Brandy Standifer, Native Village of Tyonek Council Member

Tyonek Energy Efficiency Project

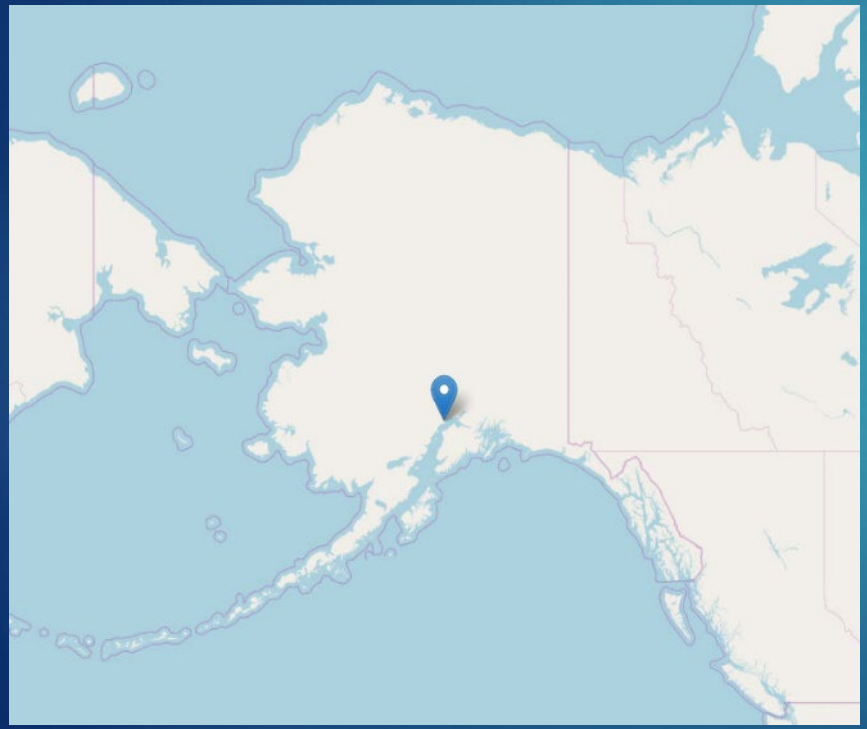
2024 VIRTUAL PROGRAM REVIEW
US DEPARTMENT OF ENERGY, OFFICE OF INDIAN ENERGY
WED, NOVEMBER 20TH, 2024

Tyonek Energy Efficiency Project

Project partners

- Native Village of Tyonek
- Tyonek Tribal Conservation District, and
- Cold Climate Housing Research Center (subcontracting with National Renewable Energy Laboratory)

Location in Alaska



Tyonek Anchorage

Native Village of Tyonek

- Dena’ina Athabascan village
- Home to the Tebughna, or “Beach People”

- Dunilggux, chin'an gheli.
  Welcome, thanks for coming.

Photo courtesy of Tebughna Foundation.

https://www.uaf.edu/anlc/research-and-resources/research/research/hello_goodbye.php

Population:

- 957 Tribal members
- 124 in Tyonek

The area encompassed by the Tribal village is 22.3 square miles of land and 3.3 square miles of water.

- Tyonek is a closed and isolated community

Temperatures are very similar to those in Anchorage: cold but typically not extremely cold in winter, and moderate in summer:

- winter 4 to 22 °F
- summer 46 to 65 °F
- extremes -27 to 91 °F

Average precipitation is 23 inches with 82 inches of snow.

- No road
- No regular marine transportation
- Airfare roundtrip from Anchorage
  - 2024: $300
    - Has been increasing $20/yr
    - 2021: $240
  - Imagine having to pay $300 round trip per person any time you go between Denver and Ft Collins if there was no road/highway between the two, and the shops are over there
- Gas:
  - $6.90 per gallon as of October
    - $8 last year
  - More than double AAA national average of $3.209
- Electricity comes from Chugach Electric, so same cost as ”south” Anchorage, $0.2246/kWh

Project:

Energy efficiency improvements on two Tribal buildings

- Tyonek Native Corporation Satellite Office (red roof)
- Tyonek Tribal Center (lower left)

Project objectives

- To reduce energy use in the rural village of Tyonek for better efficiency
- To reduce the impacts on climate change
- To keep the subsistence lifestyle
- To retrofit and update older buildings into current standards
- To better secure buildings for food security

Image from mapper.dnr.alaska.gov> layers > AK RGB high resolution

The buildings

Tyonek Tribal Center

The building is occupied
- from 9:00 am to 5:00 pm M – F
- on weekends and during some evenings for community gatherings.

