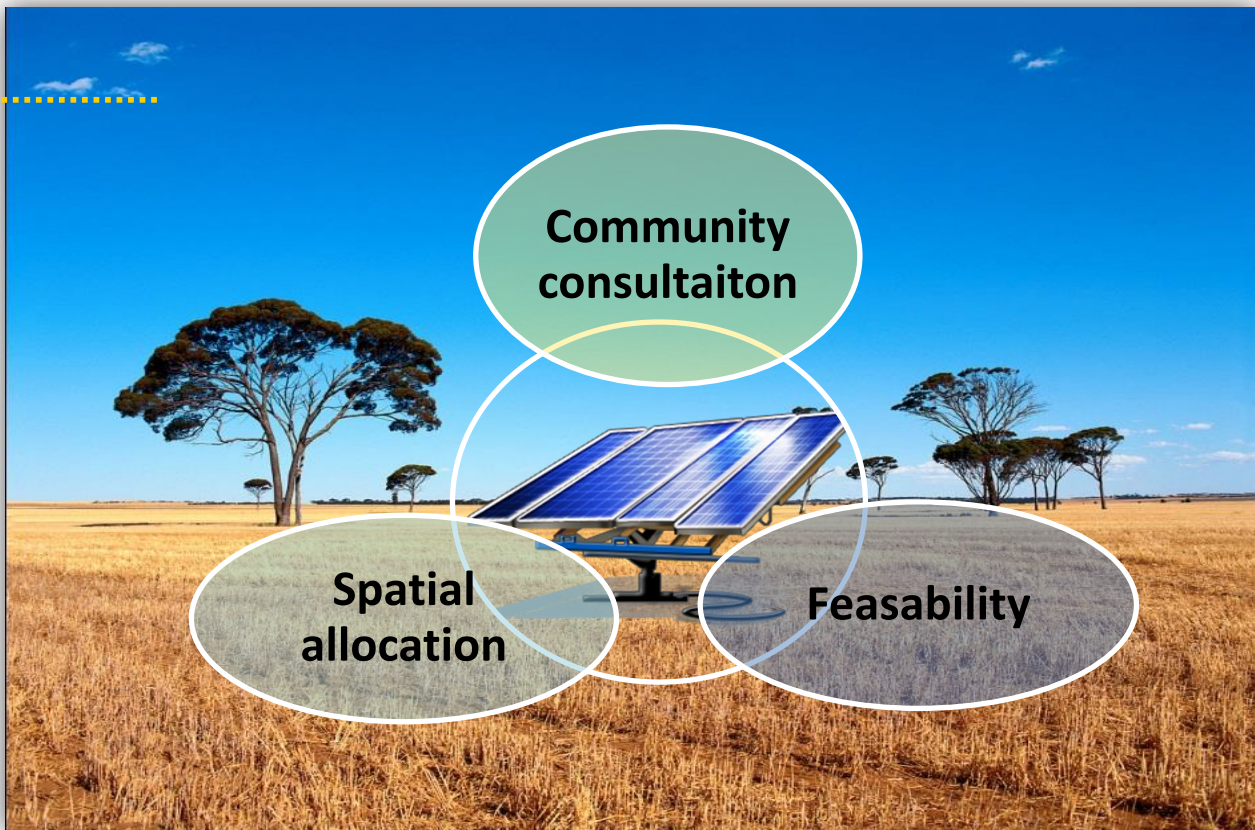


How can the ACT region use best practice in siting solar arrays?



Solar power in the ACT

Canberra is Australia's bush capital in a globalised world trying to transition away from energies that contribute to climate change. Yet, we have had great dependence on emission laden energy from New South Wales and the National Electricity Market (NEM). In light of this, the ACT government created the ACT sustainable Energy Policy: Energy for a sustainable city, 2011 – 2020. This is a mandate to acquire reliable and affordable energy, to create a smarter use of energy with a cleaner one that would provide a state growth on a clean economy. With this in mind, the ACT government with the Minister for the Environment and Sustainable Development, Simon Corbell, began to make large investments to achieve its goals of transforming the state on a national example for energetic sustainability.

