Energy Future Communities



Aligning consumer needs, technology and the economy. Will new models deliver a Net Community Benefit, based on proven research into Community Benefit in the health Services sector? Regulatory model Road testing

Waste to energy Hydrogen production New battery materials research

- Demand Launch Energy Future Communities Hydrogen trials Commence use of H2 for heavy transport (Coregas, 2 trucks, 200 kg usage per day) □ Substantial skills base in □ XX tons of H2 used for steel production Commence funding for clean steel production mining and manufacture Mature education and **Skills & training** training infrastructure Supply Social Future skills needs to be Port Kembla Hydrogen Hub determined commenced □ Need for change realized. □ I3net Hydrogen cluster commenced
 - □ H2 pipeline research @ Future Fuels CRC
 - Electricity storage research @ UOW (new battery technologies)
 - Sustainable Buildings Research Centre Solar homes

- Main grid renewables established and growing
- Distributed Solar established and growing rapidly
- □ Grid stability of concern
- H2 use cases for heavy and light transport identified, trials underway
- Energy storage becoming established for electricity, at research level for H2

Technical



Regulation



- Electricity regulation no longer fit for purpose
- □ Land use planning not fit for purpose
- Economic signals mixed
- Low consumer input

- Bridging courses developed for established skilled workers (e.g. mine electrician to H2
 - electrolyser, underground pipe fitter to H2 plant fitter, longwall mine operator to H2 plant operator.



- □ Skills bases in mining and manufacture transitioning to clean future jobs
- Skills & training





- □ Main grid renewables further increase
- Distributed Solar a significant energy supplier
- Grid remains stable through use of new technology such as voltage stabilisers, and community batteries
- □ H2 in daily use for heavy transport. Light transport trials underway
- EV sales 5% per annum
- Energy storage for H2 proof at scale

Technical



□ Energy Future Communities – consumer engagement mature, consumer needs and wants understood

- Use of H2 for heavy transport expanded to local heavy transport fleet (e.g. New car transport, usage 200 kg per day)
- □ H2 in Clean Steel production trials commenced YY tons of H2 used for steel production
- □ H2 buses in local use (5 buses, 2% of fleet) Using 150kg of H2 er day
- □ H2 train trial commenced

Regulation

- Port Kembla Hydrogen Hub established
- One commercial H2 refilling station established (Coregas by 2022)
- Hydrogen manufacture underway, capacity to supply up to 10 vehicles
- Green H2 from electrolyser @ tones per day
- Blue H2 from methane reformation @ tons per day
- □ H2 use at low pressure trials underway
- □ New Electricity storage technology proof at scale underway
- Energy smart homes street @ Innovation Campus operational
- New market models for energy storage and peer to peer energy trading identified
 - New rules drafted and socialised
 - Land use planning changes identified and changes drafted
 - Economic regulation aligned to consumer needs
 - □ Increased consumer input



- Demand
- Energy Future Communities proven at scale, new solutions employed on a region wide level
- Use of H2 for heavy transport BAU for local heavy transport fleet.
- □ H2 in Clean Steel production trials continued YY tons of H2 used for steel production
- □ ZZ tons of H2 used for steel production
- □ H2 buses in local use (10% of fleet, usage 1,000 kg per day)
- H2 train operational

Port Kembla Hydrogen Hub expanded

- Hydrogen manufacture BAU
- Green H2 from electrolyser @ 100's tons per day
- Blue H2 from methane reformation @ 100's tons per day
- Three commercial H2 refilling stations operational
- □ H2 use at low pressure proven at scale
- H2 use at high pressure proof at scale commenced
- New Electricity storage technology proven at scale
- Energy smart homes model incorporated into local DCP's
- New market models for energy storage
 - and peer to peer energy trading operational
- New market rules legislated
- Land use planning changes legislated
- Economic regulation fine tuned
- Consumer input driving further market reforms

- Energy future employment matching traditional industries one for one.
- Skills bases in mining and manufacture continue transitioning to clean future jobs
- Skills training courses, trade and degrees for new clean energy are mainstream
- Main grid renewables dominant supply technology
- Distributed Solar a significant energy supplier
- Grid remains stable through use of new technology such as voltage stabilisers, and community batteries
- □ H2 in daily use for heavy transport. Light transport proof at scale underway
- EV sales 25% per annum
- Energy storage for H2 in commercialisation





Technical





Regulation



Social

- Energy Future Communities proven solutions applied across NSW
- Use of H2 for heavy transport BAU for local and NSW heavy transport fleet – 30% or more of fleet
- □ H2 in Clean Steel production trials refined YY tons of H2 used for steel production, move towards clean steel production by 2040
- □ ZZ+ tons of H2 used for steel production
- □ H2 buses in local use (30% of fleet, usage 3,000 kg per day)
- □ H2 train operational, production of new H2 train fleet commenced. Supply
 - Port Kembla Hydrogen Hub BAU
 - Hydrogen manufacture dominated by electrolyser (green) technology, 100's tones per day
 - □ 10 or more commercial H2 refilling stations operational
 - □ H2 use at low pressure BAU
 - H2 use at high pressure proven at scale
 - □ Electricity storage technology commercialised
 - Energy smart homes model incorporated BAU
 - - □ Refinement of energy market models commenced
 - Land use planning changes refined
 - Economic regulation fine tuned
 - Consumer input driving further market reforms

- Energy future employment exceeding traditional industries.
- □ Skills bases in mining and manufacture largely transitioned to clean future jobs
- □ Skills training courses, trade and degrees for new clean energy further refined
 - Main grid renewables and storage dominant supply technology
- Distributed Solar a significant energy supplier
- Grid remains stable through use of new technology such as voltage stabilisers, and community batteries
- □ H2 in daily use for heavy transport. Light transport a mix of EV and H2.
- EV sales 50% per annum
- □ Energy storage for H2 BAU



Skills & training



