

WOODEN SLEEPERS TRACK TREATMENT AND ALTERNATIVES PROJECT

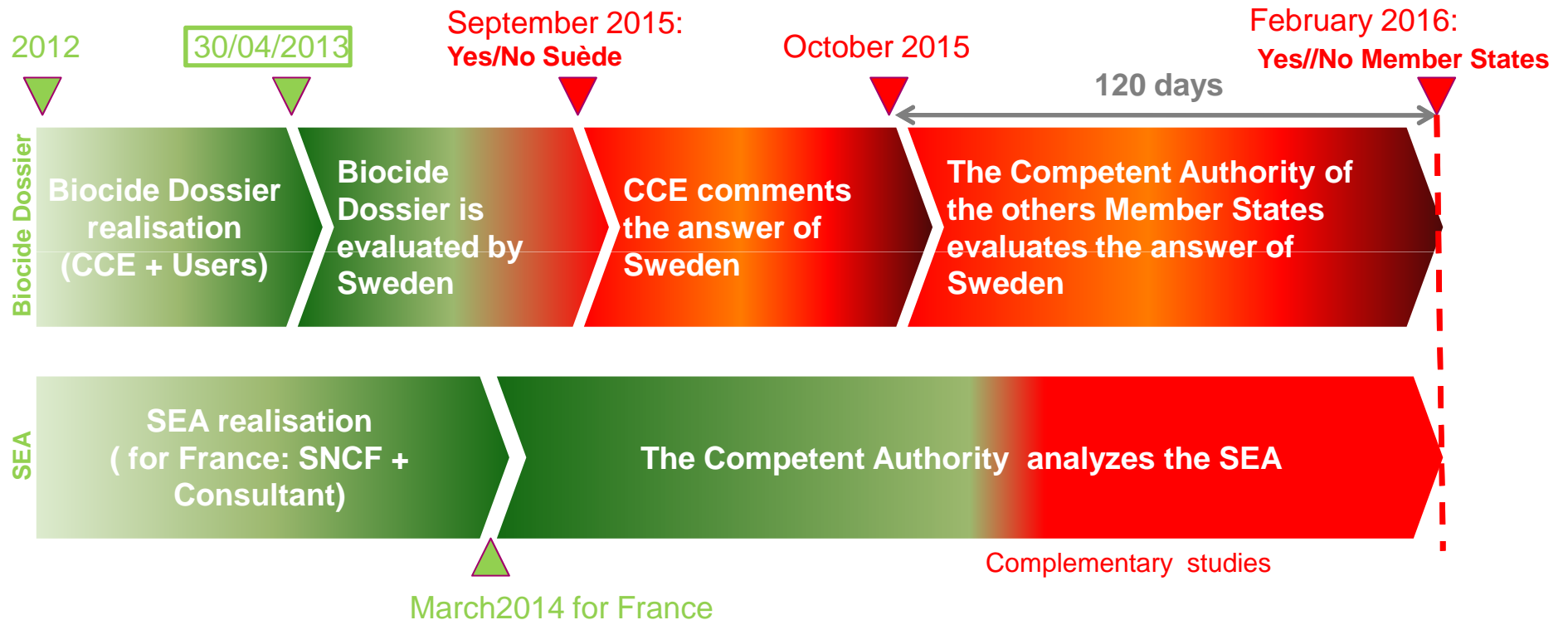


BIOCIDAL PRODUCTS REGULATION

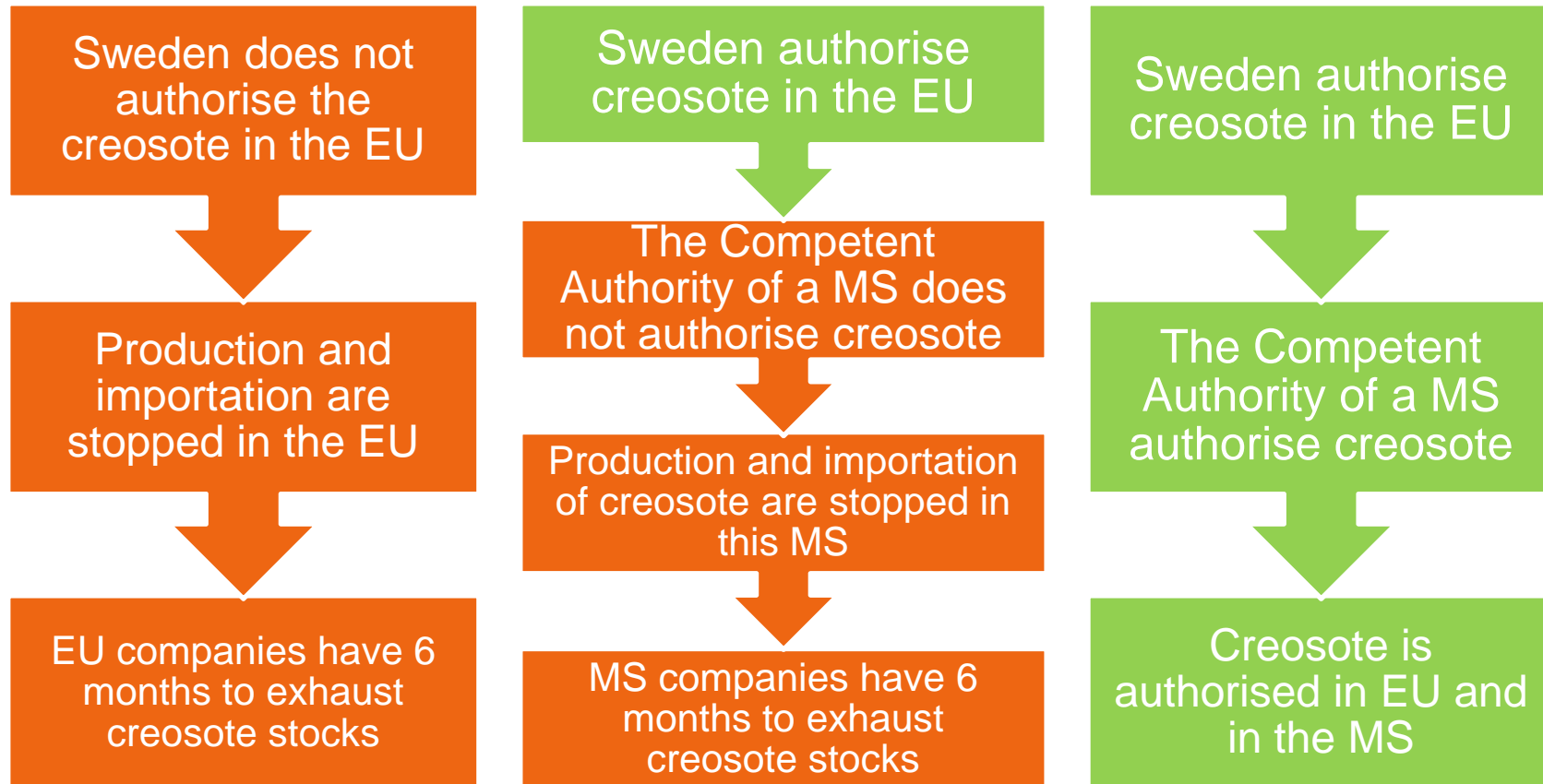
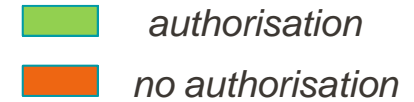
2011/71/EU Directive of
26 July 2011

Creosote needs
to be authorised
for use in the EU.
The first
registration
period is fixed to
5 years from
01/05/2013 to
30/04/2018.