It's notable that the inhabitants from the ACT agree in having green technology, until June of 2013 13,224 solar systems were installed on roof tops of companies and private housing in the state, a much higher amount than the country's one (0.1 %). There is considerable pressure from global climate change, the public and legislation targets to implement a clean

energy like solar farms which as suited to the ACT. Nevertheless, this pressure has left the potential for planning processes to be rushed not only by the solar contractors but by the ACT government, as we saw with Simon Corbell's use of call in powers. The use of call in powers not only competes with biodiversity needs, but a rushed approval process leaves no room for community consultation, or even useful community inputs.

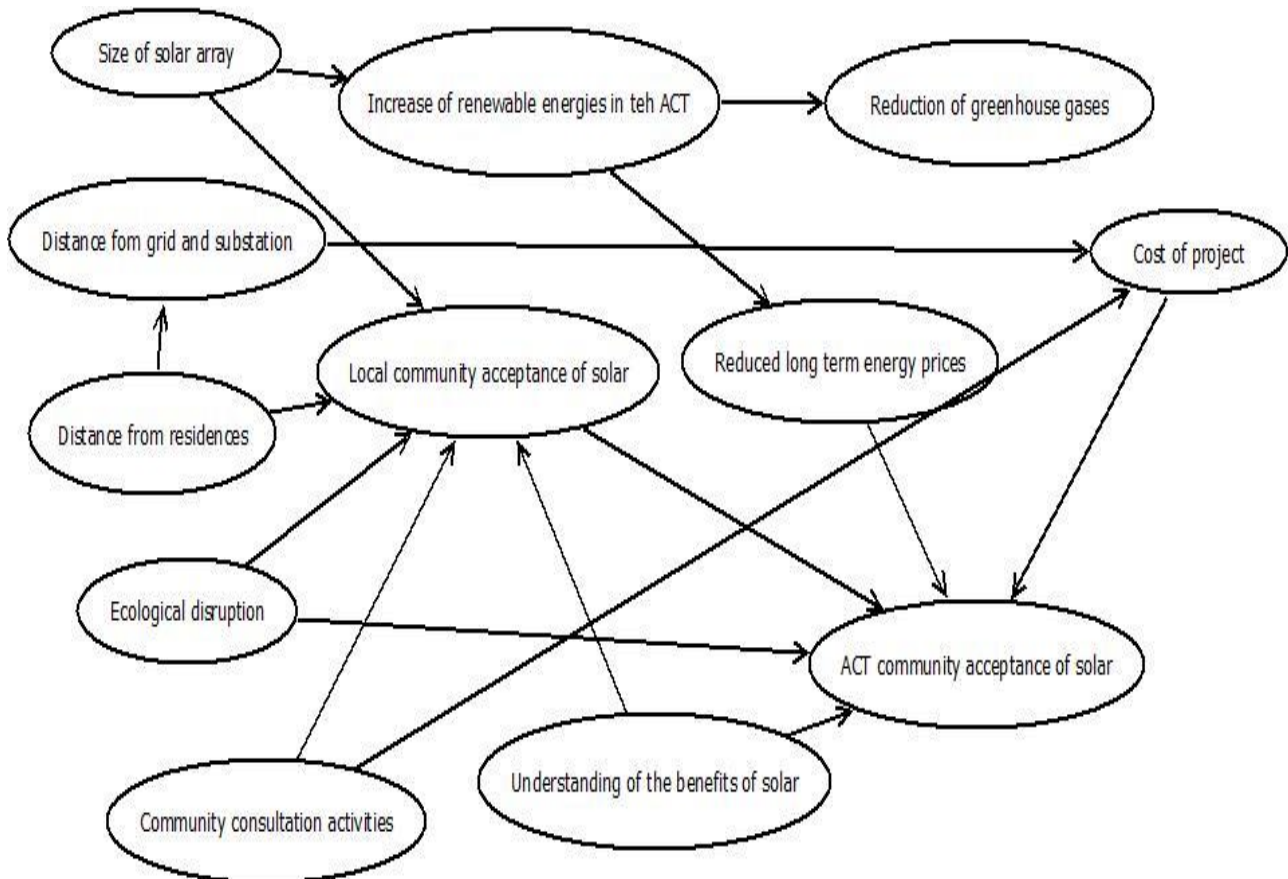


Figure 1 This is systems approach to thinking about the variety of community attitudes and planning considerations in siting in the ACT. This diagram frames community consultation activities as a key variables, considering our end goal of meeting emissions targets.

In the long run, the sites at Uriarra and Royalla will contribute to our clean energy targets. But the community dissatisfaction the approval process has caused the process to be delayed despite attempts to streamline. Good consultation increases the Canberra community's satisfaction with solar sites and the government's action on climate change. Furthermore, there is a long way to go in reaching a 90% renewable target, and the processes at Uriarra and Royalla must be improved.

This submission will argue that community consultation is core to future solar array

developments in the ACT- which the ACT community wants to see many more of to meet our clean energy targets. We propose the below framework as an improved way of thinking about the planning process, and recommend clear guidelines for these improvements.

