# VISIONS FOR THE FUTURE OF COMMUNITY ENERGY IN THE UK

## REALISING THE POTENTIAL

*Report from the 'Visions for the Future of Community Energy' workshops organised by the UK Energy Research Centre (UKERC) Financing Community Energy project.*

# INTRODUCTION

As part of the UK Energy Research Centre (UKERC) Financing Community Energy project, we ran a series of visions and pathways workshops with representatives from across the community energy sector in Edinburgh, London and Cardiff over the winter of 2018-19. We presented a series of potential business models in order to facilitate discussions on the opportunities and challenges for community energy in the UK. The models were developed from a range of existing literature, results from our survey of community energy projects and a Community Energy Listening Event held as part of the Greater Manchester Green Summit in February 2018.

This briefing presents our synthesis of participants' responses to those models, their views on what is needed to transition to an energy system where community energy is prolific and the key questions and challenges that remain. Further outputs from the project will analyse the visions and pathways to realising them in more detail.

# THE FUTURE VISION FROM THE SECTOR

**Community energy is everywhere.** Locally rooted organisations co-operate across the country in networks and federations. Today's community energy companies have been joined by a wide range of community organisations that now work in energy alongside other activities, like transport or housing.

**Community energy organisations combine multiple business models** to make best use of their complementarities and to stack revenues.

**Community energy is much more than electricity generation.** Groups retail electricity to local customers, as well selling to national wholesalers, and aggregate local supply and demand in the UK's smart energy system. They offer local tariffs, and use their pricing and technical know-how to address fuel poverty and the digital divide. Some also run 'mixed mobility' services – buses, car clubs and more; or heat networks in off-gas-grid areas and new-build developments.

**Local energy markets everywhere** make this possible. Renewables are the cheapest means of electricity generation.

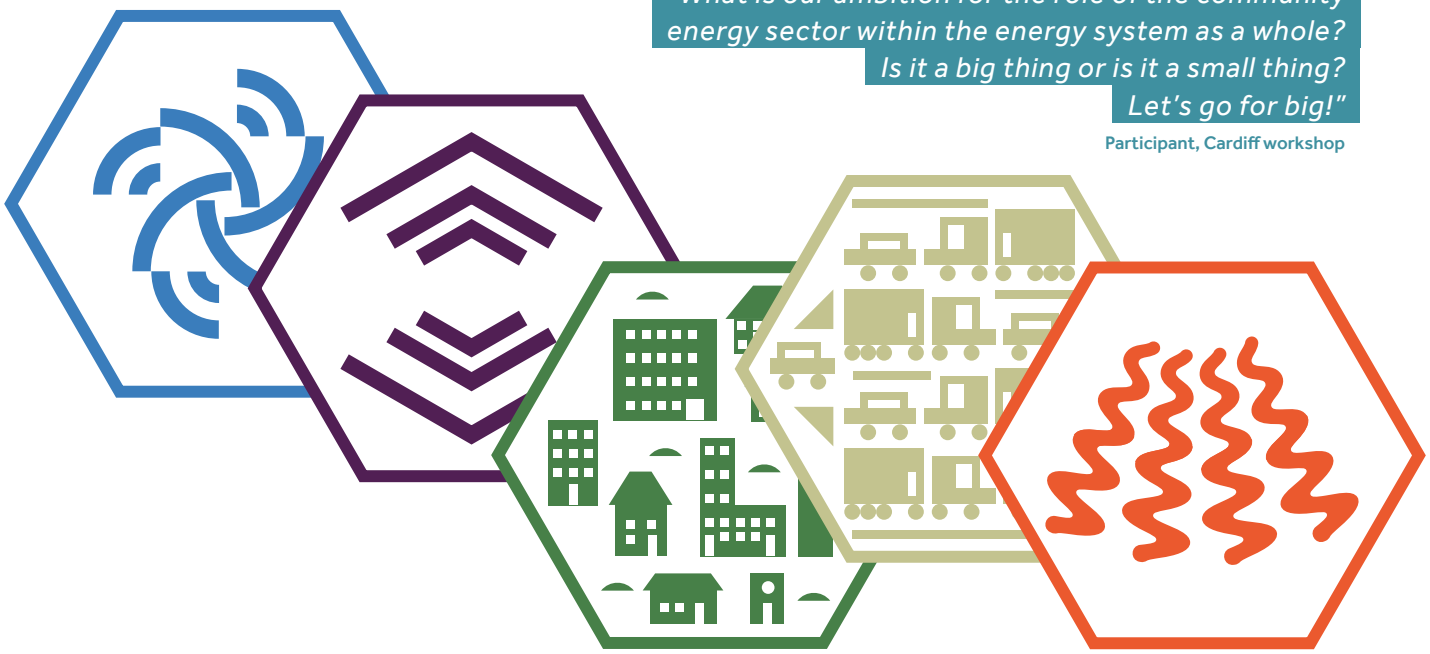
**Energy culture has changed.** Buying local energy is normal, people are more energy literate, and houses are energy efficient. A nationwide programme of significant retrofitting has been successfully delivered (community organisations have been part of delivering this).