Native Corp Satellite Office

The building is occupied
- 9:00 am to 4:00 pm M – F
- The bedroom is used on occasion when guests are staying in the building.

2017 audits

Audits were completed in 2017 by staff from Alaska Native Tribal Health Consortium.

Main recommended improvements from audits include

- replacing lights with LED lights
- installation of set-back thermostats
- maintenance of boilers and insulation of pipes
- air tightening
- addition of insulation

- Cost estimates were pre-covid

Project status: After some hiccups, descoped work is done!

How we got here:

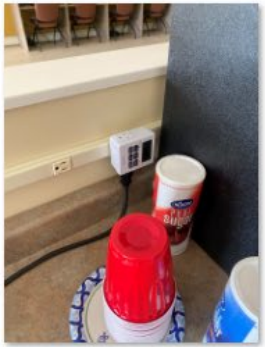
- Current audit was done in February 2022
- Learned of another project which is improving the tribal center with ARPA funding, started communication with that project
- The auditor also included a pre-feasibility study about partially replacing source of heat, baseboard, with air source heat pump for one wing
- NVT requested that change – the rest of scope stayed very similar
- DOE approved it previous summer
- Pause due to communication challenges

- **Spring 2024: sent RFP out**
- **Proposals came in many times the budget!**
  - **Changes were needed!!!**

- Identified additional funding from CCHRC
- Descoped to electrical only
  - No mechanical
  - No air sealing
  - No heat pump
  - The additional funds from CCHRC allowed electrical scope to be accomplished
  - Got approval for changes from DOE OIE
- Awarded RFP
- **Work was done in June 2024**
- **Some photos on the next two slides**

Image courtesy of Tonya Kaloa.

Some of the changes @Tyonek Corp office



(Corporation Office) Digital appliance timer

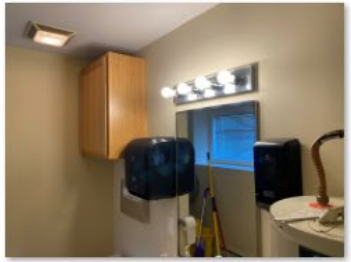
(Corporation Office) Entry lighting replaced

(Corporation Office) Hallway Lights

(Corporation Office) Office 1 Lighting

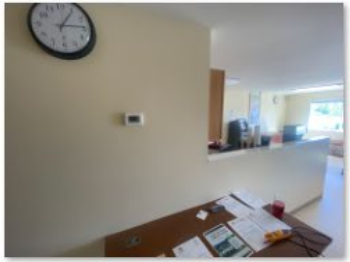
(Corporation Office) Office 2 light fixture

