

Scatec

Happy 50th anniversary!
The value of the Hydropower
Development Program
seen from Scatec (former SN Power)

Hanne Nøvik – Project Technical Manager Hybrid Power Plants
June 2023



HAPPY 50th ANNIVERSARY – Hydropower Development Program





Hanne Nøvik



- MSc NTNU - Hydropower and hydraulic engineer 2002 -2007
- PhD at NTNU in Intake hydraulics for small hydropower plants 2010 – 2014
- BKK hydropower company in Bergen, Norway (now Eviny)
- Consultancies: Multiconsult and Sweco
- Teaching science and mathematics
- Current: Scatec (former SN Power)

Dr. Løv



Short introduction to Scatec



Scatec



Our vision:
Improving our future



Scatec provides renewable energy solutions in emerging markets

- 4.6 GW of renewable capacity in operation and under construction

Scatec in brief



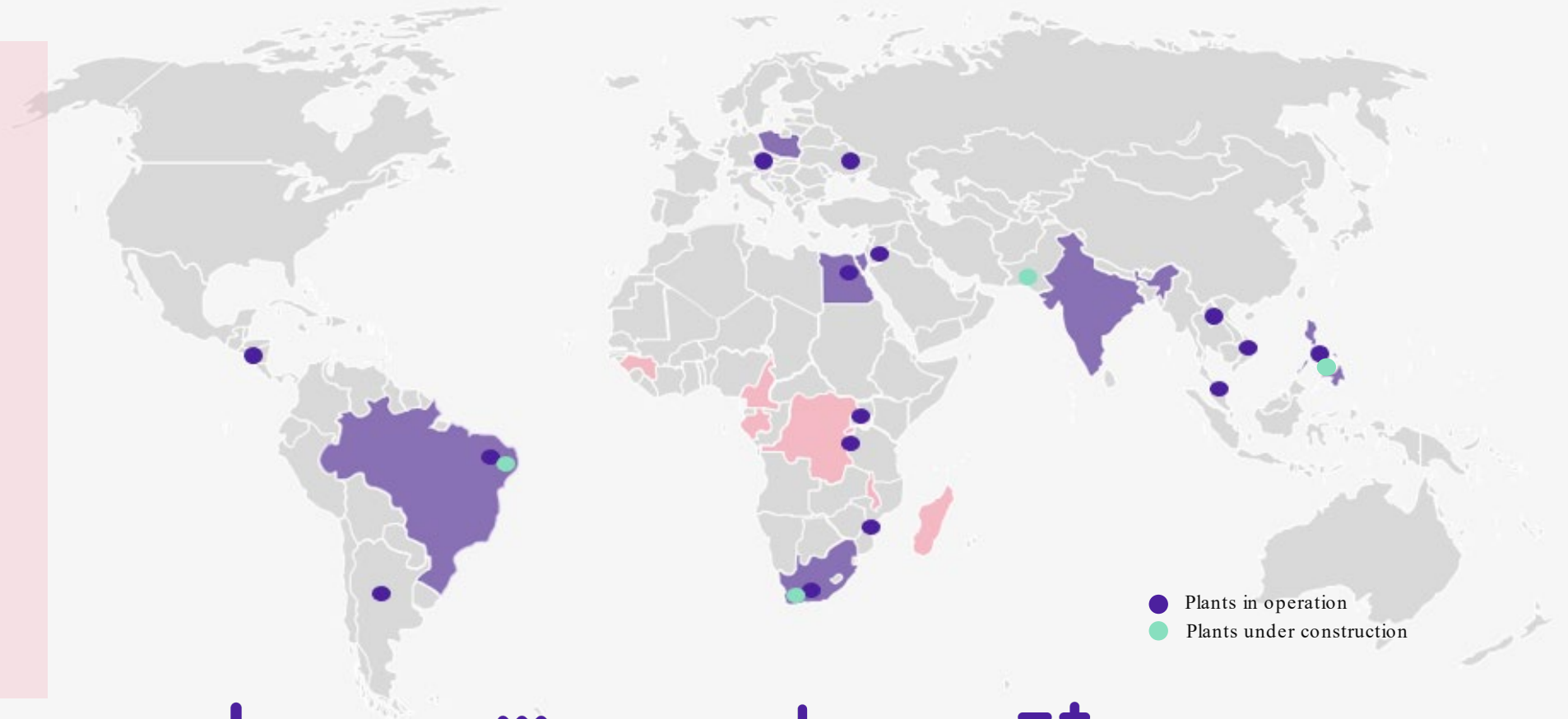
Develop, build, own and operate renewable energy



4.6 GW in operation and under construction



Close to 800 employees in 30 countries



● Plants in operation
● Plants under construction



3,161 MW



1,422 MW



39 MW



20 MW¹

1) 225 MW/1,140 MWh of battery storage is additionally under construction related to the RMIPPP project in South Africa

*Scatec's focus markets: Brazil, South Africa, Philippines, Egypt, India, Poland & Hydro Africa.



