

Project #5261

# Smart Metering Playbook: Compendium of Resources for WRF Subscribers—Survey Data



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Survey Launch Date:  
APRIL 16, 2024

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**Published:**  
**March 2025**

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WRF ISBN: 978-1-60573-710-2

WRF Project Number: 5261

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# 1. Executive Summary

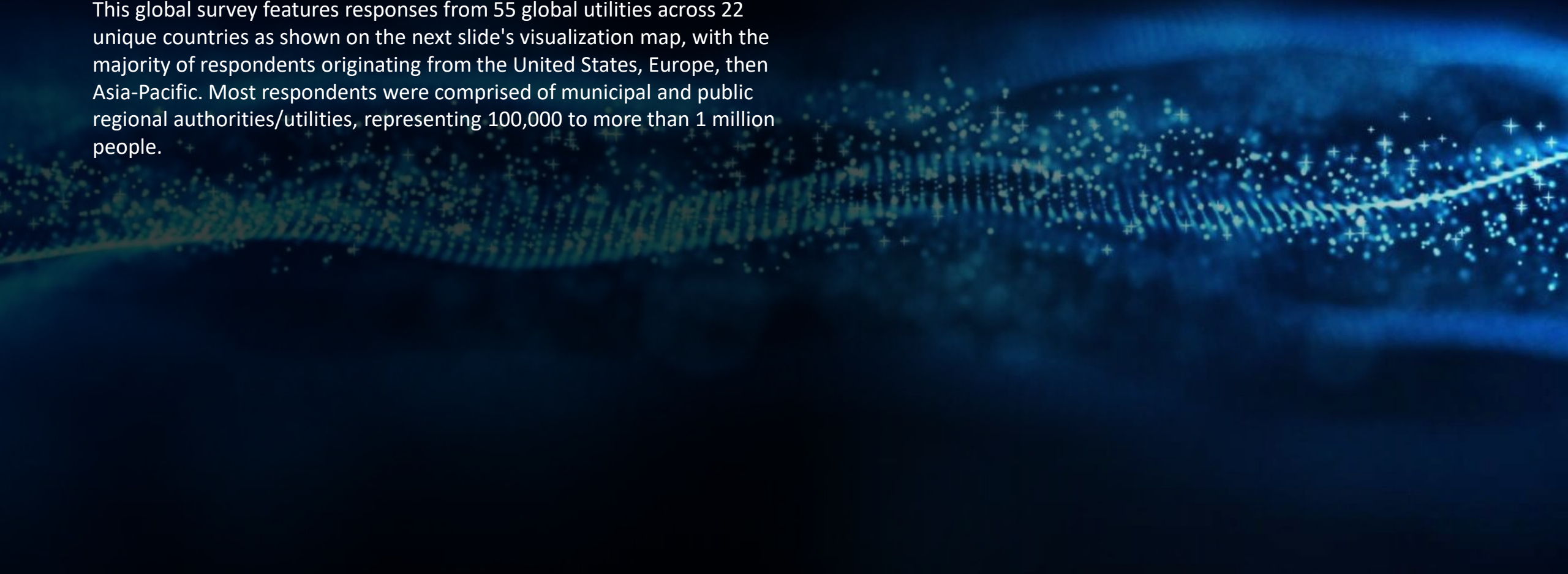
As part of The Water Research Foundation (WRF) Project #5261, SWAN conducted a global Smart Metering utility survey in April 2024 with the goal of establishing a baseline understanding of the drinking water industry's main drivers, benefits, barriers, and future Smart Metering investment plans.

This survey features responses from 55 global utilities across 22 unique countries, providing insights covering hardware, software, communication and procurement considerations. The population size of those surveyed ranges from small towns with just under 5,000 people through to large metropolitan areas with more than 5 million inhabitants.



# Respondent Demographics

This global survey features responses from 55 global utilities across 22 unique countries as shown on the next slide's visualization map, with the majority of respondents originating from the United States, Europe, then Asia-Pacific. Most respondents were comprised of municipal and public regional authorities/utilities, representing 100,000 to more than 1 million people.



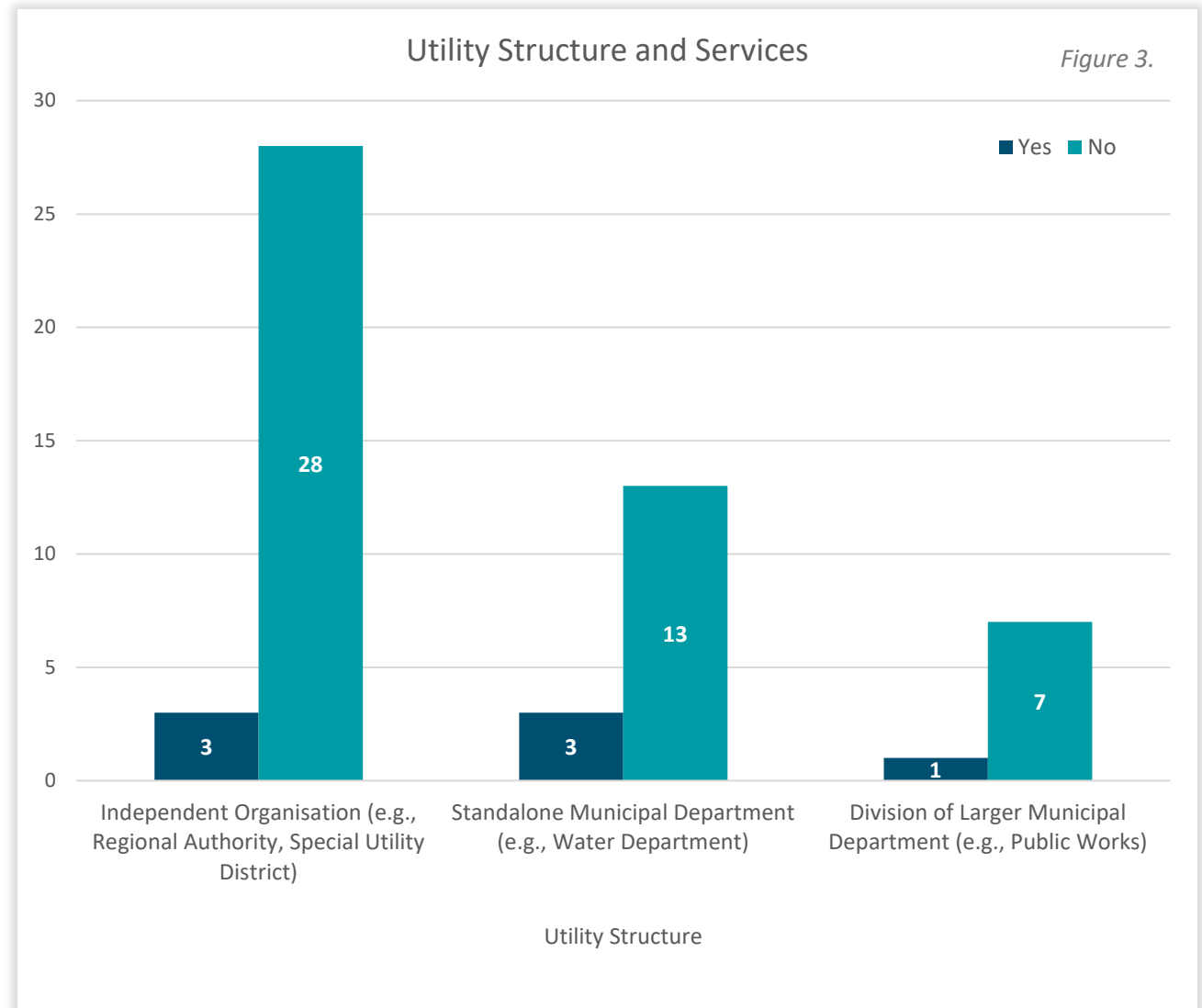
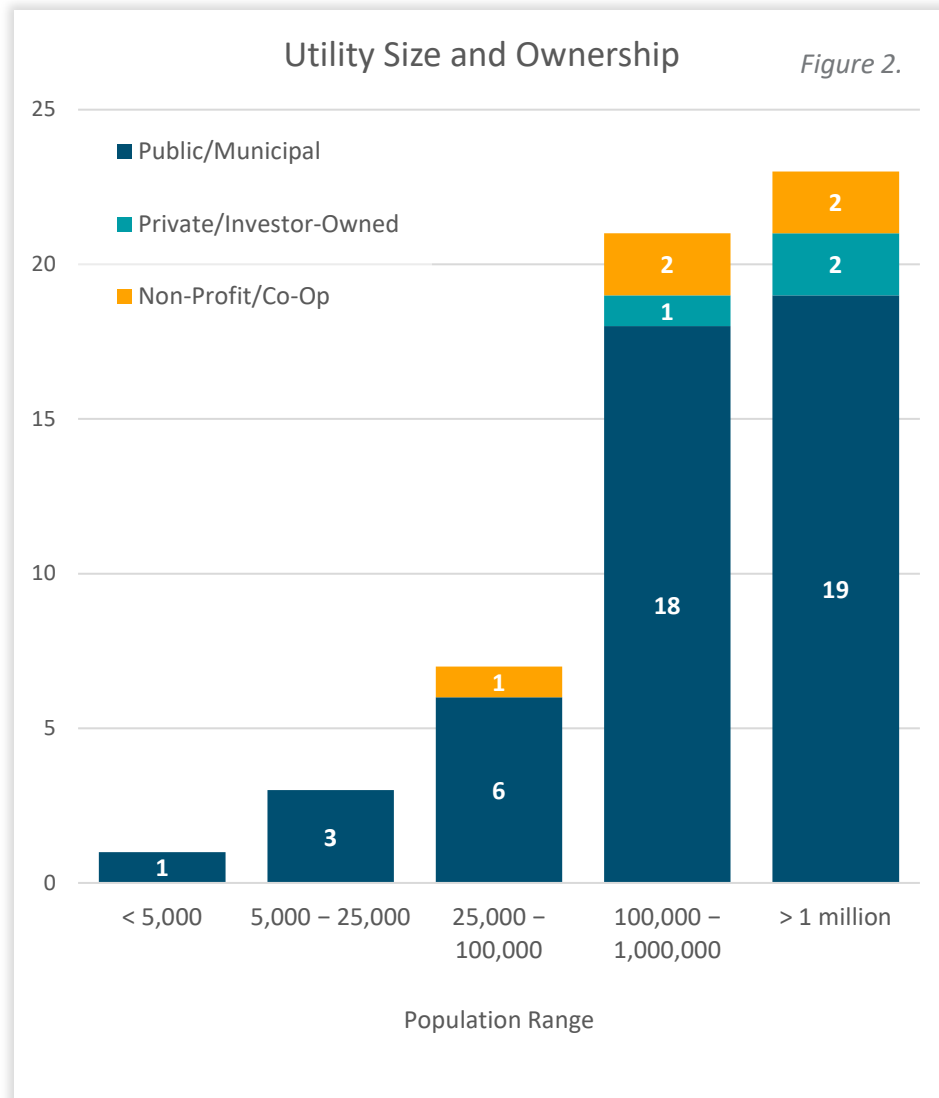
## 2. Respondent Demographics

