

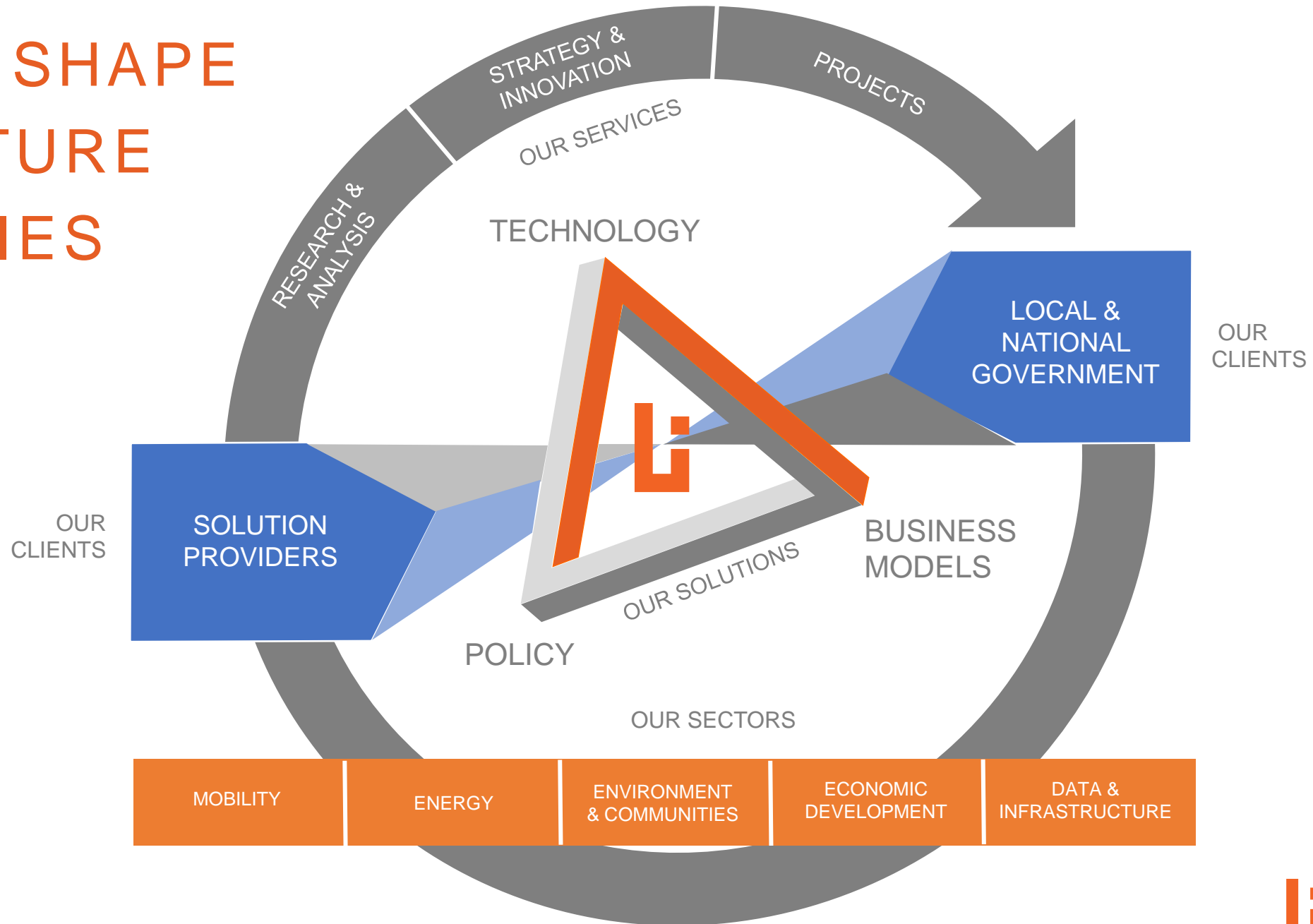
EV CHARGING HUBS AND FUTURE ELECTRIC MOBILITY

Smart City Expo World Congress | Barcelona | 14 November 2017

Dr. David Beeton | CEO & Founder, Urban Foresight



WE SHAPE FUTURE CITIES



2011



Barcelona, Spain
29 november - 2 december 2011

2017



Scotland to 'phase out' new petrol and diesel cars by 2032

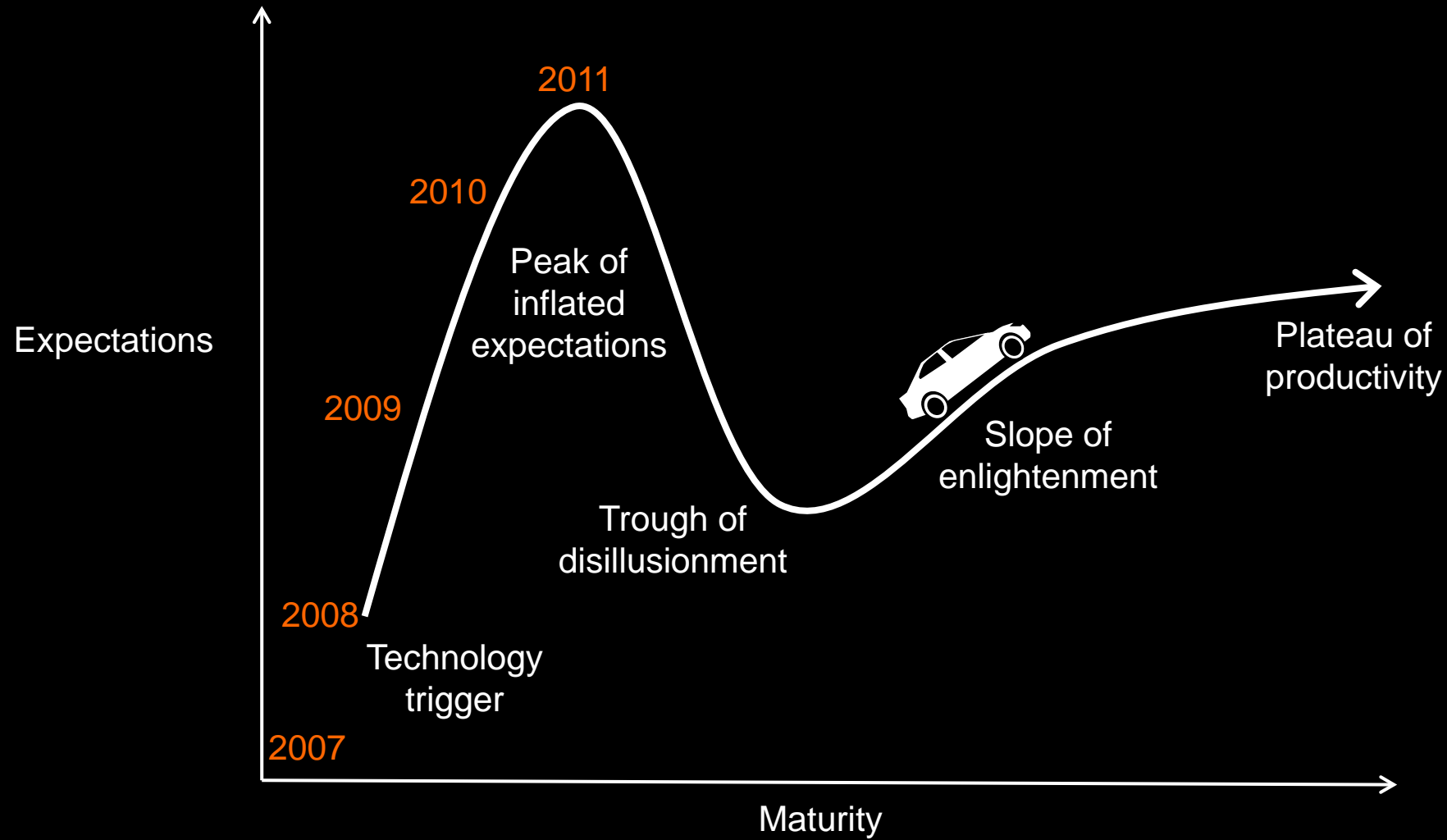
Nicola Sturgeon outlines plans to 'massively expand' pilot projects to encourage uptake of electric vehicles

