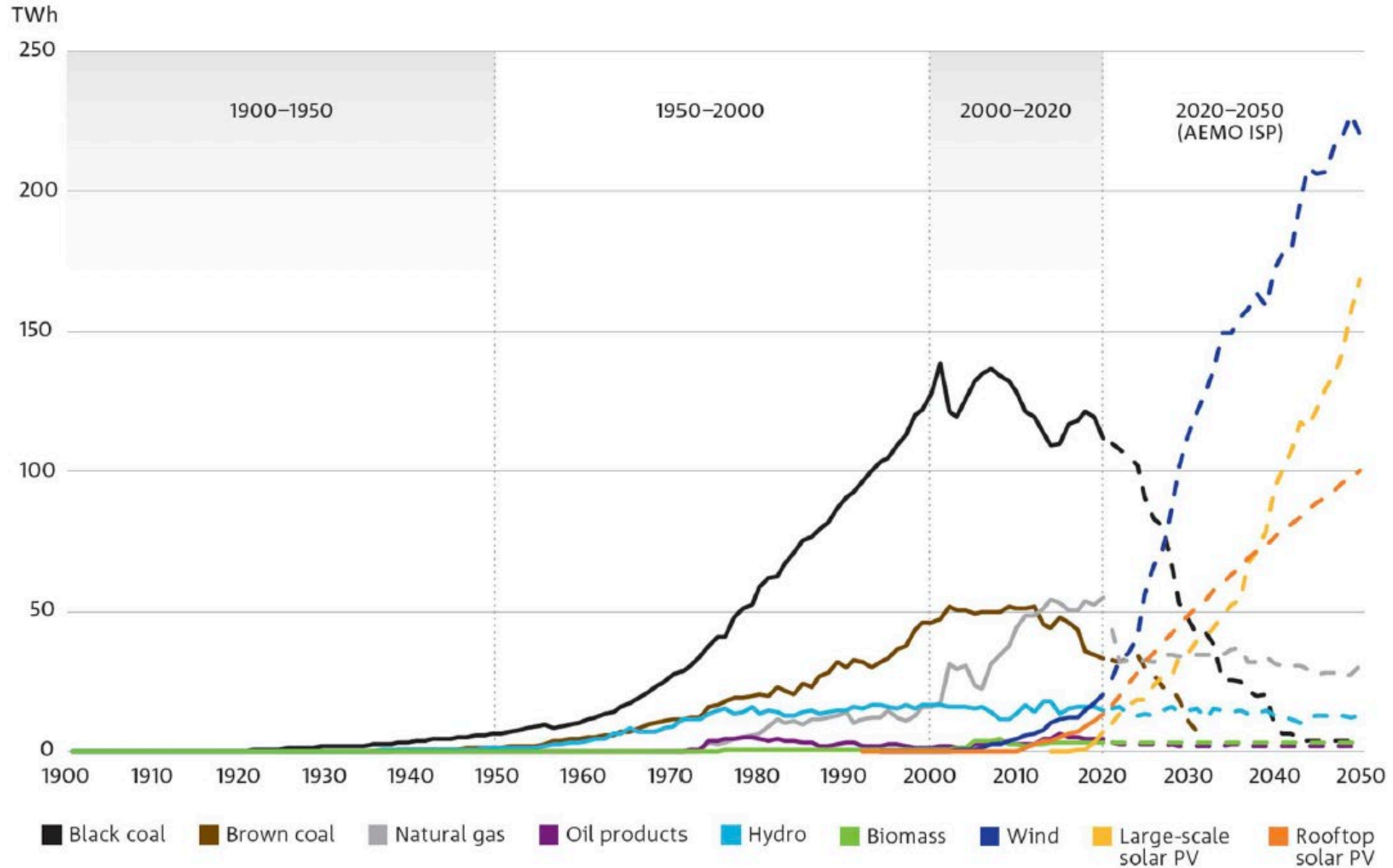




Repeating History or Charting a Strategic Course for Distributional Energy Justice?
Navigating the Crossroads of Regulatory Governance in the Renewable and Distributed Energy Sectors

