The Future of Forestry

Climate-smart forestry solutions

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- What does this mean for Quesnel?

Benchmark

BUILDING A STRONGER FOREST ECONOMY

Source: Forestry Innovation Investment

The BC Opportunity

Source: Forestry Innovation Investment

Key figures for the Finnish forest sector in 2017

Volume of growing stock on forest land and poorly productive forest land

2,473 mllllon m^3

50% pine, 30% spruce and 20% deciduous trees

Annual increment of growing stock on forest land and poorly productive forest land

107 million m^3

Nearly double compared with the 1950s level

Artificial regeneration per year

103,500 ha

77% planted, 23% sown

Protected forests

2.7 million ha

12% of all forest land and poorly productive forest land

Roundwood removals

72.4 million m^3

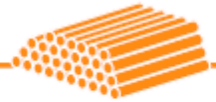
+3% from 2016

70

Gross stumpage earnings

EUR 2.2 billion

+2% from 2016*



Roundwood consumption in forest industries

69.7 million m^3

of which 90% domestic wood

Labour force in the forest sector

59,000 persons

2% of the total labour force in Finland

57 000

Wood in energy generation

100.4 TWh

27% of total energy consumption

Forest industries' turnover from domestic operations

EUR 29.8 billion

22% of the total turnover in the industrial sector

Export in the forest industries

EUR 12.1 billion

20% of total Finnish goods exports

9.8

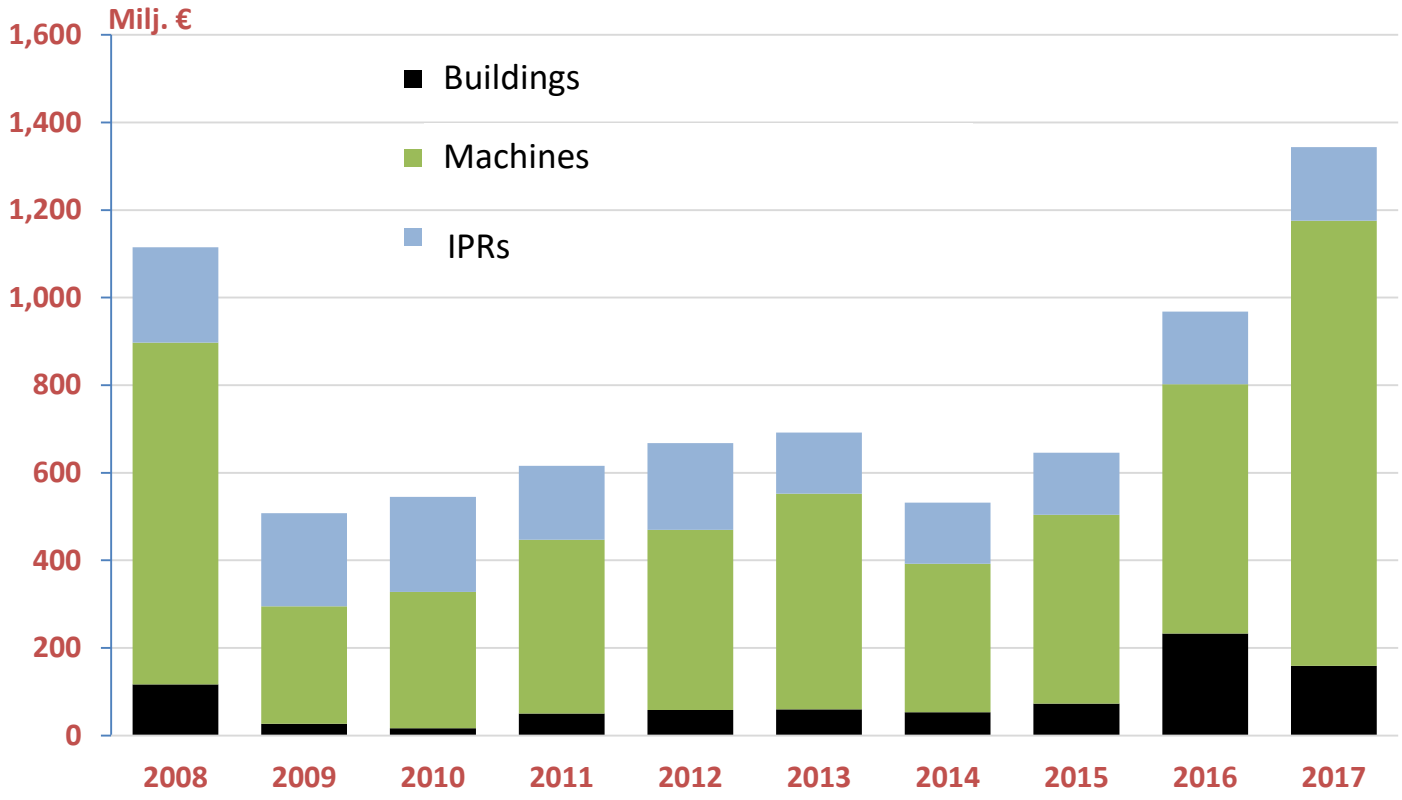
