



The Road to Continuous Improvement

Ton Manders Euro Chlor



CloroSur

2022

COSTA DO SAUÍPE



Content

- **Short introduction of Euro Chlor and its vision**
- **Euro Chlor on its way to become safety leader**



Short introduction of Euro Chlor and its vision

About Euro Chlor

KEY FACTS

36 producing members

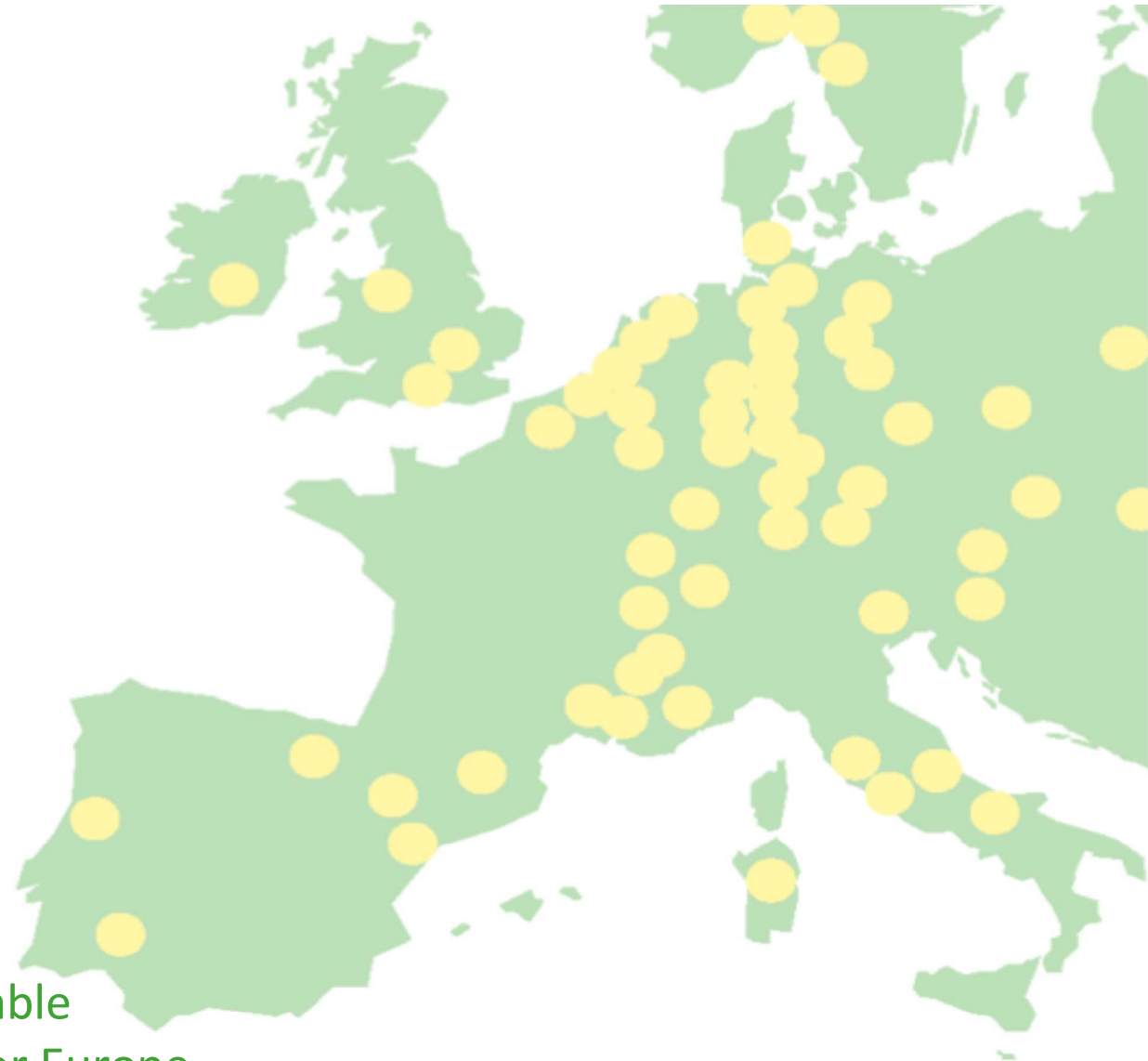
100 partners

62 manufacturing locations in
19 European countries

97% of all European production
capacity

9,645 kilotonnes of chlorine
produced in 2021

17.



Our role is to support a safe, sustainable
and successful chlor-alkali industry for Europe

Euro Chlor 2050 vision



SAFE. COMPETITIVE. GREEN.

Towards a safe, competitive,
climate neutral and circular
European chlor-alkali industry.

2050



Safety leader

Remain a leader in safety by continuously delivering outstanding performance throughout the value chain, including contractors, transporters and customers.



Competitive supplier

Regain long-term international competitiveness and aim for continuous growth in demand for chlor-alkali products.



Climate neutral player

Contribute to Europe's Green Deal through climate neutral production and by facilitating the energy transition.