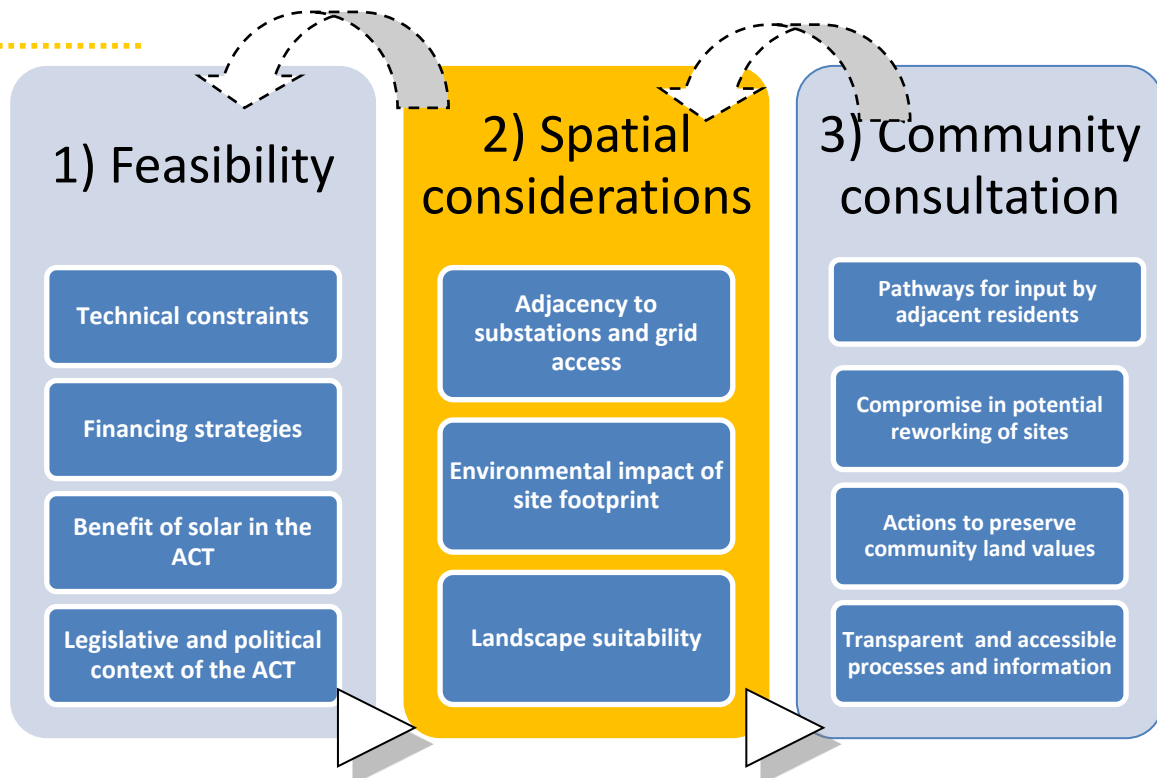


Figure 2 A framework of factors for an economic, environmentally and socially sound siting process for large solar arrays. These factors have all been given equal weight in a sustainable siting process, but as outlined in this report community consultation is a key variable for a successful outcome. The arrows indicate that if community consultation might lead back to revision of spatial considerations. If no concession in spatial considerations can be made, then feasibility must once again also be reconsidered. The only limitation of this framework is the time these processes take. But in aiming to adhere to this framework, solar siting would move closer to best practice.

Ecological impacts of large solar arrays

The main environmental consideration in siting a large solar array is the amount of land that it will occupy. Secondary, but no less important to this consideration is the impact this has on landscape integrity and community values of the landscape. Unfortunately areas of key concern are the ones that have most readily been sites for grazing and building in the past:

Box gum grassy woodlands (BGGW) and Natural temperate grasslands (NTG).

There are several key legislative elements that provide a clear framework for how environmental damage can be mitigated and, when all mitigation fails, offset. This depends on the quality and size of the land of the site or the presence of a critically endangered species. These are protected at both national and territory scales (*EPBC Act 1999; ACT Nature Conservation Act 1980*).

In terms of size, the removal of remnant patches of NTG and BGGW can have impacts beyond the net loss of biodiversity. Loss of connectivity, which healthy ecosystems need, might also be lost. Especially considering the isolated pockets of NTGs and BGGW left in our region.

Solar siting in a contested community landscape

The urban hinterlands of Canberra are already contested spaces in terms of use for residential development and ecological values. The large amount of space needed for a productive solar farm and the footprint of roads to get to it also means dual uses are unfeasible. Considering these criteria, less productive or degraded farmland in the ACT are the land types best suited to solar arrays. As an economy that doesn't rely on agriculture, this land can be spared on the premise that land owners are sufficiently engaged and informed in the siting process.

