

**Hanahagen 1,
4328 Sandnes.**

NVE Ref: 201218306-7

Uttalelse til søknad fra Småkraft AS for Øvre Lanes og Nedre Lanes Kraftstasjoner.

I refer to the proposals to develop these two hydro power stations and hope that you will accept my using English as I have limited time in which to set out my response and I find it rather more challenging to do this adequately in Norwegian.

1. Background:

1.1 Myself:

- I have had a 45 year career as a senior civil engineer, project planner and strategic planner - managing large teams promoting and implementing a wide range of development projects and also operating as a regulator for development proposals from other promoters.
- My career has been in both UK and Norway and has included working for *Defra* as special adviser on flood risk policy and legislation and for councils in areas with high landscape quality, including one of the UK's best UNESCO World Heritage Sites.
- I am a UK Chartered Engineer, Fellow of the Institution of Civil Engineers and Fellow of the Chartered Institution of Water and Environmental Management.

1.2 Local knowledge and stakeholding:

- I am married to someone from one of the local farms and have known this valley since I first visited Norway in 1975. We have a stake in the locality in that we rent a property for leisure use, visit the valley very often and spend money in the area.
- In the 40+ years I have known the valley, it has retained its charm and drama. I love the impressive scale of the landscape and the environment, especially the two waterfalls.
- I have lived in this part of Rogaland for the last 15 years and have visited many of the region's fine valleys and landscapes. This is one of the best in Rogaland. In fact, this is the only valley in Rogaland close to population centres which is not despoiled by having an asphalted through road or a development of cabins and yet is accessible to people of all mobility levels (including wheelchair users). If it is left in its current state, its value to the wider community will only increase in coming years.

1.3 Environmental and societal context:

- The valley where these waterfalls are located and where the power stations are proposed is one where the balance between pristine nature and farming is very well managed. The sense one gets in this valley is that it is 'unspoilt'. There are no buildings in the valley, private vehicles are not allowed and the tractor road with a greensward down its centre blends well with the landscape. This setting is vulnerable however. It would take little to tip the balance so that the overall experience one would then get is that it is 'developed'.
- In addition to their importance for biodiversity, natural environments with good access are most important for the health and well-being of people. There is

increasing understanding of the importance of places like this where people can get off the treadmill of modern life and unwind. This is something of very high value on which it is impossible to put a price (as in the song by Joni Mitchell: "You don't know what you've got till it is gone.")

- It would be wrong to see this simply as an issue for a protected river system. It is not just the river that has meaning in relation to this status. One ought to consider the river system in its detailed glacial landscape context with all its nuances. The waterfalls are not only impressive close-up, but it is their setting in the landscape and their contribution to it that creates a wonderful experience. As one walks into the valley, they appear as the centre point in distant views, framed sometimes by the craggy mountain tops, screes, bare rock and lakes and sometimes by the trees along the roadside. The valley would not be the same without these distant views of the falls.

2. Comments on the Applications and Environmental Impact Assessment Work:

2.1 I note that there are two separate applications from Småkraft AS, but both are put out by NVE to consultation together. This is unfortunate in that there are differences in the number, type and scale of the issues with the two proposals. Many of the challenging issues are common, but their weighting will be different and the landscape characters, environments and the context that the impacts should be judged against will be different in both places. This makes it difficult to respond both comprehensively and yet briefly. It is also difficult to understand whether the applicants really would intend to proceed with developing one site if the other was refused. Having said that, what is common is that this valley is special and would be spoilt if either or both were to be approved in either of the capacities proposed.

2.2 The applications each contain two alternatives and there are alternatives also in relation to the high voltage cable routes, including two very different ones for the cable from the Øvre Lanes location. The fact that there is not a single, clear and well developed proposal makes it especially difficult for parties to respond to in the consultation process and I suggest also make it impossible for the regulator to determine the applications otherwise than to refuse them.

2.3 The applications purport to have carried out appropriate impact assessments for both the finished projects and during the construction phase. However, particularly in relation to the construction phase impacts these assessments are inadequate. Many construction activities are undetailed and therefore their impacts not identified and hence not assessed at this stage. The application states that these details would be sorted out in the detailed design and implementation phase, in some cases, through agreement with the landowners. This is not an appropriate way of dealing with large impacts in such a sensitive environment. Again, I feel it is not reasonable to expect the applications as they stand to be determined otherwise than by refusal.