Circularity champion

Facilitate cradle-to-cradle usage and recycling of the chlorine atom. Drive circularity in the chlorine production process.

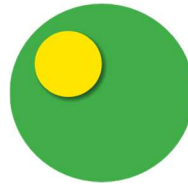
Euro Chlor vision

4 main elements selected

The European chlor-alkali industry's vision is towards a safe, competitive, climate neutral and circular industry



Safety leader



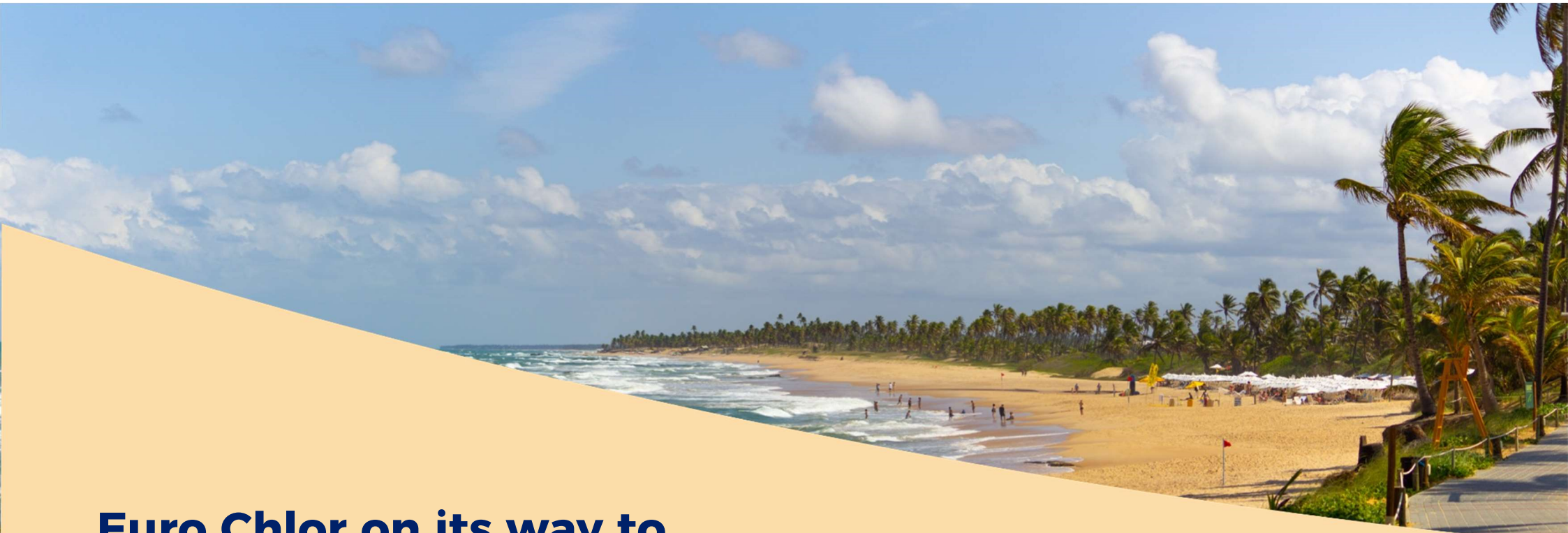
Competitive supplier



Climate neutral player



Circularity champion



Euro Chlor on its way to become safety leader

Priorities for Euro Chlor as a safety leader

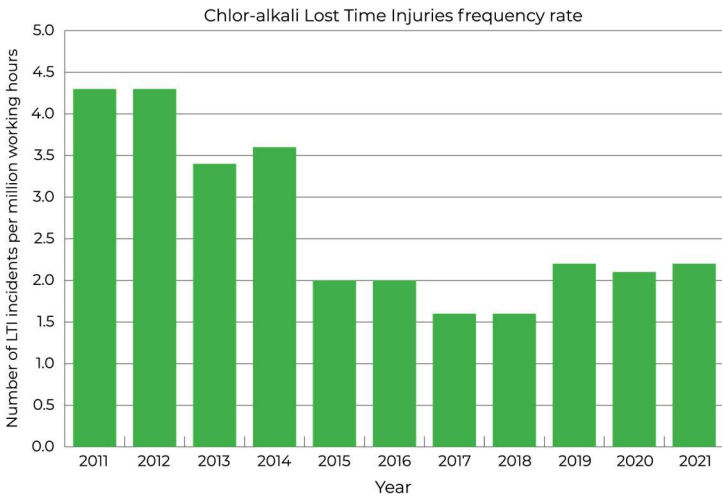
- ✓ We are committed to ensuring that our colleagues return home safely every day
- ✓ We are already sharing safety information but more can be done
- ✓ By 2050
 - ✓ Target zero incidents in our industry
 - ✓ Further share safety experience with everyone who sells/handles chlor alkali products
 - ✓ Collect data to help authorities ensure that imported chlor-alkali products meet high safety standards

WHY ?