Scatec's hydropower asset portfolio



Philippines, 642 MW

- Annual production: 1,600 GWh (100%)*
- Sale of power and ancillary services
- 50% ownership



Laos, 525 MW

- Annual production: 3,000 GWh (100%)
- Long term PPA
- 20% ownership



Uganda, 255 MW

- Annual production: 1,500 GWh (100%)
- Sale of capacity
- 28.3% ownership

*) Energy generation excluding other services

Our renewables universe



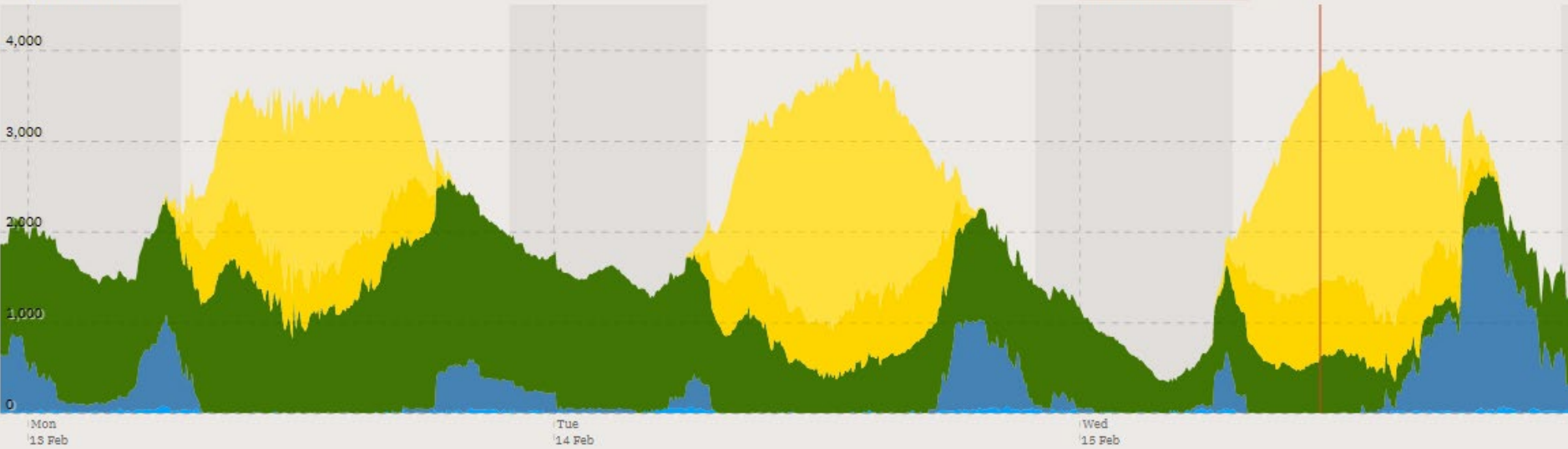


Two good, old friends – hydropower and solar power

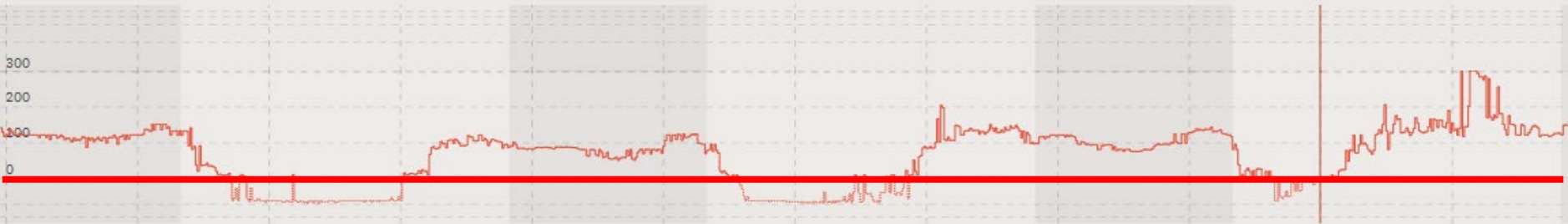


1D 3D 7D 30D 1Y ALL 5m 30m

Generation MW



Price \$/MWh

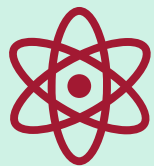

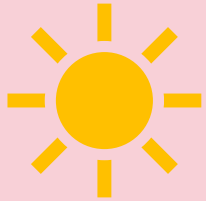
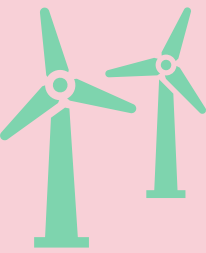