Wood imports

8.7 million m^3

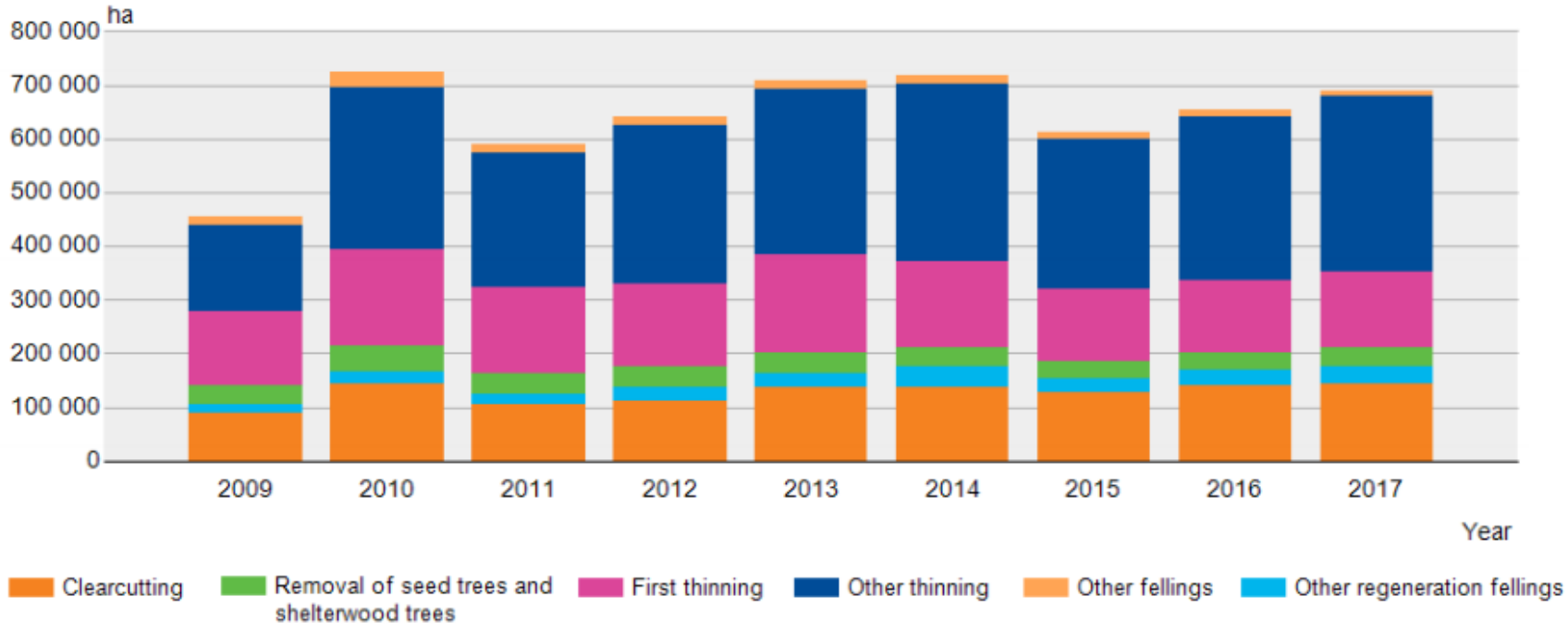
-11% from 2016

* Deflated using wholesale price index

Forest Industry Investments in Finland



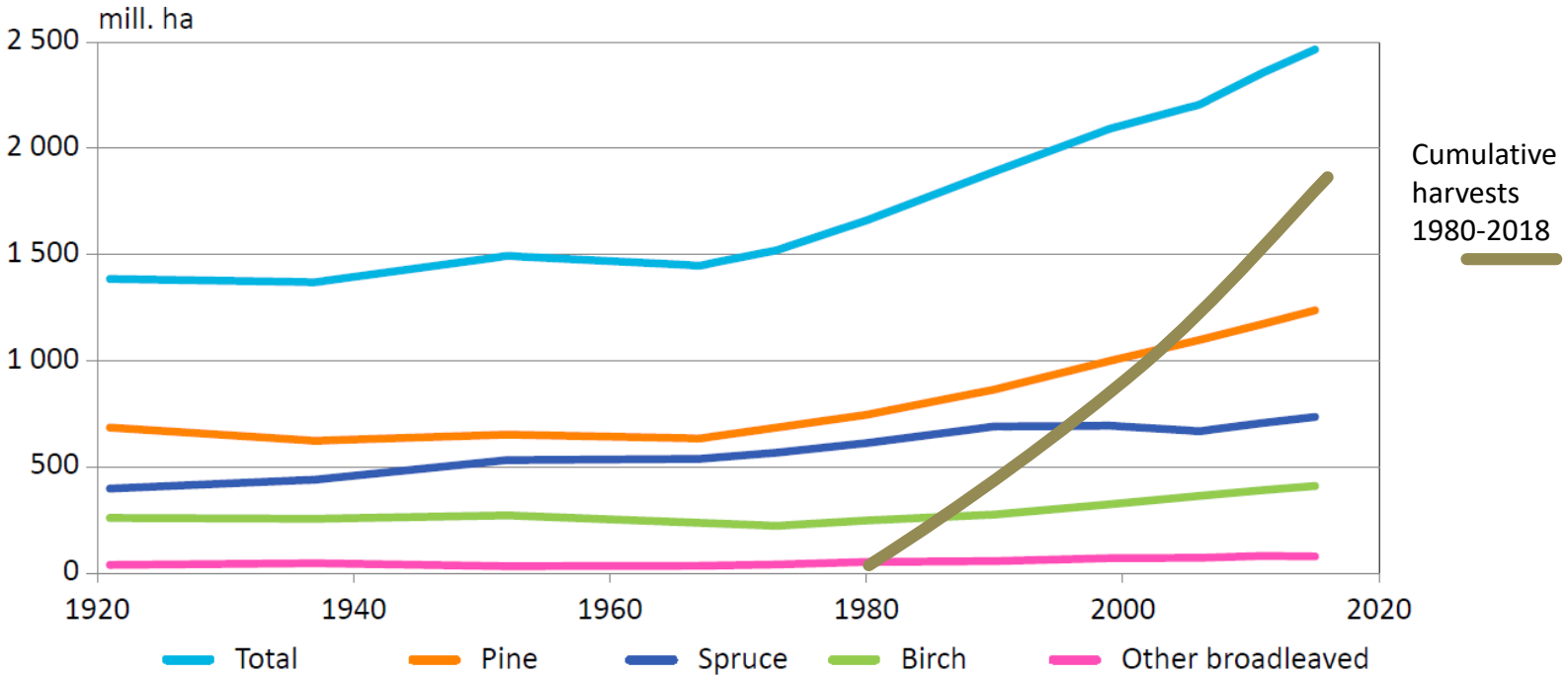
Area treated with fellings, based on notifications of forest use



Finnish Philosophy when it comes to forest ownership:

Forests are not inherited from our parents, they are borrowed from our children

Growing stock volume by tree species 1921–2015



Forest Management Planning in Finland

Advanced forest mgmt. planning

Since 1970's accurate stand-level forest inventory data and forest managemant plans (farm-level, regional) have been the basic tools for forest forestry professionals in Finland