Oil-rich Scotland wants to go all-electric with phase out of new petrol and diesel cars by 2032

Scotland Planning To Phase Out Diesel & Petrol/Gas Car Sales By 2032, First Minister Nicola Sturgeon Says




2011



Gartner's Hype Cycle

2012



EV CITY CASEBOOK

A LOOK AT THE GLOBAL ELECTRIC VEHICLE MOVEMENT

AMSTERDAM
BARCELONA
BERLIN
BRABANTSTAD
GOTO ISLANDS, NAGASAKI
HAMBURG
HELSINKI
KANAGAWA
LOS ANGELES
NEW YORK CITY
NORTH EAST ENGLAND
PORTLAND
RESEARCH TRIANGLE, NC
ROTTERDAM
SHANGHAI
STOCKHOLM

2012



AMSTERDAM THE NETHERLANDS

THE GREEN ELECTRICITY CAPITAL

// By 2040, the City of Amsterdam expects that nearly all kilometers driven will be powered with electricity generated by windmills, solar panels and biomass plants. The canals will be filled with silent electric boats. Cargo will be transported over the road and water using electric power. The city will even smell better and sound quieter thanks to electric transport. Fossil fuels will be unnecessary when travelling in the city. Harmful emissions will be dramatically reduced, as will the costs of

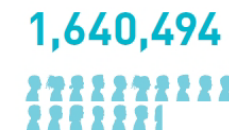
electric transport. All of this will make Amsterdam an attractive city in which to live, work and play—all thanks to developments that are being put in motion today.

// By 2015, Amsterdam is expected to have 10,000 EVs on the roads. More and more electric cars are being produced, and although they are currently more expensive than traditional vehicles, their prices will fall as the market for them increases.

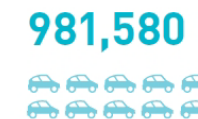
[SNAPSHOT] BARCELONA

~ 100,000 people ~ 100,000 vehicles

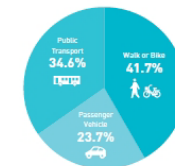
POPULATION



REGISTERED VEHICLES



TRANSPORTATION MIX



CITY SIZE

101 km²

DAILY TRIPS*

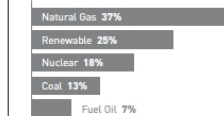
6,500,000

CONGESTION PLAN



[COUNTRY CONTEXT] SPAIN

ELECTRICITY MIX**



CURRENT EVs/PHEVs

2,446+ 15% cars
19% commercial vehicles
50% ePTW

EV/PHEV TARGET

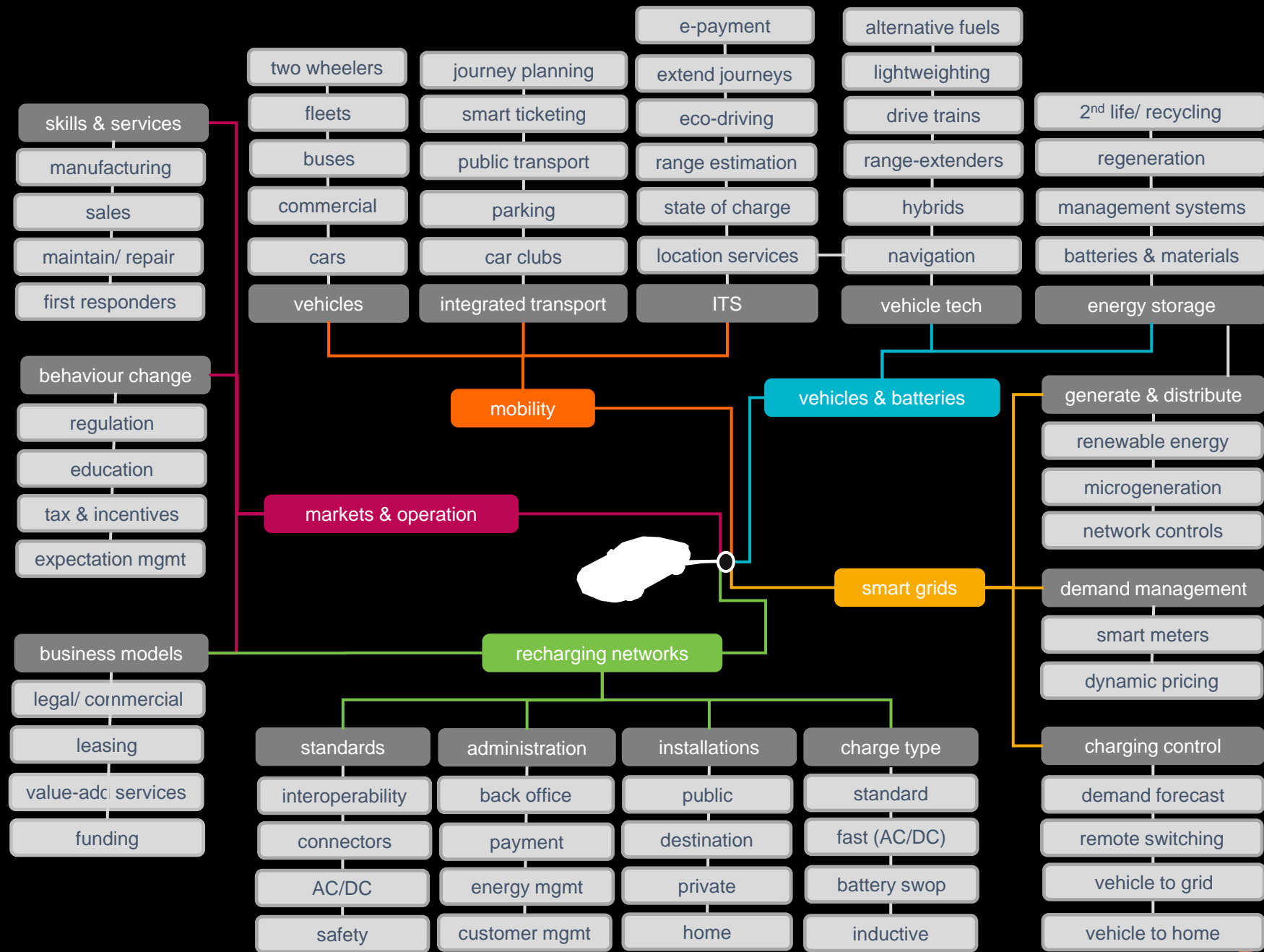
2014: 250,000 (70,000 by 2012)