ROADMAP OF BIOCIDAL PRODUCTS REGULATION

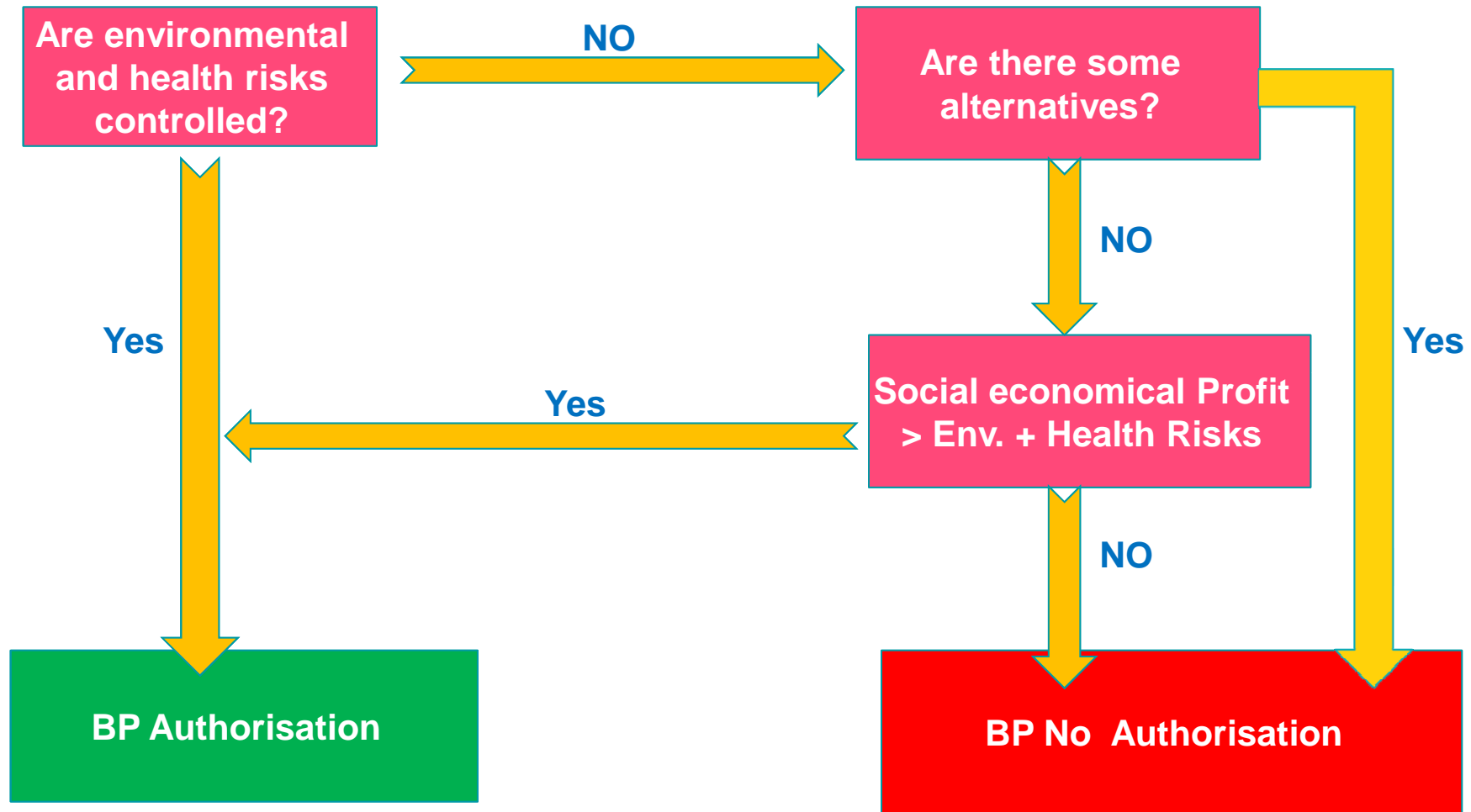


CONSEQUENCES ON EU MARKET



SNCF has its own wooden sleepers treatment plant.

THE PROCEDURE OF BIOCIDAL PRODUCTS REGULATION



SPECIFIC CONTEXTS WHERE WE NEED ALTERNATIVES WITH THE SAME TECHNICAL (ELASTICITY AND WEIGHT) AND ECONOMIC CONSTRAINTS THAN WOOD

- Sleepers used on low-traffic tracks with wooden sleepers and low height of ballast;
- Sleepers close to rail joints;
- Sleepers used for double head railed tracks;
- Sleepers used in switch and crossing;
- Horizontal sleepers used in some bridge tracks.

RESULTS OF SOCIAL ECONOMICAL ASSESSMENT (SEA) FOR SNCF APPLICATION FOR CREOSOTE IMPREGNATION IN FRANCE.

Alternatives analysed in our SEA :

- Concrete, used in high traffic lines where the substitutions is made easy in combination with tracks replacement works.
- FFU (Fiber-renforced Foamed Urethane) composite or no treated wood where use of concrete is not possible for technical and economical reasons.

Conclusions of our SEA:

No alternative has credibility in the short or medium term.