**Personal transport is electrified.** Electric Vehicles (EVs) have replaced internal combustion engines, and community organisations are part of a more collective approach to mobility through car clubs, locally managed bus services, etc.

**Community energy is part of a more civic, democratic and decentralised UK.** Political power is more evenly distributed between central, regional and local government. Decentralisation is also a central tenet of the broader transition to a zero carbon energy system. Working with local authorities and others across public and private sectors, community energy organisations play a significant role, boosting their local economies by procuring services locally and putting money in the pockets of their local members. Their democratic structures offer accountability, and engender trust and engagement.

*"What is our ambition for the role of the community energy sector within the energy system as a whole? Is it a big thing or is it a small thing? Let's go for big!"*

Participant, Cardiff workshop



# PATHWAYS TO THE VISION

## KEY QUESTIONS AND CHALLENGES

**How long will it take?**
Many energy system targets and visions are set at 2050 – but participants wanted to move much quicker than that.

**Local energy markets** play a big role in many business models. When will they come into being? How will they work, what kind of scale will they be, and how can community energy engage?

**Taking the plunge into new activities:**
in the visions, community energy is fully engaged in currently-emerging energy activities like electric transport, demand-side response and flexibility trading. When will the technologies and regulations around these have stabilised enough for it to be 'safe' for smaller organisations to commit to them? What kinds of culture and social practices will emerge around them?

**Scaling up vs local roots:**
how can the sector scale up and professionalise to gain market power, whilst retaining the local relationships and trust which make community energy different? How can scale best serve local empowerment?

**What will the future heat system look like**, and what roles can community energy play in it?

## PRIORITY ACTIONS

**Central government** should ensure regulation permits local supply of electricity; make sure regulation and standards keep smart energy trading hardware and software systems open source to allow participation from smaller actors, like community energy companies; and take the lead on deciding how heat will be decarbonised.

**Local government** should reach out to community energy organisations, as partners for their activities on developing local energy systems. An immediate action would be to use procurement policy to purchase community-generated energy, and encourage others to do the same.

**Community energy groups** should work more together and reach out to potential allies in the third sector, local government and the energy SME sector. They need to build the evidence to convince policymakers of the extra benefits community energy brings, and gain skills in energy IT and network balancing – through training, or attracting people with those skills to the sector.