EV & EVSE STATUS



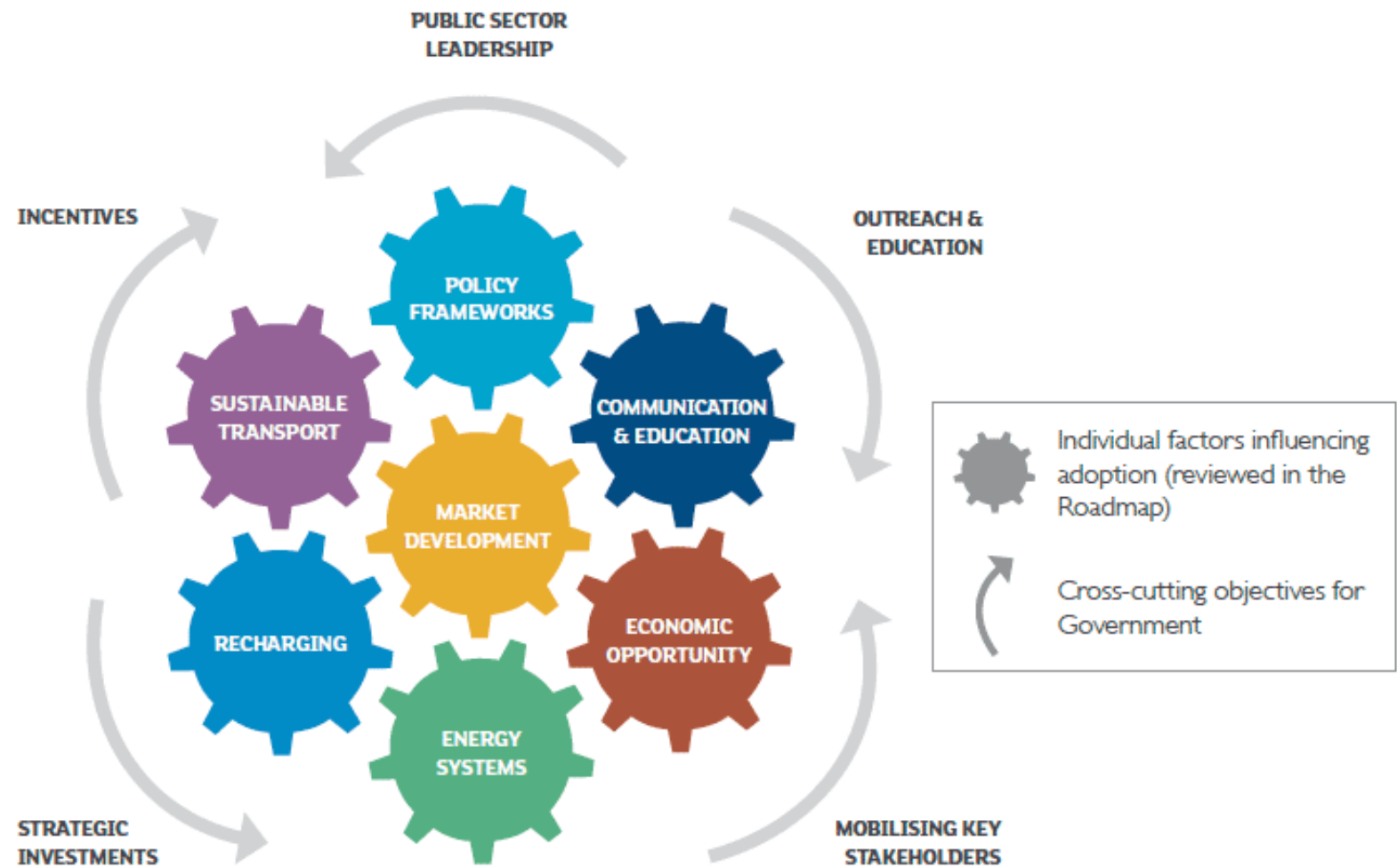
EV TODAY	EV TOMORROW	EVSE TODAY	EVSE TOMORROW
280 public fleet* 200 private (150 ePTW)	500 public fleet 2,500 private forecast for 2014	248 slow charging stations 1 fast charging stations	4,400 slow charging stations 20 fast charging stations forecast for 2014

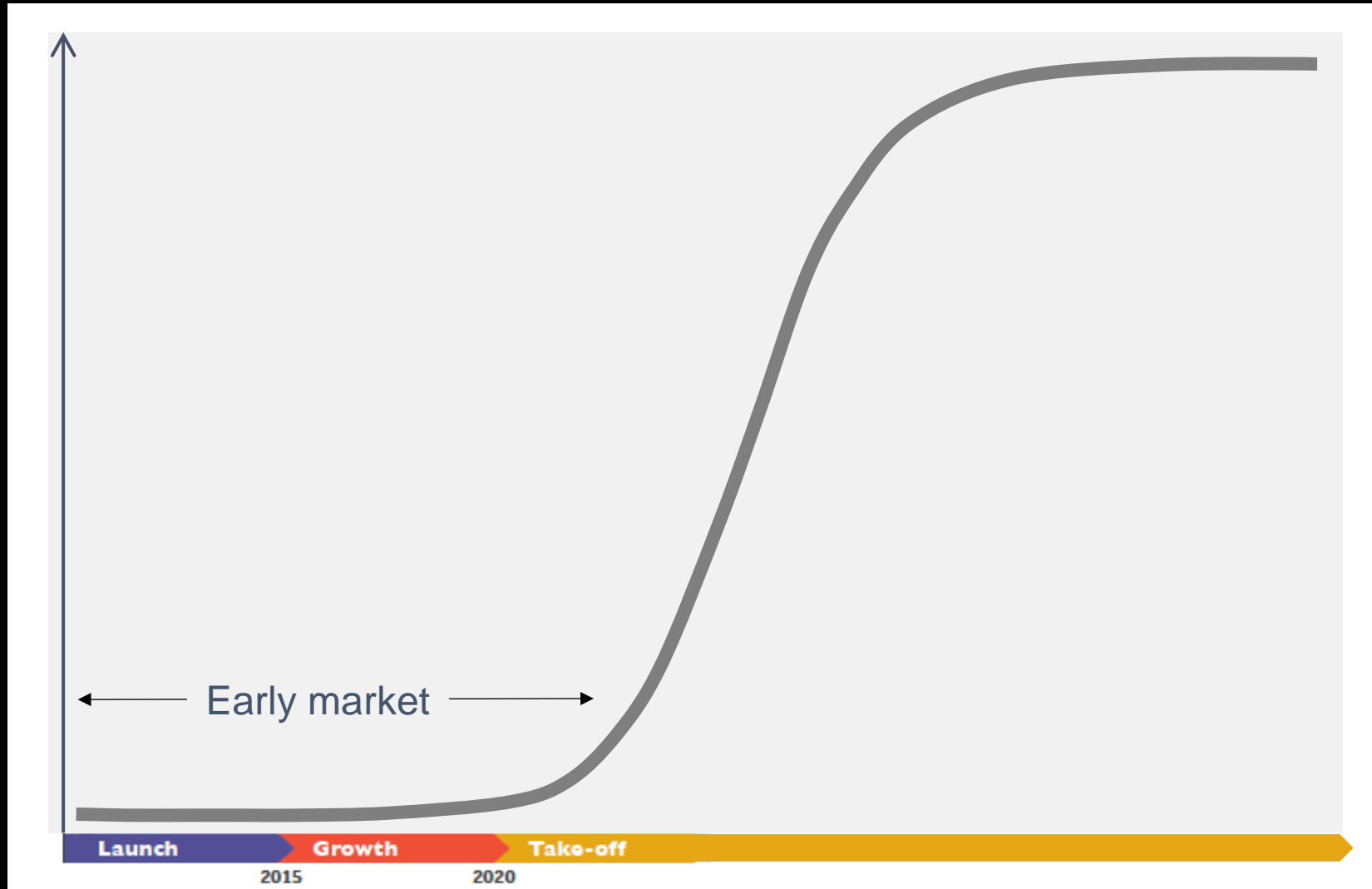
*2000. **Source: IEA, 2009.