7 All alternatives generate a very significant extra-cost.

CREOSOTE ISSUES

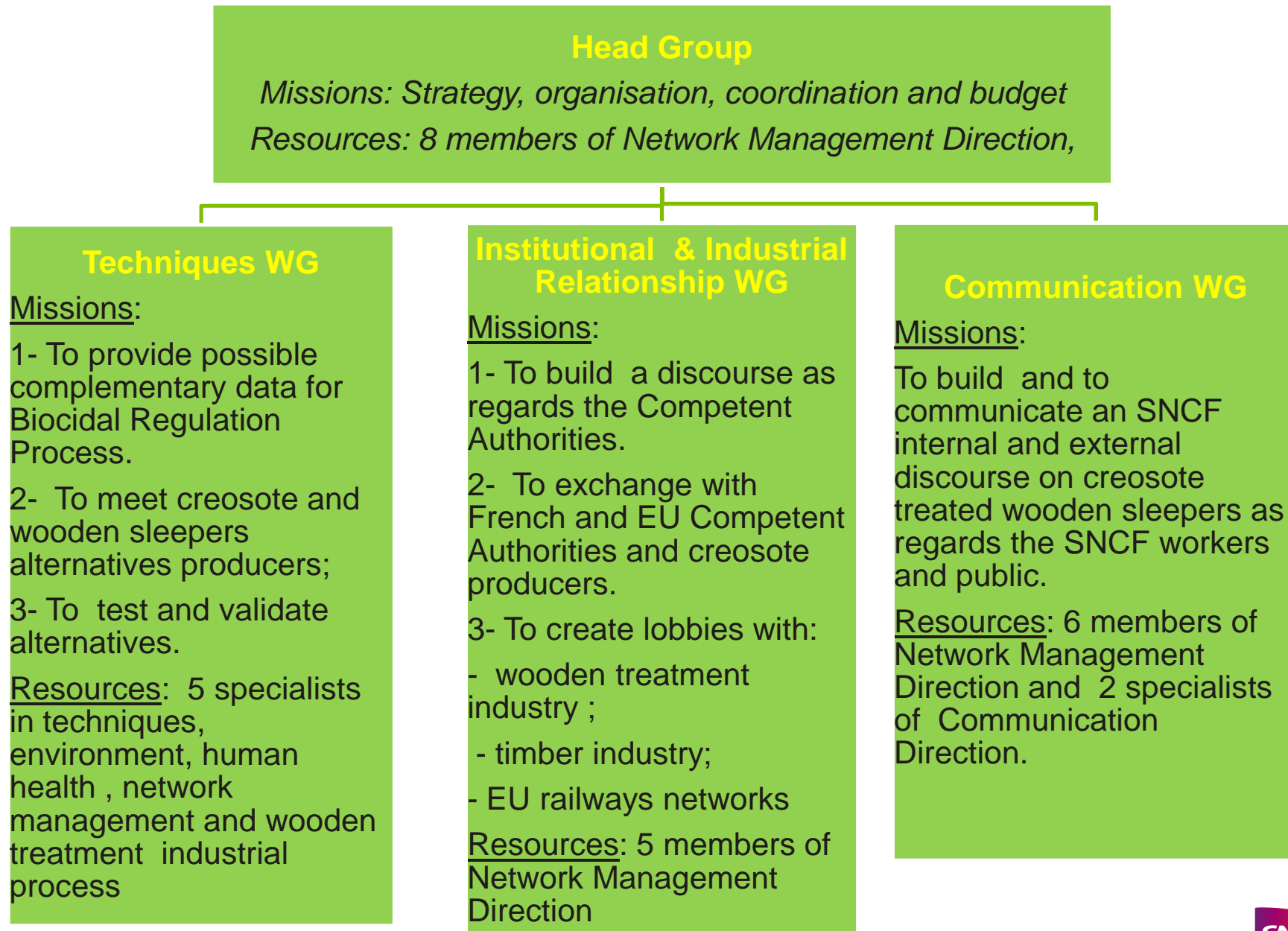
The future of creosote is uncertain – will it be allowed to use in the EU after 2018?

Do we have any realistic alternatives to creosote that can be introduced on the market in the near future?