- **Basis for planning and optimizing all the forestry operations:**
  - Harvesting
  - Road construction (pre-planning)
  - Forest & energy industry investments
  - Transparent real estate markets
  - Multi-disciplinary planning for combining different forest uses: game, multiple use, protection of water systems etc.
- **Culture on using the data – urge to get better data !**

BUSINESS JOENSUU | JOE WITH

Metsään.fi

- Data is collected for every compartment
- Forest information presented in Metsaan.fi service
  - › Soil
  - › Growing stock
  - › Treatment proposals for a five-year period
  - › Environmental values (habitats of special importance)
  - › Latest maps and aerial photographs

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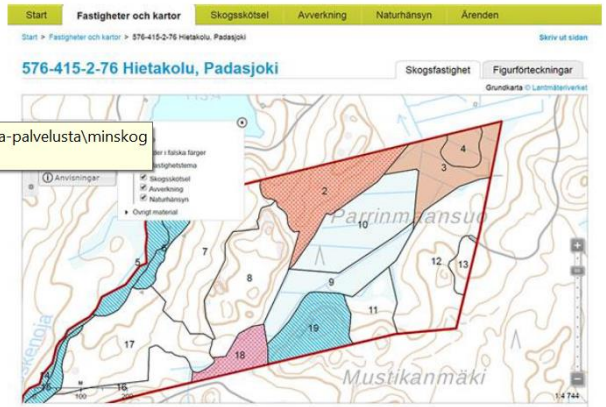

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MAIN PRINCIPLES OF FOREST MANAGEMENT IN FINLAND

Objective:

- Growing of good quality sawlogs
- Maximising yield
- Maintaining economic and ecological sustainability

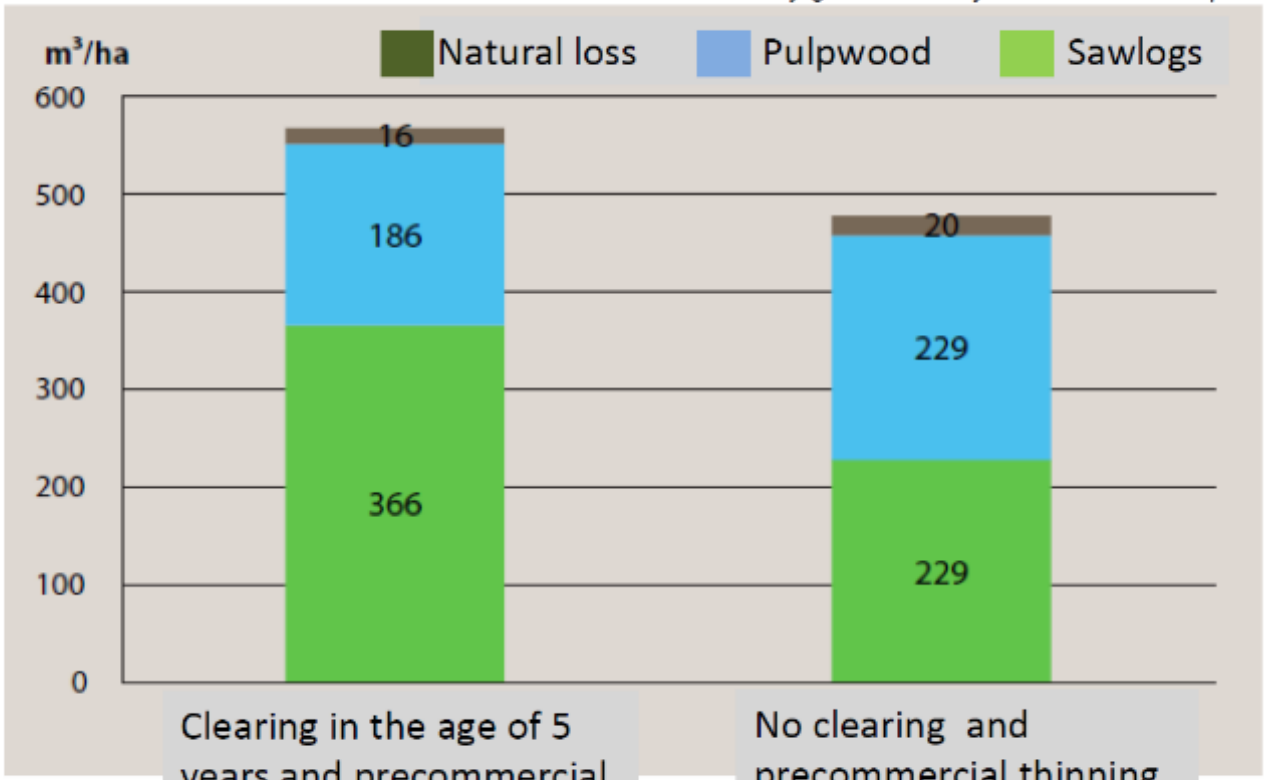
Tools:

- Forest management plan & thinning models
- Intensive reforestation
- Silvicultural treatments
- Pre-commercial thinnings (Energy wood harvesting)
- 2-3 thinnings
- Control

The Art and Importance of Thinning

ECONOMICS OF SILVICULTURAL TREATMENTS

Good forestry guidelines. Äijälä et al. 2014 / Tapio



ENERGYWOOD THINNING – PRECOMMERCIAL THINNING

Government subsidizes this kind of operation to support renewable energy and the production of good quality timber.

1ST THINNING

- At the age of 25-40 years (height 12-16m)
- Careful selection of removed trees ”bad trees out” and optimized spatial distribution
- Removal 30-60 m3/ha
- Income for forest owner 450-900 €/ha (666-1332 CAD) Pulpwood only

2ND THINNING

- At the age of 50-70 years
- Removal 60-100 m^3/ha
- Income to forest owner 2 000-3 000 €/ha (2 958-4 437 CAD)
- Sawlogs 40-50%

Because of thinnings

- More and better quality yield
- Increased availability of timber
- Advanced income
- Decreased insect risk
- Decreased wildfire risk

But

- Increased harvesting costs
- Decreased biodiversity

Where are the differences?

- Forest inventory data is more detailed and accurate in Finland. (Because it is so important for planning of our tiny but numerous harvesting units and operations)
- Over 3 times bigger area in Finland is annually treated by thinning cuttings than by clearcuttings
- Cut-to-length method is used in 99.9% of cuttings
- Vocational training is organized and almost fully financed by the government

What is Climate Smart Foresty?

A development strategy defining alternative scenarios and road maps of forestry for the voyage to a sustainable future.

Climate Smart Forestry is **not the same everywhere**. The idea is, but the roadmap and scenarios vary.

Joint effort of forested countries to actively cooperate, search, study, test and demonstrate different solutions.

The method to **quantify effects** of and to **find tools** for climate policies.

Application of **state-of-the-art technologies** to advance the sector.

FAO Elements of Climate Smart Forestry

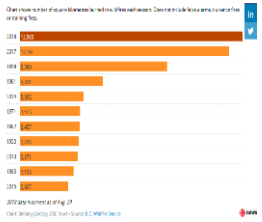
- Enhancing the contributions of forests and trees to food security and livelihoods
- Reducing the vulnerability and increasing the resilience of forests and people
- Addressing deforestation and forest degradation to help safeguard food security

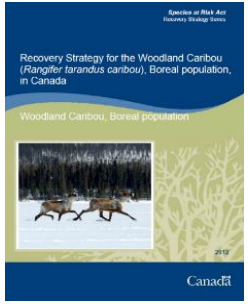
What does this mean for Quesnel?