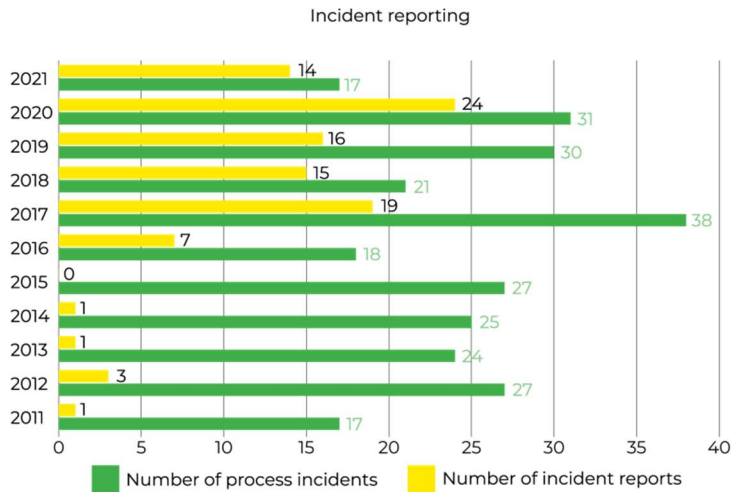
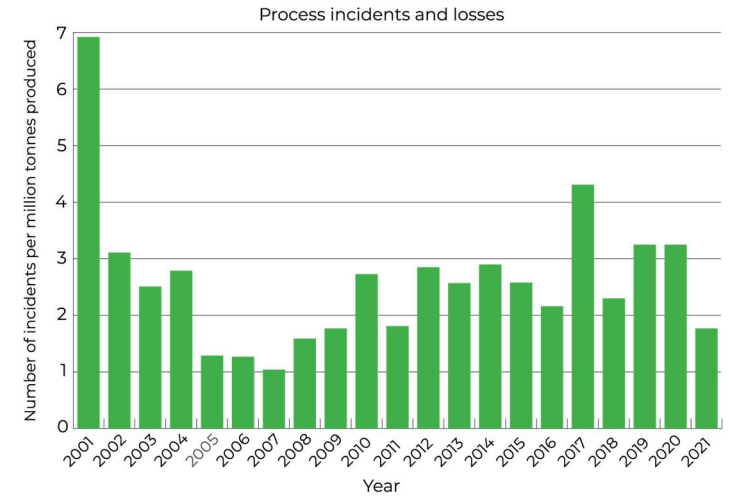
Because every incident involving chlor-alkali is one too many



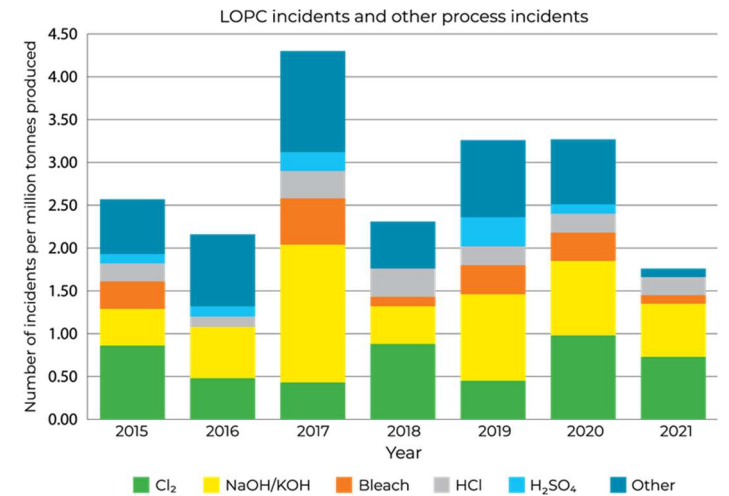
Priorities for Euro Chlor as a safety leader