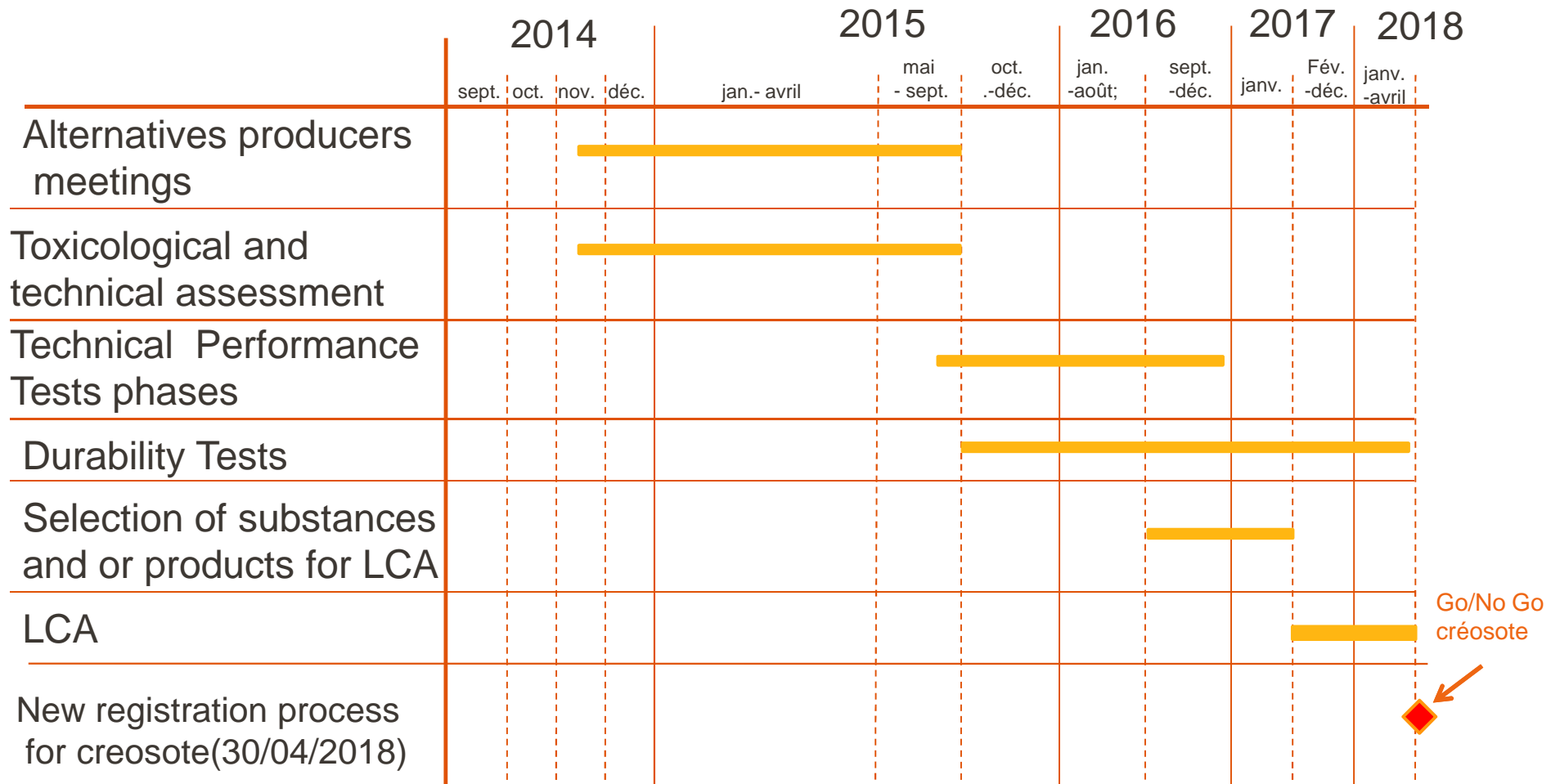
...and what are their real environmental benefits?

Are the alternatives markets ready?