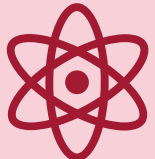
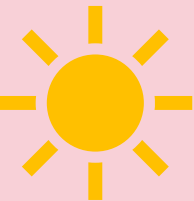
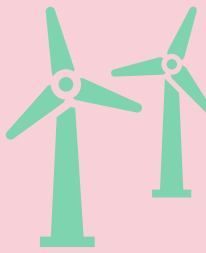


Sources

- Solar (Rooftop)
- Solar (Utility)
- Wind
- Hydro



Future energy sources – with low emissions

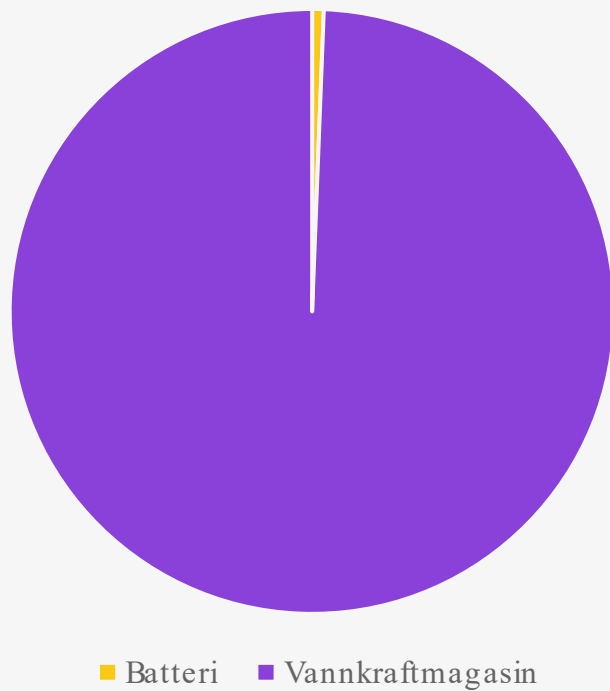
Constant and predictable	 	 
Dispatchable (easily turned on and off)		  



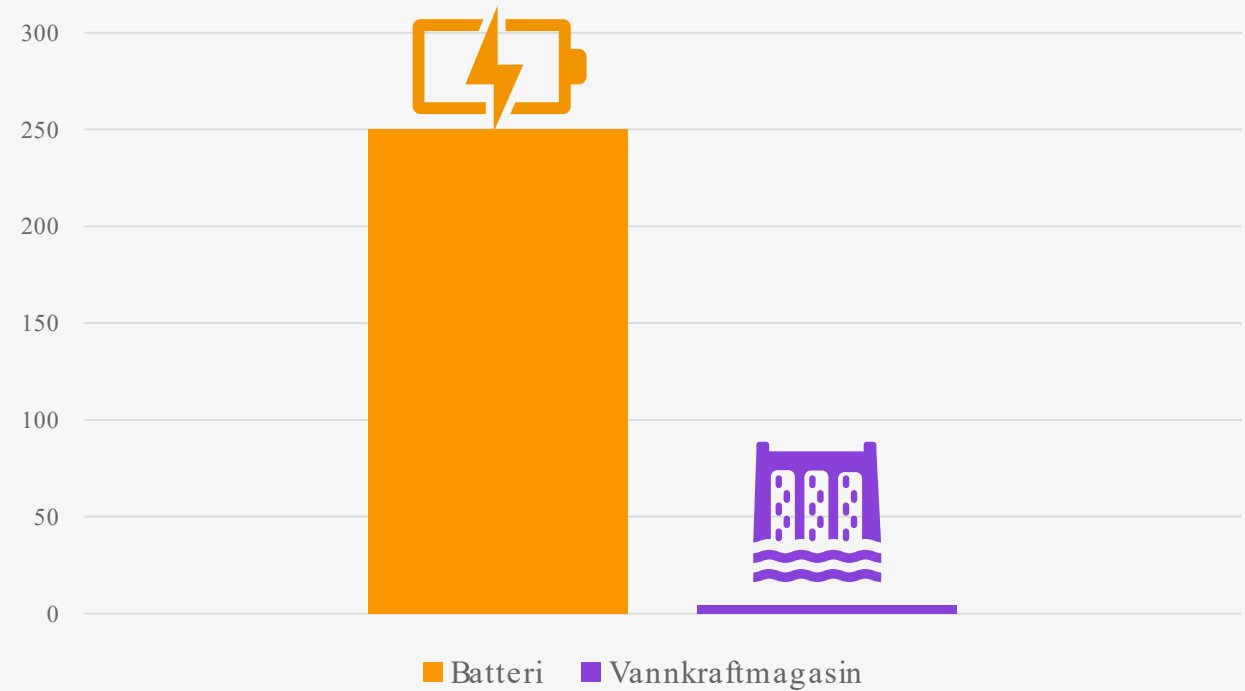
Hydropower reservoirs can not be replaced by chemical batteries