1. South East Water, Melbourne, Australia
2. Sydney Water, Sydney, Australia
3. Coliban Water, Kangaroo Flat, Australia
4. Hunter Water Corporation, Lower Hunter Region, Australia
5. Yarra Valley Water, Melbourne, Australia
6. De Watergroep, Brussels/Flanders, Belgium
7. Aegea, Rio de Janeiro, Brazil
8. Toronto Water, Toronto, Canada
9. Enwin Utilities, Windsor, Canada
10. City of Vancouver Water, Vancouver, Canada
11. Water, Coquitlam, Canada
12. HOFOR, Copenhagen, Denmark
13. Alva, Jyväskylä, Finland
14. SUEZ Smart Solutions, France
15. Water Supplies Department, Hong Kong, China
16. Perusahaan Daerah Air Minum (PDAM) Surya Sembada Kota Surabaya, Surabaya, Indonesia
17. Agricultural Pump Station System, Zabol, Iran
18. Mei Lod, Lod, Israel
19. ACEA Ato2, Rome, Italy
20. Water Services Corporation, Malta, Malta
21. Vitens, Zwolle, Netherlands
22. Watercare, Auckland, New Zealand
23. EPAL, Lisbon, Portugal
24. Águas e Energia do Porto, Porto, Portugal
25. AGS, Tavira, Portugal
26. Scottish Water, Edinburgh, Scotland
27. PUB, Singapore, Singapore
28. George Municipality, George, South Africa
29. Umgeni Water Services, Durban, South Africa
30. Drakenstein Local Municipality, Paarl, South Africa
31. Consorci d'Aigües de Tarragona, Tarragona Province, Spain
32. Canal de Isabel II SA MP, Madrid, Spain
33. VA SYD, Malmö, Sweden



- |  |  |   |
|--|--|---|
| 34. NSVA, Helsingborg, Sweden                                      | 42. City of Walla Walla, Walla Walla, WA, USA                | Services, Isle of Wight County, VA, USA                           |
| 35. SES Water, Redhill, UK   | 43. Anchorage Water & Wastewater Utility, Anchorage, AK, USA | 50. The Pittsburgh Water and Sewer Authority, Pittsburgh, PA, USA |
| 36. Anglian Water, Huntingdon, UK                                  | 44. Portland Water Bureau, Portland, OR, USA                 | 51. Loudoun Water, Ashburn, USA                                   |
| 37. Sammamish Plateau Water and Sewer District, Sammamish, WA, USA | 45. City of Highland Park, Highland Park, IL, USA            | 52. Toho Water Authority, Kissimmee, FL, USA                      |
| 38. Moulton Niguel Water District, Laguna Hills, CA, USA           | 46. WSSC Water, Laurel, MD, USA                              | 53. Seattle Public Utilities, Seattle, WA, USA                    |
| 39. City of Phoenix, Phoenix, AZ, USA                              | 47. Las Vegas Valley Water District, Las Vegas, NV, USA      | 54. City of Newport News Waterworks, Newport News, VA, USA        |
| 40. City of Salem, Salem, OR, USA                                  | 48. Pace Water System, Inc., Pace, FL, USA                   | 55. Riverbend Water Resources District, New Boston, TX, USA       |
| 41. City of Bellevue Utilities, Bellevue, WA, USA                  | 49. Isle of Wight County Department of Utility               |   |