2.4 The Bjerkreim river system is protected, but the status gives a possibility of developing small power stations up to 3MW. However, this is with the proviso that this should not adversely impact on the basis on which the river has been protected. There is therefore no presumption that power stations can be developed at these locations or indeed anywhere along the river system. It is clear that there is an onus on the party proposing the power stations to make an especially rigorous case why they should be developed. Such a case requires a need to be established and alternatives to be evaluated alongside a specific proposal. Impacts should be identified along with what would be affected, then assessed and potential for

mitigation considered. These are standard elements when proposing new infrastructure. In particular, adverse impacts should be shown to be not disproportionate to the benefits.

2.5 The need to make a robust case with full assessments would apply even if the river system did not have protected status. In my view, Småkraft in its applications has not carried out such a process adequately, for example:

- They have not shown why it is actually necessary to develop power stations in this protected river system and in these two specific locations. It has not been mentioned that it already looks as if Rogaland has significantly over-achieved its target figure of concessions and electricity production from 'small power stations' and why further development of production should be considered.
- They have not identified and considered alternative locations against this particular river system and these two locations. There are no alternative configurations considered for the two locations themselves.
- They have not produced adequate plans with sufficient detail to enable all impacts to be identified and then to be properly assessed (by themselves and by consultation respondents and by regulators).
- In assessing potential impacts, they have not established what might be affected in the valley through their own efforts and through working with local stakeholders. They seem to have simply relied upon what statutory information is available from public sources. In other words, a very superficial, mechanistic process has been used.

2.6 The fact that this river system has protected status ought to mean that alternatives be thoroughly considered, proposals be precisely defined and then the assessment work should be of the highest quality, comprehensive and fully detailed.

2.7 In respect of the context against which the impacts are identified and assessed, Småkraft AS has significantly downplayed the quality of the landscape, biodiversity, heritage and its use by people now and in the future. An example is the implication that because the waterfalls cannot be seen by motorists on the public road, they have less value. It also says that one has to be high up to obtain distant views of them in the landscape. This is wrong. The fact that these matters are understated so much means that the assessment is presented against an incomplete and false context.

2.8 Very relevant to the previous paragraph is the fact that Småkraft AS have not adequately discussed proposals with affected parties. It is normal and recommended good practice to hold such meetings not only to build relationships, but because such meetings are essential at an early stage in developing a project and the impact assessment work. Providing an early opportunity for local stakeholders and others to provide input, local knowledge and concerns greatly strengthens the quality of subsequent impact assessment work. The fact that Småkraft have not secured the confidence of local people and have produced and assessed their proposals without seeking inputs from local people in itself ought to be enough to say that the proposals are not adequately founded and should be rejected.

2.9 Whilst I have read through the applications several times, I have found surprisingly little information on the detail of the permanent works other than a standard power station building and the diameters of conduits and length, height and material of an intake dam at the upper site. Similarly, there is little, if any, detail on the management and maintenance regime proposed for the power stations. In my view, these are important aspects as they affect matters such as the visual intrusion,

amenity and health and safety. Småkraft's applications ought to have been much clearer on these matters including for instance:

- The future responsibilities they would propose to take upon themselves.
- How the interests of other parties would be secured.
- Details of the intakes and outlets themselves and risks to the public.
- Risks to visitors of variations in water levels (and unsafe ice in winter), especially if the stations are controlled remotely.
- Risks of dams breaching, inlet works blocking or extreme rainfall; any of which could result in higher flows being re-diverted over the waterfalls, potentially mobilizing trees and debris which may have accumulated over the period the falls have not had high flows.
- Risks of interference by trespassers.
- Risks of pollution.
- Risks of electrocution.
- Emergency procedures.

The management of such matters may for instance include things like fencing, CCTV and daily visits – all of which would have their own consequences (negative). None of these are mentioned or assessed.

2.10 The economic aspects are presented in an over-positive way including the tax income to the public sector and employment during the construction phase. The employment benefits will be rather limited as works of this type are likely to be built by specialist contractors from outside the area, with only limited potential for employment of local subcontractors. My comments in the following section refer to potential negative impacts on the visitor economy which could result from the projects.

2.11 The outcome from this approach is that the adverse impacts are scored significant lower and positive impacts scored significantly higher in Småkraft's evaluations than they should be. This reinforces the case why the applications ought to be rejected.

2.12 The following sections provide more information on the construction impacts as well as the context which should have been looked at when the proposals were initially conceived and then as they were developed and assessed.

3. Biodiversity and the Use of the Valley by People.

3.1 Even if there were no endangered species in the valley, it is a simple fact that it is rich in flora and fauna. The latter includes insects, trout and other fish, reptiles, amphibians, many of the Norwegian mammal species and a large variety of birds. It is very regrettable that potential impacts on all of these have not been assessed.

