

DER, the wholesale market and ripple control – an explainer

Innovation and
Participation
Advisory Group

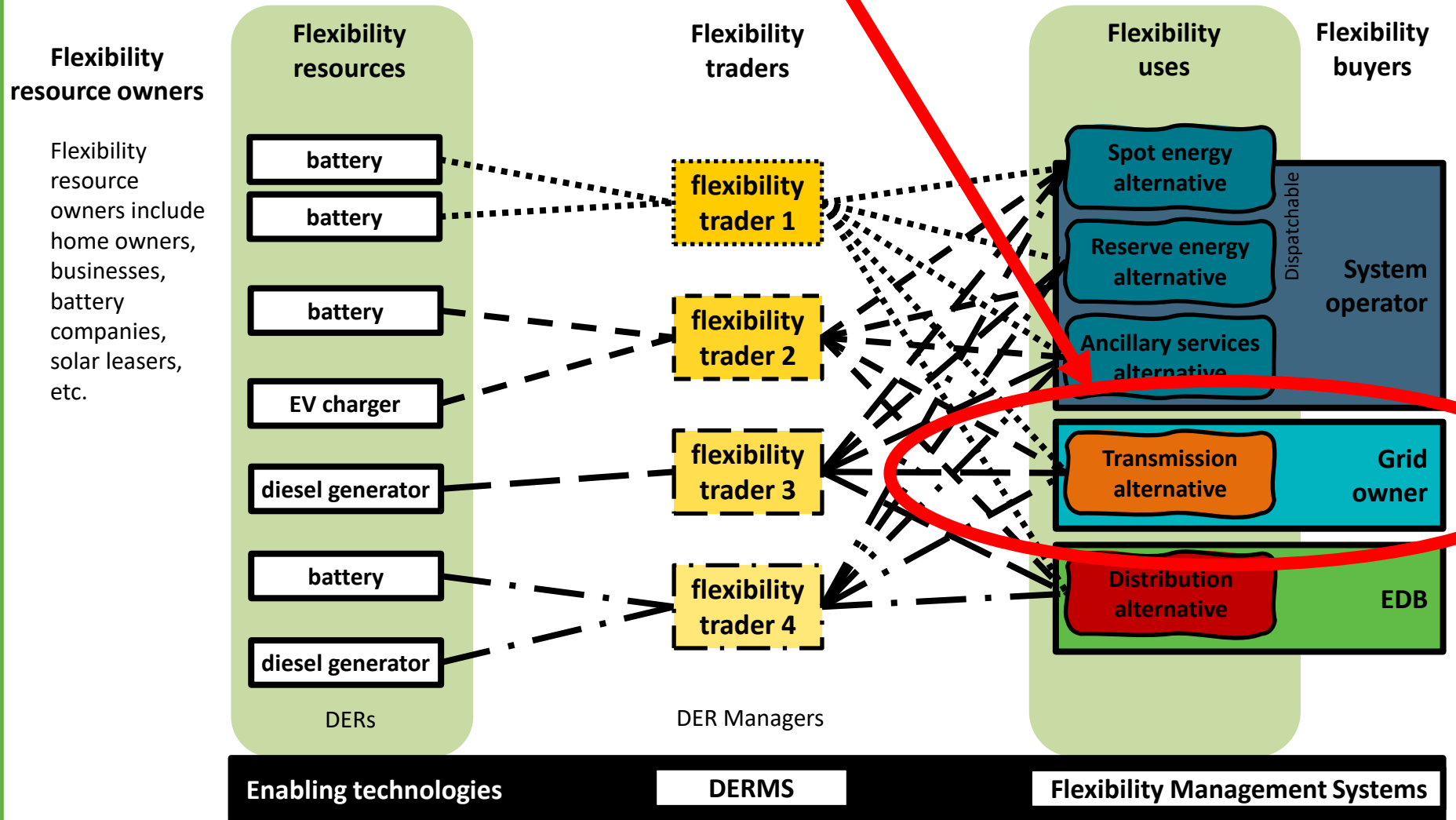
There is considerable confusion about the role of DER in the market

- *People have been asking “why didn’t Transpower use the DR programme to avoid the 9 August electricity cuts?”*
- *This provides an opportunity to paint a picture of how flexibility resources could contribute to situations like generation scarcity in future through flexibility traders seeking their highest value use.*
- *It also highlights the importance of showing how NZ’s ripple control resource can transition into this model.*