- But BESS is very important in the combination

Storage capacity in Scatec
Hydropower reservoir vs BESS



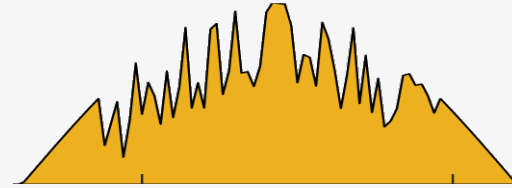
Price of storage [USD/MWh]



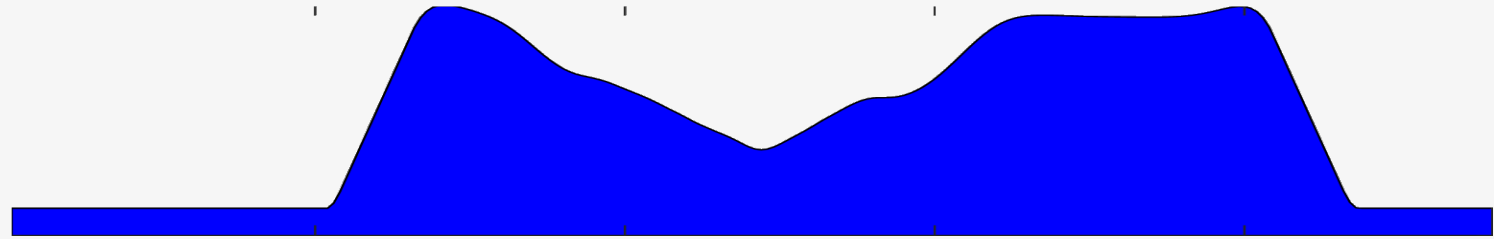


Owner of a hydropower dam can save reservoir energy usage by adding floating solar to the dam