Residential communities can be seen as at the centre of the spatial conflict nexus of urban development, large scale energy, endangered biomes and agricultural land. This means any use of land for one of these purposes, often negates its use as another.

By contrast, there is a positive nexus of community values and natural urban spaces in Canberra. Organisations like the Conservation Council are public embodiments of the community's value for biodiversity. This means that in achieving biodiversity conservation outcomes social outcomes are also achieved.

Are there alternatives to large solar farm arrays?

Roof-top photovoltaics in addition to large scale solar farms could play an important role in the ACT's renewable energy future. However, a clear distinction needs to be made between

the two technologies for the purpose of this report. Roof-top photovoltaics utilise existing roof space, and therefore do not have to occupy farmland containing NTG or BGGW. However, compromises are often made with regards to the optimum tilt and orientation, and the systems are typically of a relatively small size (< 5kW).

In terms of achieving a high penetration of renewable energy in the grid, it is necessary to consider larger photovoltaic systems, typically described as farms. These systems are generally located outside of urban areas, and can be several to many acres of land in size. In order to minimise construction costs, this land should be relatively open and flat. Open farm land is ideal, otherwise, woodlands or other types of native vegetation may need to be cleared.

Technical Considerations of Large Scale Solar

There are a number of key technical factors that need to be considered in the siting of large solar farms.

- The solar farm needs to be able to connect into a relatively high voltage (~132kV) transmission line. Higher voltages minimise the need for transformers and increase the efficiency of the energy transported.
- The solar farm needs to be located relatively close to a sub-station, in order to connect into the grid without disruption.
- The site needs to be clear of vegetation and relatively flat. Any shading of the solar cells will dramatically reduce the output of the system. The system should also be kept clear of long grass or other equivalent vegetation as this would provide a potential fire risk.