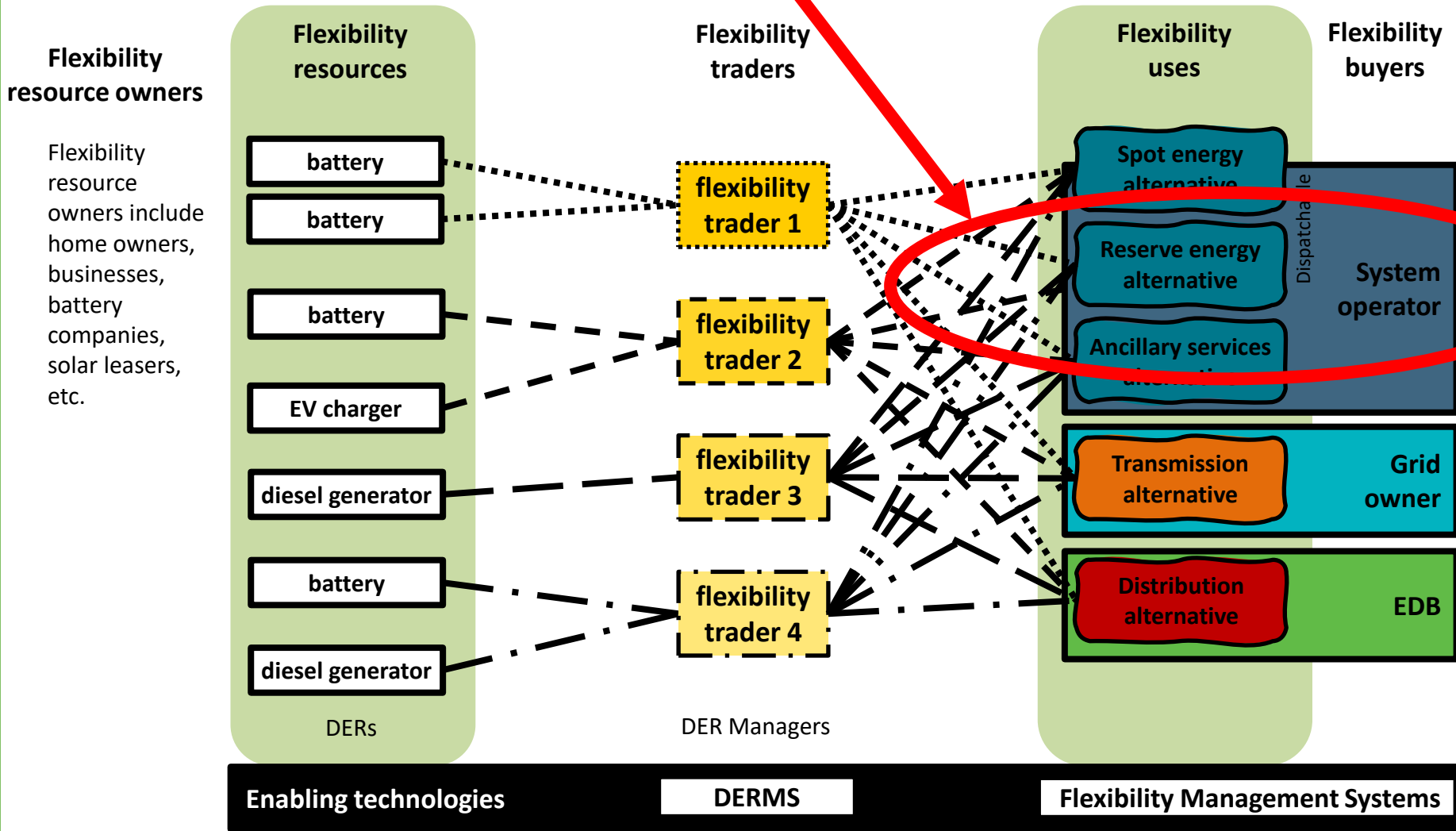
The term “Demand Response” is used to mean different things by different people

- The uncontroversial meaning of “demand response” is end consumers of electricity (“demand”) choosing (not being forced to) reduce load or bring on local supply instead of buying it from the pool transmission system in response to the wholesale price
- Transpower’s “DR Programme” is confusingly named
 - It’s not just about “demand” in the sense of consumption – they use the word to mean “net load at grid exit points on the transmission system” so it includes controllable generation and storage embedded on distribution networks – which look the same as load reduction to Transpower
 - It’s not about “response” in the sense of end consumers choosing to use less pool electricity because it’s too expensive – it’s the Grid Owner pre-contracting controllable DER that it can dispatch to reduce peaks in demand on the transmission system as an alternative to building more network capacity
- This is why IPAG prefer to talk about “flexibility” - modifying generation and/or consumption patterns in reaction to an external signal (such as a change in price) to provide a service within the energy system

The Transpower DR programme is the Grid Owner buying flexibility services as a transmission alternative



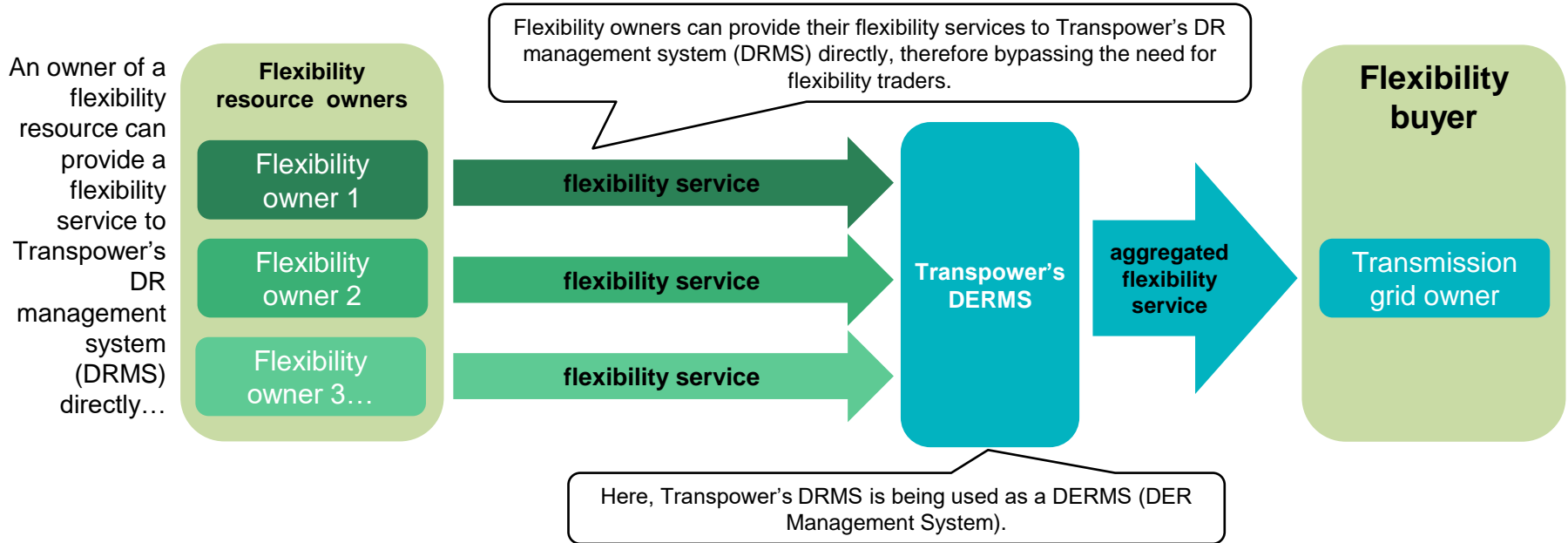
During a Grid Emergency when there's a generation shortage, the System Operator needs to buy reserves



The System Operator is not allowed to use the TP DR Programme - even in an emergency