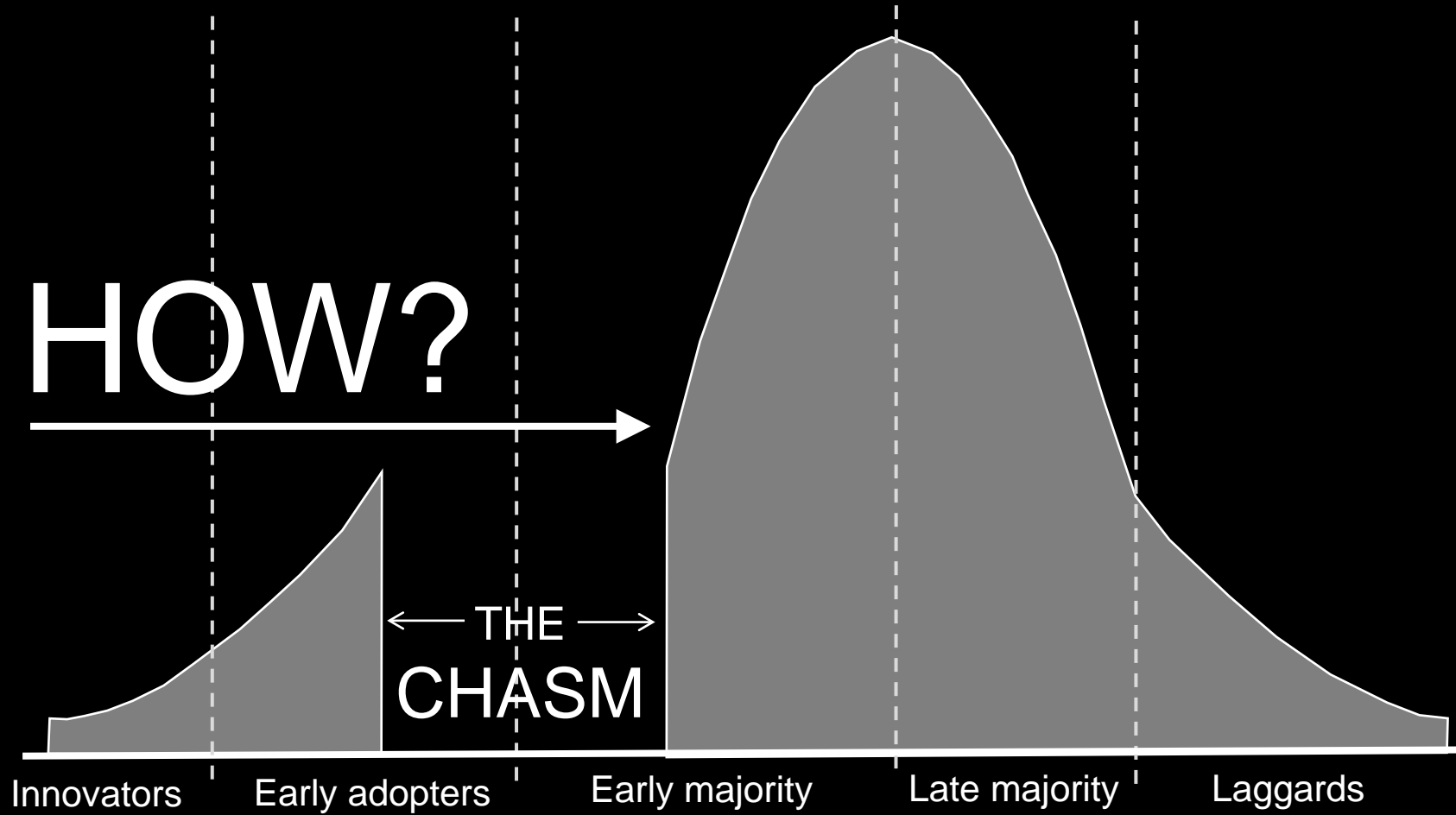


2013

Switched On Scotland:
A Roadmap to Widespread
Adoption of Plug-in Vehicles







2014

EV CITY CASEBOOK

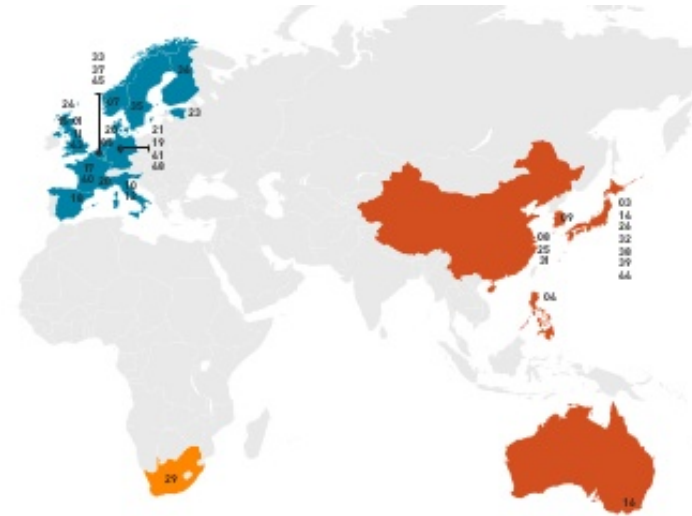
50

BIG IDEAS

SHAPING THE FUTURE
OF ELECTRIC MOBILITY

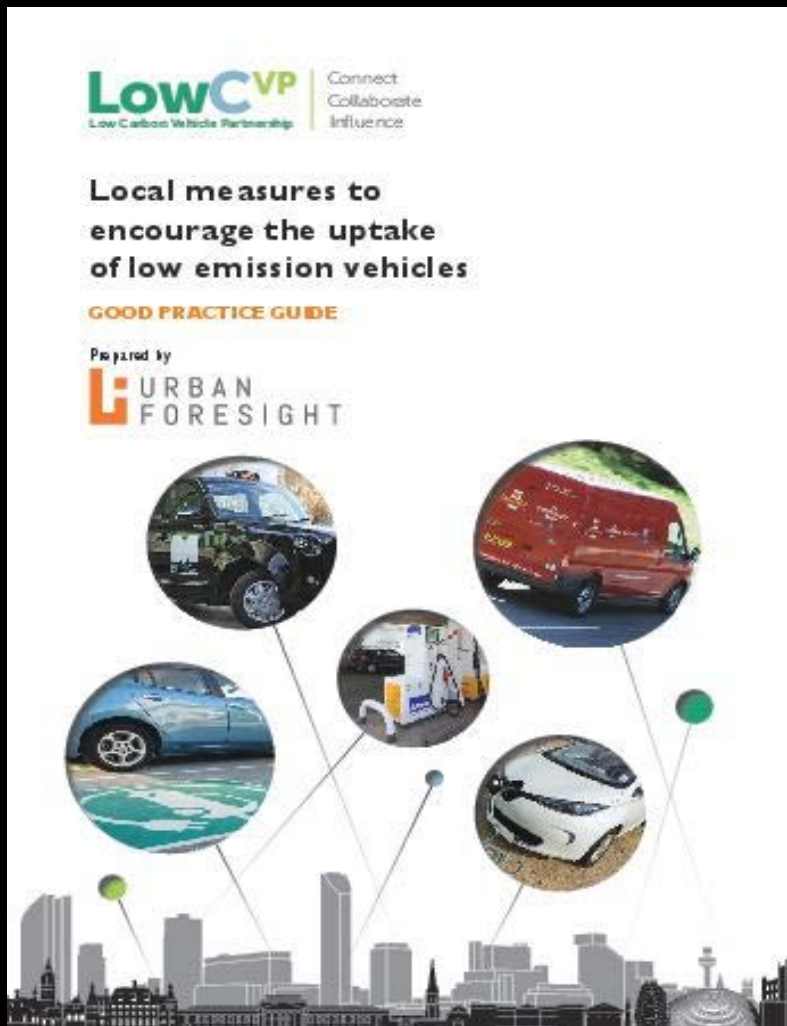


PRODUCTION			25
01. USA, LOWDOWN ON SECOND EDITIONS	01	16. SECOND LIP FOR MULTIBROS	25
02. ELECTRIC TALKS	13	17. FLEET OPTIMIZATION	26
03. INTERVIEW TO LINDAN ON TELLERENCE	16	18. FINGERING CHLOE AND TALKS OF POPS	27
04. TUBN SPORTS ON TELL	18	19. SHARED MOBILITY	28
05. BATTLES FOR THE FUTURE	19	20. NEW MARKET ENTRY TALKS	30
06. FINGERING INCEPTION	17	21. LOST FIVE HUNDRED	33
07. CIGAL, INCEPTION	18	22. FINGERING INCEPTION	34
08. FINGERING INCEPTION	19	23. LECTURE TALKS ON TELL	35
09. FINGERING INCEPTION	20	24. COLLABORATION AND TALKS ON TELL	36
10. FINGERING INCEPTION	21	25. TALKS ON TELL AND TELL	38
11. ALL ELECTRIC TALKS	23	26. CRYSTAL TALKS	40
12. CHALLENGE TO TELLERENCE	23	27. BATTLE TALKS	41
13. FINGERING INCEPTION	24	28. TALKS ON TELL	42
14. FINGERING INCEPTION	25	29. TALKS ON TELL	43
15. FINGERING INCEPTION	26	30. TALKS ON TELL	44
16. FINGERING INCEPTION	27	31. TALKS ON TELL	45
17. FINGERING INCEPTION	28	32. TALKS ON TELL	46
18. FINGERING INCEPTION	29	33. TALKS ON TELL	47
19. FINGERING INCEPTION	30	34. TALKS ON TELL	48
20. FINGERING INCEPTION	31	35. TALKS ON TELL	49
21. FINGERING INCEPTION	32	36. TALKS ON TELL	50
22. FINGERING INCEPTION	33	37. TALKS ON TELL	51
23. FINGERING INCEPTION	34	38. TALKS ON TELL	52
24. FINGERING INCEPTION	35	39. TALKS ON TELL	53
25. FINGERING INCEPTION	36	40. TALKS ON TELL	54
26. FINGERING INCEPTION	37	41. TALKS ON TELL	55
27. FINGERING INCEPTION	38	42. TALKS ON TELL	56
28. FINGERING INCEPTION	39	43. TALKS ON TELL	57
29. FINGERING INCEPTION	40	44. TALKS ON TELL	58
30. FINGERING INCEPTION	41	45. TALKS ON TELL	59
31. FINGERING INCEPTION	42	46. TALKS ON TELL	60
32. FINGERING INCEPTION	43	47. TALKS ON TELL	61
33. FINGERING INCEPTION	44	48. TALKS ON TELL	62
34. FINGERING INCEPTION	45	49. TALKS ON TELL	63
35. FINGERING INCEPTION	46	50. TALKS ON TELL	64
36. FINGERING INCEPTION	47	51. TALKS ON TELL	65
37. FINGERING INCEPTION	48	52. TALKS ON TELL	66
38. FINGERING INCEPTION	49	53. TALKS ON TELL	67
39. FINGERING INCEPTION	50	54. TALKS ON TELL	68
40. FINGERING INCEPTION	51	55. TALKS ON TELL	69
41. FINGERING INCEPTION	52	56. TALKS ON TELL	70
42. FINGERING INCEPTION	53	57. TALKS ON TELL	71