## 2. Respondent Demographics



# Current State of Metering and Technology Adoption

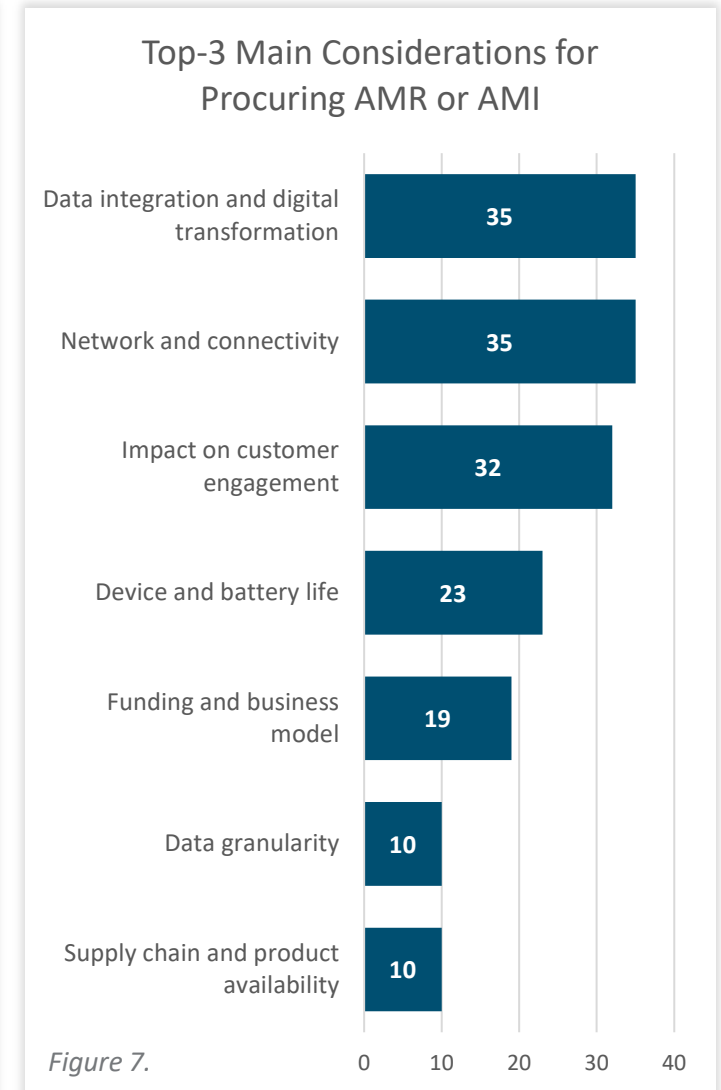
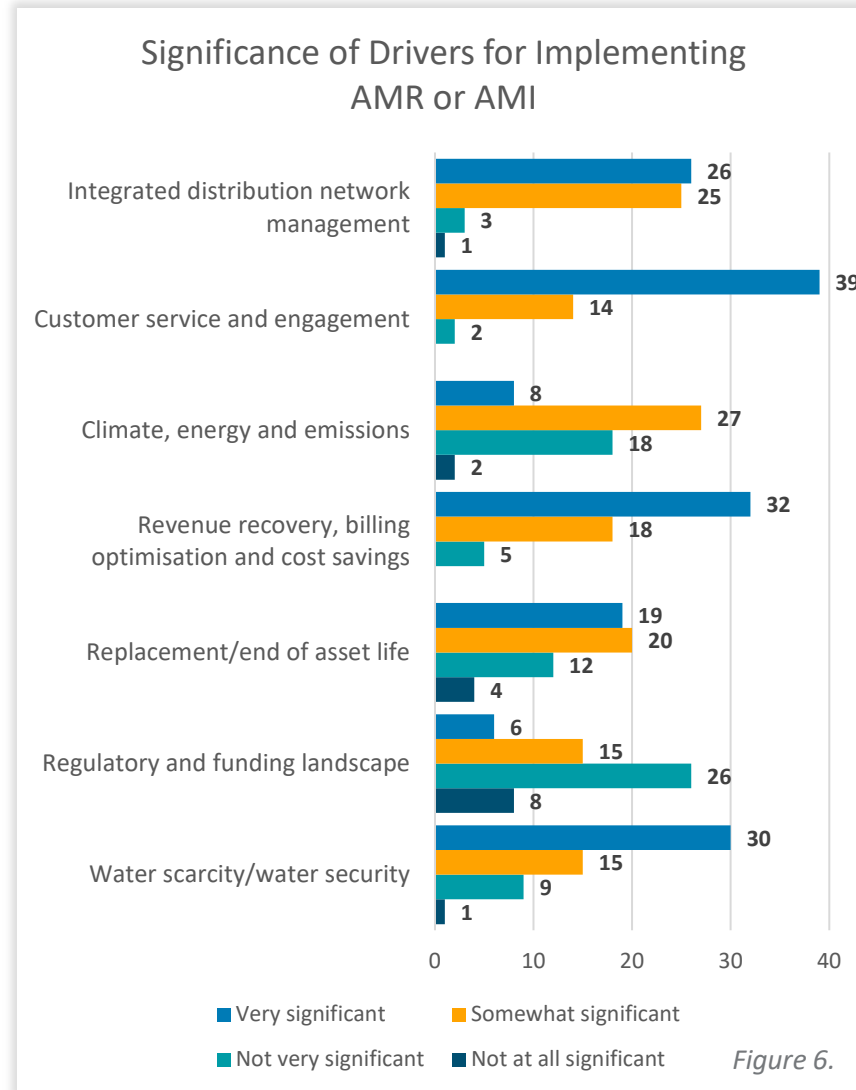
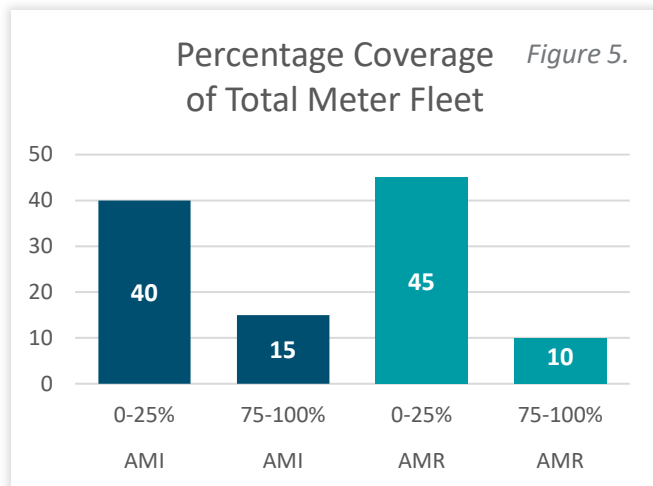
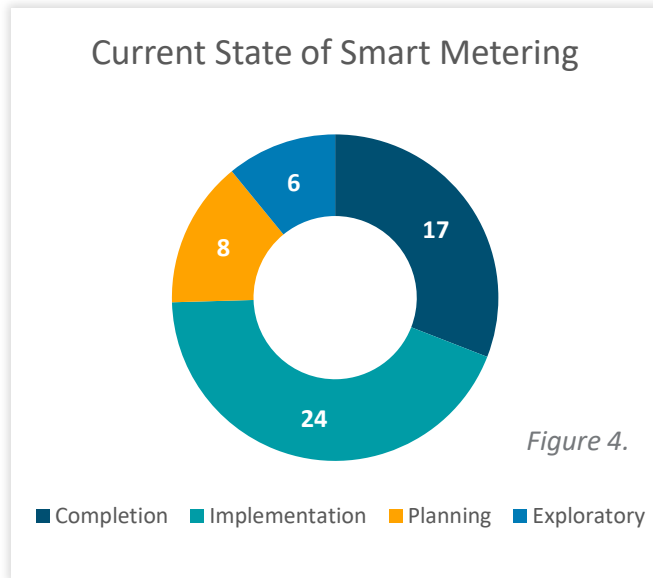
The figures on the next slide reflect the current state of metering and technology adoption, from the smart metering phase, the type of smart metering approach chosen, AMR/AMI drivers, and main procurement considerations for determining AMR or AMI.

Nearly 55% of the respondents indicated they were either in the completion or implementation state of smart metering at the time of the survey.

From the 55 total responses, 40 have 0–25% AMI coverage, while 15 have 75–100% AMI. On the AMR side, 45 have 0–25% AMR fleet coverage, while 10 have 75–100% AMR coverage.