- In April 2014, the Authority wrote to the Commission about concerns it had that Transpower's DR programme may adversely affect the wholesale electricity market.
- These concerns included that Transpower's DR programme:
 - might inefficiently 'crowd out' other uses for DR, and in the longer term, could *'lead competing, commercially funded DR providers to scale back or withdraw from the NZ market'*
 - might lead to inefficient spot market prices
 - could reduce market efficiency by providing side payments
 - could create perceptions of non-impartiality because the system operator was not separated from the transmission asset owner.
- The Transpower DR Programme "operational protocol" is an agreement between TP and the EA to address concerns about the potential to adversely affect the wholesale electricity market and limits its use to network investment alternatives

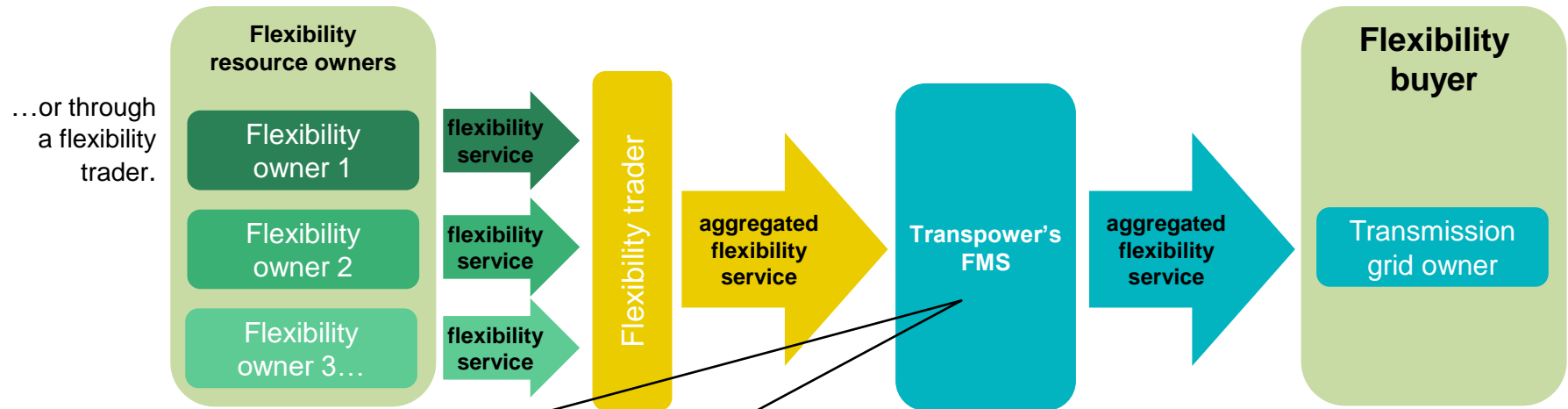
Transpower's DR programme locks DER up for a single use



Transpower send control instructions to the DER devices

If the SO (or anyone else) wanted to send instructions to the same devices, they'd need to contract with the same DER and build a parallel DERMS tool to control them since the Grid Owner is not allowed to use resources in the programme as anything other than a transmission network alternative

IPAG recommend that DERs are controlled by flexibility traders who are not monopoly buyers of flexibility services



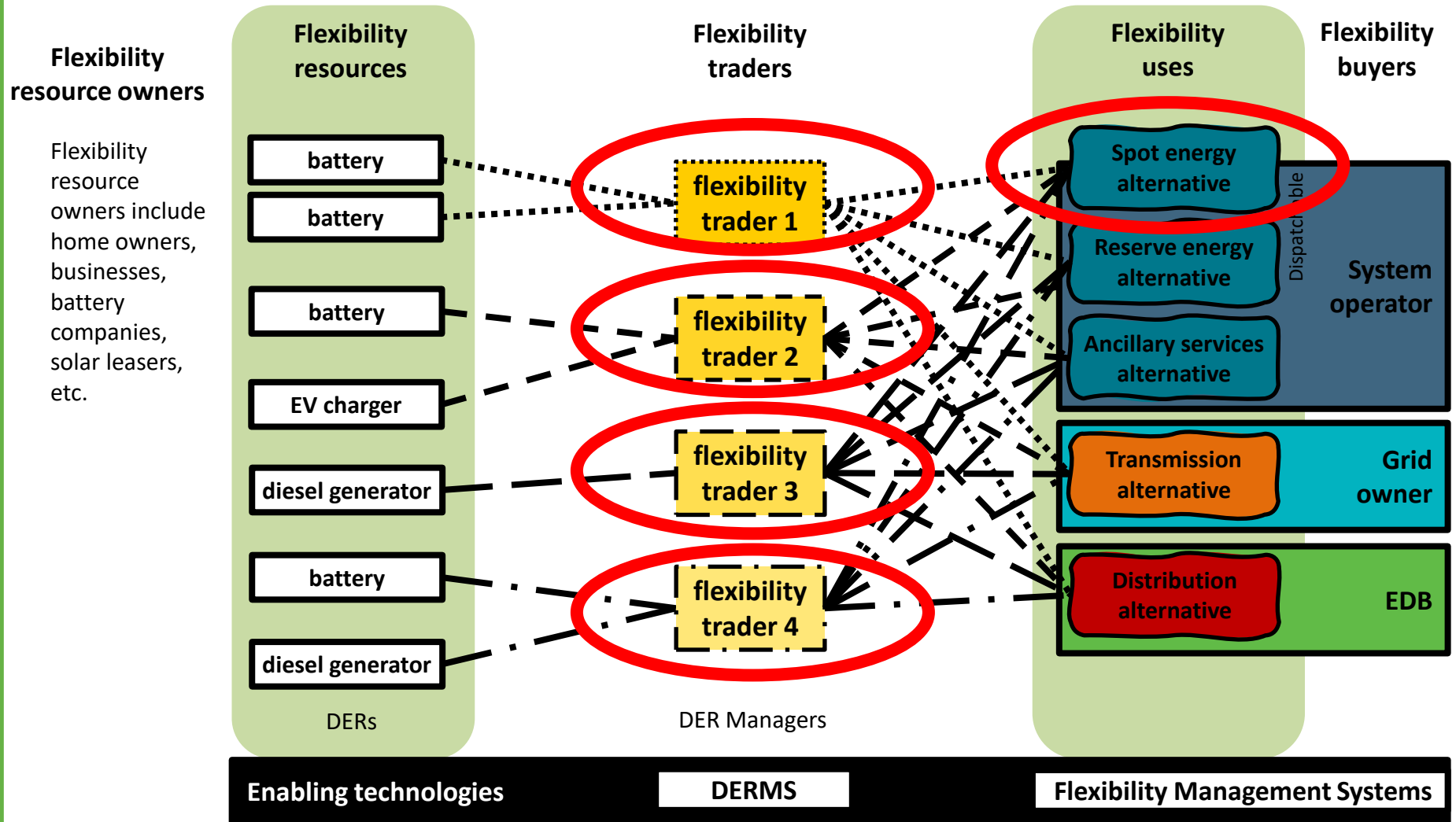
Here, Transpower's DRMS is being used solely as a Flexibility Management System. Traders send instructions to DER using their own DERMS and so can value stack to other, potentially higher value, uses.