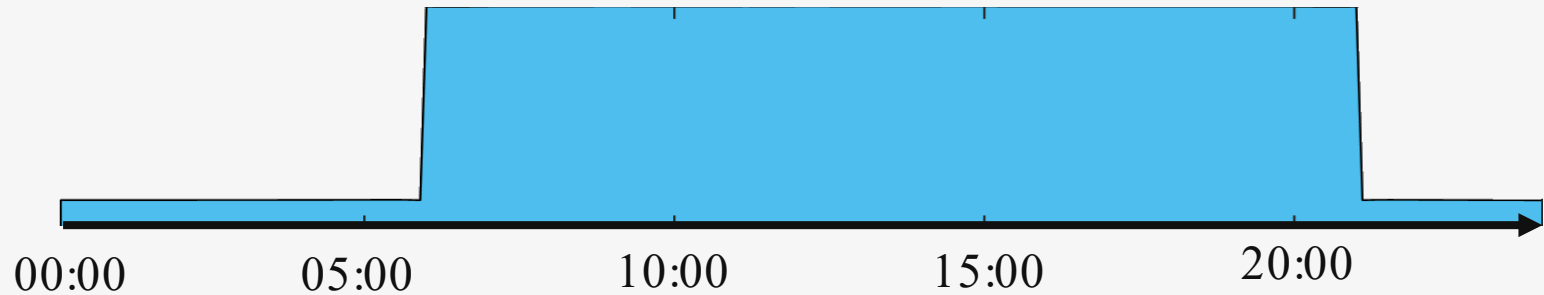
Solarpower production



Hydropower production



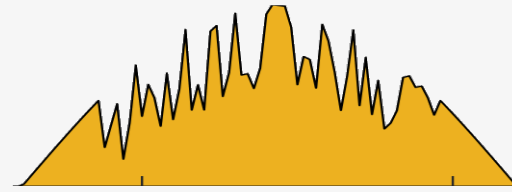
Contracted daily powerprofile with TSO



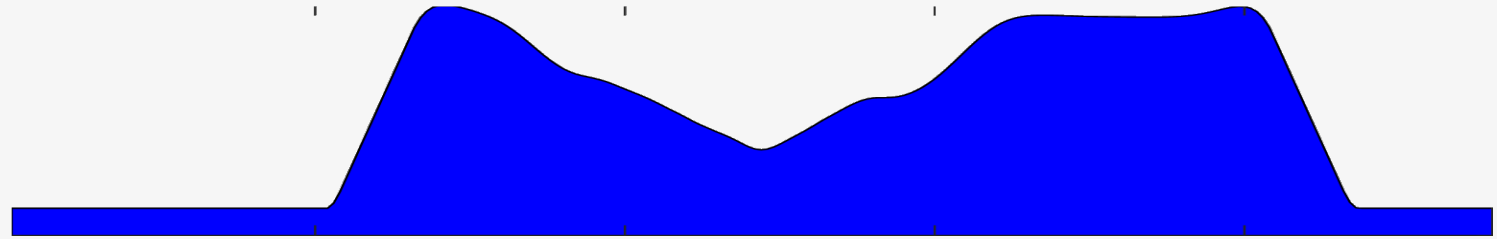


A battery energy system is added to handle sudden changes in solar energy production

