

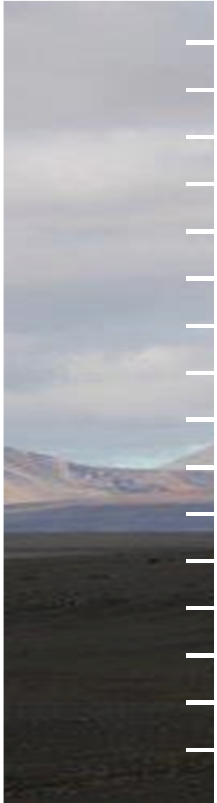
Icelandic GoOs

- Where do the electrons come from?

Reykjavik
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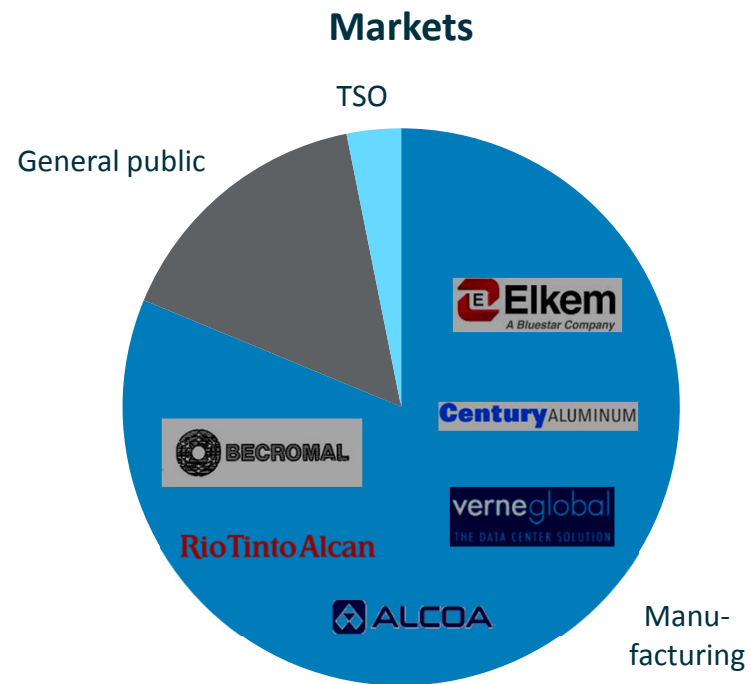
1. ABOUT LANDSVIRKJUN



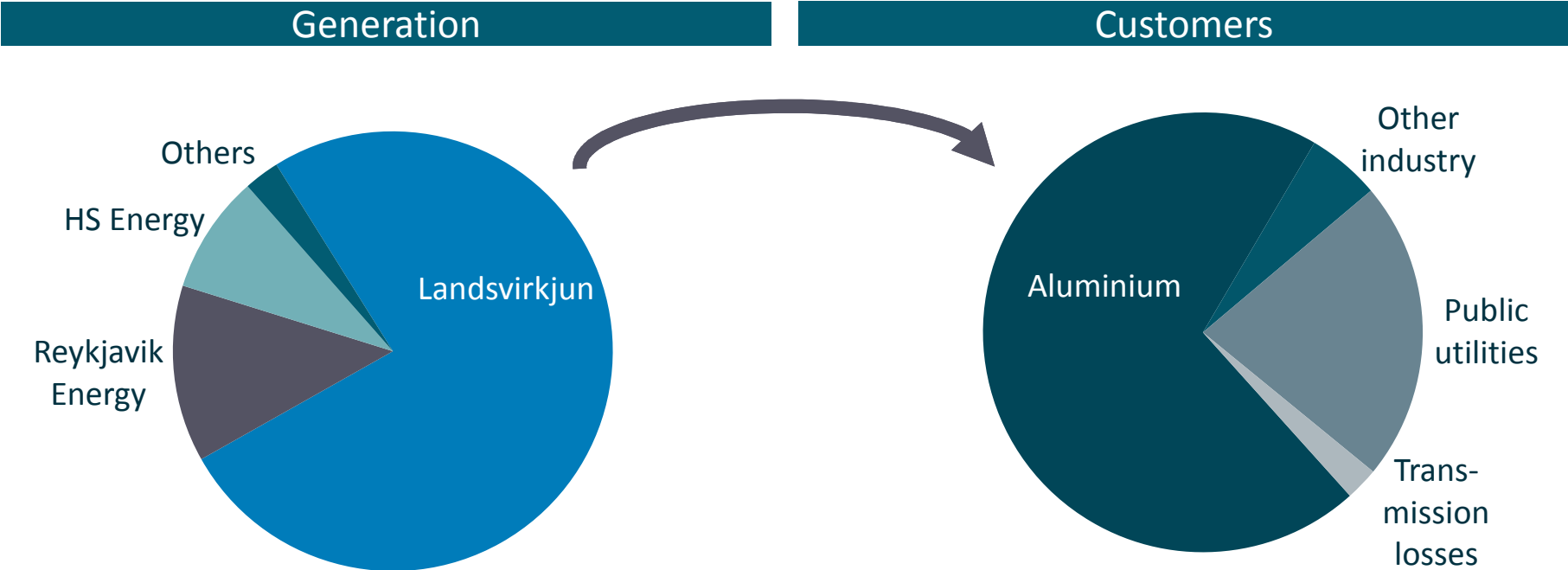
Landsvirkjun is one of the ten largest renewable energy companies in Europe