3.2 The valley is used a lot by walkers and people interested in wildlife and the natural environment. There are many day visits and nowadays there are many cabins, caravans and camping places nearby with many visitors staying longer. We are often walking in the valley and it is seldom that one does not meet with other like-minded people there. Bjerkreim kommune itself promotes the valley as a place to visit and has put up information boards, signs and waymarking for the paths.

3.3 Undoubtedly, this valley contributes to the local economy: People (local, from elsewhere in Norway and from abroad) choose to stay in their own cabins or in rental accommodation because of special places such as this valley. This sort of 'lower key' visitor economy is just as important as visitors sightseeing places like Preikestolen

and Gloppealsuren (perhaps more important on account of lower environmental impact). The contribution such 'lower key' tourism makes to the local economy has not been stated or impacts on it evaluated in the applications. It is also unfortunate that Bjerkreim kommune in its response to NVE has omitted to mention these inputs to the local economy which will be significant for a small council area such as this one. The Kommuneplan states that sustaining and developing the visitor economy is a key part of their plan strategy.

3.4 Whilst the whole valley is an outstanding environment, the waterfalls are the 'jewels in the crown'. Even though the volume of water has some variation according to whether Maudal power station is operating or not, these waterfalls are always spectacular through all seasons. People who have seen them many times before, nearly always stop to appreciate them. The value of the waterfalls in making this valley special and drawing people has to be something against which impacts ought to be measured. Last weekend I was watching fossefall in one of these falls.

3.5 The waterfall and the associated pools at Fossbrekka (so-called Øvre Lanes in the application) are used a lot for bathing in summer. I know of nowhere else in this area where it is possible to bathe in an environment of such quality. It is a natural adventure park suitable for people of all ages, with rapids to ride down, quiet pools to bathe or paddle in and flat rocks where one can sunbathe. The area adjacent to the waterfall is also used a lot for camping, grilling and picnics. As stated, many people derive health and well-being benefits through access to this wilderness place and this happens with very low impact. It is the essence of clean and unspoilt Scandinavian outdoor experience. This place would be changed out of all recognition if a power station were to be built. It would no longer be an attractive place to camp or have a picnic and it would no longer be possible to enjoy the waterfall and pools.

3.6 The lower waterfall (so-called Nedre Lanes in the application) is different in character and setting to that at Fossbrekka, but no less valuable. It is very accessible and has its own dramatic quality, not least through its very distinctive bowl-shaped erosion features. A real attraction of this waterfall is that it presents a different appearance on each visit. Different volumes of water flowing over it mobilise different routes over the rock formations. Sometimes the water simply plays around the edge of the upper erosion feature and sometimes it gushes into it. In winter, when the waterfall partially freezes, it is especially spectacular. The application is not at all clear, but my understanding of the proposals is that a construction road would be taken over the river immediately upstream of this waterfall (presumably to avoid the steep hill on the existing tractor road). A road crossing the river at this point would be a significant new intrusion in the landscape which would have significant impacts (e.g. new structures, habitat disturbance, tree loss, visual intrusion). Again, these impacts are not identified and assessed. The application seems to seek to play down the quality of this fall by referring to its former use for hydro power generation. I can point out that this power station was a very low impact one. It took flow only from the lower part of the waterfall and then only a fraction of the total volume. Compared to the so-called 'small generating station' now proposed, the former one could be classified as 'micro'. It stopped generating about 30 years ago and most of the infrastructure is removed. The former presence of a micro generating station here offers no basis on which the new proposal can seek legitimacy.

3.7 One can see many examples of dry, former waterfalls in Norway and these two, on what is a protected river system, ought not to be allowed to suffer this fate.

3.8 A particular feature of the valley is the wide range of glacial erosion and deposition features and the very limited extent to which these have been disturbed. As such, they present a geomorphological heritage area and a wonderful learning resource. The development of power stations would spoil this. Such a geologically 'immature' environment is especially vulnerable to damage from infrastructure and engineering activity. It is inevitable that the power station buildings, dam structures, the inlet and outlet works, roadways and fencing will be discordant aspects in such an environment. No amount of skilled design and screening can avoid this - not that the applicant has offered to apply such skills and screening. The example of a 'standard' power station building that has been provided in the applications does not suggest that any thought would be given through design and material use to making the installations less intrusive in the local environment. This again points to the fact that the applications have been developed without an appreciation of the context and are of poor quality.

3.9 An especially interesting aspect of the valley is the heritage from human activity. The route through the valley is an ancient trackway and at Fossbrekka are the attractive remains of a farm which has been long abandoned, but which serve to show the conditions under which people lived in former times. The stone walls here show the boundaries of former small fields and sites of the former farm buildings. The local landscape is rich in large boulders with origin in scree and glacial erratics. It would be very difficult to develop a power station here without many of these heritage features losing their setting; this in addition to the direct impacts on some of the features.