43. FINGERING INCEPTION	54	58. TALKS ON TELL	72
44. FINGERING INCEPTION	55	59. TALKS ON TELL	73
45. FINGERING INCEPTION	56	60. TALKS ON TELL	74
46. FINGERING INCEPTION	57	61. TALKS ON TELL	75
47. FINGERING INCEPTION	58	62. TALKS ON TELL	76
48. FINGERING INCEPTION	59	63. TALKS ON TELL	77
49. FINGERING INCEPTION	60	64. TALKS ON TELL	78
50. FINGERING INCEPTION	61	65. TALKS ON TELL	79
51. FINGERING INCEPTION	62	66. TALKS ON TELL	80
52. FINGERING INCEPTION	63	67. TALKS ON TELL	81
53. FINGERING INCEPTION	64	68. TALKS ON TELL	82
54. FINGERING INCEPTION	65	69. TALKS ON TELL	83
55. FINGERING INCEPTION	66	70. TALKS ON TELL	84
56. FINGERING INCEPTION	67	71. TALKS ON TELL	85
57. FINGERING INCEPTION	68	72. TALKS ON TELL	86
58. FINGERING INCEPTION	69	73. TALKS ON TELL	87
59. FINGERING INCEPTION	70	74. TALKS ON TELL	88
60. FINGERING INCEPTION	71	75. TALKS ON TELL	89
61. FINGERING INCEPTION	72	76. TALKS ON TELL	90
62. FINGERING INCEPTION	73	77. TALKS ON TELL	91
63. FINGERING INCEPTION	74	78. TALKS ON TELL	92
64. FINGERING INCEPTION	75	79. TALKS ON TELL	93
65. FINGERING INCEPTION	76	80. TALKS ON TELL	94
66. FINGERING INCEPTION	77	81. TALKS ON TELL	95
67. FINGERING INCEPTION	78	82. TALKS ON TELL	96
68. FINGERING INCEPTION	79	83. TALKS ON TELL	97
69. FINGERING INCEPTION	80	84. TALKS ON TELL	98
70. FINGERING INCEPTION	81	85. TALKS ON TELL	99
71. FINGERING INCEPTION	82	86. TALKS ON TELL	100
72. FINGERING INCEPTION	83	87. TALKS ON TELL	101
73. FINGERING INCEPTION	84	88. TALKS ON TELL	102
74. FINGERING INCEPTION	85	89. TALKS ON TELL	103
75. FINGERING INCEPTION	86	90. TALKS ON TELL	104
76. FINGERING INCEPTION	87	91. TALKS ON TELL	105
77. FINGERING INCEPTION	88	92. TALKS ON TELL	106
78.			

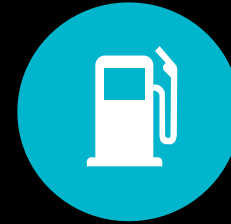


26. EYE AND TORSION	66	62. INNOMINATE FINGERING	6
27. LAMPROSCOPIC PERS. PULSE	69	63. BUREAU CODE AND FOR PUBLIC CHARGING	6
28. THE CAY BURN NEEDS PREFERENCE	66	64. INITIAL INCIDENT REPORT SYSTEMS	6
29. EYE ENDING MACHINES	67	65. INTERPRETABLES	6
30. EYE AND BULGERS	69	66. INTERPRETED IN PRACTICE	6
31. CITY LOGISTICS	68	67. BULGERS IN PRACTICE	6
32. CHARGING A TYPING	61	68. PIRCY IN PRACTICE	6
33. PROSECUTION IN TENDENCY A	62	69. CHARGING IN PRACTICE	6
34. EYE AND BURNING	63	70. THE CAY BURN NEEDS PREFERENCE	6
35. PROSECUTION OF BURNING IN BURNERS	68	ACROSSING A CROSSING, ETC.	7
36. MACHINES	66		
37. BURNING CHARGING	67		
38. BURNING THE CAY BURN NEEDS PREFERENCE	68		
39. PULSING	69		