| | RENEWABLE ELECTRICITY FEDERATION | LOCAL ENERGY AGGREGATOR |
|---|---|---|
| ENERGY ACTIVITIES | Generating renewable electricity | Trading energy – both microgeneration and demand-side response – on behalf of members<br>Running energy trading platform |
| TECHNOLOGY AND OTHER PHYSICAL RESOURCES | Each generation project needs generation equipment and a physical site<br>The Federation of projects needs an IT system that can monitor energy flows and payments | IT system for monitoring energy flows and managing payments |
| SPECIALIST SKILLS | Renewable electricity engineering<br>Electricity markets<br>Finance raising and management | Energy networks<br>IT systems and security |
| COST PROFILE | High development costs; relatively low operating costs | Relatively low upfront and running costs |
| REVENUE AND CUSTOMERS | Sale of electricity, aggregated from many local projects, to energy wholesaler via PPA<br>Local energy retail to business and households | Flexibility contracts with network operators – revenue for demand shifting or release of stored electricity<br>Members may be households, or SMEs outsourcing some energy management<br>Platform use fees for members wishing to trade independently |
| GEOGRAPHY | UK-wide – for maximum range of renewable electricity generation conditions<br>Members will mostly run local generation projects – but scope for Federation as a whole to raise UK-wide investment for larger scale e.g. offshore wind? | Local or regional – minimum size for viability is key question<br>Could join Federation – local groups likely combine generation and demand-side aggregation in any case |
| STRUCTURE | Cooperative of cooperatives or other community groups – local projects controlling central hub<br>Existing projects join as their current PPAs expire<br>Central hub – all in-house or outsourced?<br>Can communities without generation projects join? | Local groups with households and businesses as members<br>Wider scale federation dealing with network operators<br>Could be part of national Federation – opening it up to communities without generation |
| FINANCE AND FUNDING | Local projects: mix of bonds (for scale) and community shares (to keep equity local)<br>For larger projects: community shares and bonds again? Or look to more mainstream finance e.g. pension funds? | Probably less upfront finance needed compared to renewables, but may depend on scale of operation?<br>Community shares and/ or membership fees<br>Integrate with Renewables Federation finance? |
| THE COMMUNITY DIFFERENCE | Spend and revenues used to promote inclusive local economic and social development<br>Psychological and cultural benefits from communities taking control | Trust essential to get people to participate in smart energy systems<br>Fair deal for all – overcoming digital divide and ensuring all get share of revenues from value they create |

| ENERGY SAVING SERVICES | LOW CARBON MOBILITY | DISTRICT HEAT NETWORKS |
|---|---|---|
| Installing and operating energy efficient appliances or systems | Mixed-mobility services – EV clubs, bus services –with membership card or app | Generating renewable heat<br>Supplying heat to end users |
| Energy appliances and energy management systems: smart meters, heat pumps, lighting, etc.<br>Operation and maintenance equipment | Electric: cars, (mini)buses, bikes<br>EV charging infrastructure<br>IT systems for apps, billing etc.<br>Leased technology (e.g. charging hardware) to stay up to date | Heat generator<br>Feedstock/ fuel source<br>Pipes – heat supply infrastructure |
| Technical low-carbon energy knowledge and installation skills<br>Customer recruitment and relations | Electrical engineering and EV charging knowledge<br>Vehicle maintenance<br>Passenger vehicle driving<br>Software system operation<br>Customer relations | Heat generation technology specialists<br>Infrastructure construction and maintenance<br>Customer relations |
| Undulating cost profile – labour costs, purchase of technology and own equipment | Upfront costs of vehicle and tech acquisition (leasing spreads this)<br>Ongoing labour and (low) running costs | High upfront costs, lower running costs |
| Revenue from: sale and installation of appliances; ongoing energy services paid for out of energy bill savings<br>Customers – individuals or organisations<br>Energy advice services provided free to users – key social benefit | Revenue from transport users: bus fares, EV rentals<br>EV charging revenues<br>Potential for different tariff rates for members/ non-members, local rates, income levels<br>Customers – individuals and organisations | Heat sold to domestic customers, and organisations<br>Possibly heat-as-a-service to incentivise network efficiency |
| Local – to maximise use of local social networks and local reputation | Local to regional – potential fit with 'travel to work areas' – maybe different rural/ urban<br>Will community energy be left with hardest-to-serve remote rural niches?<br>Connection with groups in other areas for travel further afield | Local – from micro to city-wide? |
| Local cooperatives - of consumers, or of trades<br>Or other community company structures? | Local cooperatives<br>Network of local cooperatives facilitating inter-operability – again could be the Federation | Small standalone cooperatives or other community companies<br>Partnerships with larger organisations providing 'anchor load' |
| Long-term grant funding for hardest-to-retrofit or fuel poor households? | Community shares and bonds | Community finance for smaller projects – maybe refinancing loans<br>Public sector loans, grant funding, cheap capital via larger partners |
| Accountability and trust through long term local presence<br>Knowledge of local issues and housing stock | Local economic and social benefit – providing transport to those in need, local procurement and employment | Better value for members<br>Accountability and trust through long term local presence - and through cooperative governance structure? |

# 1 RENEWABLE ELECTRICITY FEDERATION

*"If you had a federation of communities then maybe you could bring together investment across the UK, investment in offshore wind ...[and] the benefit could flow out, back out to the owning communities"*

**Participant, London workshop**

## BUSINESS MODEL VISION

A federation of community renewable electricity projects operates across the UK. Projects sell electricity to their local communities, but through the Federation they also collaborate to collectively sell electricity to an energy wholesaler via a power purchase agreement (PPA). The range of geographical locations and generating technologies enables a more reliable and consistent electricity output, thus securing a better PPA deal than individual projects could obtain. In turn, the PPA provides the security around pricing and revenues needed to attract upfront finance.