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By separating the control and use of individual DERs from the need to procure flexibility, competition will ensure that all DER is put to the highest value use across many potential buyers of flexibility services

This includes wholesale market participants and the system operator

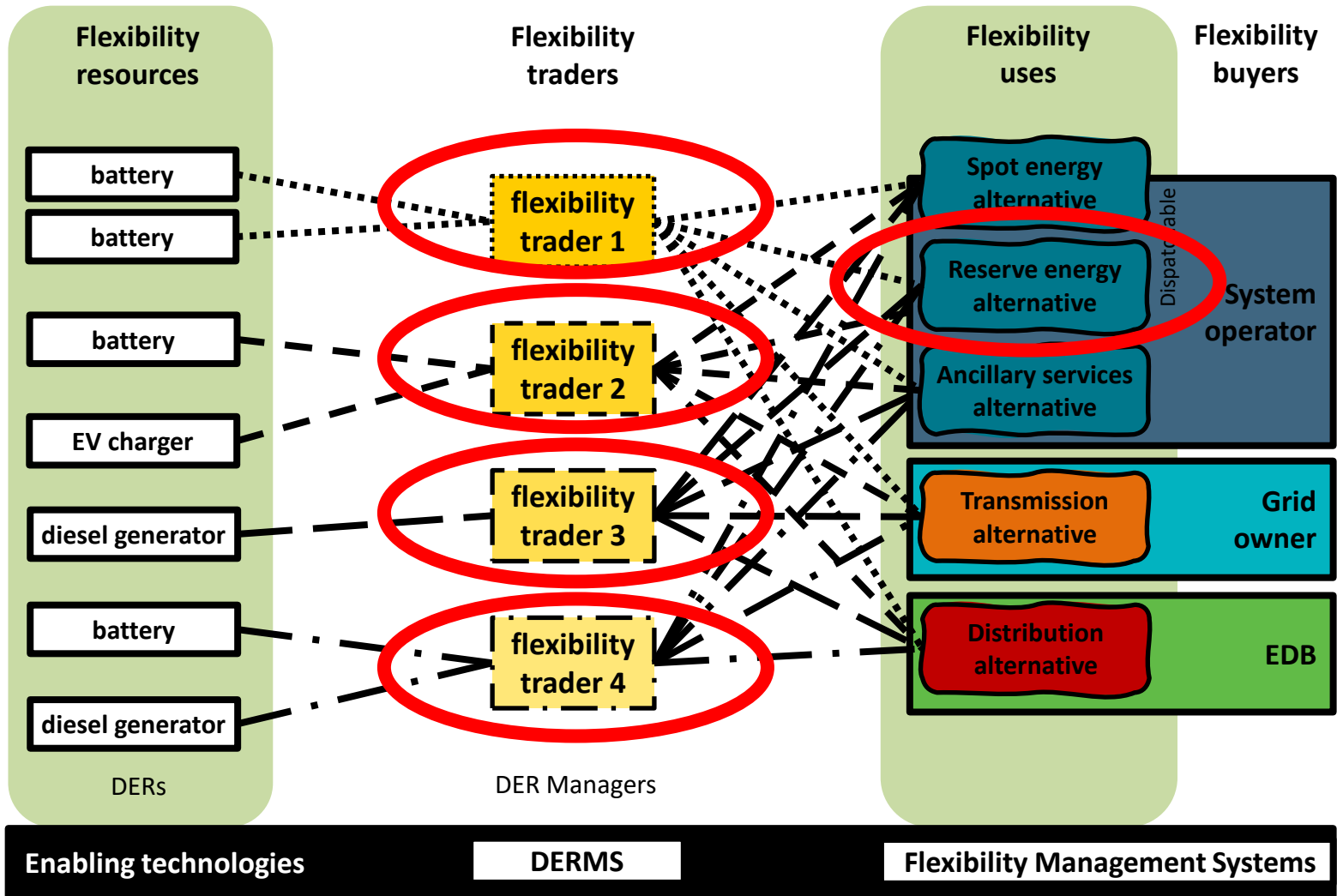
When there's a generation shortage, flexibility traders will use DER as an alternative to spot energy for market participants