2015



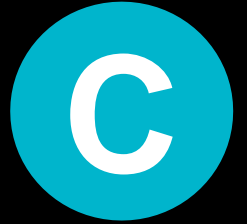
PARKING



INFRASTRUCTURE
PROVISION



PLANNING



ROAD ACCESS AND
CHARGING



TAXIS &
PRIVATE HIRE
VEHICLES



INTEGRATION WITH
WIDER TRANSPORT



CAR SHARING



PROCUREMENT



ECONOMIC
DEVELOPMENT
& TOURISM



PILOTS & TRIALS

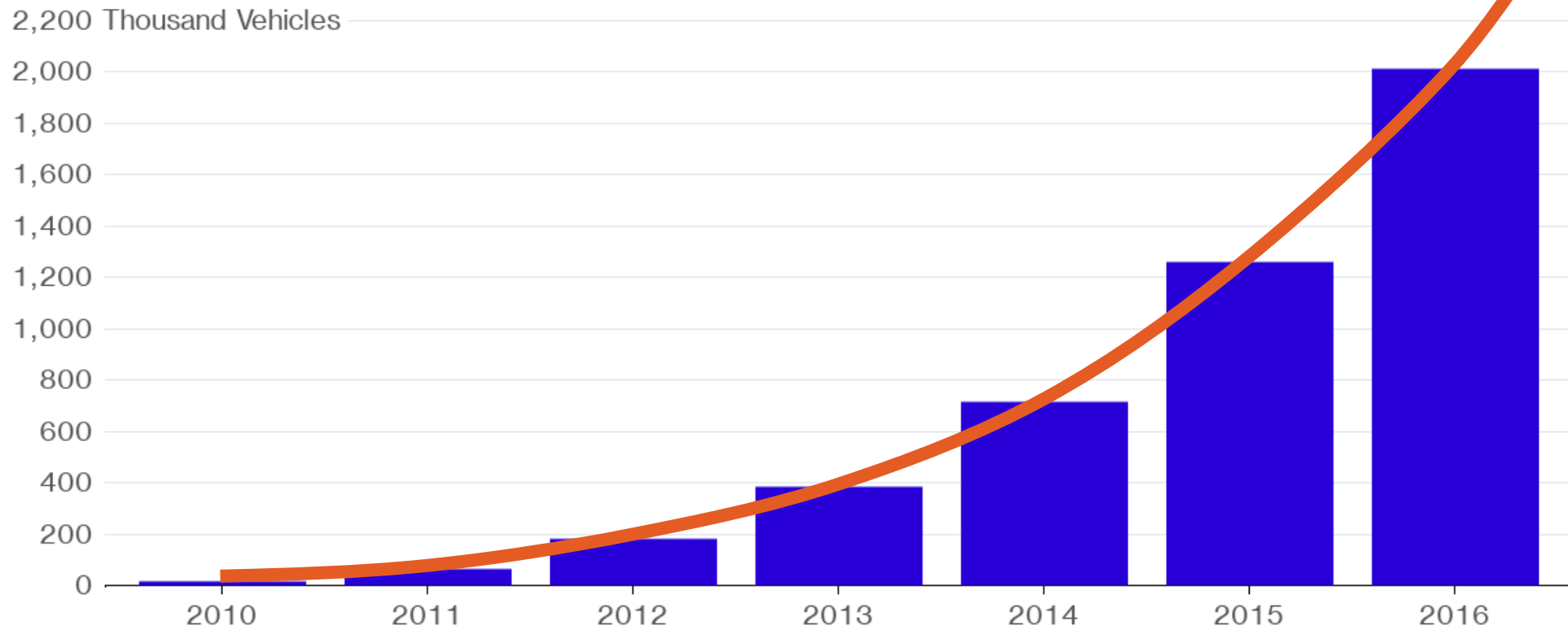


EDUCTAION &
PROMOTION



FINANCIAL
MEASURES

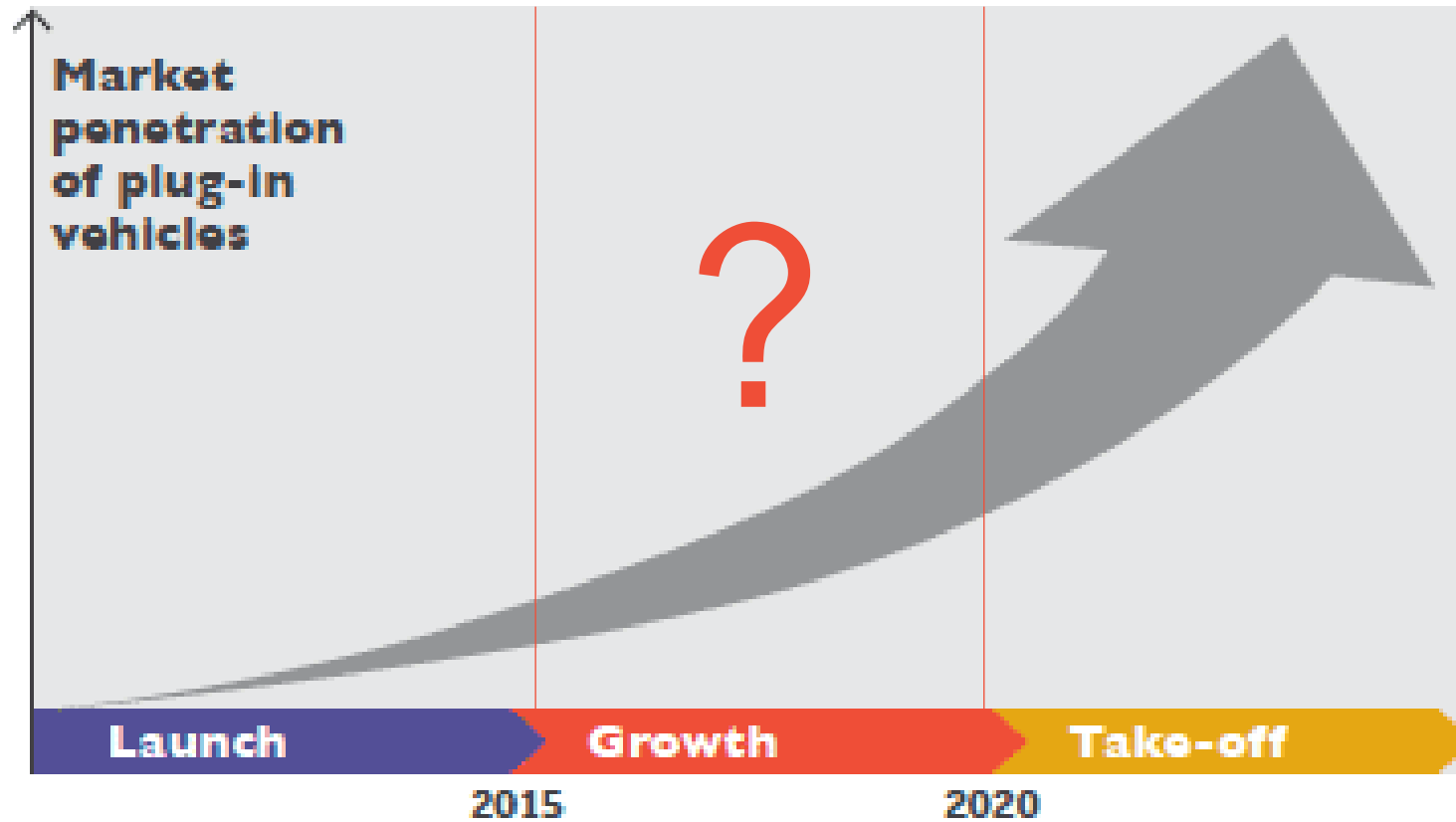
2016



Source: IEA (2017)