Photo credit: City of Quesnel

No lack of challenges

- MPB
- Spruce beetle
- Spruce budworm
- Wildfires
- Social license
- Tenure diversification
- Shrinking THLB
- Climate change
- Forest carbon management





Climate-smart forestry solutions

The low hanging fruit – better utilization of existing resources

Nordic countries

Western Canada

- Pellets
- Bioproducts
- Biochar
- Bioenergy
- Thinnings

Climate-smart forestry solutions

Investment & utilization of advanced forest inventory tools

Payback Time from Provincial Budgets:	1.5 - 4 years	Cost Benefit Ratio:	10x - +25x

Area	Conservative	Potential
MoFLNRO Savings on Resource Management & Inventory Practices	$4 M	$++
Timber Harvest Related Savings for Forestry Firms	$25 M	$95 M
Provincial Wildfire Fighting Cost Savings	$18 M	$36 M
Improved Yields for Agriculture Sector	$12 M	$120 M
Water Management Related Cost Savings	$4 M	$++
Infrastructure & Construction Savings	$5 M	$+++
Oil, Gas, & Energy Savings	$2 M	$++
Resource, Wildlife, & Habitat Conservation as well as other Environmental Initiatives	*Difficult to Quantify but Potentially Tens of Million of Dollars*	
****PUBLIC SAFETY ASPECT****	*Difficult to Quantify but Potentially Hundreds of Million of Dollars*	
Provincial & Private Benefit of LiDAR per Year:	$70 M	+$150 M

Large areas
Diverse landscape
Numerous stakeholders

Need to catch-up in BC

Quesnel as the catalyst to lead the charge and make us a global champion for the adoption of technology to advance climate-smart forestry

Climate-smart forestry solutions

Landscape level forest management planning

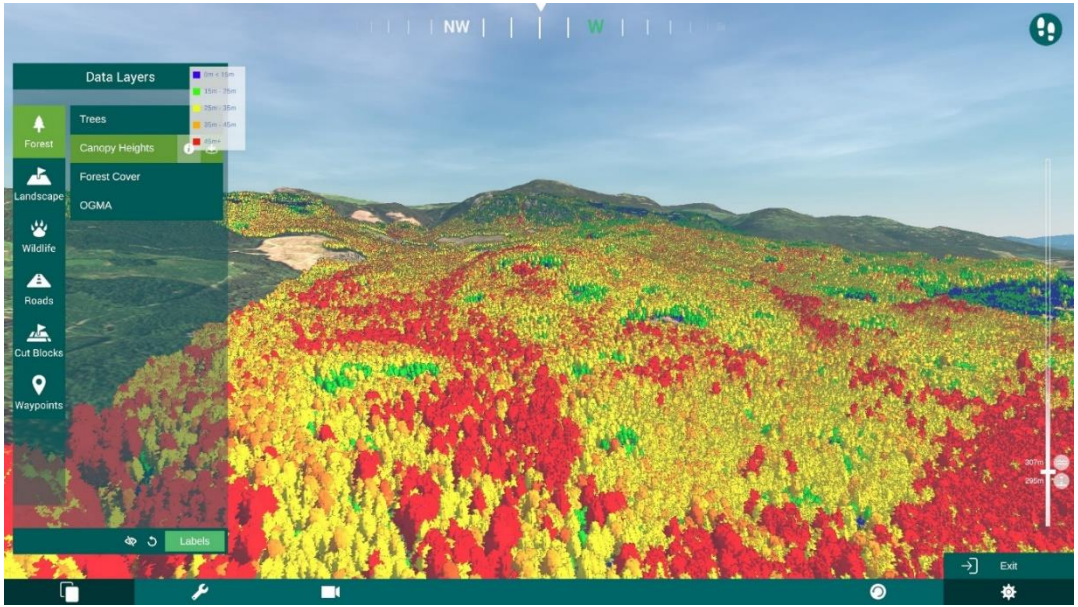
Dynamic vs. static mgmt.

Cariboo

Mule Deer

Goshawk

Wildfire



Multiple values

Stakeholder engagement

Maintaining AAC

Increasing AAC

Climate change impact

Protecting values

Climate-smart forestry solutions

Investment & development of BC solutions for thinnings

Climate-smart forestry solutions

Training & Education – key to success

Benefits

- Secured fibre production
- Improved fibre access
- **Employment opportunities**
- Fire resilient mosaic landscapes
- Increased carbon storage
- Reduced wildfire suppression costs

Why are we here today?

We must **convince** all important stakeholders to join and **financers to contribute** with adequate figures to enable **R&D**

We must increase open **dialoque** and **encourage** stakeholders to try new things and follow trials by academia & partners

Continue to **build trust** and build a **coalition of the willing**

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