Learning from previous case studies in the ACT

As seen in 2008 with the Tuggeranong gas fire powerplant, community rejection can be a critical point in the planning process. A key criticism by the group Canberrans for Power station relocation was that the consultation process was not sufficient and residents were not aware a power station was even being planned. Secondary to this were also concerns about their view and impact on wildlife (Canberrans for Power station Relocation, 2008, Accessed 25/10/13 [<http://www.canberrapowerstation.info/about.html>])

A case of lack of community consultation – Uriarra

These negative community responses are more often than not caused by a lack of interactional justice. That is lack of consultation or even active efforts to foster understanding about the project and how it might affect individuals.

Uriarra is a rural village which is close to one of the many sites which solar panels will be implemented in the ACT with the purpose of establishing 40MW of solar generation which will reduce the state's carbon emissions by 1,400,000 over 20 years. In this region it is planned to locate 26,000 solar panels that will provide 10 MW to the grid.

The Uriarra community got shocked when this information got released on the media once no one had consulted them about it. Their main complaint was that they had moved to a peripheral area to have a rural lifestyle, not filled with industrial landscapes and the decision of having solar farm only 115 meters from their front door was ignoring the community's participation on this planning process.

Many of dwellers say they are not against solar panels or renewable energy; they just wanted to be consulted before so, together with the government, they could manage, as fast as possible, to find the best sitting place for the solar farm.

This is a clear example of where community consultation failed and for this reason the implementation of the solar farms might face disapproval. It's important to recognise that in the process of finding the best sitting place to set the solar farms one of the most necessary items to be checked on the research period is the community's opinion so that they can feel they took part on the decision process and the outcome is the best possible.

Community Renewable Energy Farms - a model of Community Consultation

Hepburn Wind Farm is one of very few community-owned renewable energy farms to be successfully operating in Australia. Located near Daylesford in rural central Victoria, the wind farm consists of two 2MW turbines. However, as a community-owned and managed scheme, Hepburn wind is immensely popular and a model of community consultation. Whilst the ACT government is operating under a different scenario, there are still lessons that can be learned from Hepburn Wind and applied to a Canberra context.

First, it should be noted that in 2005, the residents of Daylesford rejected a proposed commercial wind farm at Clarkes Hill. Frustrated by the opposition, a small group of volunteers chose to change the mindset of an entire community by advocating for a

community-owned wind farm, using a detailed and extensive process of community consultation. It was noted that: “the level of fear, opposition, anger and general emotion in relation to a wind farm is directly proportional to the lack of familiarity and knowledge... fear and opposition quickly wane once the community is familiar and informed”.

Hepburn Wind, ‘The Inquiry into the Social and Economic Impact of Rural Wind Farms’, (<http://dancass.com/static/files/assets/056e6c81/sub732.pdf>)

The Hepburn Wind Farm consultation process consisted of a number of factors. First, numerous Community Forums were held in the main township of Daylesford, allowing information to be communicated and any questions answered in a transparent manner. Second, several years after beginning, the organisation conducted a survey of the residents in the area, asking the following questions:

- How did they feel about renewable energy in general?
- How did they feel about wind power?
- How did they feel about making a financial investment into the project?

The 400 results to this survey were decisive in favour of the wind farm.

In addition to the multitude of consultation tactics used, it is important to note that this process took time. Despite the idea forming in 2005, the project was not operational until 2011. As soon as suitable sites have been found, the consultation process should begin to ensure timely installation of panels to meet targets.

Economic feasibility of solar in the ACT

The implementation of large scale solar generation facilities in the ACT can result in significant reductions in levels of greenhouse gas emissions, but also considerably benefit households and the territory government financially.