- Founded in 1965 and is state owned
- Produces 73% of all electricity in Iceland
-
- 100% renewable:
Hydropower 96%
Geothermal power 4%

Strong international customer base



Landsvirkjun is the largest power company and the aluminium industry is the largest customer





Generation assets

Booked value is
3 billion USD

25 Dams

15 Power Stations

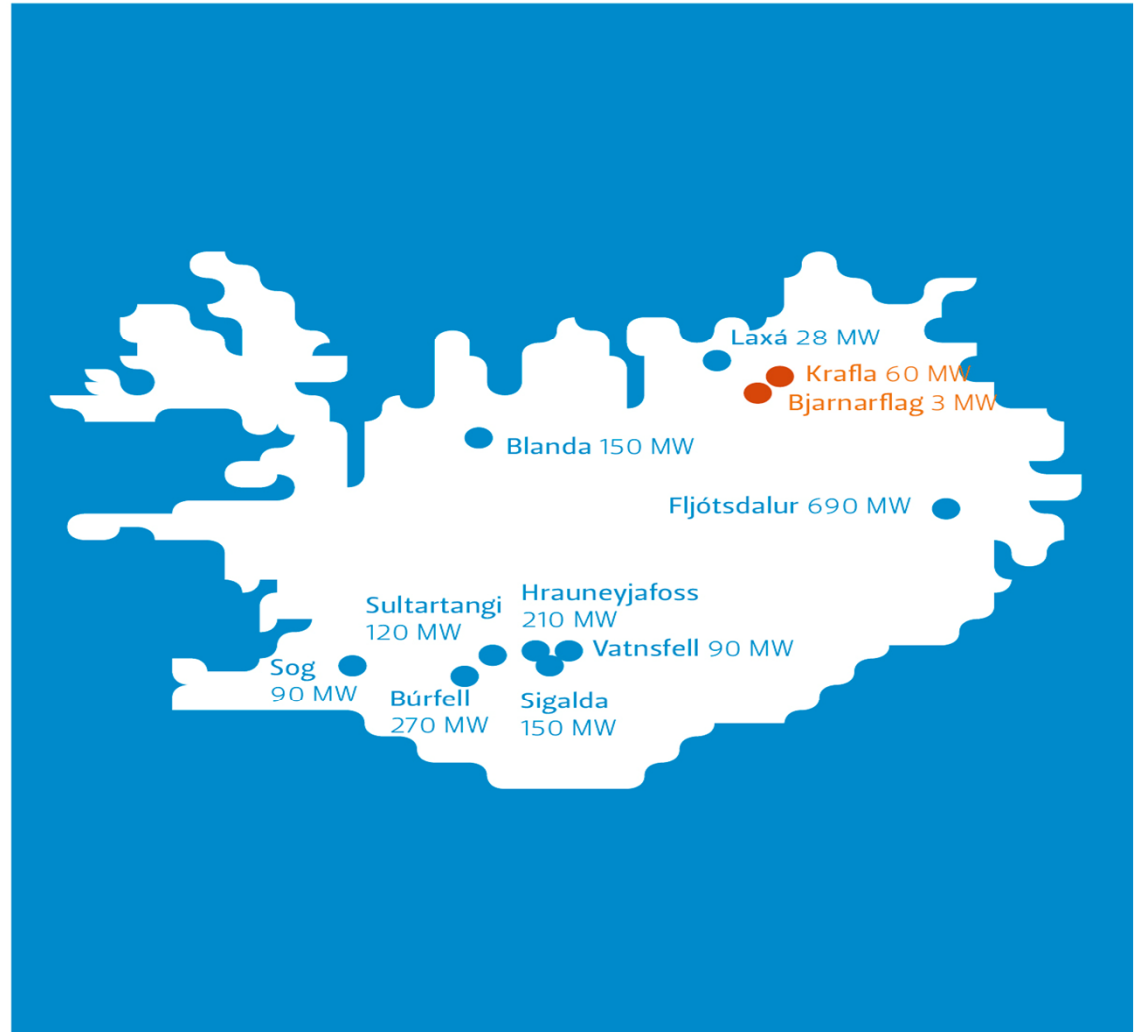
40 Generation units

Total installed power
1.860 MW

Generation capacity
13.200 GWhours



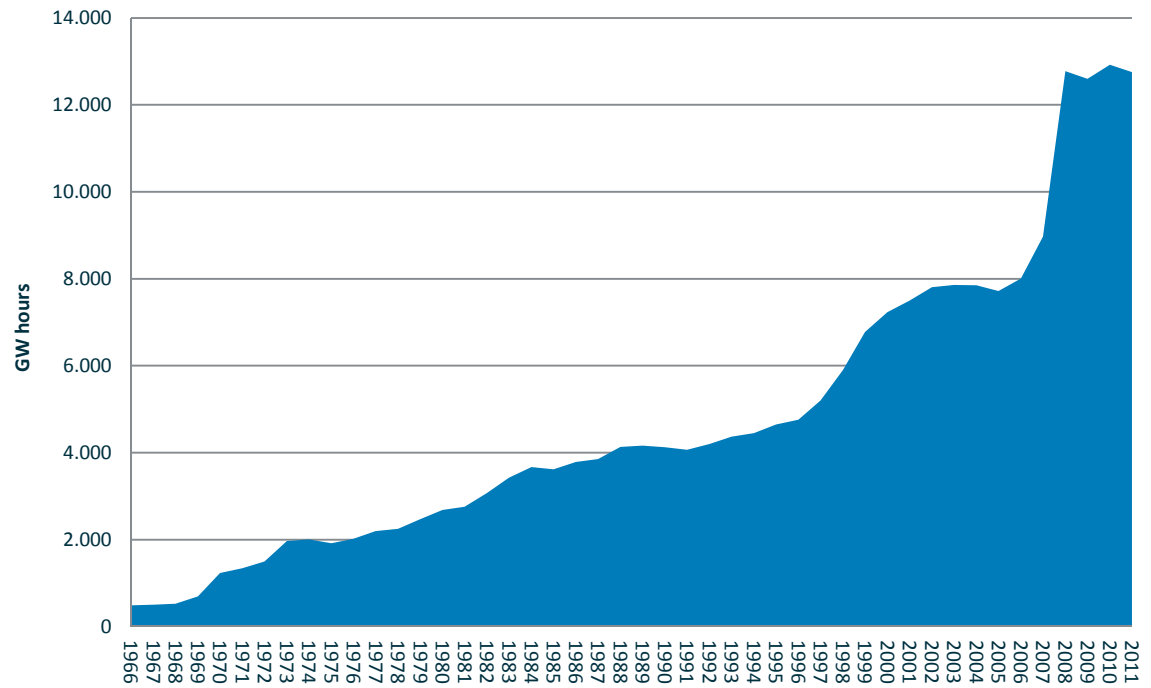
Power plants





Electrical power production

from 1965



The electrons come from these power stations



Ljósafosstöð 1937



Írafosstöð 1953



Steingrímsstöð 1959



Búrfellsstöð 1972



Sigöldustöð 1978



Hrauneyjafosstöð 1981



Blöndustöð 1991



Sultartangastöð 1999



Vatnsfellsstöð 2001



Fljótsdalsstöð 2007



Laxá I 1939



Laxá II 1953



Laxá III 1973



**Bjarnarflag
1969**



Kröflustöð 1977





The smallest station: 3MW
Supplies a village of 2000 including swimming pools and geothermal baths





Our largest station: 690 MW
Supplies electricity to aluminum facilities that produces 480.000 tonn pr. annum.



The first commercial wind turbines began operation in February 2013



2. TRADING ICELANDIC GOOS

– WHAT WE HAVE LEARNED SO FAR



**The go system
offers great
potential for
support
towards
renewable
generation**

1. Provides evidence that a specific amount of electricity has been generated and helps to avoid double counting
2. Provides a way for users to claim support for renewables through ownership of specific renewable generation
3. Provides a common platform of international standards
4. Provides transparency and product choice
5. Provides an vehicle for a scalable market based solution
6. Provides a way forward for further build up of renewable generation across Europe

**Voluntary
markets have
not been
efficient in
promoting real
support for
renewables**

1. Is the goO concept too complex and abstract for a necessary public acceptance?
2. Is low consumer involvement and end-user value unclear?
3. For how long will the market be oversupplied?
4. What are the effects of regulatory and political uncertainties on market efficiency?
5. When/how will voluntary market prices offer incentives for new generation projects

A number of challenges are facing the future of the system

1. Lack of market liquidity and transparency makes price discovery difficult – without price discovery market based solutions are less efficient
2. Conflicting marketing messages undermine public acceptance – is it really “green electricity” where do the electrons come from?
3. End users pay mostly for “administration expenses” when buying “green electricity”
4. Discrepancies in domain regulations create a non-level playing field

There are multiple ways to further strengthen the system going forward

1. Stimulating local demand – onboarding national bodies
2. Closer ties to carbon markets and compliance mechanisms
3. Developing a consistent market message and further promote and educate about the benefits of the system
 - Reduces confusion of end consumers about GoOs
 - Increases credibility of the system
 - Demand likely to increase

Thank you