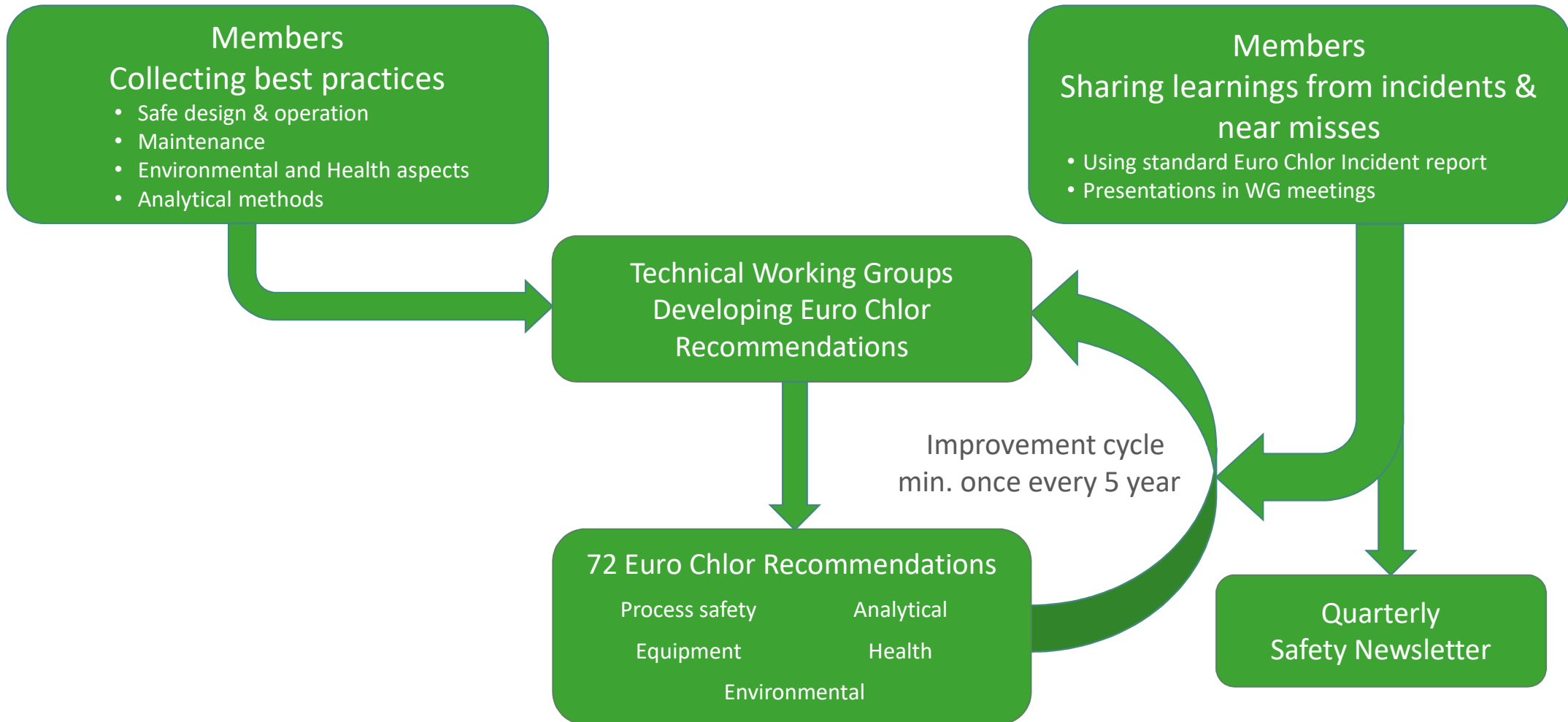
Ambition
is
ZERO!