2017

AN ACTION PLAN FOR GROWTH



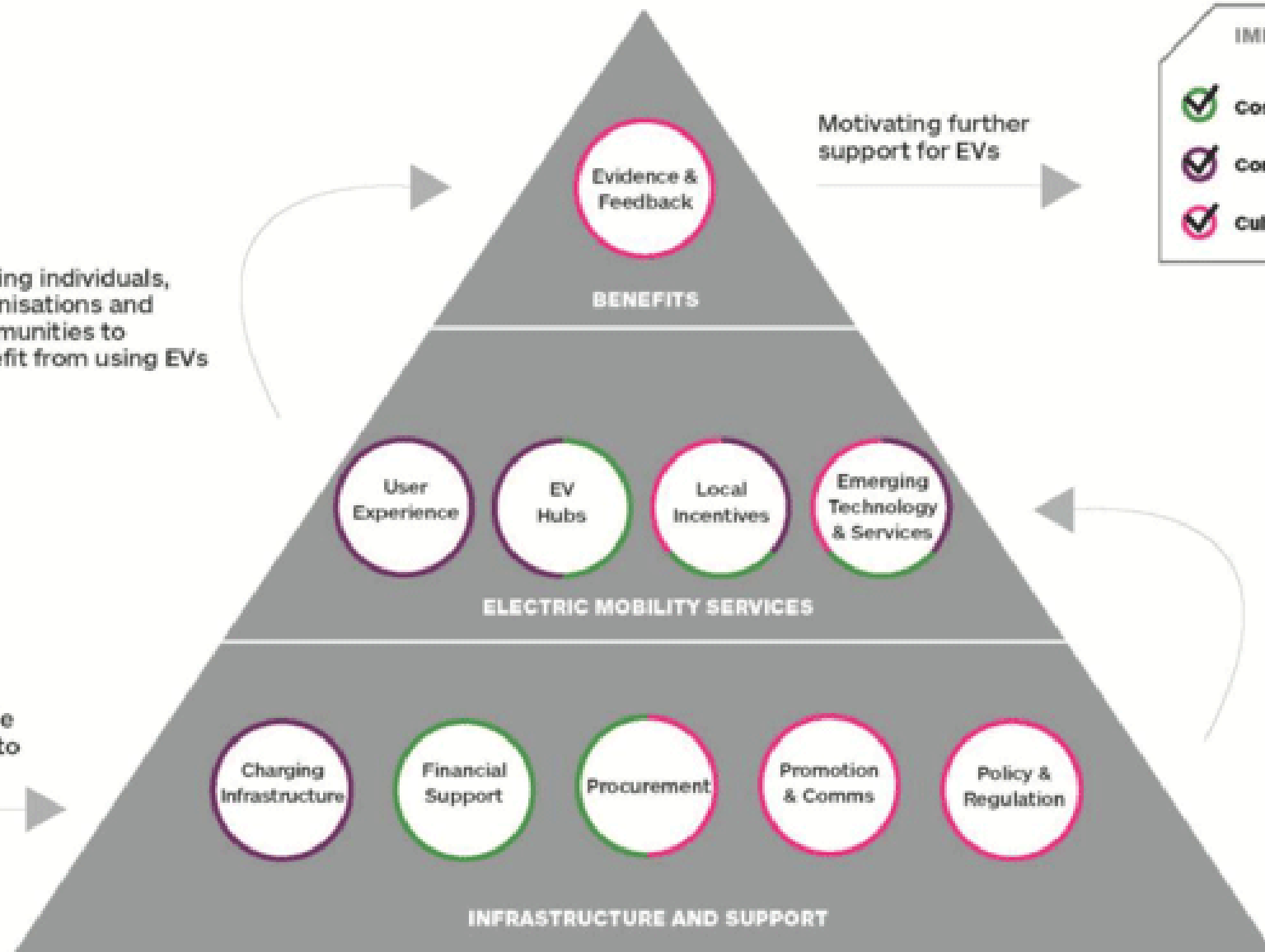
2017

**Switched On Scotland
Phase Two:**
An Action Plan For
Growth



Helping individuals,
organisations and
communities to
benefit from using EVs

Making it possible
for more people to
use EVs



Motivating further
support for EVs

IMPACTS

- ✓ **Costs decreased**
- ✓ **Convenience enhanced**
- ✓ **Cultural change**

Making EVs
more cost effective,
convenient and
desirable to use

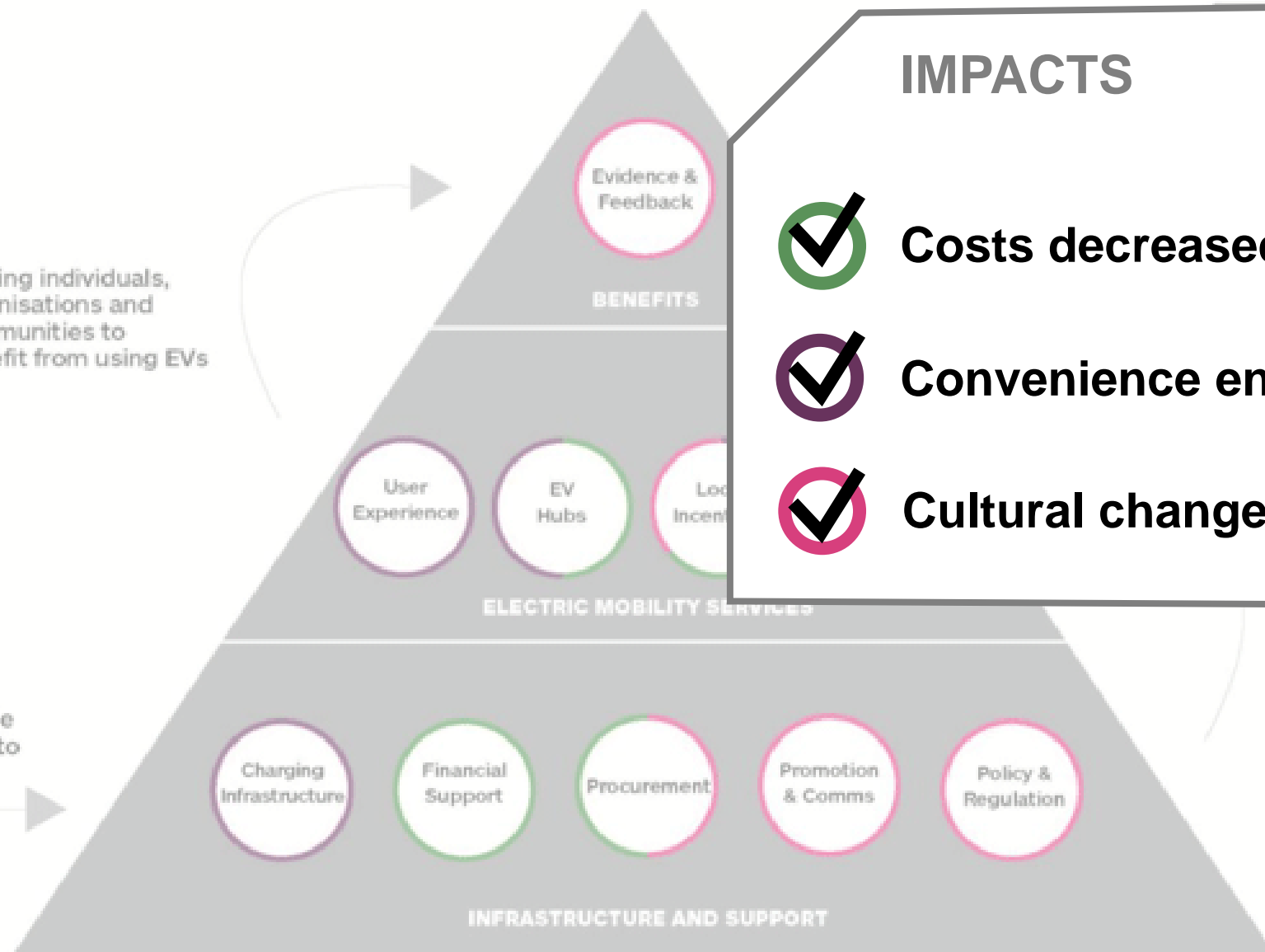
2017

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Helping individuals,
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e,
desirable to use

2017

**Switched On Scotland
Phase Two:**
An Action Plan For
Growth



Helping individuals,
organisations and
communities to benefit
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Making it possible
for more people to
use EVs