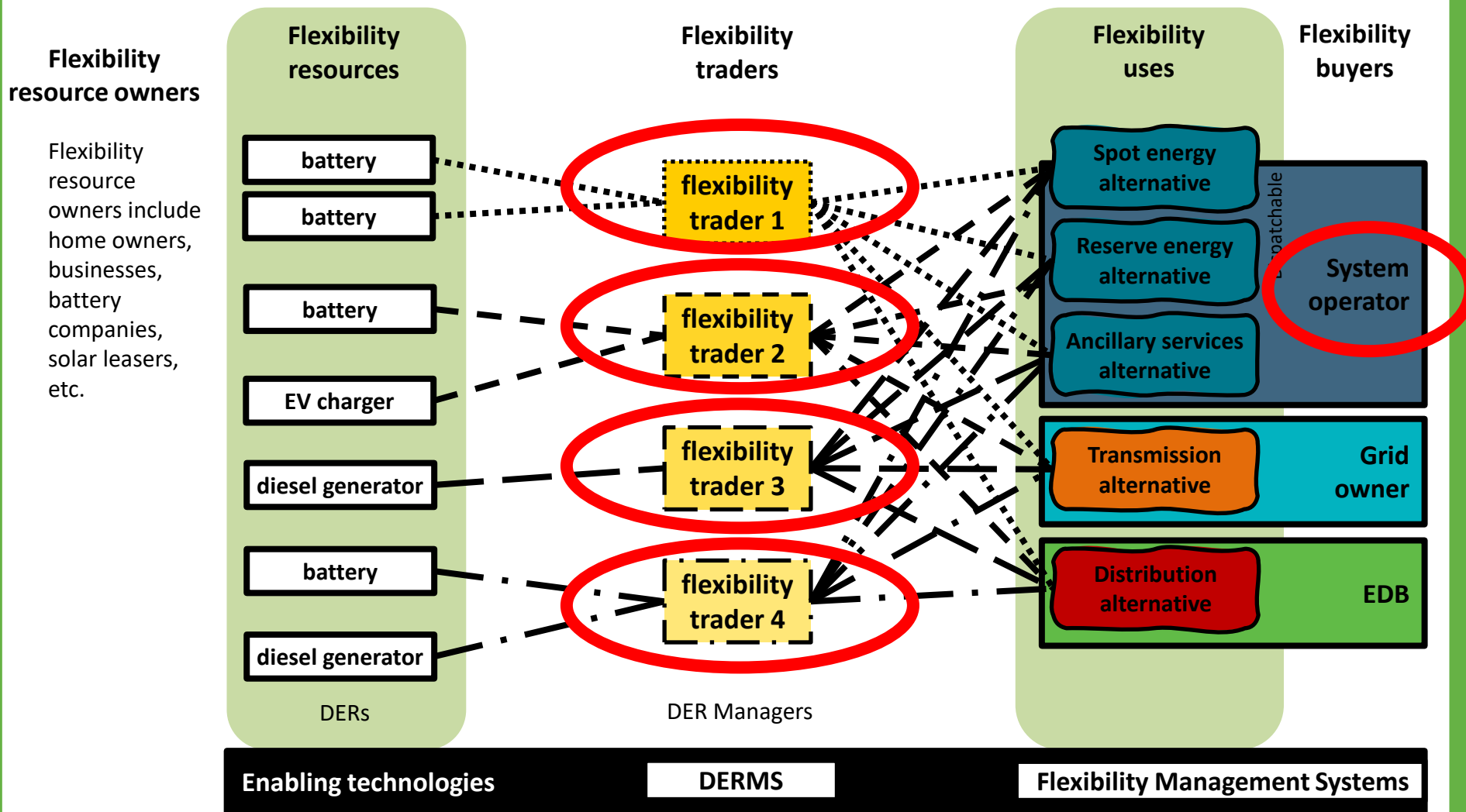
Flexibility traders will also use DER as an source of reserve energy for the system operator

Flexibility resource owners

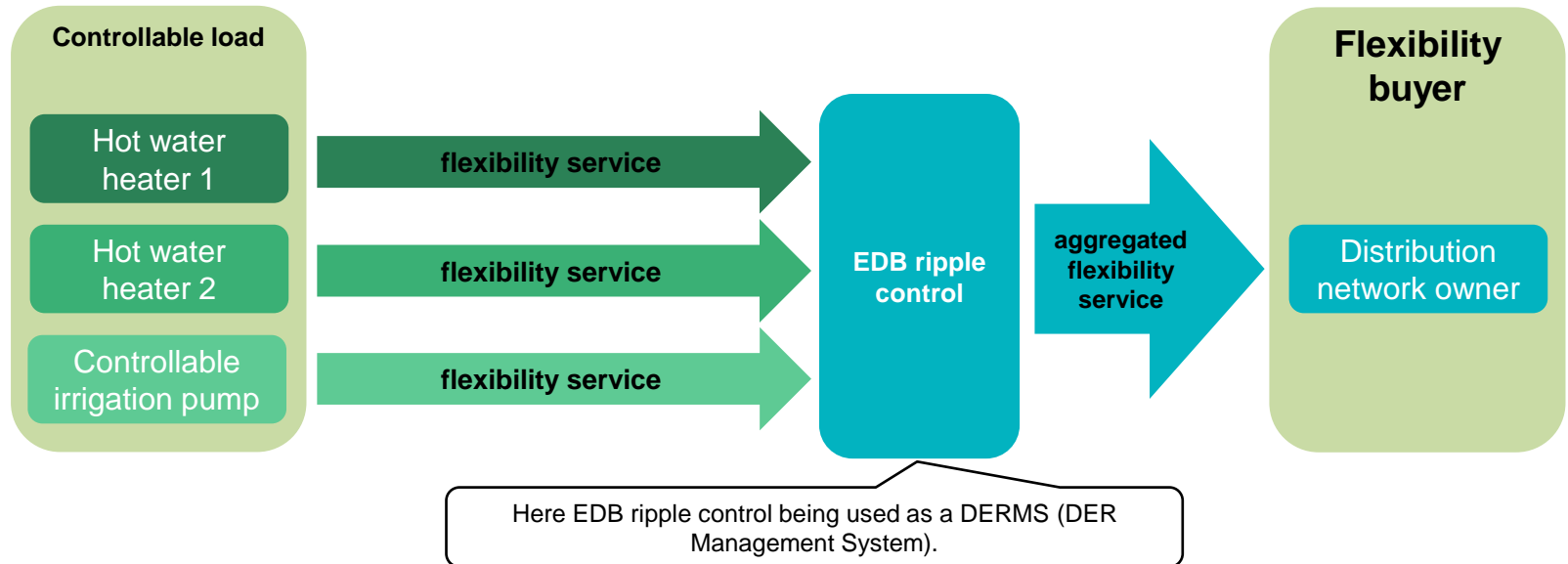
Flexibility resource owners include home owners, businesses, battery companies, solar leasers, etc.