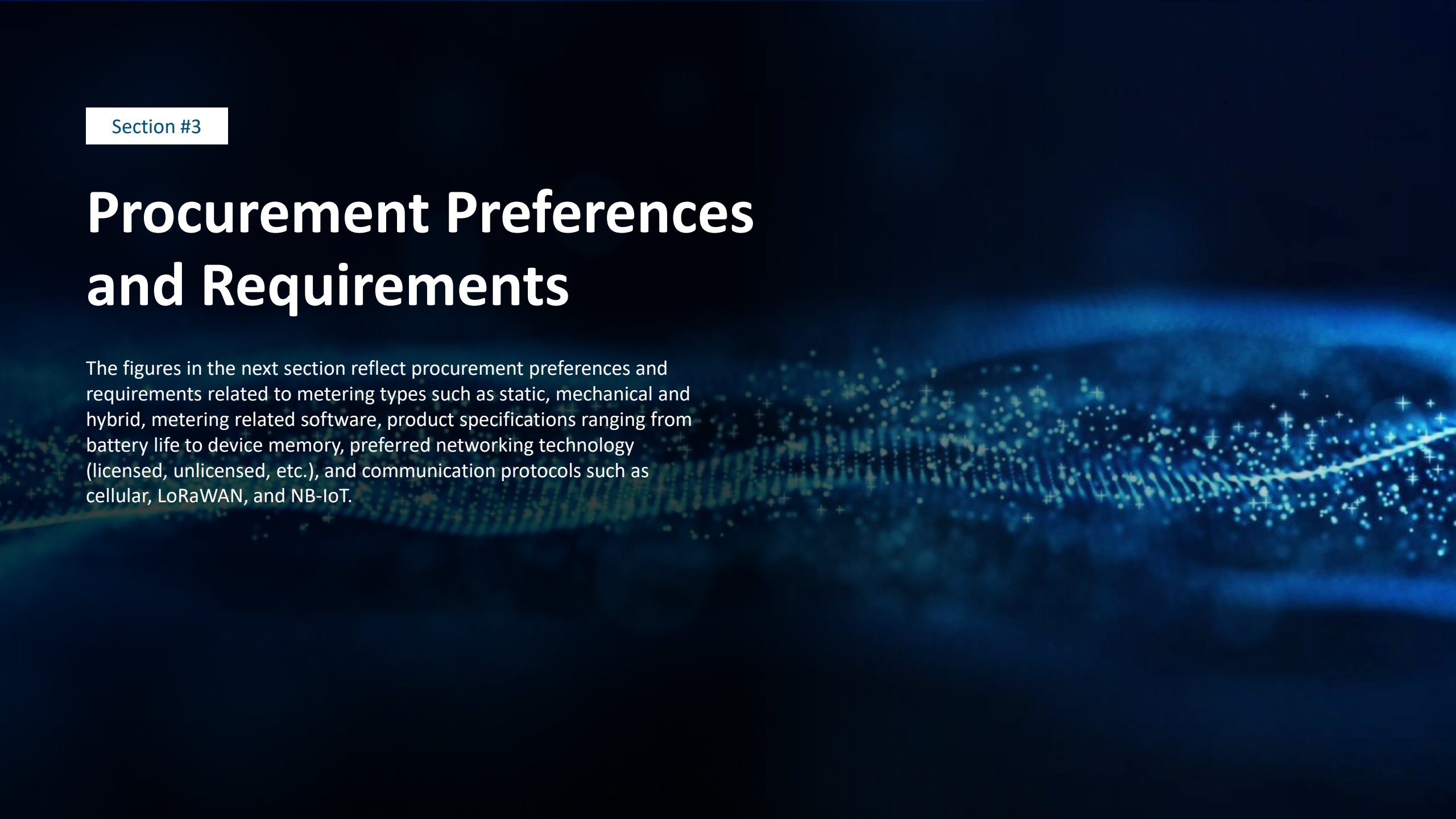
# 3. Current State of Metering and Technology Adoption

AMI = Advanced metering infrastructure, AMR = Automated meter reading



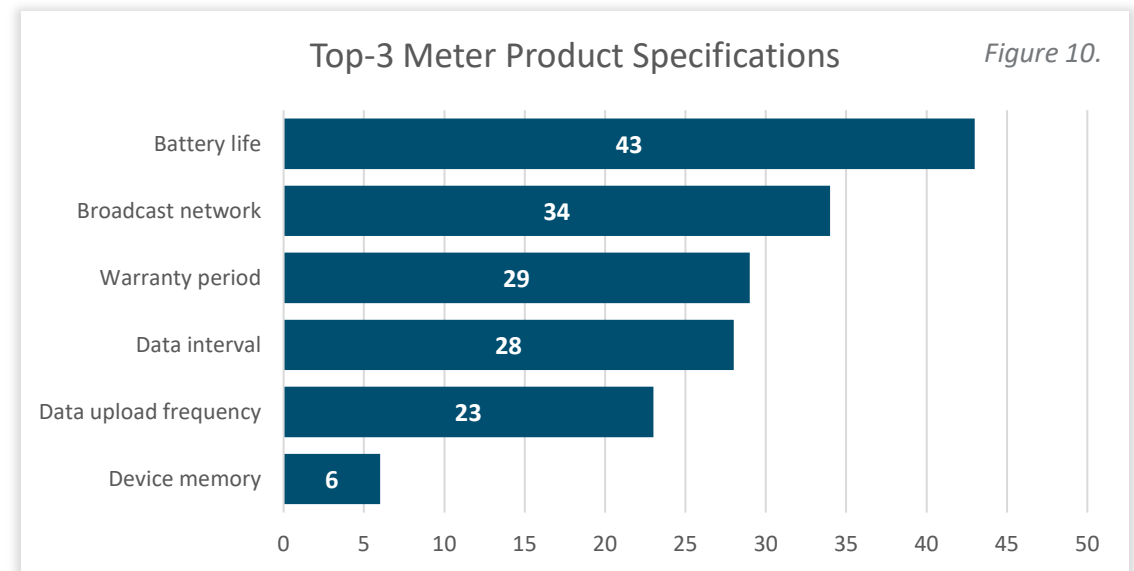
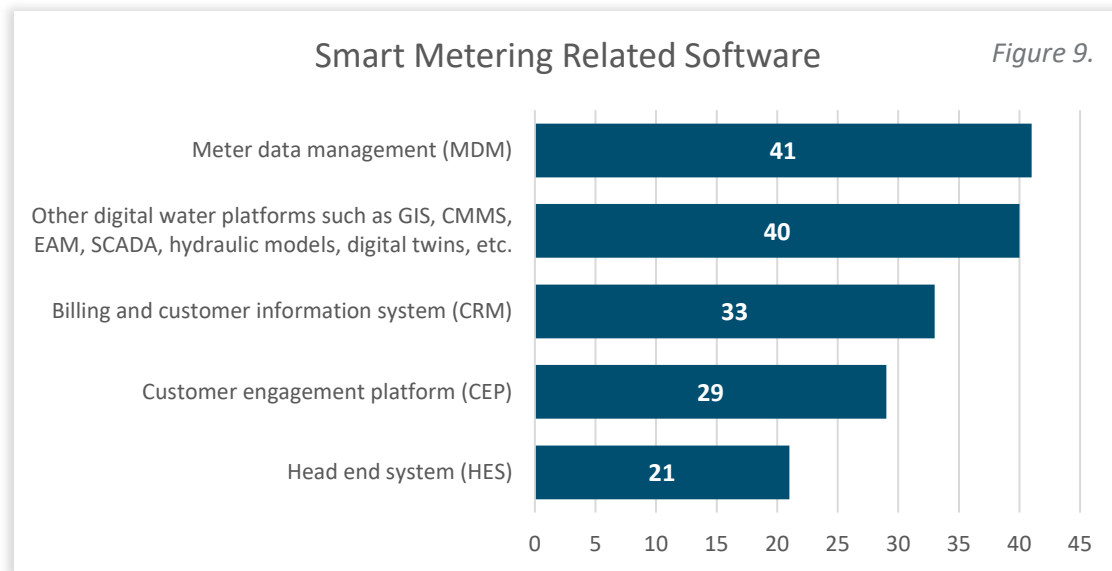
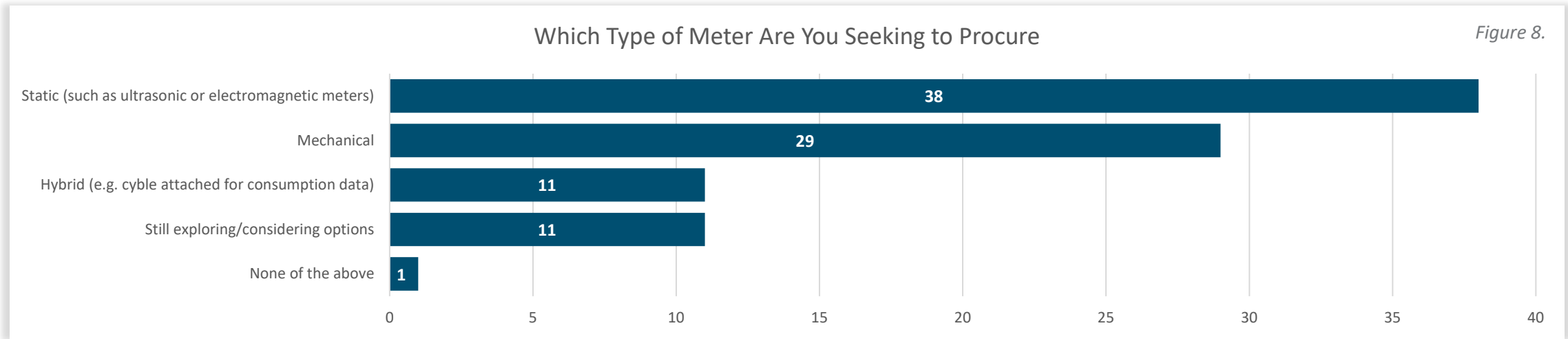
# Procurement Preferences and Requirements

The figures in the next section reflect procurement preferences and requirements related to metering types such as static, mechanical and hybrid, metering related software, product specifications ranging from battery life to device memory, preferred networking technology (licensed, unlicensed, etc.), and communication protocols such as cellular, LoRaWAN, and NB-IoT.