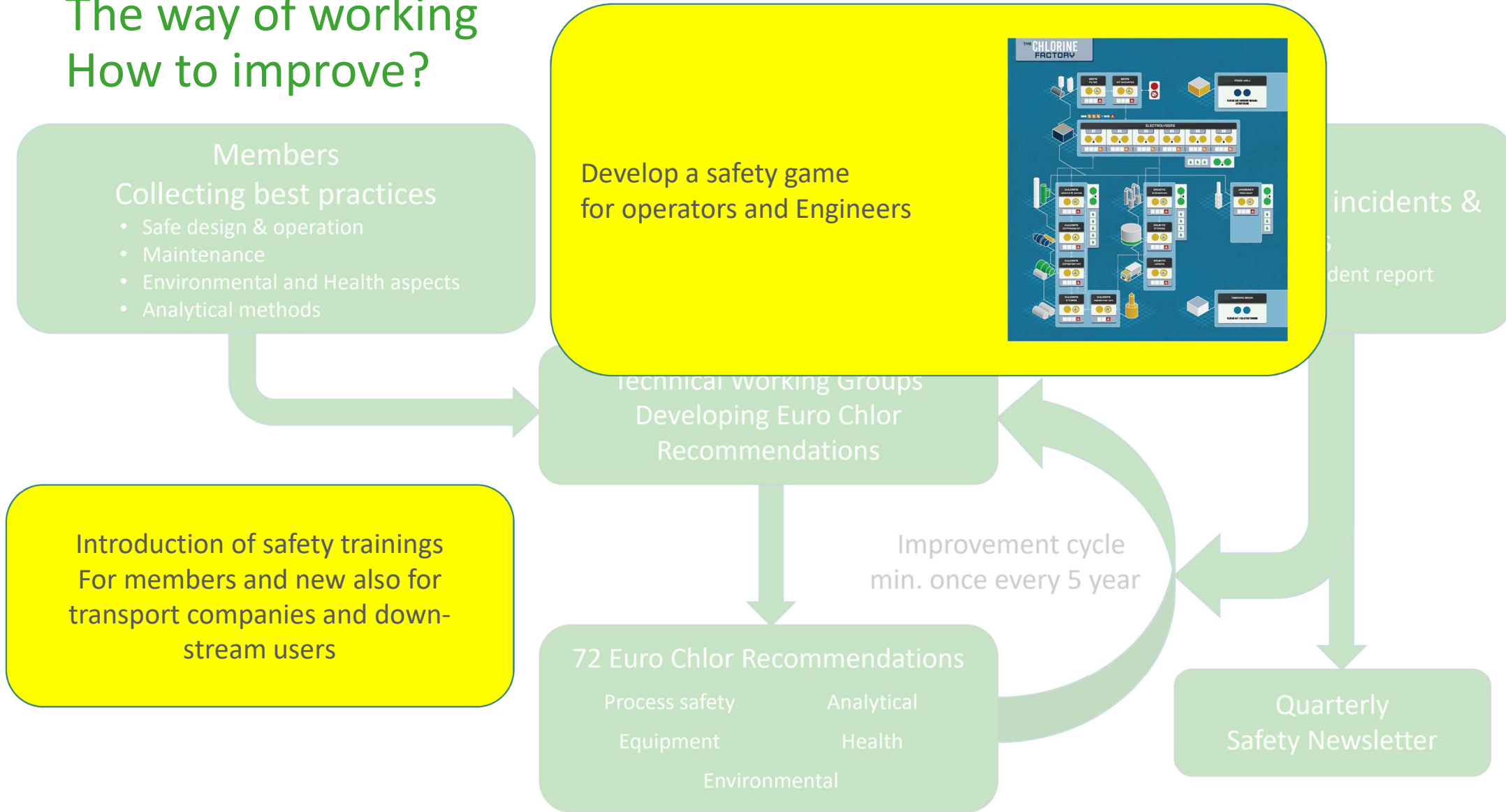
Room for
improvement



The way of working



The way of working How to improve?

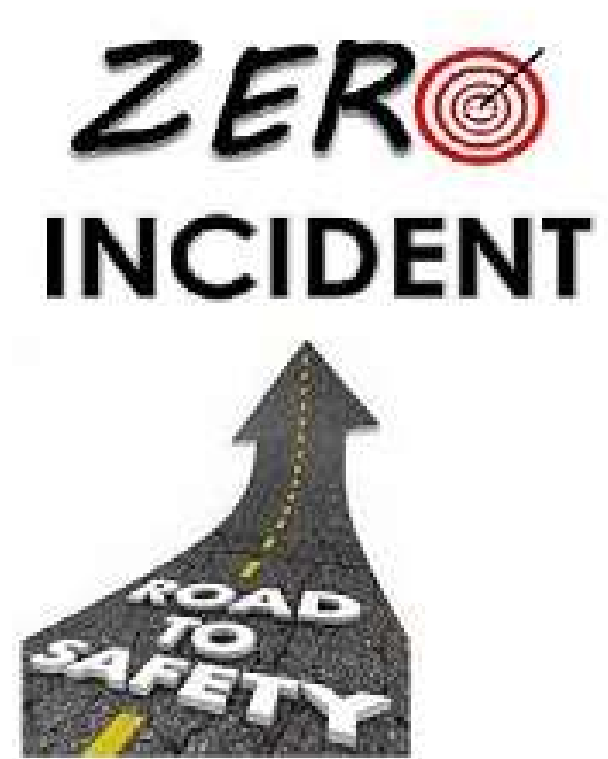


Route to zero

- ✓ How to achieve zero incidents?
- ✓ What can we do more?

- ✓ In 2016, Euro Chlor had 97 recommendations
 - ✓ Average age of documents was 13 years
 - ✓ Mainly focused on chlorine

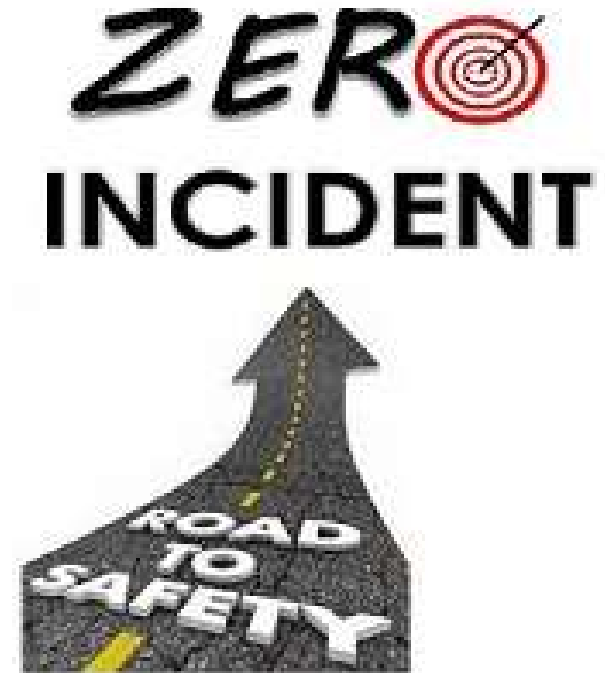
- ✓ What to do??