In a grid emergency, the SO could instruct flexibility traders to dispatch all available DER but would need to pay a scarcity price to do so



Ripple control locks DER up for a single use



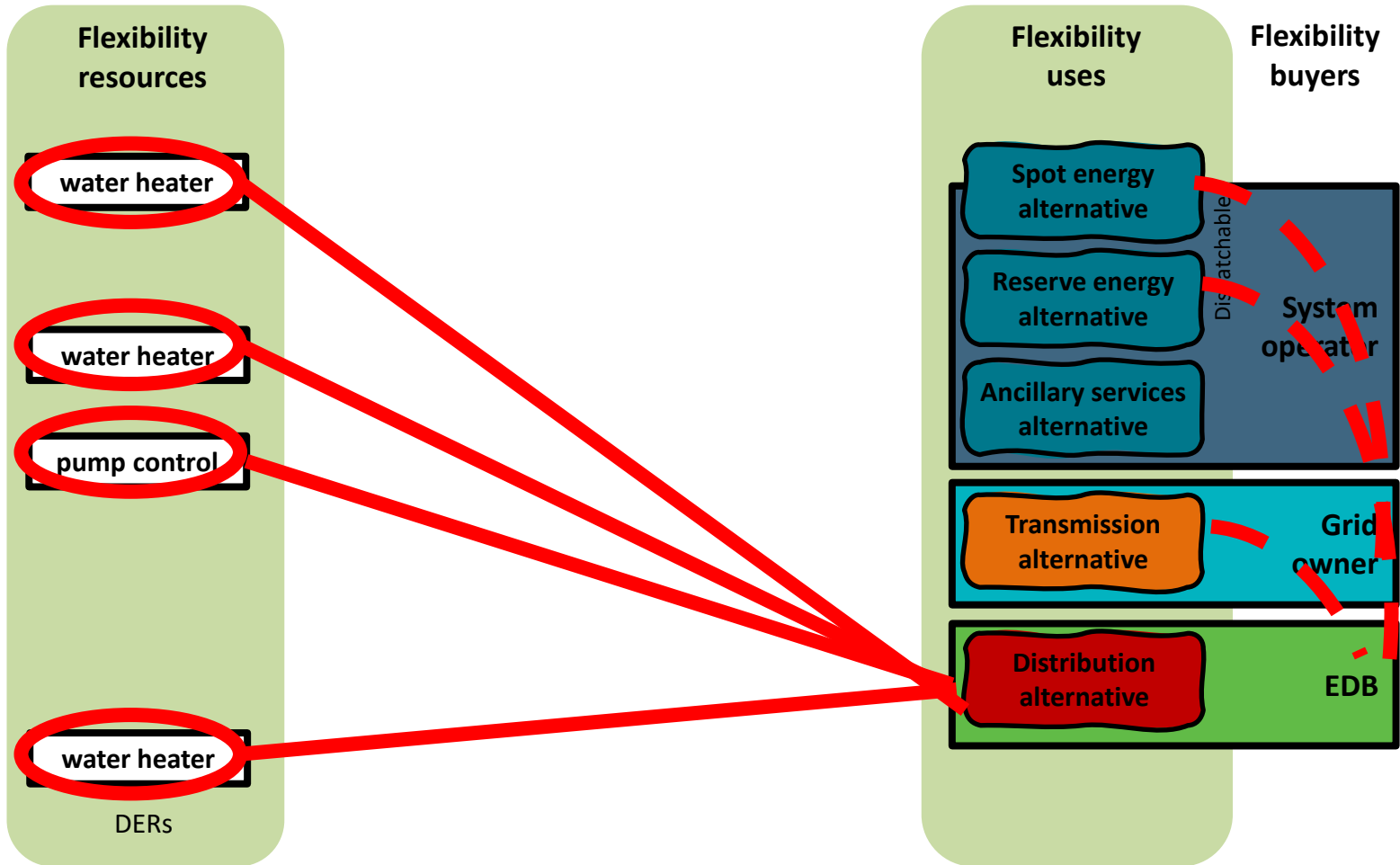
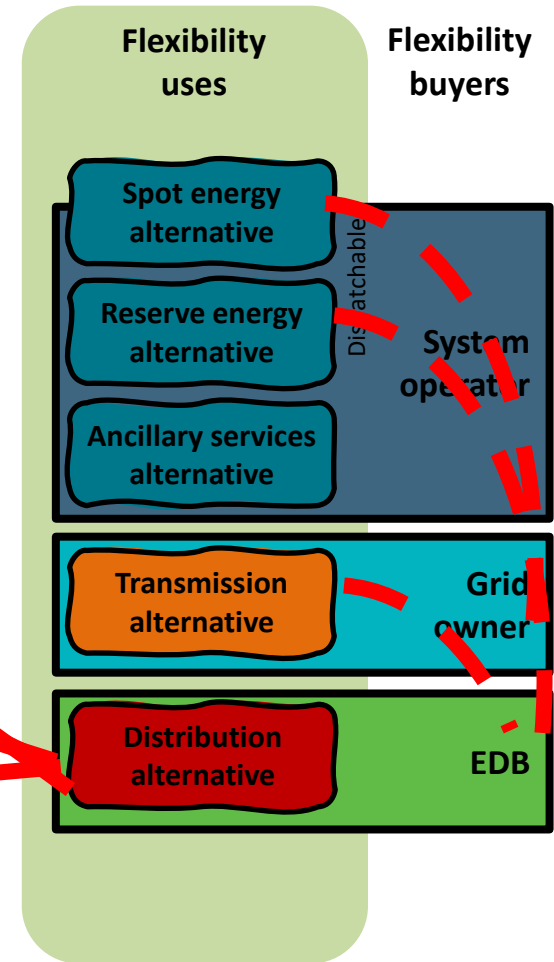
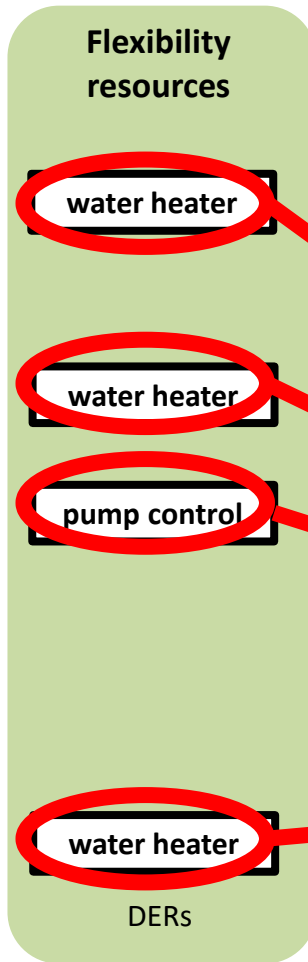
The EDB who sends control instructions to the DER devices using ripple control

The only way the SO gets EDBs to send instructions to the same devices is by instructing the EDBs to under a Grid Emergency Notice – they don't pay for this and most ripple control isn't used as an alternative to