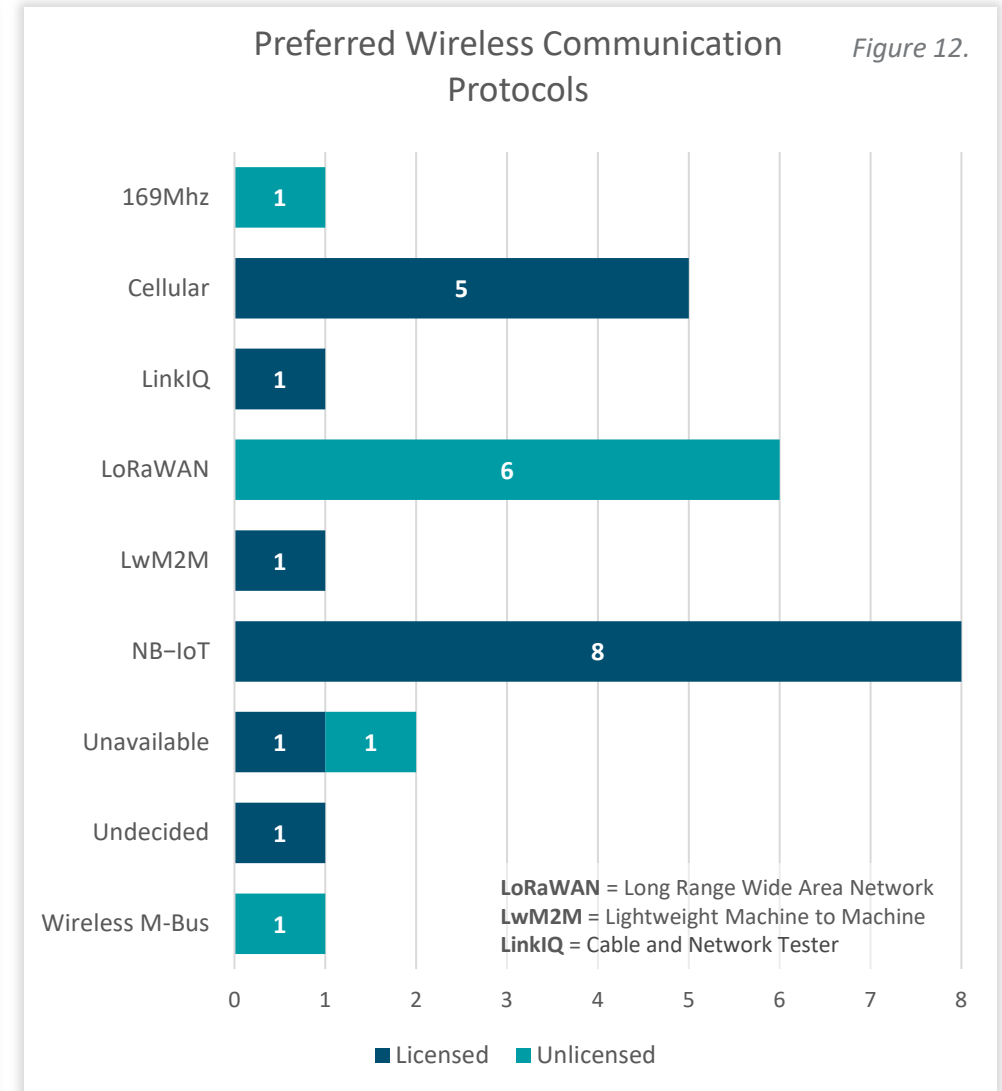
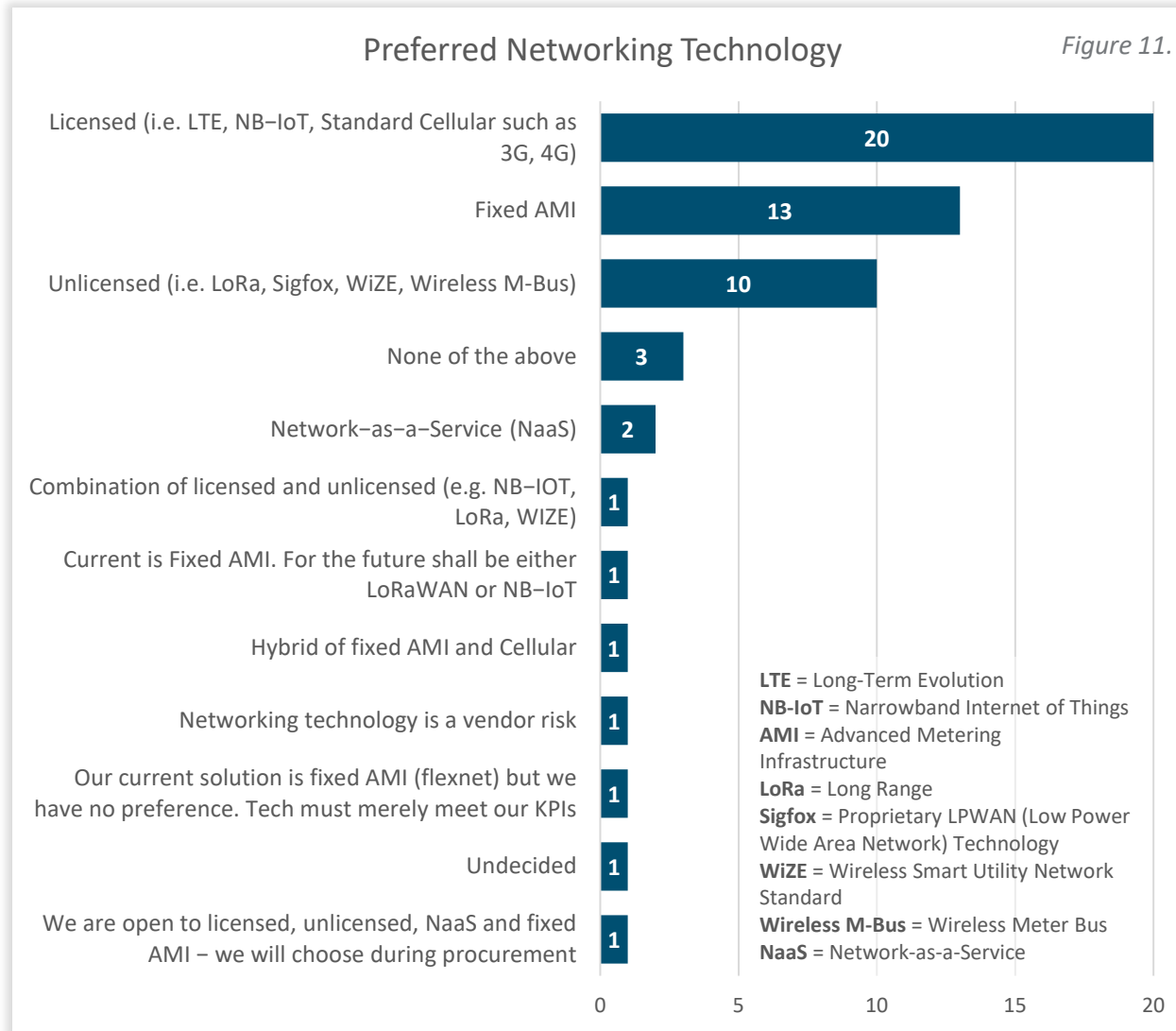