3.10 My experience gives me serious doubts about whether it is possible to carry out the construction works proposed without significant damage to the landscape, environment, heritage and amenity. The applications provide no detailed method statements about how it is envisaged the works would be built and how damage would be avoided or mitigated. It is all too easy for heritage and special landscape features to simply disappear when work such as this is carried out. Some examples of the ways in which significant adverse impacts can arise from construction works are:

- No indication of construction traffic or its impacts are given. Considerable traffic is inevitable and this would lead to more wear and tear and erosion of the roadways which could lead to fine material entering streams and lakes. Some 'improvements' of the roadways would be unavoidable to cater for the construction traffic (and future access) meaning that the roadway would no longer be intimate with the landscape and would become a much more intrusive feature. As the tractor road largely follows the route of the ancient trackway, this heritage would be directly impacted upon.
- The construction of the buried conduits to carry water to the turbines will produce a lot of surplus excavated material. Småkraft say that this will be deposited locally and then seeded. I contend that this matter is not so simple. There is a real risk that the local disposal of this amount of surplus material (potentially in excess of 3,000 cu. metres) will obliterate aspects of the landscape and create alien landforms. The application is very undetailed on this aspect. It does not show specific proposed disposal areas and this approach does not enable the impacts to be identified and assessed.
- Trenching works along the roadway to install the electricity cable will lack working space and nowhere to stockpile the excavated material. The road is very narrow and constrained by steep slopes (above and below), by stream and lake edges and by specimen trees. Attempts to work within such

limitations always lead to environmental damage. Trenching work in the roadway would also require cutting through roots of specimen trees and undoubtedly to the loss of some of these. Again, there would be significant amounts of surplus material for disposal. No disposal areas are identified and there are no impact assessments.

3.11 There are other matters of concern relating to the idea of developing hydro power in this valley as well as other matters of concern in the quality of the applications which have been made to NVE. These include for instance the possible need for reinforcing the local electricity network and/or a cable route from Fossbrekka to Maudal for which there are no details. However, I believe that in the above notes I have demonstrated enough reasons why these proposed developments should not go ahead and also why these particular applications fall a long way short of providing an adequate basis on which they might actually be evaluated. I am happy to provide more information if you require.

4. The Need for Hydro Power.

4.1 As an engineer who is engaged in sustainable development and to an extent in 'green energy', I am in principle positive to small hydro generating stations. However, the whole sustainability picture has to be considered. Here, it is clear that the adverse impacts greatly outweigh the benefits of the electricity that would be produced. If the applicant were to identify all impacts, fully assess them and then propose mitigation measures, I still do not think the proposals could be made acceptable in these locations. Even if mitigation measures were to be possible for some of the impacts, they would adversely affect the viability of the proposals and one would still be left with the major impacts which are not capable of mitigation. The gap between the benefits and the impacts on a protected river system in a special valley is simply too great to warrant attempts to improve the applications. This situation is especially relevant when Rogaland has already exceeded the target set in planning policies for total energy production/concessions awarded for 'small power stations'.

4.2 In the scale of things, the amount of electricity that can be generated at these locations is relatively small and could be generated with less impacts through other means, e.g. solar power, extra wind turbine capacity on a wind farm or efficiency improvements in larger hydro stations or in the distribution network.

4.3 I recently attended a presentation on climate change measures by one of Norway's experts on climate and energy issues. His assessment is that even with full electrification of transport (which is the main area Norway needs to act on in respect of controlling emissions), there is adequate generating capacity in Norway to cover this without requiring more to be developed. This valley should therefore not be sacrificed to produce an excess of electricity that would in effect be sold abroad.

5. Summary.

5.1 In my view, the applicant has not built relationships and confidence with local stakeholders and the applications have not made an adequate case as to why power stations should be developed on this river system and in these two specific locations. My view would apply even if the river system did not have protected status.

5.2 The assessment of permanent and construction impacts is inadequate in that many potentially serious impacts are not identified and other impacts are assessed against an inaccurate context (the landscape, natural environment and use of the valley by people are all significantly understated).

5.3 It is clear that the main impact, that of removing the major flows over the waterfalls is very significant. This would undermine the basis on which the river system has been protected and would despoil an outstanding natural environment which is appreciated and well-used by people and which will have even greater value in the future. This impact, along with others, is simply not capable of mitigation to make the proposals acceptable.

5.4 The adverse impacts in these locations vastly outweigh any benefits of the proposals.

5.5 This gap between adverse impacts and benefits is too great to be made good by attempts to 'improve' the proposals or the impact assessment work.

Graham Fairhurst C.Eng, FICE, FCIWEM

31.03.17