According to the CCF, if all solar projects currently proposed in Australia were to be completed, more than 10,000MW of solar capacity would be created and generate approximately 16,000 GWh clean electricity per year; the equivalent of powering 2.2 million Australian homes (CEC. 2011).

The Royalla plant will also produce some employment opportunities as well as skills training. Fifty people will be required in the construction stage, and due to its efficiency only 5 to 6 will operate it (Noel Towell, “ACT to get australia's biggest solar power plant”, *Canberra times*,

06/9/12). The majority of these generated jobs are in the stages of system integration, such as installation, construction and plant operation (CEC.2011).

Another important consideration of solar power is its ability to increase output in the summer months, which can potentially align with National Electricity Market summer peak prices. As such, large scale solar facilities are capable of generating disparate amounts of electricity at or approaching peak electricity prices (CEC. 2013). This could become increasingly appealing with technological advances in solar energy storage, which could potentially allow for large-scale solar generation to provide baseload electricity generation, replacing baseload generation currently provided by coal fired power plants. Such an ability to increase electricity output during peak times and to be able to meet baseload requirements could potentially reduce pressures on the national grid network and reduce the occurrence of system failures.

The Royalla Solar Farm, reverse auctioned to Spanish solar firm FRV, will generate 20MW of clean energy. FRV won the auction with a bid of \$186/MWh, beating nine other bids (ACT Government. 2012). The generating capacity of 37,000 megawatt-hours per year will be able to produce enough renewable electricity to power approximately 4,400 Canberra homes at a cost of 25c per week per household or \$13 per year, as well as generating 100 direct jobs during the construction process and indirectly injecting spending into the local community (FPV. 2012).

The 20MW PV solar farm will be situated about 25km south of the Canberra CBD on the Monaro Highway in the vicinity of Royalla. The facility will occupy approximately 50 hectares and contain around 83,000 photovoltaic panels.

The tendering process

Whilst the tendering process was effective in achieving a cheap outcome, the way it was carried out limits the ACT governments capacity to apply a process framework such as we have suggested. The responsibility for community consultation was placed on the contracting company (ACT. Parliamentary Debates. Legislative Assembly. 2013, Week 3, 27th of February p. 841. . <http://www.hansard.act.gov.au/hansard/2013/week03/841.htm>). Contractor their expertise is necessary in consultation, this is contrary to the government's role as community representatives and mediators and the ACT government continues to suffer from this lack of consultation. The onus for community consultation should remain with the government if it is to be done effectively and accountably.

The ACT government will also benefit financially through the project. RECs that will be generated through the solar farm will be surrendered to the ACT government – currently worth about \$45 MW/h. However, the ACT has decided to retain the certificates to further offset its emissions, and to ensure that the emissions abatement is additional to national caps (Parkinson. 2012).

The ACT government will pay the difference between the wholesale cost and the agreed tariff with FRV. It expects this to fall over time as wholesale electricity costs rise. It says this will amount to 25c/week, or \$13 a year, for each household for this project. It expects this cost to fall to \$9.50 a year by 2020 as the gap between wholesale prices and the fixed contract narrows ((Canberrans for Power station Relocation, 2008, Accessed 25/10/13 [<http://www.canberrapowerstation.info/about.html>]))

In terms of emission reductions, the Royalla generation facility will cut emissions by approximately 560,000 tonnes over the 20 year life of the project (ACT Government. 2012). This equates to a reduction of 28,000 tonnes of CO₂ each year; the equivalent of removing around 5,400 cars of the roads.

Conclusion

“The ACT government is leading the way nationally, delivering the largest solar power at the largest cost anywhere in the country” (Noel Towell, “ACT to get australia's biggest solar power plant”, *Canberra times*, 06/9/12). But can they lead the way nationally with community consultation?

For these reasons, it is vitally important that further solar siting applications in the ACT, such as those on Mugga Lane and Williamsdale, follow a model solar siting process that involves the community, as well as not sacrificing the local environment for global environmental goals.

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