Ripple controlled devices don't get used efficiently or effectively across the market

Flexibility resource owners

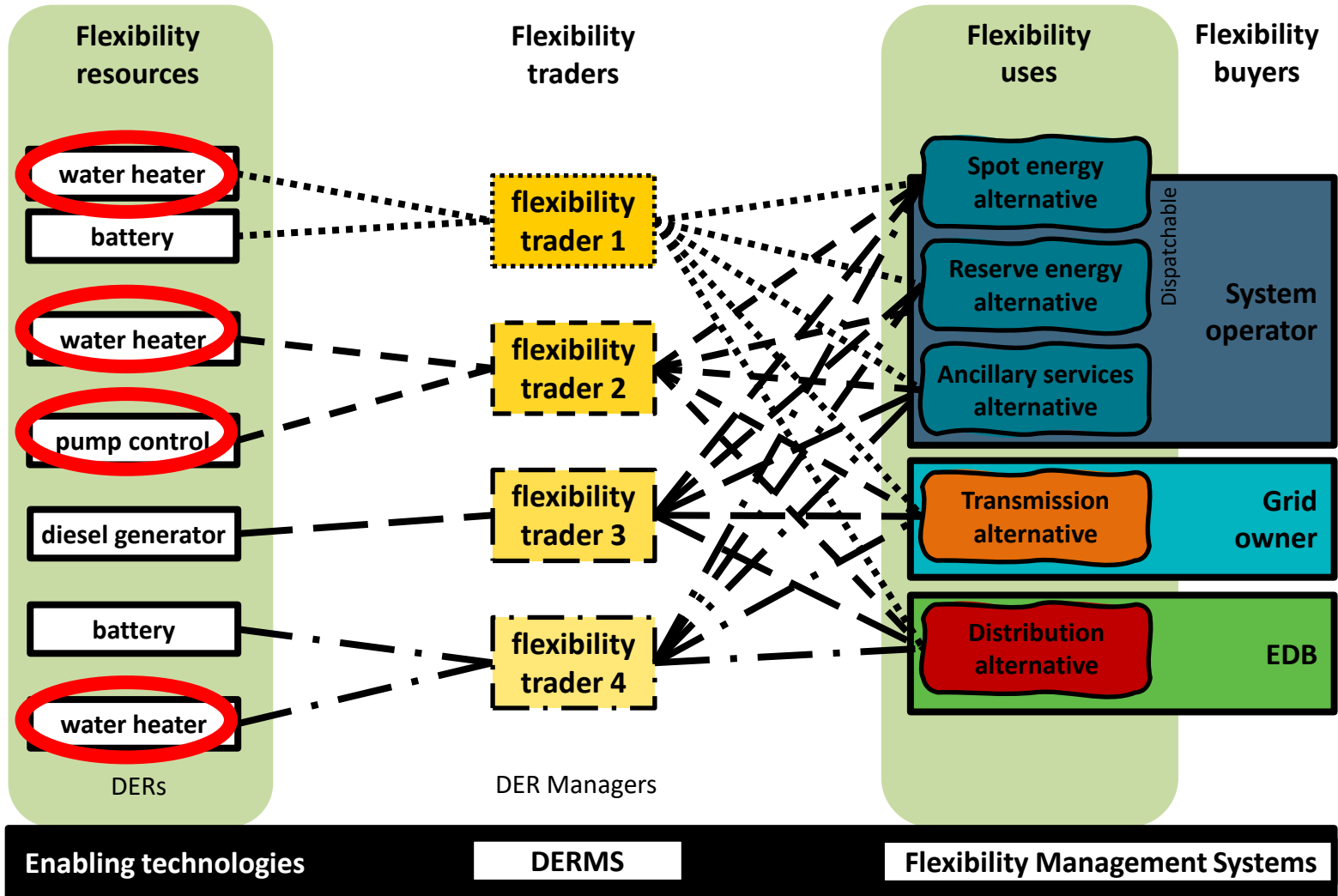
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It would be more efficient and effective for ripple controlled devices to be just another flexibility resource

Flexibility resource owners

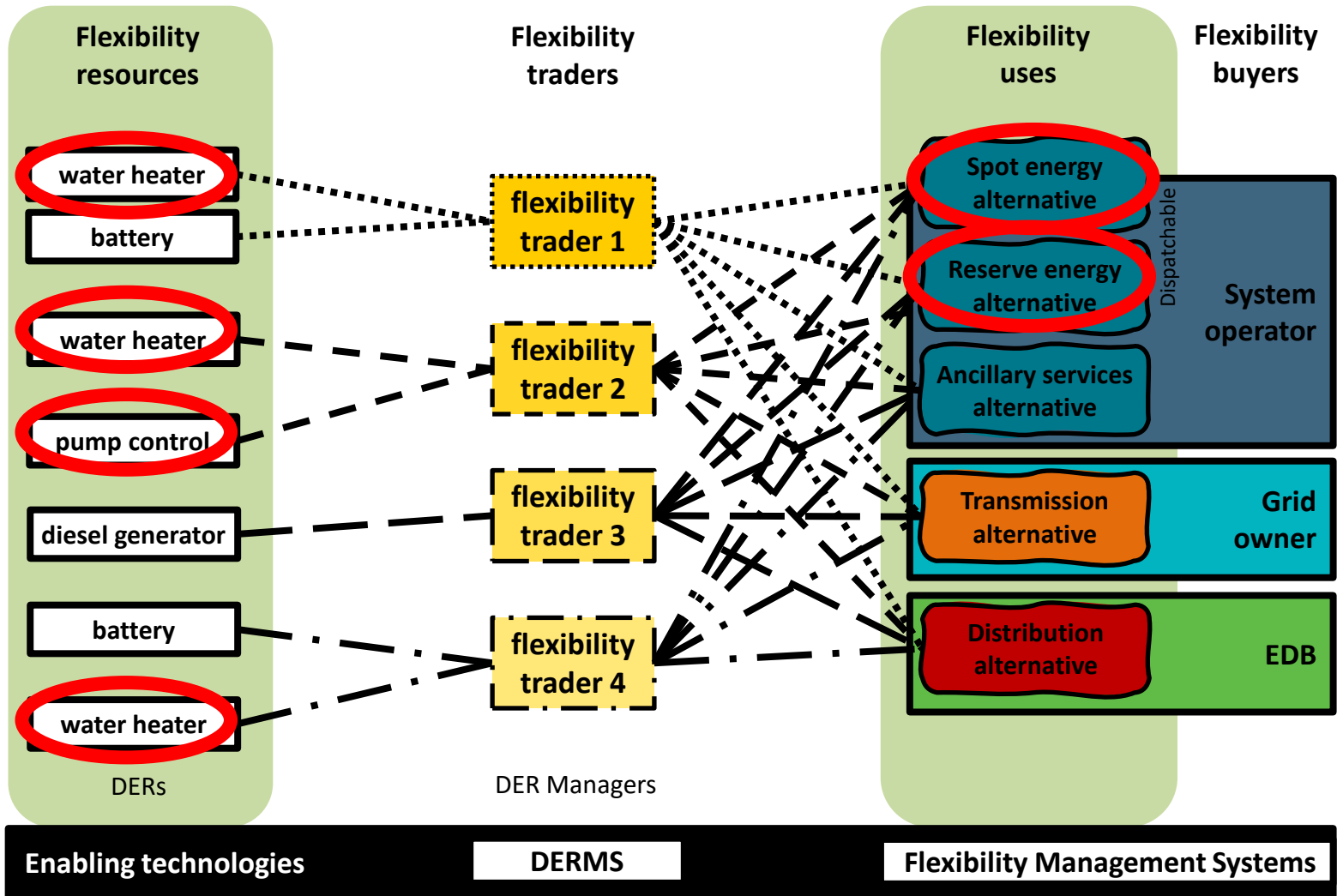
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Then ripple controlled devices could compete with the spot market and reserve generation

