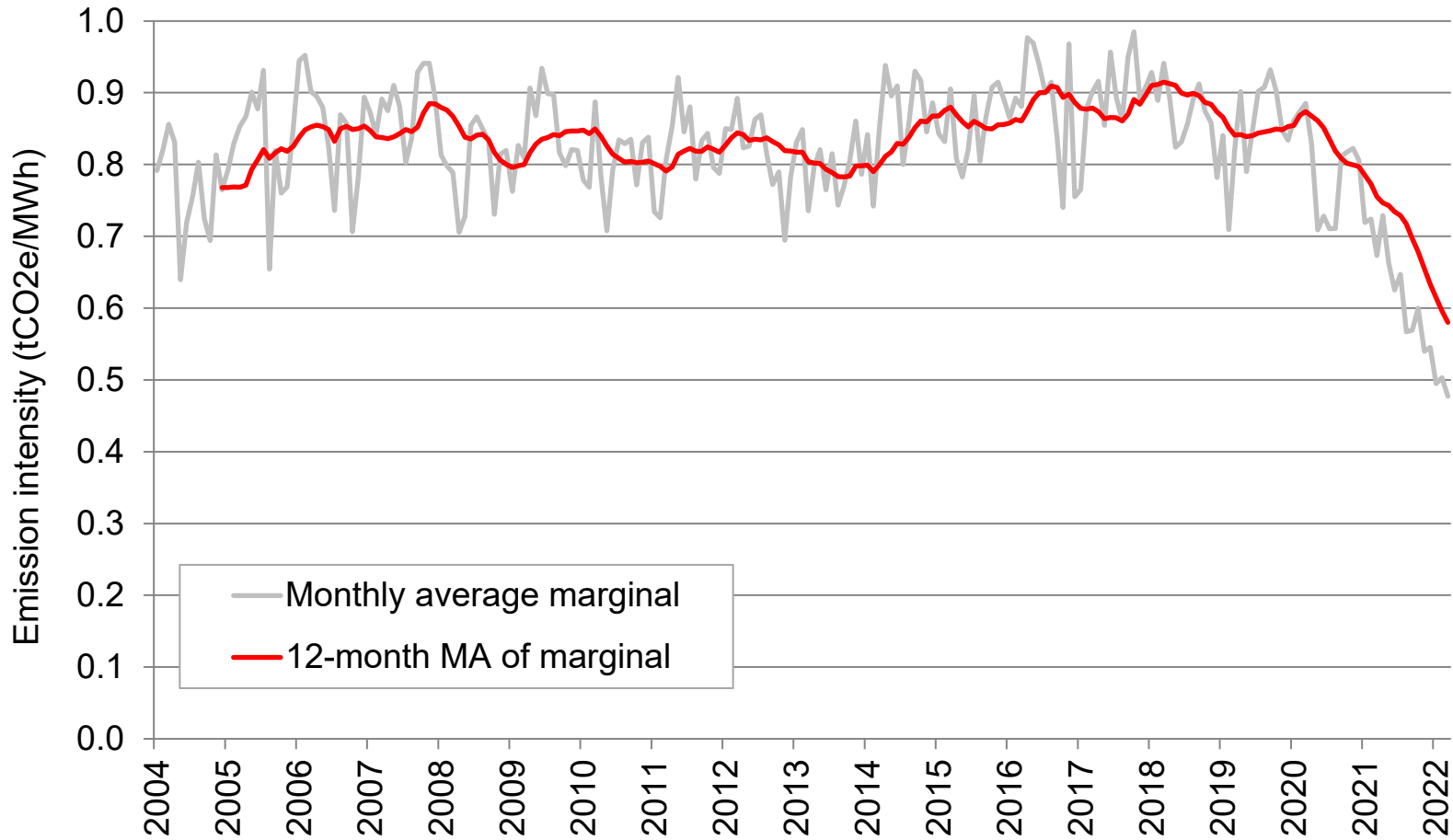
# Emission performance: Distribution of average carbon emission intensities in Q1, 2019 to 2022



# Emission performance: Average emission intensity of electricity generation



# Emission performance: Average marginal emission intensity of electricity generation



# Summary and looking forward

## Summary

- Markets work and clear economic incentives are tremendously powerful
- Coal has been replaced with natural gas and, to a lesser extent, renewables
- Carbon emissions have decreased substantially in recent years
- Clear link to carbon pricing but there are outstanding questions
- Emission intensity will fall somewhat further as coal is fully retired

## Looking forward

- More stringent public policy objectives regarding carbon emissions
- What happens to emissions after all coal has exited?
- Current policy and technological neutrality
- The net in net-zero
- Emissions caps and trading

# Questions?