Associate Professor Penelope Crossley, Sydney Law School

Figure 2-2 Australian electricity generation by fuel and technology 1900 to 2050



Today

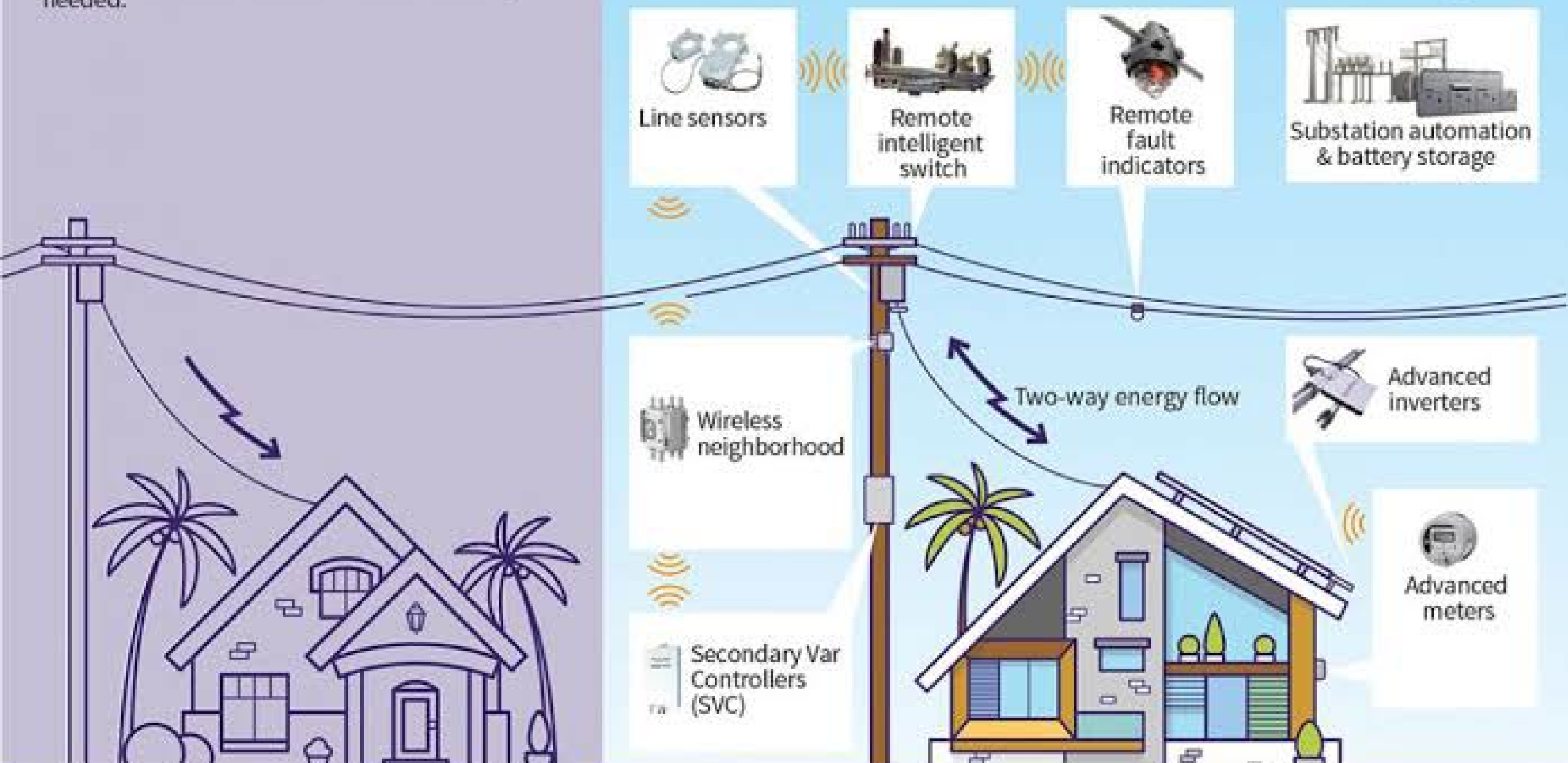
One-way energy flow

Power generated from a few central power plants supplied to all customers. Limited monitoring needed.

Tomorrow

Two-way energy flow

Customers' resources are an important part of the grid. Reliability is critical as more and more customers provide resources to the grid.



Decentralisation

Decarbonisation

Energy 4.0

Democratisation

Digitisation



- Utilities globally invest approximately \$710bn on energy assets every year.
- Bloomberg/NEF estimates that by 2030 the major source of investment in energy assets will come from consumers (in the form of PV, batteries, electric vehicles, community energy etc) \$2,100bn.