Flexibility resource owners

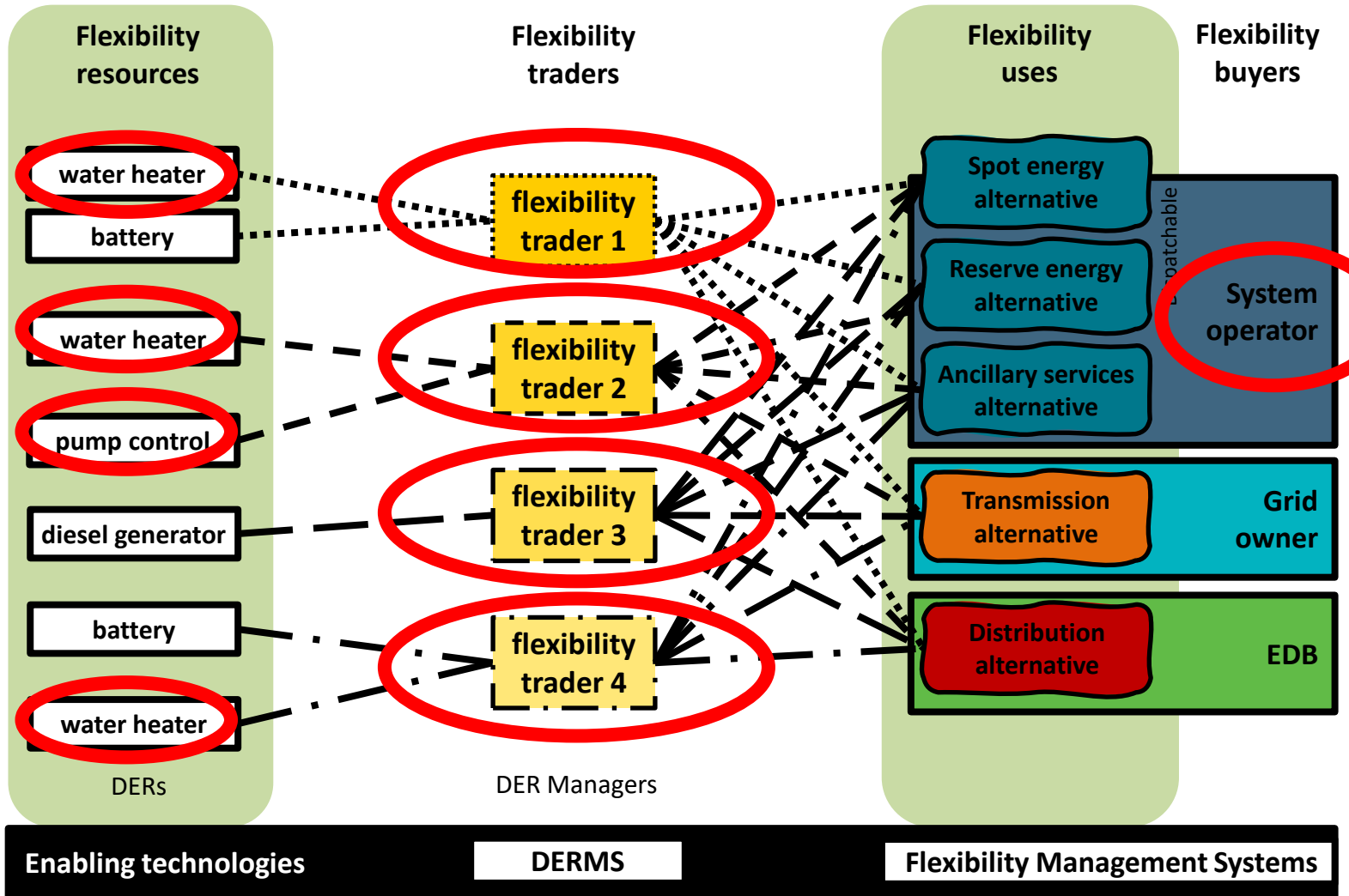
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Distribution networks have been sized with the assumption that EDBs have ripple control

- The resource can't be taken away overnight or bigger networks would need to be built, but ripple control can transition to flexibility resources
- EDBs could make standing offers to all dispatchable DER at the same prices as the difference between controlled and uncontrolled tariffs
- EDBs should move away from owning and directly managing ripple control to buying the flexibility services that they offer
- One option could be to prohibit the replacement of ripple control infrastructure like-with-like and require competitive tendering of replacement services from flexibility providers – similar to Aurora's Upper Clutha RFP process
 - Availability payments to successful tenderers to underwrite investment in new dispatchable hot water/pump controllers and
 - Event payments when called