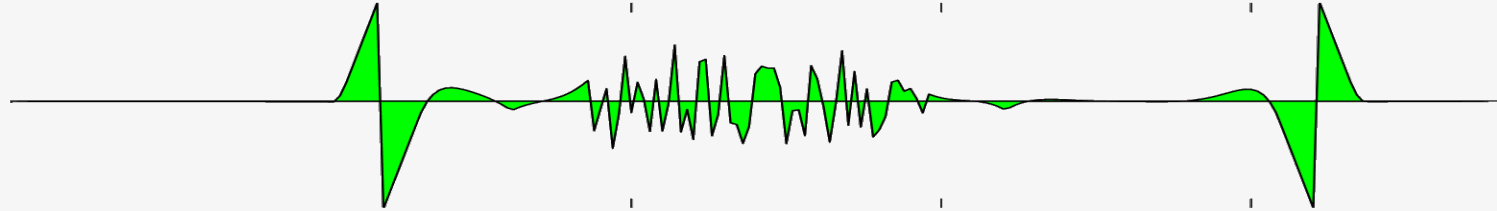
Solarpower production



Hydropower production



BESS



Contracted daily powerprofile with TSO

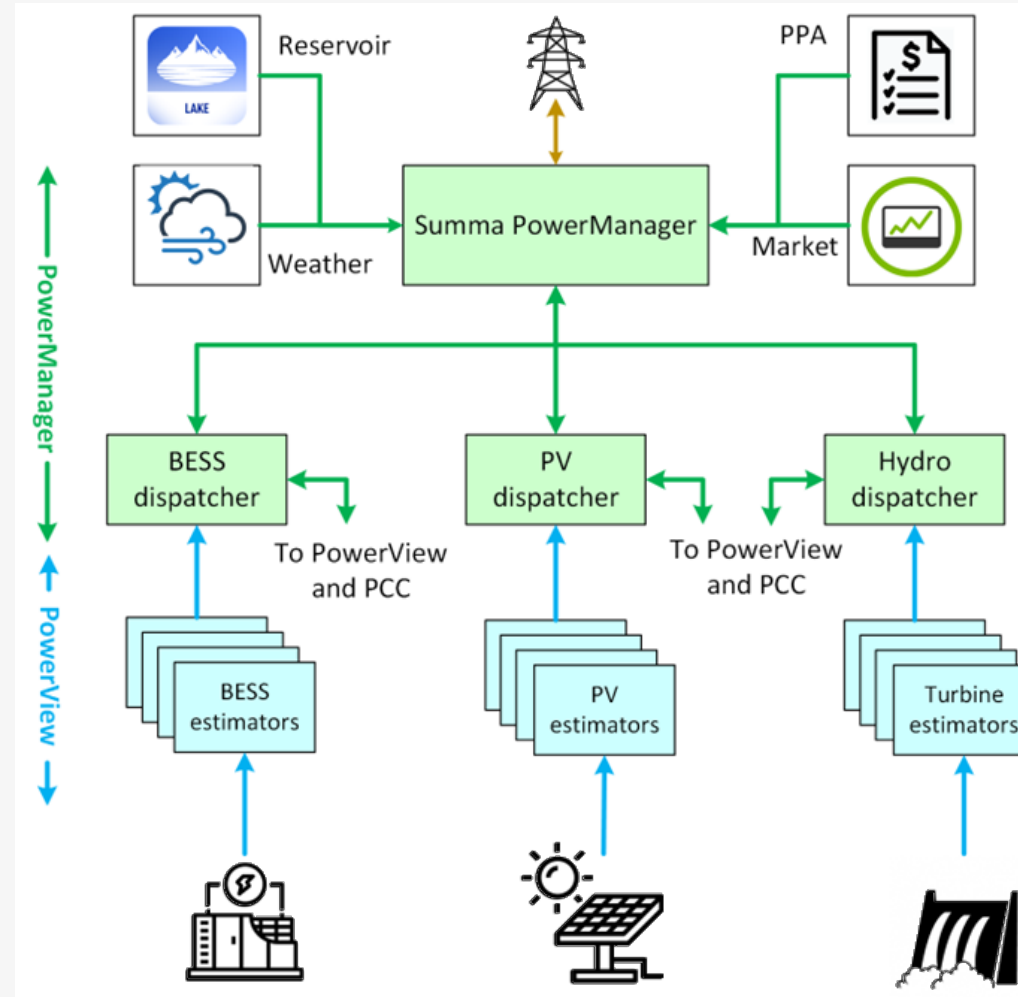


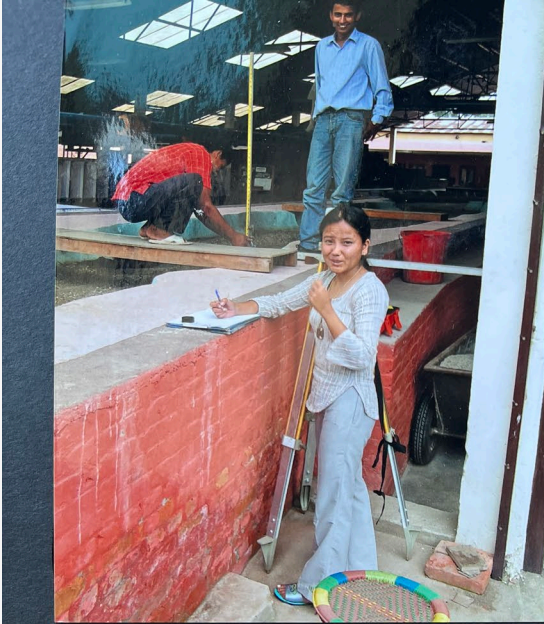
00:00 05:00 10:00 15:00 20:00





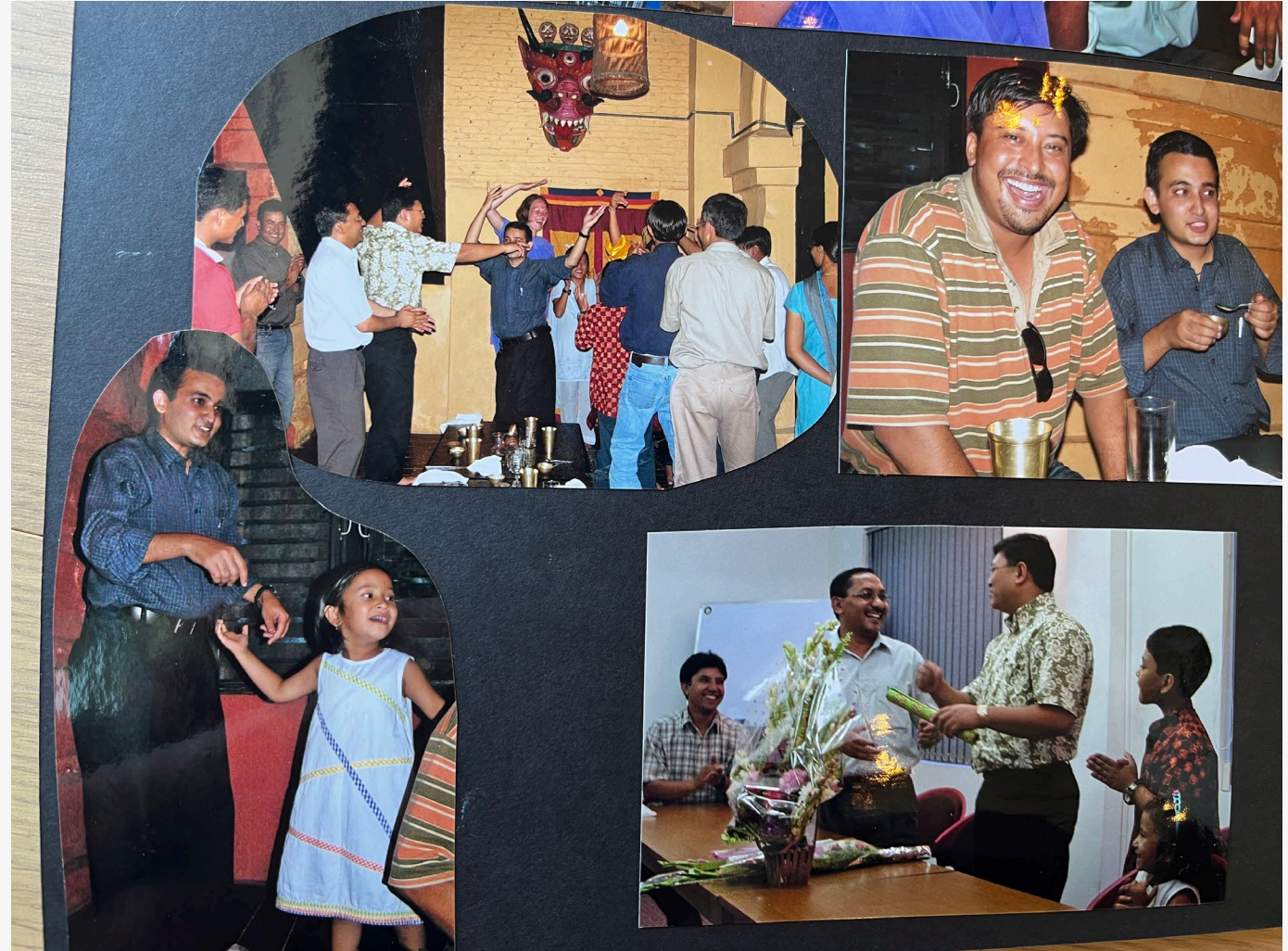
Prediktor will in the project develop the system, PowerManager, that give setpoint commands to various plant controllers