(Corporation Office) Rear bathroom vanity lights replaced



(Corporation Office) Replaced bathroom vanity bulbs - front

(Corporation Office) Replaced Thermostat



(Corporation Office) Replaced Thermostat

(Corporation Office) Spare furnace nozzle

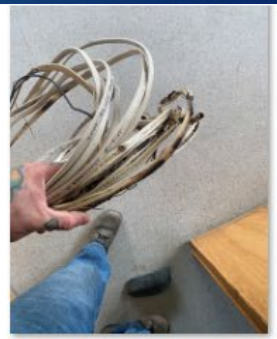
Some of the changes @ Tribal Center

(Tribal Center) Meeting room new thermostat

(Tribal Center) Mens bathroom new light fixture

(Tribal Center) New baseboard heater thermostat

(Tribal Center) New office light fixtures



(Tribal Center) Old burnt wiring from trough fixtures

(Tribal Center) Old troughs light fixtures

(Tribal Center) Return air register filter

(Tribal Center) Rewired baseboard heater

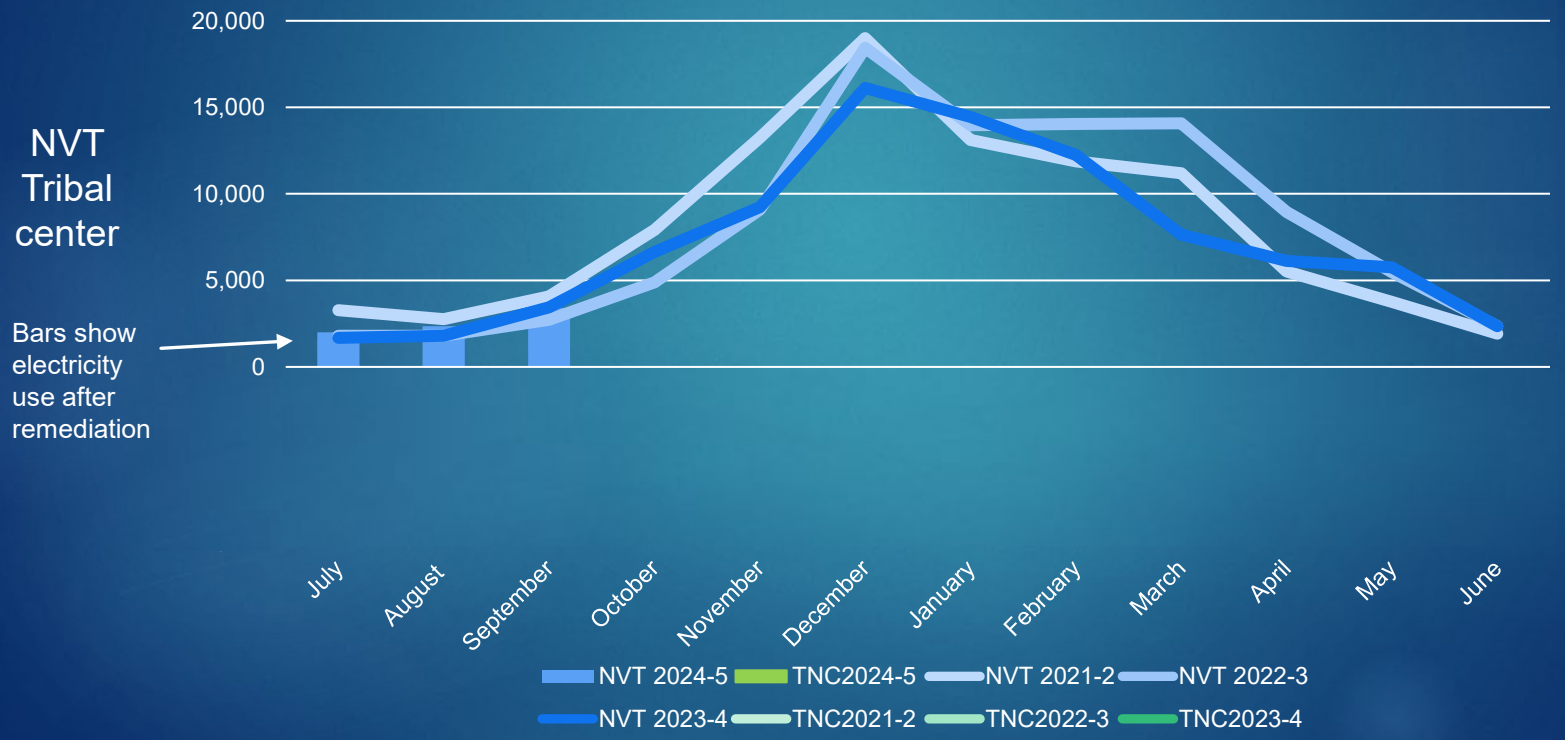
(Tribal Center) Rotunda light troughs - cleaned