The Federation is composed of local groups, so retains the benefits of local mobilisation: face-to-face engagement, local benefit funds, local procurement boosting local economies, and local energy markets that enable cheaper local tariffs to target fuel poverty.

In addition, the inter-group cooperation organised through the Federation helps new groups with funds and mentoring to develop projects, spreads revenues across different parts of the country, and enables larger scale investment – e.g. in offshore wind or tidal energy – through connecting lots of potential investors.

## CONNECTION WITH OTHER BUSINESS MODELS

The Federation's members do more than generate electricity. They run Local Aggregators, provide energy advice and technology installation, and run low carbon transport services. Because of this, the Federation structure is used by its members for more than just selling the electricity they generate. As Aggregators they also trade flexibility and demand-side response through the Federation. And they use the Federation structure to cooperate with each other in transport, e.g. agreeing terms for members of transport coops to use their 'local mobility passes' in other localities also.

## KEY QUESTIONS AND CHALLENGES

- Can a national Federation retain the local relationships, and local benefits, that make community energy different? How can scale best serve local empowerment?
- Can community groups without generation projects join the Federation to invest in projects elsewhere?
- What staffing and governance arrangements will the Federation's co-ordinating hub have? Will technical tasks like energy trading be outsourced, or will the Federation keep everything in house? How can returns to members and democratic control be maximised?
- Will a Federation be necessary in the long term – or will the structure of the grid and the energy industry be quite different, and renewable electricity be viable as a local business model?

# LOCAL ENERGY AGGREGATOR


*"let's call it a community aggregator platform, but it's made up of multiple community organisations who'll ... have both a combination of generation and demand. They may not have any generation or they may only have demand, or vice versa, but those are the assets that they would be bringing into that platform."*

**Participant, London workshop**

## BUSINESS MODEL VISION

**Many community organisations are integrating generation and demand-side response at a local scale, using skills they have gained in IT and local network balancing. Anyone who uses or generates electricity can join a local community aggregator company.**

A wider scale cooperative or federation backs up local organisations and helps them manage their interface with the wider grid. Revenues come from the value created by maximising local energy self-provisioning, thus avoiding costly grid upgrades, and are accessed through local energy markets.

People trust community aggregators with their data and managing their appliances because they are known in their localities, and have proved both their technical competence and ethical standards.

They offer a better deal to consumers in general, including businesses, but in particular are more responsive to people who find it hard to manage smart systems, or do not have the money and resources to engage on their own behalf. Their members also benefit from the community aggregator acting as a 'legal shield', taking on the contractual risk of engaging in the wider energy market on their behalf.

Local authorities are often involved, promoting community energy services, providing backup resources, and in some places owning and operating the local grid.

## CONNECTION WITH OTHER BUSINESS MODELS

Many organisations providing Local Aggregator services are members of the Renewable Electricity Federation, including those that don't actually generate renewable electricity. Now that demand-side flexibility is a valued energy system resource, communities that have no renewable projects can participate in the Federation.

Electric transport businesses are also important members of local aggregator coops, as their vehicles' batteries are a key flexibility resource.

## KEY QUESTIONS AND CHALLENGES

- On what scale will flexibility and demand-side response be traded – both in terms of geography, and volumes? Will neighbourhood or village aggregators be viable, or will it be at larger scale?
- At what scale will revenues be sufficient to pay staff?
- Do community groups run the technical side of aggregation themselves, or contract specialists to do some of this?