HYDRO-LAB

Forming my professional life HydroLab – Kathmandu, Nepal - 2005





The HydroLab Family

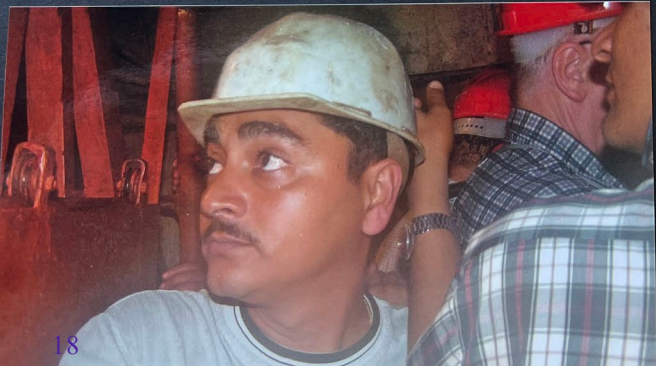




Andi Khola – Nepal - 2005



ANDI KHOLA





Sediment Management





Importance for Norwegian Master Students





TET4510 - Electrical Energy and Power Systems

Optimization of Hybrid Power Plant

Case Study of Mulungushi Hydro Power Station

CANDIDATE NUMBER AND NAME:
10074 - Vegard Kristiansen

05/06/2023
Spring 2023




Norwegian University of Science and Technology
Faculty of Information Technology and Electrical
Engineering
Department of Electric Power Engineering
Energy and the environment, engineering master



Cross cultural connections

“Throughout my international career in Hydropower from both Asia, Africa and South and Central America, I have had the pleasure of encountering and working with several NTNU/NORAD Master Study Alumni. And have experienced how their studies in Trondheim have contributed to create a solid foundation for cooperation. It has also created across cultural connection, not only to Norway, but between the students from across the World.”


Øyvind Engelstad
SVP Projects - Hydropower
Hydro Projects
Norway, Oslo
+4745401483







Anton-Louis Olivier
Head Hydropower Africa
Business Development - SSA
South Africa, Cape Town
+27212021230



“My own hydro story would not have been possible without support from Norfund and the various Norwegian experts I have worked with over the years”



Dorji Namgay Project Manager in Division of Power, Royal Government of Bhutan

“I had the pleasure of working closely with Dorji Namgay when he more or less straight after finishing his Master from NTNU in became the Project Manager in Division of Power of the Royal Government of Bhutan. I was a fairly young engineer at the time and I lived 1 year in Bhutan together with my wife, who also worked as an engineer on the project. Due to the similarity in age and background, we connected well and worked closely together on the Feasibility Study for Mangde Chhu HPP just downstream of Tongza in the central part of the country. We were invited into Dorji's home and became close friends both with him, his wife - Pelden and tgeir two children aged 5 and 7 years at the time. We still have contact via social media and have always had a wish to come back some day with our children to reconnect.”





Andres Marulanda Escobare, Colombia Technical Manager, Ingetec consultancy company



“I had the pleasure to cooperate with him in several projects during my time as General Manager for Norconsult Andina in Chile (2010-13). We worked in projects in Chile, Colombia, Ecuador and Panama. Due to his thorough understanding of "Norwegian design principles" for hydropower and specifically the concepts of unlined tunnels the cooperation was easy. His company had several employees with a connection to NTNU and especially Prof. Einar Broch and the Engineering Geology department which combined with their knowledge about local conditions and practices have led to them having a unique position in the South American Hydropower market. I regard Andres as a good friend, and we keep in touch on a regular basis. Recently also in connection with cooperation under the umbrella of the International Tunnelling Association (ITA) where he is on the Executive Committee.”