INFRASTRUCTURE AND SUPPORT

ELECTRIC MOBILITY
SERVICES

BENEFITS

Motivating further
support for EVs

IMPACTS

- ✓ Costs decreased
- ✓ Convenience enhanced
- ✓ Cultural change

Making EVs
more cost
effective,
convenient
and desirable
to use

N
RIGHT

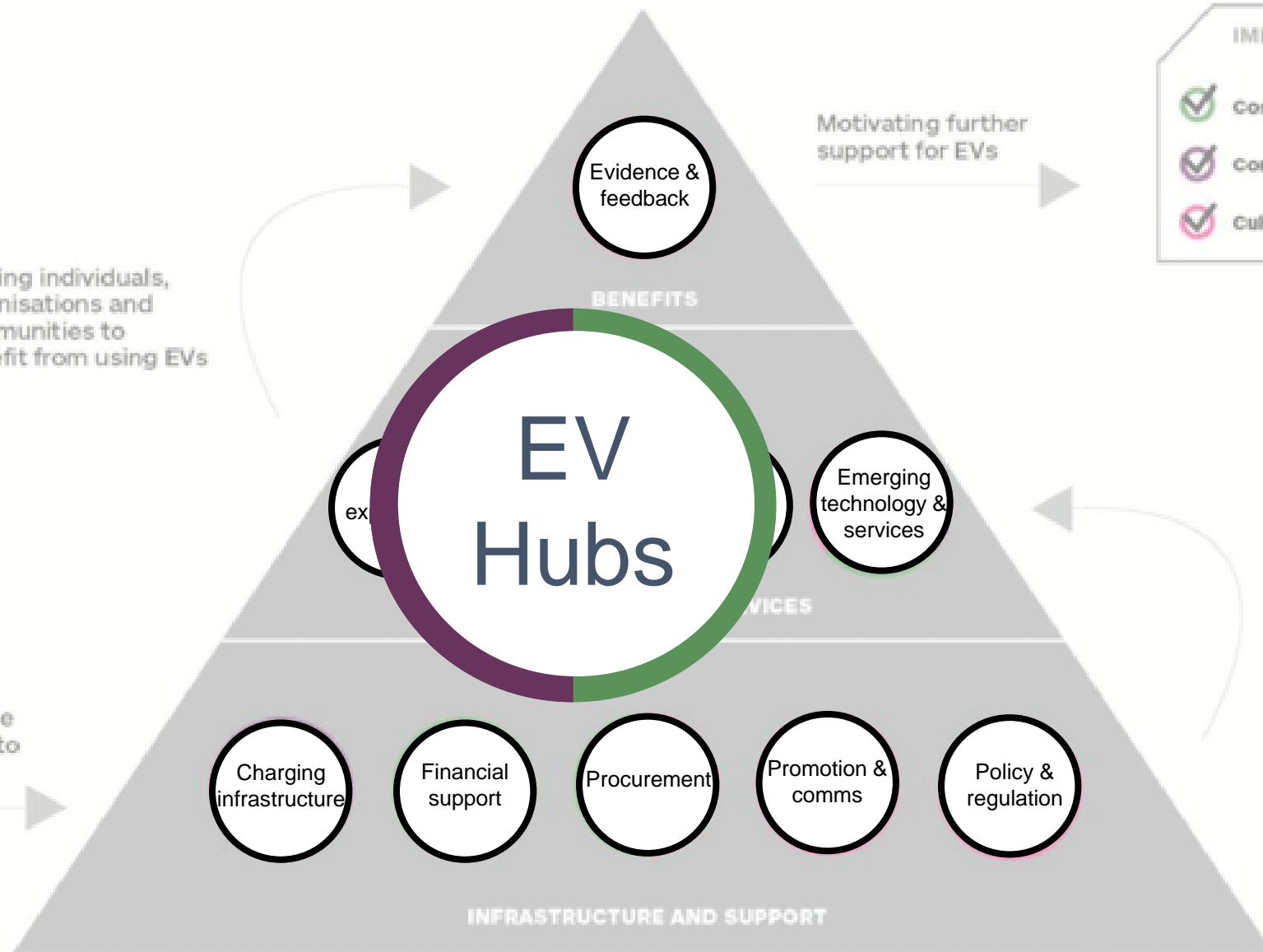
2017

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IMPACTS

- ✓ Costs decreased
- ✓ Convenience enhanced
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Making EVs
more cost effective,
convenient and
desirable to use



Dundee City Council, UK



EV Oasis



EV Hub, UK



Sortimo, Germany



Hewitt Studios, UK



HA:MO, Japan

10

PRACTICAL STEPS IN DEVELOPING EV HUBS

1. Specify the facilities
2. Select sites
3. Review infrastructure options
4. Consult the market
5. Forecast demand
6. Futureproof where possible
7. Consider renewables & energy storage
8. Develop a commercial case
9. Develop an operating model
10. Explore additional revenue generating opportunities

COME AND INNOVATE IN DUNDEE, SCOTLAND



The MILL (Mobility Innovation Living Laboratory) will be investing
£1 million in innovation pilots for smart low emission mobility

Shared mobility | Fleet solutions | Smart parking | Big data | Cycle sharing

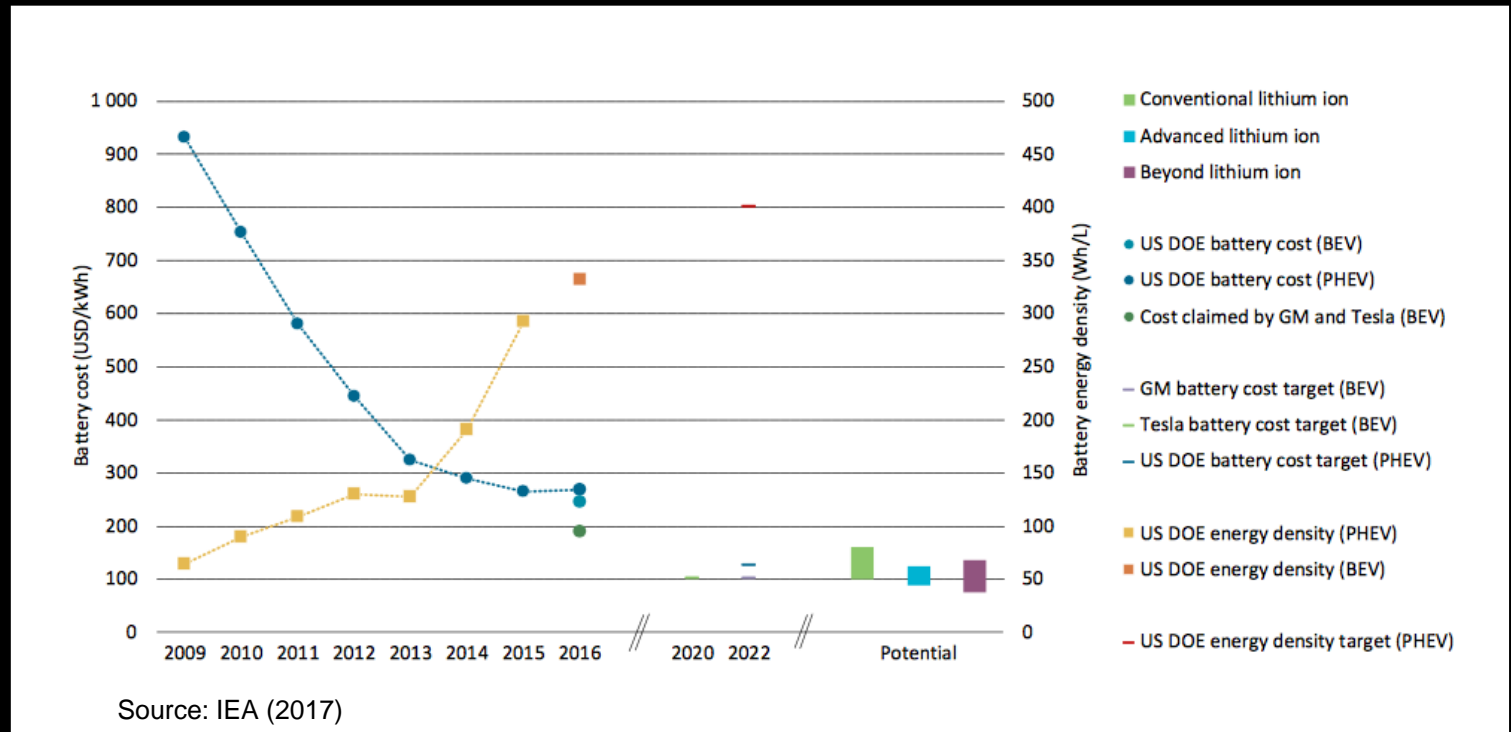
Look out for a call for proposals on: www.PublicContractsScotland.gov.uk

CLOSING THOUGHTS

COST



[Simon Perry](#)



CONVENIENCE





URBAN
FORESIGHT

THANK YOU

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