# 3 ENERGY SAVING SERVICES

*"a long term commitment from government ... rather than doing one and two years here and there, and you fiddle around with a handful of buildings and say it's fantastic, and then there's no scheme for years. It needs to be, we are going to keep doing this every year for 25 years to get them all done."*

**Participant, Cardiff workshop**

## BUSINESS MODEL VISION

**Energy efficiency is part of business-as-usual home improvement. People are 'energy literate': they are knowledgeable about how their home energy system works. There are lots of local tradespeople with skills to enable better building energy management. Community energy groups, working with local authorities and others, are widespread and membership of them is 'normal'.**

The community energy sector has been an important part of a nationwide significant retrofit programme. All buildings are now adequately insulated and have basic low carbon energy technologies fitted - meaning there is no longer a business model based on retrofit.

Energy saving services work is instead mostly about upgrading and maintaining low carbon appliances such as heat pumps or low energy lighting, and energy management systems, for domestic customers and businesses.

Some customers pay upfront, others pay through energy services contracts linked to performance standards. Low cost loans and funding is available for those that need it, with negativity around 'grants' replaced with a sense of investment for future generations.

Community energy organisations also continue to provide face-to-face support and advice on energy issues to local people. Their long term commitment to their area, and visibility, builds trust and take-up of their services.

## CONNECTION WITH OTHER BUSINESS MODELS

There is some crossover with other business models, e.g. with staff making sure that smart energy systems will work with community aggregator platform, and helping resolve any issues. And in general, the face-to-face relationships built through this business model help generate the awareness and trust which enables the other models to work. But community energy groups continue to work in this field not so much because it feeds in to other activities, but because providing assistance with energy issues in people's everyday lives remains core to their mission and motivation.

## KEY QUESTIONS AND CHALLENGES

> Can the 'completion of retrofit' be done for all properties? Do some old buildings with poor energy performance need to be accepted and served with zero carbon energy, or should they be demolished?

> When will policy, regulation and funding come together to enable a decisive push to make the UK's buildings energy efficient? Without this, the vision of retrofit no longer being needed may not be realised.

# LOW CARBON MOBILITY

# 4

*"there's a huge opportunity here for mobility, because mobility isn't working ... If you're elderly in any part of rural Wales, you can't access social interaction, you can't access healthcare, you can't access shops and pubs and banks any more. This is of its time really, and the technology is already in place."*

Participant, Cardiff workshop

## BUSINESS MODEL VISION

**Community organisations in many locations offer a 'mixed mode mobility pass', available as a card or a smartphone app. Pass holders can travel within a given locality or region on a variety of low carbon vehicles: car club EVs, electric bikes, minibuses, buses and trams. Electric transport is good value: mass adoption has brought the price of vehicles down, and fuel and maintenance is cheap. The mix of transport modes offered varies with geography, with community organisations particularly filling gaps in rural transport.**

Community energy groups work with community and commercial transport operators, including taxi and bus firms, to run these services. In general, people take a more collective approach to transport, renting cars and using public transport.

They link up with other community organisations around the country to allow pass holders to use community transport facilities in other localities.

## CONNECTION WITH OTHER BUSINESS MODELS

Electric transport uses locally-generated renewable electricity where possible, and vehicle batteries are an important source of storage and flexibility for community aggregators. The link-up with other community transport organisations is done through the Federation structure which also connects renewable generators and energy aggregators.

## KEY QUESTIONS AND CHALLENGES

> In 2019, the electric transport revolution is already underway – can community energy groups get up to speed in time, while the market is still relatively open to newcomers?

> Will community energy groups be left with a niche role, operating in sparsely populated rural areas underserved by larger actors – or will they become widespread in urban and peri-urban areas too?

> Will network operators, or vehicle manufacturers, be involved in the management of vehicle batteries as well as vehicle users, and how will Vehicle-to-Grid revenues be shared?

# 5 DISTRICT HEAT NETWORKS

*"Reaching the 'off gas grid' communities drives rural heat networks in Europe. Look at Iona, where any heat 'solution' is difficult!"*

**Participant, Edinburgh workshop**

## BUSINESS MODEL VISION

**Community energy organisations operate district heat networks in some places, and are partners with larger actors in many more.**

Community-run heat networks are found in off-gas-grid rural areas, and in more recently-built developments, where low carbon regulation and increasing developer awareness have created opportunities. Heat is generated through shared loop heat pumps, which are widely applicable; with biomass boilers also used in more rural heat networks, and large heat pumps and waste heat plants in more urban networks. Community networks can be quite small, less than 10 houses even – which makes finance and operation simpler.