Communication and understanding

Morten Johnsen

Director E&S Hydropower



” have met people while working in Myanmar, Tanzania, Bhutan and Nepal, who have studied at NTNU. This makes the contact much easier and the communication more efficient»



Studies done for SN Power

Hans Jacob Bull-Berg

VP Project Finance SSA Hydro



“While I was in Country Manager in Panama, a HPD-student worked on the project Bajo Frio (58MW). Here is the result:»

Andrew Mabula

Optimal use of hydro resources in the Chiriquí Viejo Basin, Panama

Master's thesis in Hydropower Development
Supervisor: Oddbjørn Bruland
July 2019

Norwegian University of Science and Technology
Faculty of Engineering
Department of Civil and Environmental Engineering

 **NTNU**
Norwegian University of
Science and Technology




Lecturing at the hydropower development course..

“I have had the pleasure of on some occasions give lectures in the NORAD Master Program. It is always inspiring to meet the students and witness their eagerness to learn and how much knowledge and diversity they bring to the university”.

«I also loved giving lecutres in financing of hydropower projects i HPD course»




Internship in Scatec



Elene Gotsiridze
MSC of Science (Hydropower Development) student - NTNU
Norwegian University of Science and Technology

[+ Follow](#)

[View full profile](#)



Elene Gotsiridze • 2nd
MSC of Science (Hydropower Development) student - NTN...
1yr • 🌐

[+ Follow](#) ...

And the first Georgian at Scatec ASA 🇬🇪

Dear colleagues,

I am happy to introduce you to [Elene Gotsiridze](#) who has joined Scatec as part of the M&A and Strategy team based in Oslo with a specific focus on carbon credits. Of Georgian origin, she is currently pursuing her master's degree at NTNU in Hydropower development. In 2020, she graduated from Georgian technical university with a bachelor's degree in Energy and Electrical engineering. She is a full scholarship holder from NVE (Norwegian Water Resources and Energy Directorate).

She has 8 years of work experience in different fields, including engineering, communications, and banking. Recently she was working for Statkraft and NTNU on a bathymetric survey in Albania at Moglicë Hydro Power Plant.



Suppliers

Sedicon – sediment management systems.

Alberto - HPD-program in 1999 – General manager

Javier – HPD-program in 2017 – Employee in Sedicon since 2010.





Friends and memories





Manohar Shrestha

23. mai 2015 · 2

Background [Hanne Nøvik Palace](#)

[Se oversettelse](#)









Thank to NORAD, NTNU and hydropower enthusiasts

For making this unique network of hydropower professionals around the world – with common understanding – common language and common passion for hydropower development!!



Scatec



Our asset portfolio

Plants in operation	Capacity MW	Economic interest
Theun Hinboun, Laos	525	20%
Magat, Philippines	388	50%
Benban, Egypt	380	51%
Upington, South Africa	258	46%
Bujagali, Uganda	255	28%
Quantum Solar Park, Malaysia	197	100%
Apodi, Brazil	162	44%
Project I, Ukraine	148	100%
Binga, Philippines	140	50%
Guanizuil IIA, Argentina	117	50%
Ambuklao, Philippines	105	50%
Kalkbult, South Africa	75	45%
Dreunberg, South Africa	75	45%
Agua Fria, Honduras	60	40%
Project II, Ukraine	55	100%
Project III, Ukraine	54	100%
Project IV, Ukraine	47	51%
Redsol, Malaysia	47	100%
Jordan, Jordan	43	62%
Linde, South Africa	40	45%
Mocuba, Mozambique	40	53%
Dam Nai, Vietnam	39	100%
Los Prados, Honduras	35	70%
Project V, Ukraine	32	61%
Czech, Czech Republic	20	100%
Maris Hydro, Philippines	9	50%
Release	20	100%
Asyv, Rwanda	9	54%
Total	3,375	52%

Under construction	Capacity MW	Economic interest
Kenhardt, South Africa	540	51%
Mendubim, Brazil	531	33%
Sukkur, Pakistan	150	75%
Release	26	100%
Philippines	20	50%
Total	1,267	47%

Project backlog	Capacity MW	Economic interest
Tunisia	360	51%
South Africa	273	51%
Egypt	260	52%
Botswana	60	100%
Total	953	54%

Project pipeline	Capacity MW	Share in %
Solar	4,259	32%
Wind	5,983	46%
Hydro	1,443	11%
Green Hydrogen	1,181	9%
Release	300	2%
Total	13,166	100%



Renewable energy in a sustainable way

- ESG integration across our value chain
- About 50 dedicated sustainability resources
- Strictest ESG risk management frameworks
- Trusted partners with high ethical standards