Consumer protection issues

Failure to appropriately plan for decommissioning

Regulatory inertia 3.0

Lack of transparency and accountability

Democratic deficit

Inadequate collection of and access to data

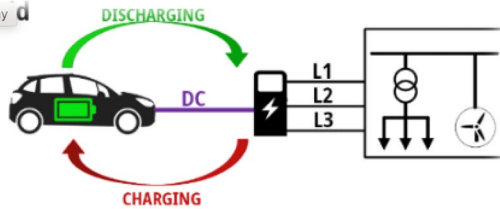
Lack of technical standards for DER

Competition issues

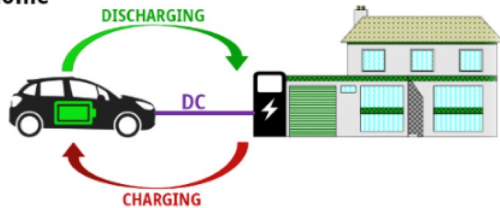
Disruptive innovations in the sector



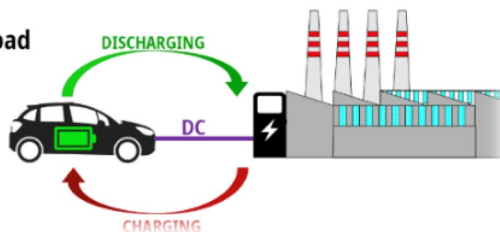
a) V2G - Choose sidebar display d



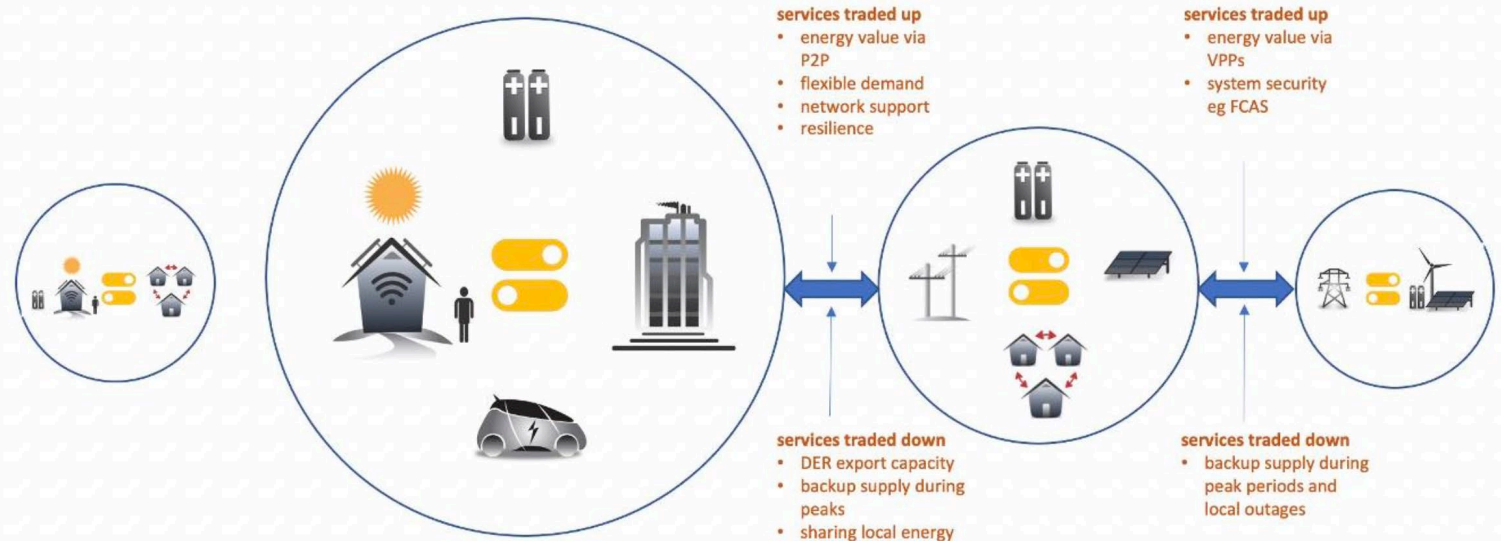
b) V2H - Vehicle-to-home



c) V2L - Vehicle-to-load



the democratic grid



- services traded up**
- energy value via P2P
 - flexible demand
 - network support
 - resilience

- services traded up**
- energy value via VPPs
 - system security eg FCAS

- services traded down**
- DER export capacity
 - backup supply during peaks
 - sharing local energy