(Tribal Center) Rotunda lights, all completed

Next steps

- Outreach
- Analyze savings
  - Preliminary data on next page
- Report

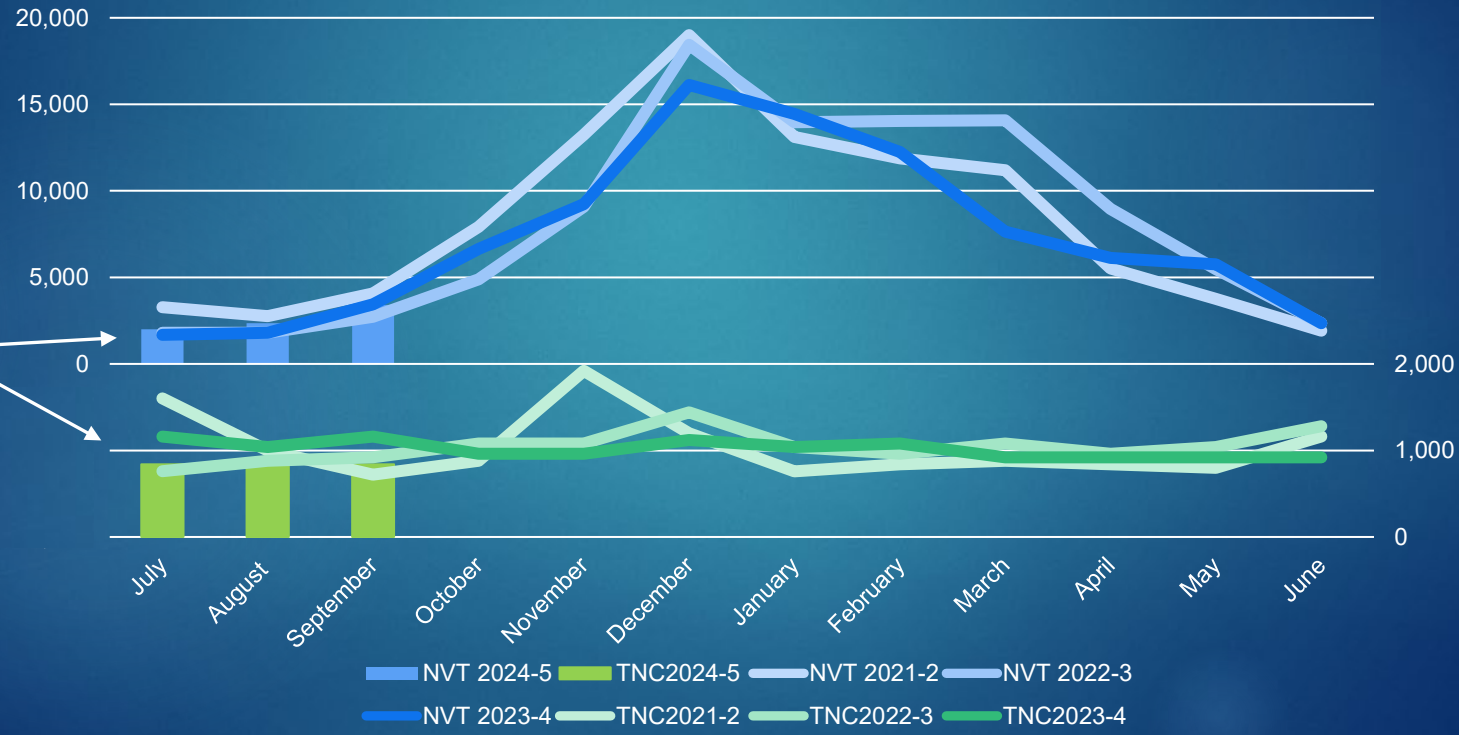
Electricity usage for the last three years



Electricity usage for the last three years

NVT Tribal center

Bars show electricity use after remediation



Scale is 5x smaller on this side, each bar is 1,000 kWh.

Tyonek Native Corp office

Lessons learned

- The helpline for fedconnect is very useful if the website has an old email address for you that no longer exists
- In small communities, people wear many hats
- Communication is important
- Life interferes with projects, especially in a small community, and takes precedence
- Prices change
- Wide range of proposed costs

Chin’an!
Thank you!

Dena’ina

Chin'an gheli.

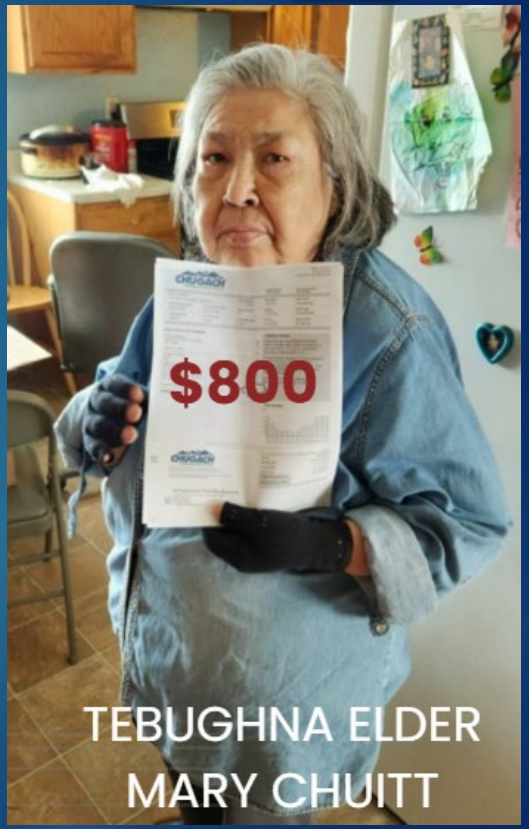
Thank you very much.