# 4. Procurement Preferences and Requirements

CMMS = Computerised Maintenance Management System, EAM = Enterprise Asset Management, GIS = Geographic Information System, SCADA = Supervisory control and data acquisition

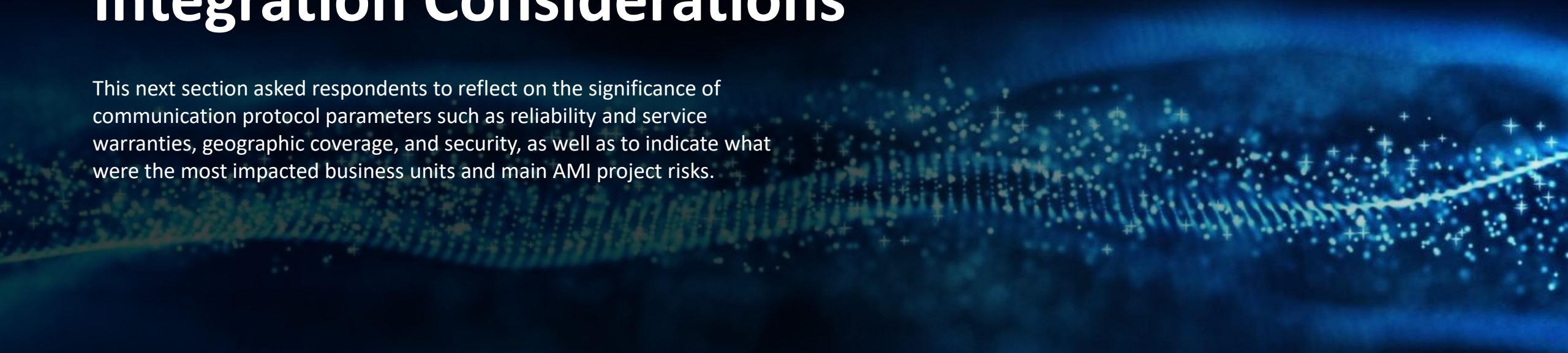


# 4. Procurement Preferences and Requirements

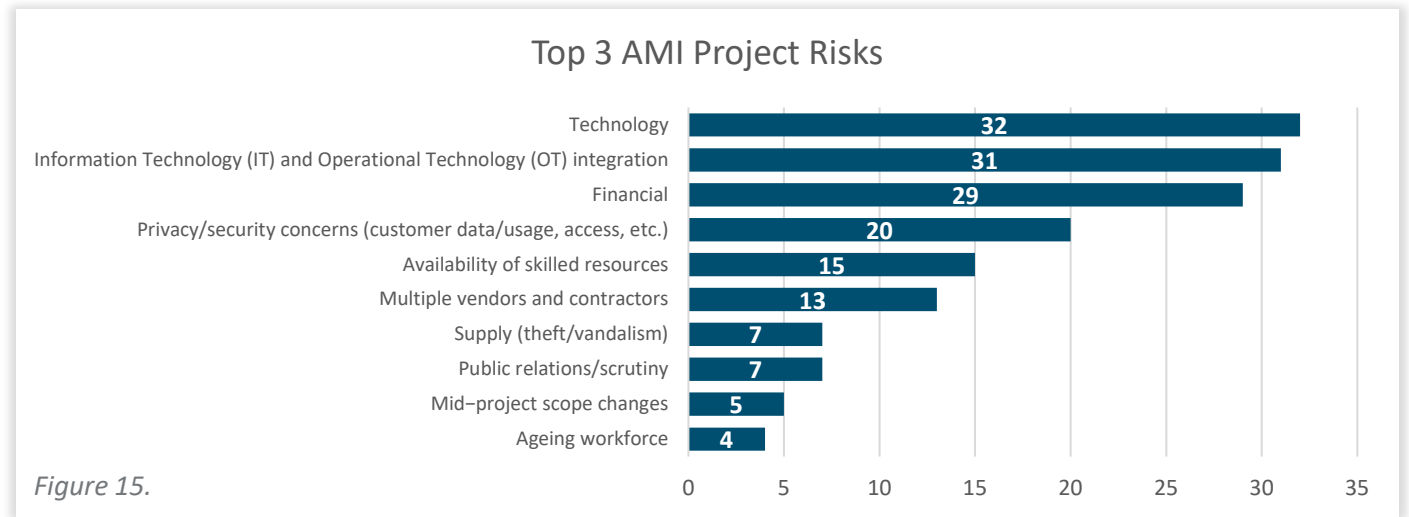
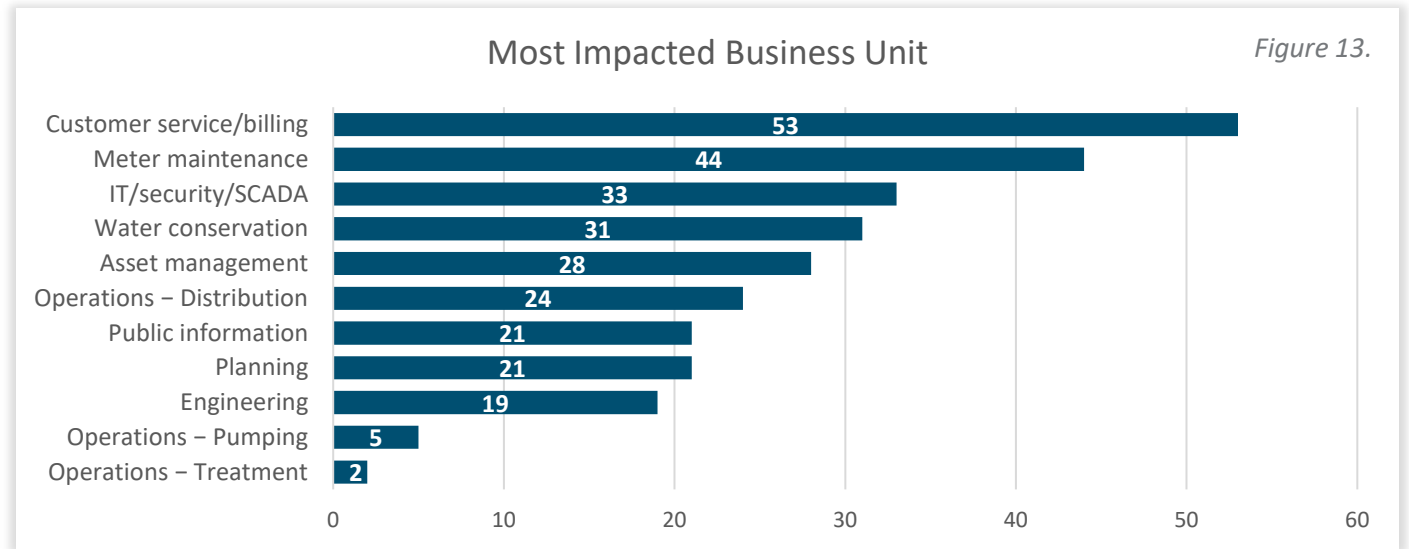
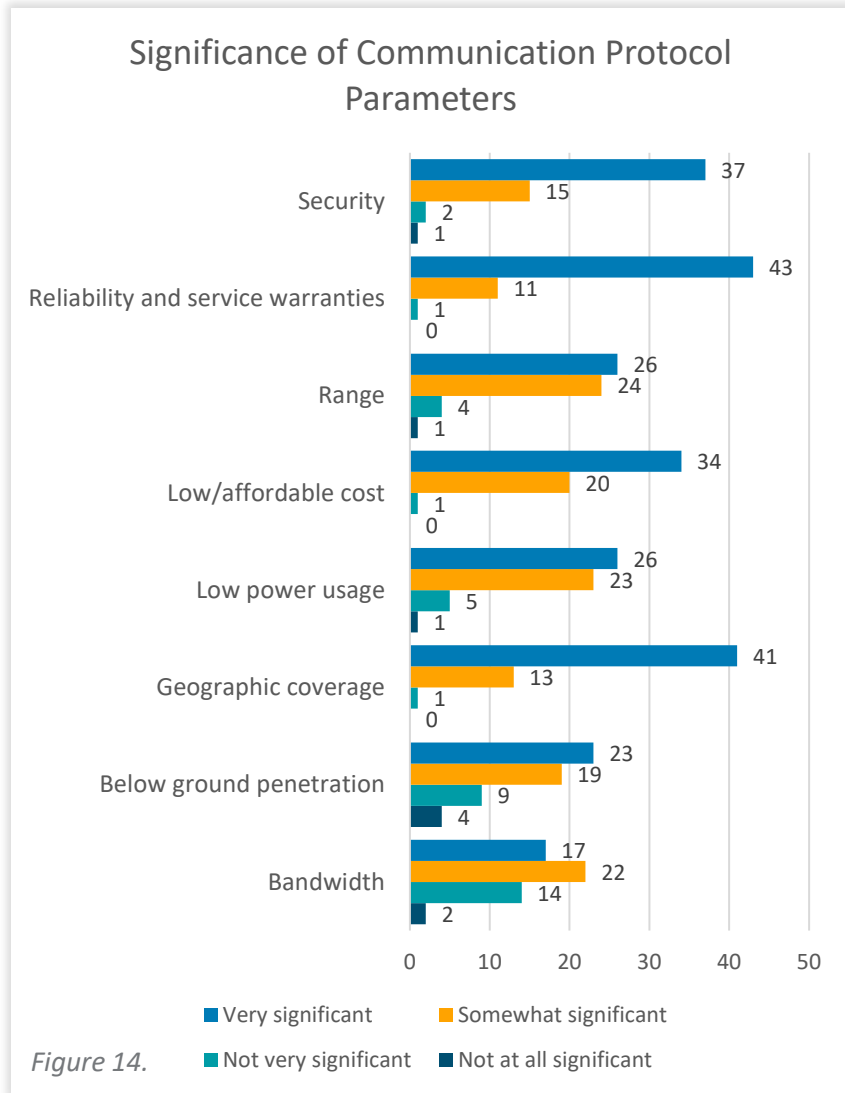