The route to zero

✔ What did we do:

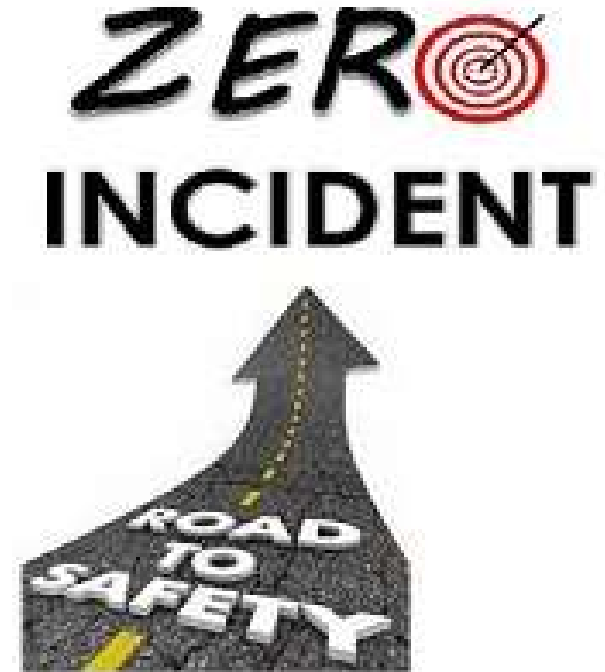
- ✔ Introduced safety newsletter every quarter
- ✔ Harmonising our safety recommendations and updated content
 - Reduced/combined and now 73 documents
 - Average age is two years
 - Five new documents
 - More attention to other products and downstream
- ✔ Visiting and discussing with members how to improve
- ✔ Workshop with members to discuss improvement options



Route to zero

- ✔ Outcome of workshop and member visits
 - ✔ How can Euro Chlor help to bring message across?
 - ✔ Documents are good but youngsters do not learn from reading them

- ✔ Result:
 - ✔ Introduced safety trainings
 - Started in 2021
 - Training consists of 11 lessons of 1.5 hours each
 - So far over 240 participants covered (over three rounds)
 - ✔ Try to find new training methods....



New methods of training

- ✔ Based on input of members of Health Working Group, University of Delft in Netherlands contacted in 2018
 - ✔ Department Technology, Policy & Management: Gamelab
 - ✔ Large experience with the development of serious games for simulations and trainings

- ✔ In May 2019, contract signed to develop together board game to train operators and engineers on safety

Development of game

- ✔ Kick-off with university and several members of GEST Working Group in July 2019
- ✔ Main conclusions of kick-off meeting:
 - ✔ Goal is to reduce incidents in chlorine plants. To achieve this, game should aim for players to become more aware of their lack of knowledge and help improve decision making.
 - ✔ Target group is primarily shift leaders, engineers and operators. Maintenance and Plant managers should also be able to play, but for more general awareness creation
 - ✔ Should be a group game, where 4 to 6 players sit together, discuss decisions and solve incidents



Board game would fit best

Development of game

- ✔ Development of board game (August 2019 – March 2020)
 - ✔ Several meetings of small group
 - People from university
 - Engineer from one of the members
 - Euro Chlor staff

- ✔ Prototype ready for testing at beginning of 2020
 - ✔ But Covid-19 came into the game.....
 - ✔ Delays as face-to-face testing was not possible
 - ✔ First face-to-face test with engineers from Nobian in September 2020
 - ✔ Online test (via Teams) with GEST members in December 2020
 - ✔ Online tests with engineers from member companies in March 2021

Development of game

- ✔ Prototype ready to test with operators since May 2021
- ✔ But Covid-19 still makes face-to-face tests with operators impossible
- ✔ Finally, first test with operators from Inovyn in Antwerp on 9 February 2022

✔ very positive feedback:

“ The game created a good dynamic between the operators and seems to really add value in enhancing operator knowledge levels. In any case, I saw that a lot of work had already been put into the development of the game, with clearly good results. After yesterday I am also enthusiastic about the further development.”

Suggestions for improvements - see later.

- ✔ But first a bit more about game....