Q'uch'a.

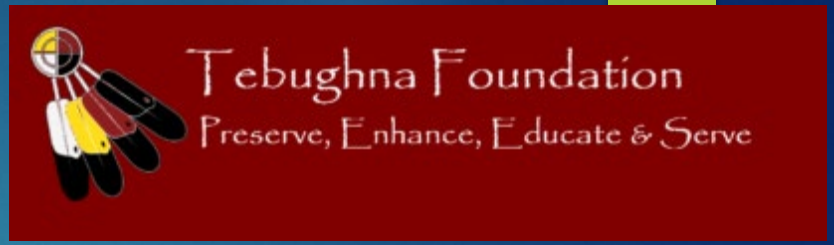
That's all.

https://www.uaf.edu/anlc/research/useful_expressions.php

Community Need – The WHY



Tebughna Solar Program



Our solar program has four focus areas:

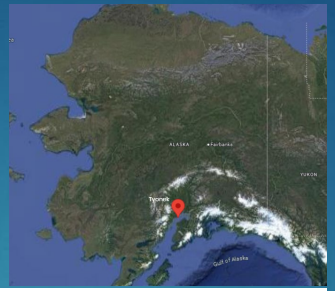
- Install a 25 kW solar array at the Tyonek tribal center;
- Install solar-assisted heat pumps in Tribally-owned residential buildings in Tyonek;
- Facilitate the design of a utility-scale solar array and become a tribally owned independent power producer
- Prepare the local workforce to work in the renewable energy industry by providing vocational scholarships.