# Communication and Integration Considerations

This next section asked respondents to reflect on the significance of communication protocol parameters such as reliability and service warranties, geographic coverage, and security, as well as to indicate what were the most impacted business units and main AMI project risks.

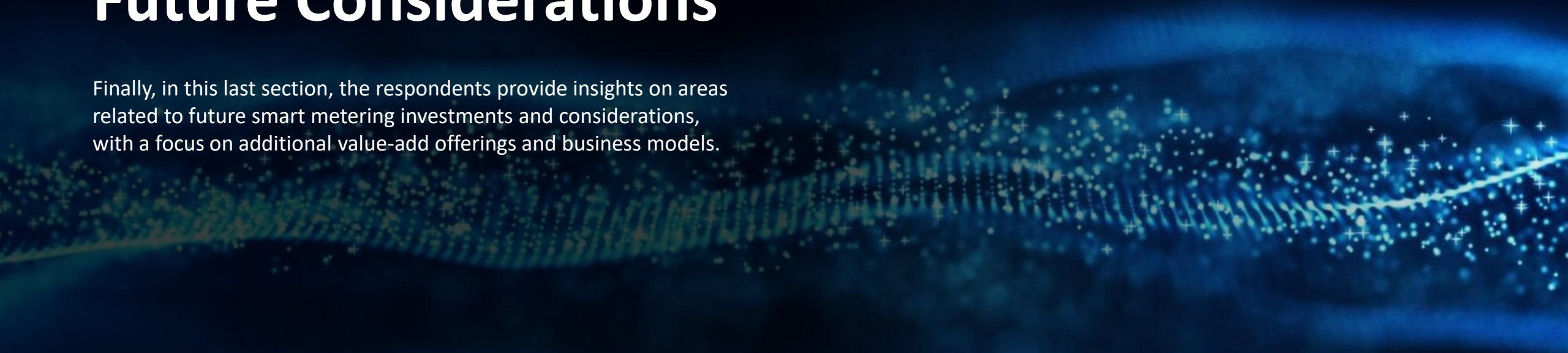


# 5. Communication and Integration Considerations

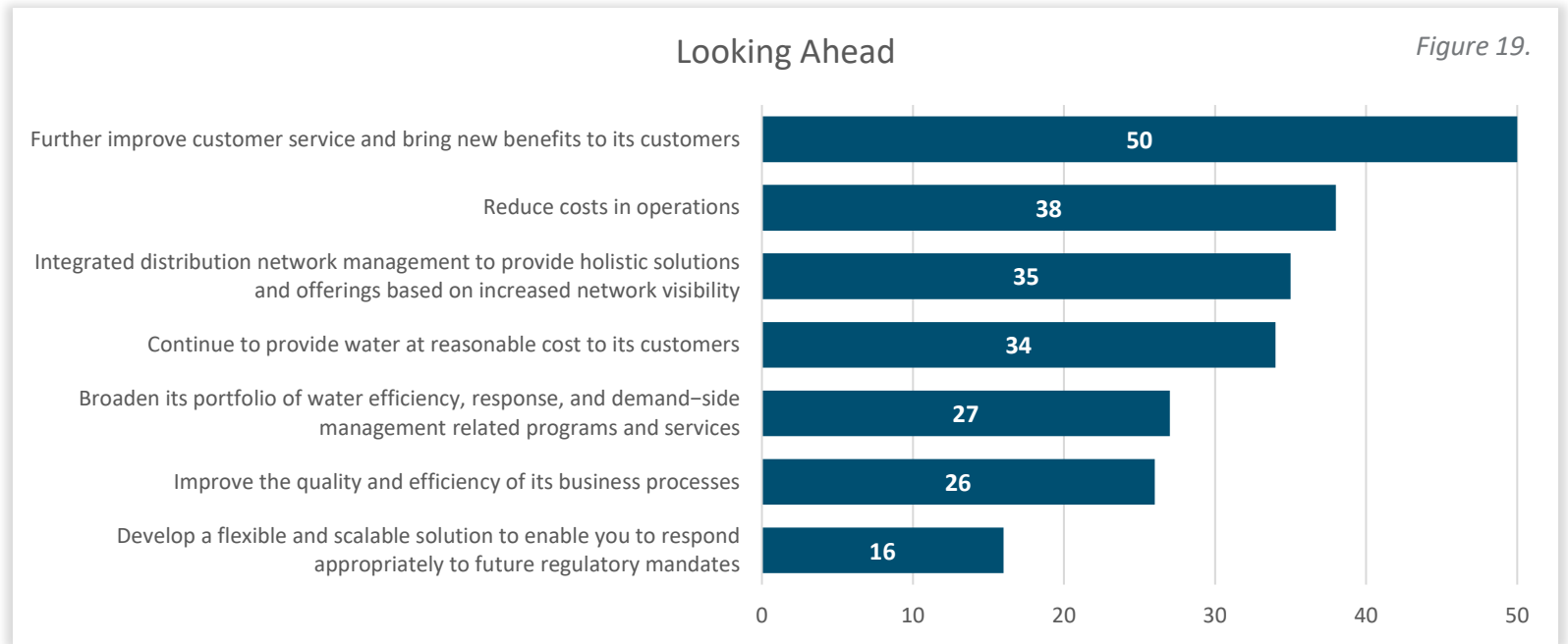
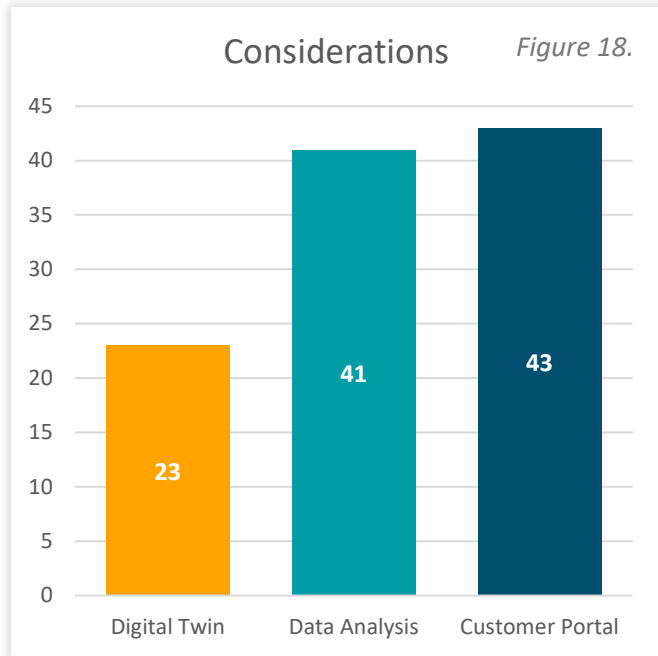
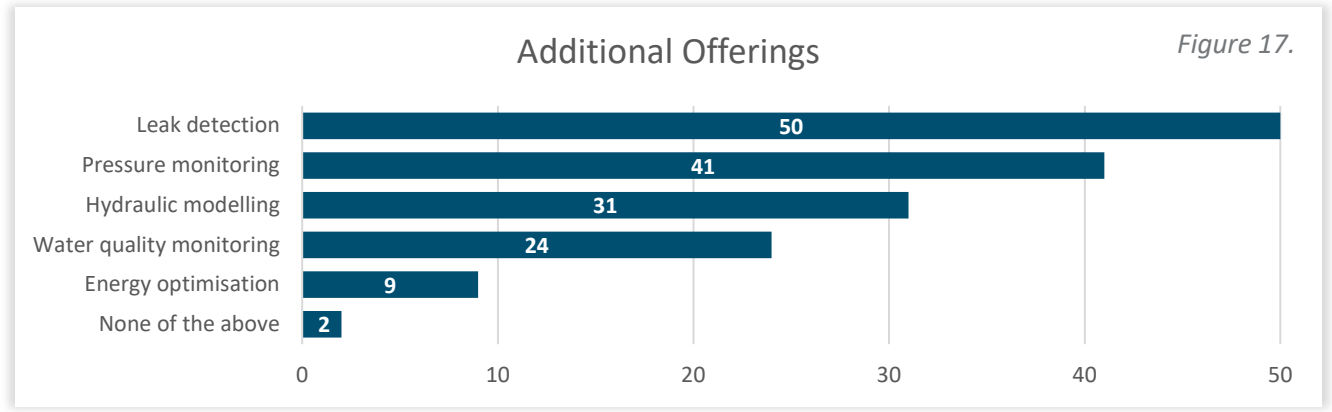
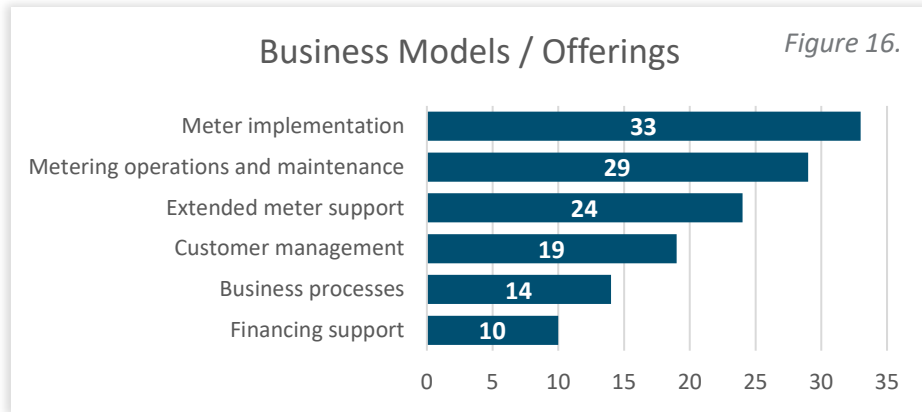