- services traded down**
- backup supply during peak periods and local outages

stand-alone systems

- isolated and individualistic users
- isolated microgrids

controlled by HEMS & smart inverters

user DER

- primary supply source
- active + passive resources
- islandable systems for resilience

controlled by HEMS & smart inverters

networked DER

- shared resources
- multiple distribution trading platforms using common APIs

controlled by DNSP as DSO

bulk system

- grid scale generation
- transmission network
- wholesale market

controlled by AEMO as TSO



**The biggest
resistance to the
energy transition
is the resistance to
changing our
regulatory model.**

Allocation of risks and liability

- Risk ought to be allocated to those parties best able to manage it
- The liability that prosumers are currently being exposed to is significant:
 - There is a lack of insurance products available
 - Poor understanding of the potential risks involved
 - Limited ability to be able to mitigate those risks

What we need to do:

Create a flexible and adaptive regulatory framework that meets the innovative needs of decentralised energy, while also recognising the importance of coordination and system security.



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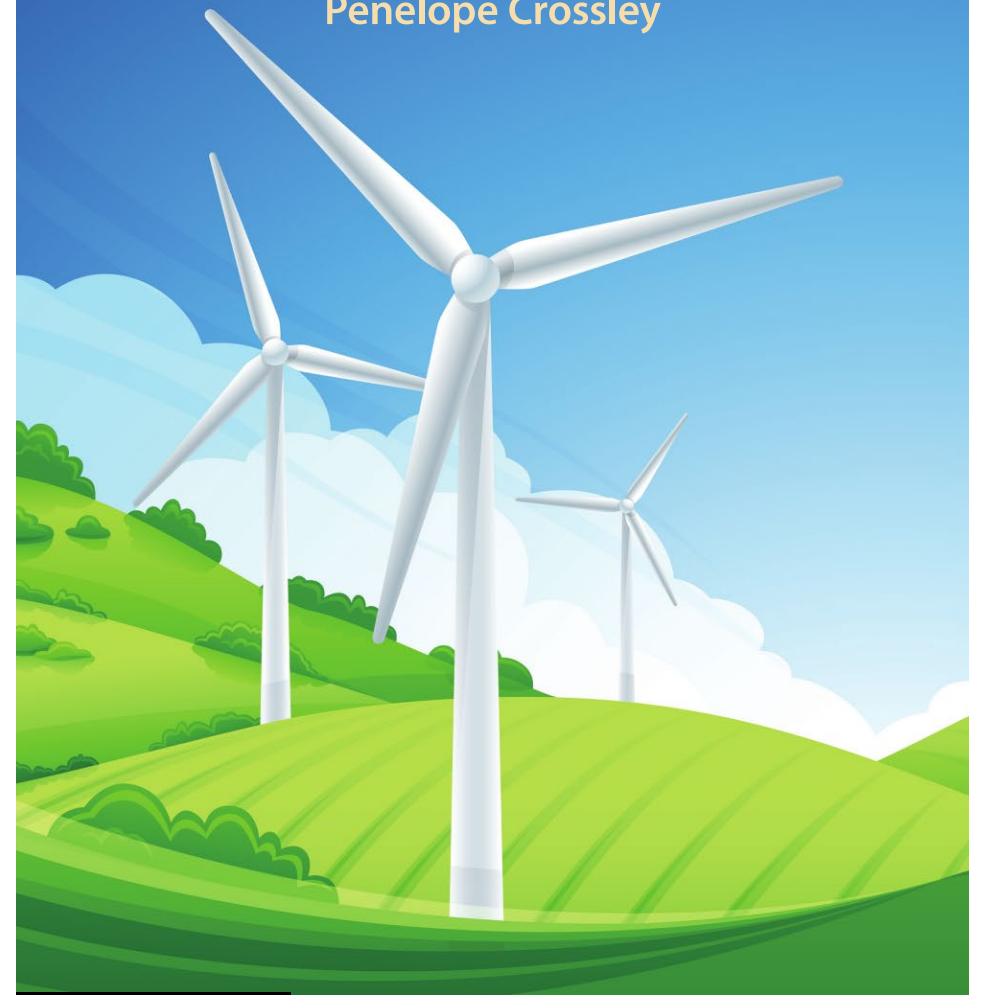
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Renewable Energy Law

An International Assessment

Penelope Crossley



CAMBRIDGE