SNCF PROJECT ORGANISATION FOR CREOSOTE AND ALTERNATIVES



ROAD MAP ASSESSMENT ALTERNATIVES TO CREOSOTE AND TREATED WOODEN SLEEPERS



CONDITIONS FOR A GOOD ALTERNATIVE:

1. **Good toxic profile**
2. Life-cycle of over 30 years
3. Fulfilment of technical characteristics and not conductive for electricity
4. A class 4 quality of treatment (EN 335-2)
5. Economically viable
6. No chemical residues in the ballast and environmental compartments
7. Waste management issue (LCA)

HOMOLOGATION STRATEGY

1. Holistic approach: Technical performance, Human Health and LCA .
2. To create a huge European market (need of users lobbies) to encourage firms to invest more:
 - in R&D to find new alternatives;
 - in production capacity to cover the demand for sleepers.
3. Durability and technical tests, LCA and validation of alternatives managed directly by SNCF (user) and not by suppliers (difference with Creosub Project)

REQUIREMENTS FOR REPLACEMENT

- It is a complex problem to find alternatives to creosote.
- A holistic approach on technical properties, environmental and human health impact, expected service life, waste management and economy is required.
- There is a considerable uncertainty about these properties with the alternatives available today.
- The major uncertainty is about the expected service lives which will be decisive for the environmental impact as well for the economy.

FINAL COMMENTS

- Health and safety and environmental impact must be judged and evaluated in the same way for alternative materials and creosote. Creosote cannot politically be banned unless alternatives just as good or better are available today.
- With respect to the ongoing process in the EU, it is still advisable to look at different alternatives and start full scale trials with respect to durability, process issues and technical properties.

FINAL COMMENTS

Actually, we still believe in creosote.

Its LCA, its cost and its technical performance are very good and its life-cycle is proved by centenary experience.

We promote the communication to give again a good image with creosote.

Creosote issue is above all a social acceptability issue.

Communication is supported by studies which show the weak or no impact on environment and human health of creosote treated wooden sleepers (≠ than creosote substance!).

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ENVIRONMENTAL AND HUMAN HEALTH ASSESSMENT OF END-OF-LIFE WOODEN CREOSOTED SLEEPERS



RESEARCH PHASES

➤ **Phase 1 : Benchmark.**

Phase 2 : Sites selections, sampling and analysis strategy.

➤ **Phase 3 : Survey, sampling analysis.**

➤ **Phase 4 : Results analysis interpretation and human health risk assessment.**

SNCF was assisted by URS France.

SCENARIOS OF END-OF-LIFE WOODEN CREOSOTED SLEEPERS REUSE EN FRANCE

1. Fences.
2. Rivers banks retaining walls.
3. Walks landscaping (e.g. decks of walks).
4. Portions delimitations of vegetable kitchen gardens.
5. Equipments of collectives games surfaces (e.g. Bowling pitch delimitation).
6. SNCF historical sleepers storages.

RESEARCH CHOSEN SITES



COMPARTMENTS ANALYSED

- Soil
- Sediment
- Surface water
- Ground water
- Soil gas
- air
- Vegetable:
 - Wild vegetables: nettles, dandelions, salicornes;
 - Kitchen garden vegetables: carrots, beans, pumpkin, zucchinis, leeks, salads, potatoes, tomatoes, beets and cabbages

CHOICE OF REFERENCE SUBSTANCES CONSIDERED AS MARKERS OF CREOSOTE

For every compartment:

- 16 PAHs classified as priority by the US EPA;
- Phenols and Chlorophenols.

For Soil, sediment, surface water and ground water:

- C10-C40.