# Business Models and Future Considerations

Finally, in this last section, the respondents provide insights on areas related to future smart metering investments and considerations, with a focus on additional value-add offerings and business models.



# 6. Business Models and Future Considerations



# 7. Playbook Acronyms and Abbreviations

<b>AES</b>	Advanced encryption standard	<b>GLWA</b>	Great Lakes Water Authority	<b>NMI</b>	National Measurement Institute
<b>AMI</b>	Advanced metering infrastructure	<b>GPS</b>	Global positioning system	<b>NPV</b>	Net present value
<b>AMQP</b>	Advanced message queuing protocol	<b>GSM</b>	Global system for mobile communications	<b>NTN</b>	Non-terrestrial network
<b>AMR</b>	Automated meter reading	<b>HES</b>	Head End System	<b>O&amp;M</b>	Operations and maintenance
<b>APAC</b>	Asia-Pacific	<b>IaaS</b>	Infrastructure-as-a-service	<b>OIML</b>	International Organization of Legal Metrology
<b>APN</b>	Access point name	<b>IoT</b>	Internet of Things	<b>OPEX</b>	Operating expenditures
<b>ASIC</b>	Application-specific integrated circuit	<b>IP</b>	Internet protocol	<b>OSI</b>	Open systems interconnection
<b>CAPEX</b>	Capital expenditures	<b>ISO</b>	International Organization for Standardization	<b>PaaS</b>	Platform-as-a-service
<b>CMWSSB</b>	Chennai Metropolitan Water Supply and Sewerage Board	<b>IT</b>	Information technology	<b>PUB</b>	Public Utilities Board
<b>CBA</b>	Cost-benefit analysis	<b>LCD</b>	Liquid crystal display	<b>RF</b>	Radio frequency
<b>CE</b>	Customer Experience	<b>LEO</b>	Low Earth orbit	<b>ROI</b>	Return on investment
<b>CIS</b>	Customer Information System	<b>LoRaWAN</b>	Long range wide area network	<b>RSRP</b>	Reference signal received power
<b>CSF</b>	Cybersecurity framework	<b>LPH</b>	Litres per hour	<b>SaaS</b>	Software-as-a-service
<b>CSV</b>	Comma-separated values	<b>LPWAN</b>	Low power wide area network	<b>SCADA</b>	Supervisory control and data acquisition
<b>DaaS</b>	Data-as-a-service	<b>LTE</b>	Long-term evolution	<b>SIM</b>	Subscriber identity module
<b>DC</b>	Direct current	<b>MaaS</b>	Metering-as-a-service	<b>SLA</b>	Service-level agreement
<b>DECT</b>	Digital enhanced cordless telecommunications	<b>MCU</b>	Microcontroller unit	<b>SMS</b>	Short message service
<b>DAAS</b>	Data-as-a-Service	<b>MDM</b>	Meter Data Management	<b>SUN</b>	Smart utility networks
<b>DMA</b>	District metered area	<b>MDMS</b>	Meter Data Management System	<b>SWAN</b>	Smart Water Networks Forum
<b>DN</b>	Diameter nominal	<b>MID</b>	Measuring instruments directive	<b>SWM</b>	Smart water meter
<b>DRF</b>	Digital reference framework	<b>MIS</b>	Management information system	<b>TCP</b>	Transmission control protocol
<b>DTLS</b>	Datagram transport layer security	<b>MIU</b>	Meter interface unit	<b>UDP</b>	User datagram protocol
<b>ERP</b>	Enterprise resource planning	<b>MPE</b>	Maximum possible error	<b>UK</b>	United Kingdom
<b>EU</b>	European Union	<b>MQTT</b>	Message queuing telemetry transport	<b>UPI</b>	Unified payments interface
<b>EUL</b>	Effective useful life	<b>NaaS</b>	Network-as-a-service	<b>US</b>	United States
<b>FOTA</b>	Firmware over-the-air	<b>NB</b>	Narrowband	<b>vDMA</b>	Virtual district metered area
<b>GEO</b>	Geosynchronous Earth Orbit	<b>NB-IoT</b>	Narrowband-Internet of things	<b>wM-Bus</b>	Wireless M-bus
<b>GIS</b>	Geographic Information System	<b>NFC</b>	Near field communication	<b>WSAA</b>	Water Services Association of Australia
		<b>NIST</b>	National Institute of Standards and Technology	<b>XaaS</b>	Anything-as-a-service