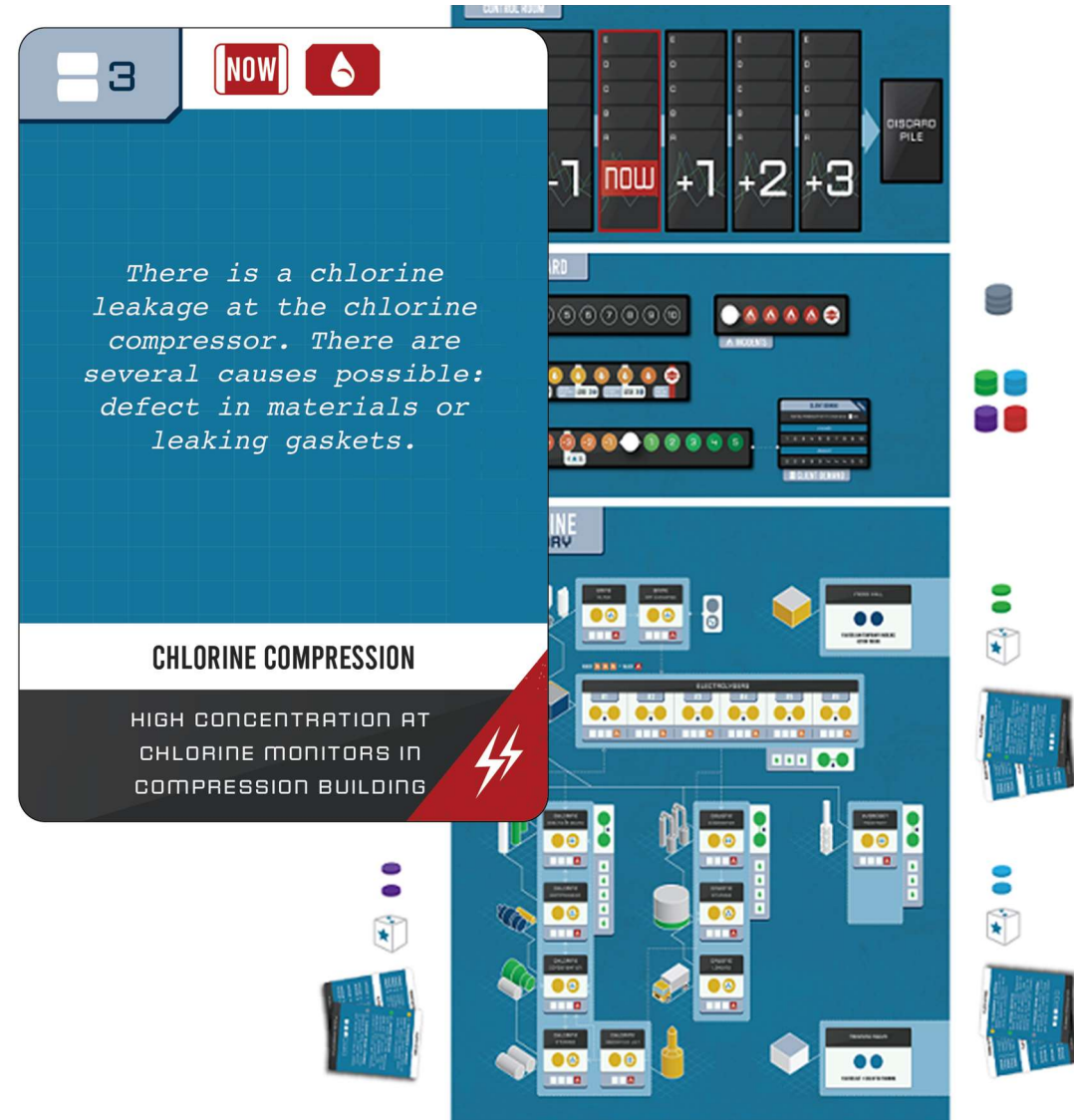
Game itself

- ✔ Simplified representation of real plant with main units present and other units part of main units
- ✔ Played with four players and one facilitator;
- ✔ Players act as one team trying to beat game
- ✔ Consists of 10 rounds
- ✔ In every round, certain production required



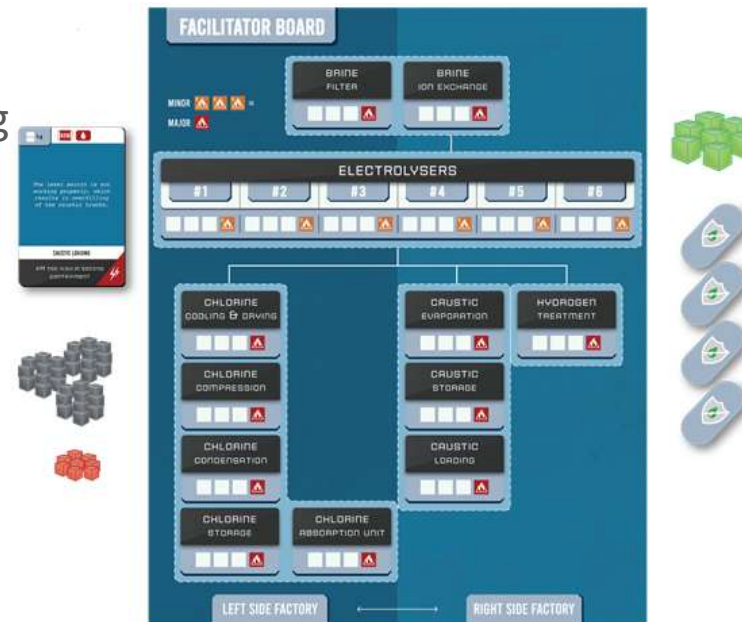
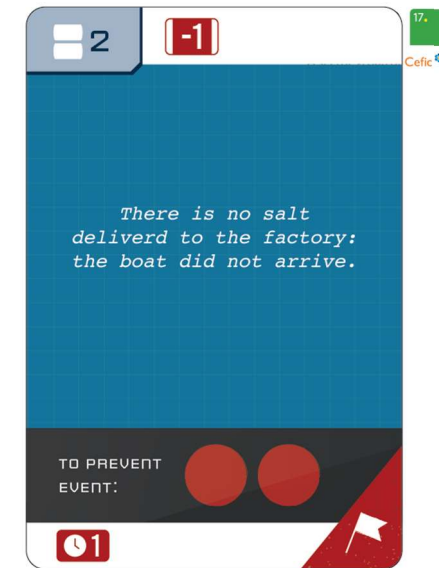
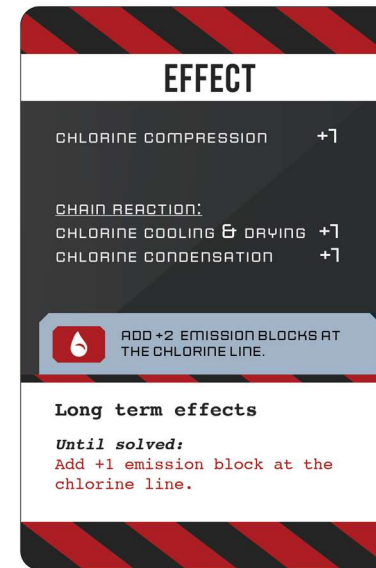
Game itself