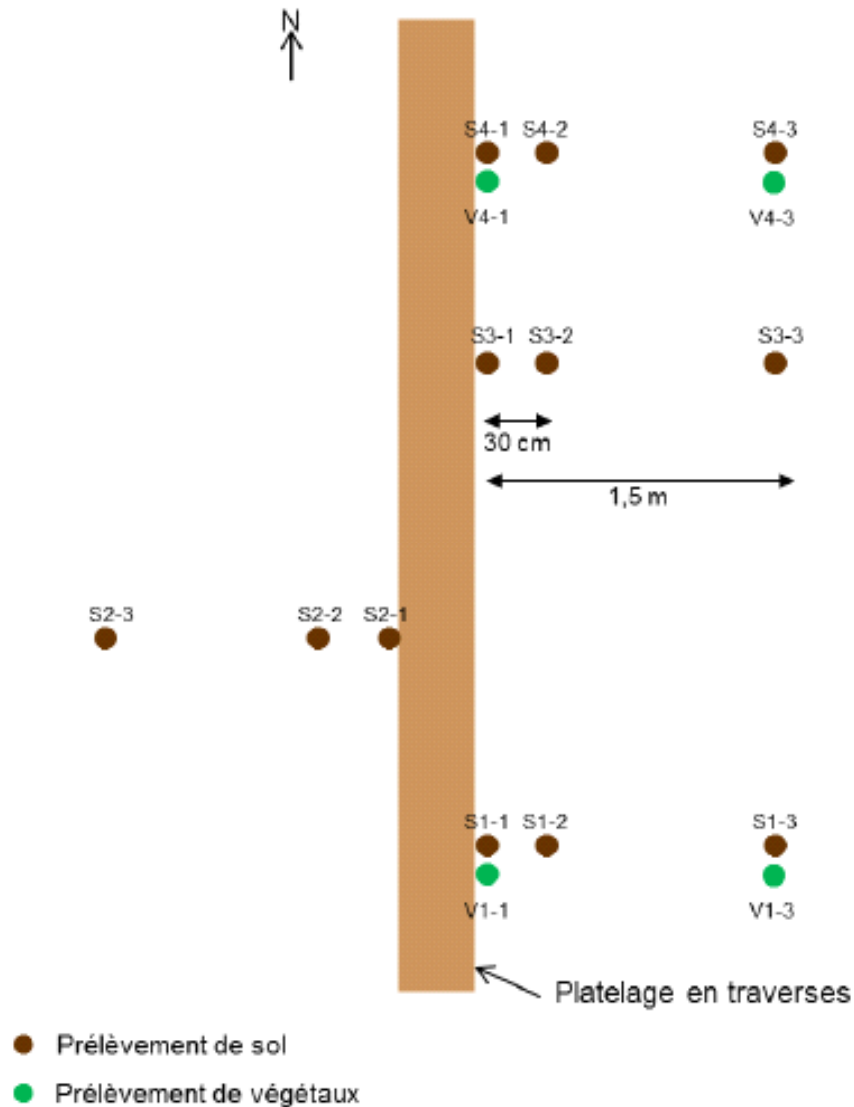
For soil gas:

- C8-C16.

For vegetables:

- C10-C56.

SAMPLING STRATEGY



➤ Sampling at:

- Reference station:
- Immediate vicinity of sleepers (0.0m)
- 20 - 30 cm from sleepers;
- 1.5 - 4 m from sleepers;
- Upstream et downstream for sediments and surface water;
- Depth:
 - Soil: 0 -10 cm and 10 - 50 cm
 - Sediment: 0 - 20 cm and 20 - 50 cm

Ech. Surface = 0-10 cm; Ech. Profondeur = 10-50 cm

ENVIRONMENTAL MONITORING RESULTS AND HUMAN HEALTH RISK ASSESSMENT

Compartments	Soil or sediment		Surface water or ground water		Soil Gas		Human Health Risk	
	yes	no	yes	no	yes	no	yes	no
20 years storage of 15 000 sleepers in a industrial area.	Moderated on a 20 cm bulb around the sleepers			X		X		X
Fences in a National park.	Moderated on a 10 cm bulb							X
River banks retaining wall in a National park. Brackish surface waters	Moderated on a 20 cm bulb			X				X
Birds observatory in a National park. Brackish surface waters		X		X				
Deck of walks in a National park	Moderated on a 10 cm bulb							X
Channel banks retaining wall in industrial area. Fresh surface waters		X		X				
Portions delimitation of a vegetable kitchen garden.		X		X				
Bowling pitch delimitation.		X				X		X

IMPACT ASSESSMENT OF CREOSOTED WOOD SLEEPERS ON BALLAST AND SOILS UNDER THE BALLAST (SNCF, 2013)

Statistical analysis on ballast 16 PAHs (598 samples from more than 100 sites all over France railways web) and on subjacent soils (44 samples, 0-1 m deep).

Monitorig data from wood and concrete sleepers. More than 30 yars old sleepers.

Conclusion:

+90% of the ballast sampled

+77% of the soil sampled

} Show a PAH concentration below 20 mg/kg DW for all kind of sleepers

+It is impossible to define a creosote fingerprint in the PAHs. Presence of PAH from other sources such as diesel engines, lubricating oils, urban soils (brownfields).

Urban noise: ATSDR : 25 - 569 mg/kg MS;

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Thank you