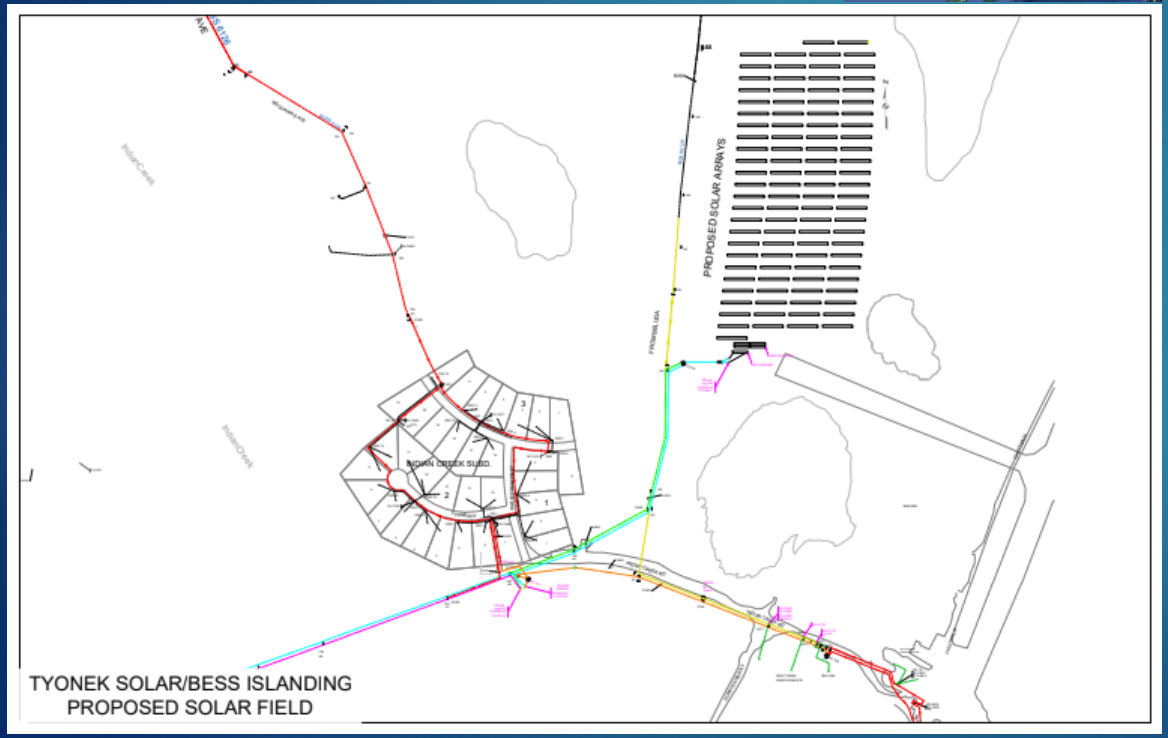
Tyonek Solar +Storage Array - Overview

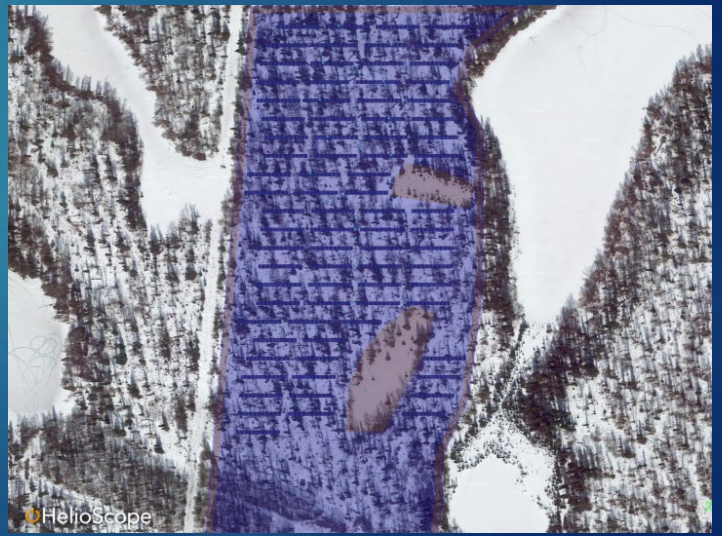
Tribally owned and operated solar and energy storage independent power producer (IPP)

- 4.5 MW_{DC}/4 MW_{AC} solar photovoltaic (PV)
- 5 MW/12MWh battery energy storage system
- Agrivoltaics on the Perimeter

Location Site Selected
Tyonek, Alaska







Current Stage: Design + Planning + Funding

HelioScope

Annual Production Report produced by Edwin Bifelt

Tyonek_4 MW Solar PV Project_FINAL_0718 Tyonek Microgrid Project, Tyonek, AK, USA

Report

Project Name	Tyonek Microgrid Project
Project Address	Tyonek, AK, USA
Prepared By	Edwin Bifelt edwin@anr-industries.com

ALASKA NATIVE RENEWABLE INDUSTRIES

System Metrics

Design	Tyonek_4 MW Solar PV Project_FINAL_0718
Module DC Nameplate	4.03 MW
Inverter AC Nameplate	3.75 MW Load Ratio: 1.08
Annual Production	4.049 GWh
Performance Ratio	85.0%
kWh/kWp	1,004.3
Weather Dataset	TMY, 10km Grid, Meteonorm 7 (meteonorm)
Simulator Version	b24eac4779-0be23a2d9e-8402562ab2-e9b7359c86

Project Location

Project Timeline

Phase	Target Completion Date
Project Start Date	October 1st 2024
Completion of engineering 100% Design	December 31st 2024
Purchase Order for CEA linework-Order of Long Lead Items	Jan 31st2025
RFP for 4MW Solar PV system	Jan 31st 2025
Battery O&M Agreement with CEA and PPA finalized and filed	Feb 28th, 2025
RFP for Battery Energy Storage Systems – long lead items ordered	March 30th 2025
Start of Solar Construction	June 1st 2025
BESS system Construction Started – site prep	June 15th, 2025
BESS Long lead items arrive	Aug 1, 2025
CEA line work complete	July 30, 2026
Solar Array Construction Complete	Aug 30, 2026
Full system integrated and commissioned	March 30th 2027
Project Closeout	Sept 31st2027

Figure 7. Tyonek Village Sustainable Resilient Tribal Energy Project Timeline