- ✔ Players can increase production by taking cards
 - ✔ Cards also introduce treats and/or emissions to solve
 - ✔ They need to judge if there might be chain effects involved...
- ✔ They have to balance production and safety of plant
- ✔ Opportunities to increase skills by following training etc
- ✔ During game, problem/stress level increases



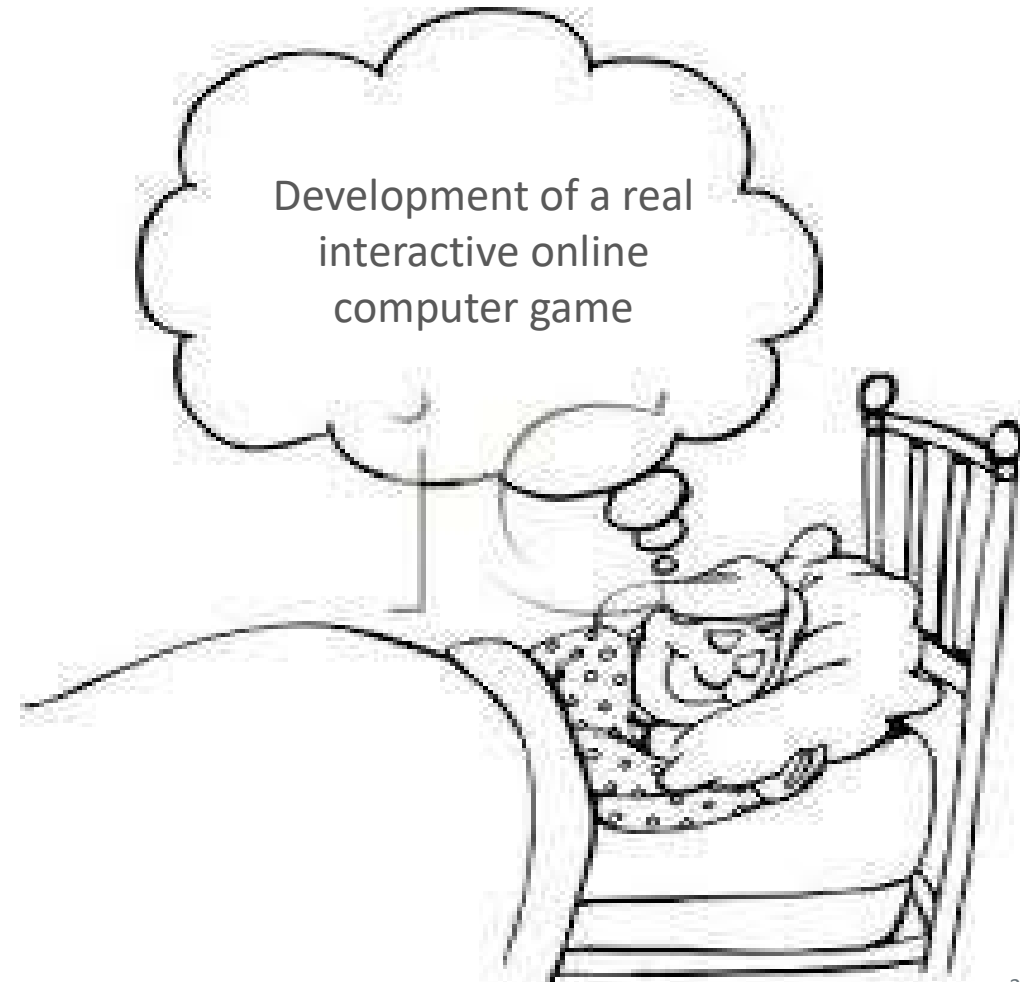
Game itself

- ✔ Working together and good knowledge of chain effects key
- ✔ Facilitator is very important for game:
 - ✔ He/she knows exactly effects of all cards on table ; While players have to judge/predict this themselves
 - ✔ Can manipulate the complexity
 - ✔ Discusses afterwards improvement/learning areas for team that played game



Next steps

- ✔ Next steps
 - ✔ Printing game boxes; one box available for each member site in Europe (if interested)
 - ✔ Training sessions for game facilitators
 - ✔ Handing over game boxes to sites
- ✔ Getting feedback from members on how it works and further improvements.....



A tropical landscape featuring a body of water in the foreground, a line of palm trees on a small island in the middle ground, and a blue sky with scattered white clouds. The scene is partially obscured by a large, diagonal, light orange overlay that contains the text.

Thank You
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