Organisations partnering with community groups include social housing providers, other public sector bodies like universities and hospitals. The partners value the local relationships which community groups have developed, which facilitate the smooth operation of the networks, and communities' ability to raise extra funding. Partners provide the bulk of the financial and technical resources, and a larger 'anchor load' to ensure heat demand and financial viability.

## CONNECTION WITH OTHER BUSINESS MODELS

Some organisations doing district heat also install and maintain electric heat pumps through an Energy Saving Services business model.

## KEY QUESTIONS AND CHALLENGES

Heating requires both high upfront capital and ongoing customer relations effort, hence it is challenging for smaller groups. To grow the heat network sector beyond niche areas, will community groups be able to work with the larger-scale partners they need?

How can heating contracts be designed so that people in all kinds of housing tenures can sign up to a community heat network? And how can critical densities of heat network customers be achieved in urban on-gas-grid areas, where people have other heating options, and networks remain unfamiliar?

The long term future of the gas network, and the shape of the heating system in the UK, is quite uncertain. When will this become clearer, and when will community energy groups feel able to engage in future heating systems?

# ACTIONS

*"The local authority are 'them' and we're 'us'. And to join the two would be such a positive thing. Because that's the definition of local action, isn't it?"*

Participant, Cardiff workshop

## CENTRAL GOVERNMENT

- Make a clear and sustained commitment to tackling climate change, combining environmental and social goals for long term policy, and giving immediate support to delivering low carbon projects and innovation.
- Set bold, clear targets for growing the community energy sector.
- Policy and regulation should preserve space for smaller actors in the energy transition, and avoid the creation of new infrastructure monopolies in the fields of energy data and smart energy systems.
- Energy regulation should take a 'whole society value' approach and recognise the benefits community energy brings to other policy areas (local economies, health and wellbeing, etc.).
- Energy regulators need to be allowed to look beyond just reliability and lowest cost.
- Investment in energy efficient retrofit to get our housing stock in the condition needed for a low carbon energy system. Participants felt that, while community energy pay-as-you-save business models can reach many people, they won't work for people in fuel poverty who need retrofit the most.

## DEVOLVED GOVERNMENTS

- Maintain support for the sector, through providing patient finance in the form of grants, loans and equity, and through policies like local, community and shared ownership targets for energy generation projects.
- Work with local authorities to help them take a leading role in local energy systems.

## LOCAL AUTHORITIES

- Buy community-generated energy, and work with local businesses to help them do the same.
- Reach out to community energy groups and broker partnerships across sectors to develop local energy systems.

## COMMUNITY ENERGY SECTOR

- More cooperation within the sector, building towards the kind of Federation that features in the long-term vision.
- Reach out more – to the wider third sector and social enterprises, and to the smaller commercial sector who face some similar challenges in the current centralised energy system.
- Make the case for the value that community energy creates – evidence the co-benefits for people and society more generally, and the value to the energy system of engaging people with energy – a key task for the energy transition.
- Gain new skills in IT and network balancing.

## PRIVATE SECTOR

- Energy system operators should value the contribution that community energy can make to the energy system, and promote openness with markets and data.
- Energy SMEs should make common cause with community energy when approaching government and larger actors in general, for a more diverse and decentralised energy system.
- Beyond energy, innovative companies should see 'buying community' as a positive branding, like 'buying green'.

# CONCLUSIONS

**Members of the community energy sector feel they have lots to offer to, and gain from, a transition to a more decentralised and flexible energy system which will require greater citizen engagement.**

They see a future where democratic citizen-run organisations are involved in many aspects of the energy system: generating electricity; selling it to local users or on national markets; trading demand-side flexibility as well on behalf of community members; continuing to work on energy efficiency in homes and other buildings; collaborating with others to ensure that the low carbon transport transition is a fair and equitable one; and developing collective heat projects where they can.

Some of this may be near at hand - other parts further off. But we are at a critical point in the transition. For the potential of community energy to be realised, policy and regulation must set the UK on a path that is not just decentralised but genuinely democratised too.

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## SOURCES

**1. Renewable Electricity Federation**

Examples from practice: Schools Energy Coop, Energy4All, Communities4Renewables, Orkney community wind pool (UK); Somenergia (Spain).

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**4. Low carbon mobility**

Examples from practice: Gwent Energy CIC.

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