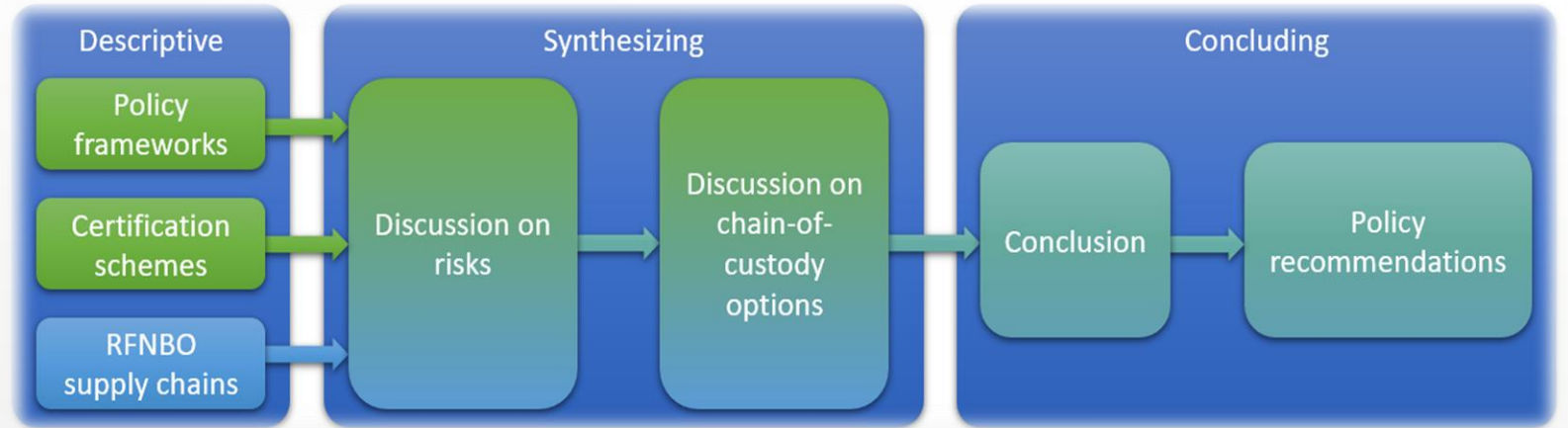


Integrity of certification framework for E-fuels

*Guaranteeing renewable energy (RE)
consumption via E-fuels to
decarbonize the transport sector*

Ted Knijn
Utrecht University
Internship project RVO

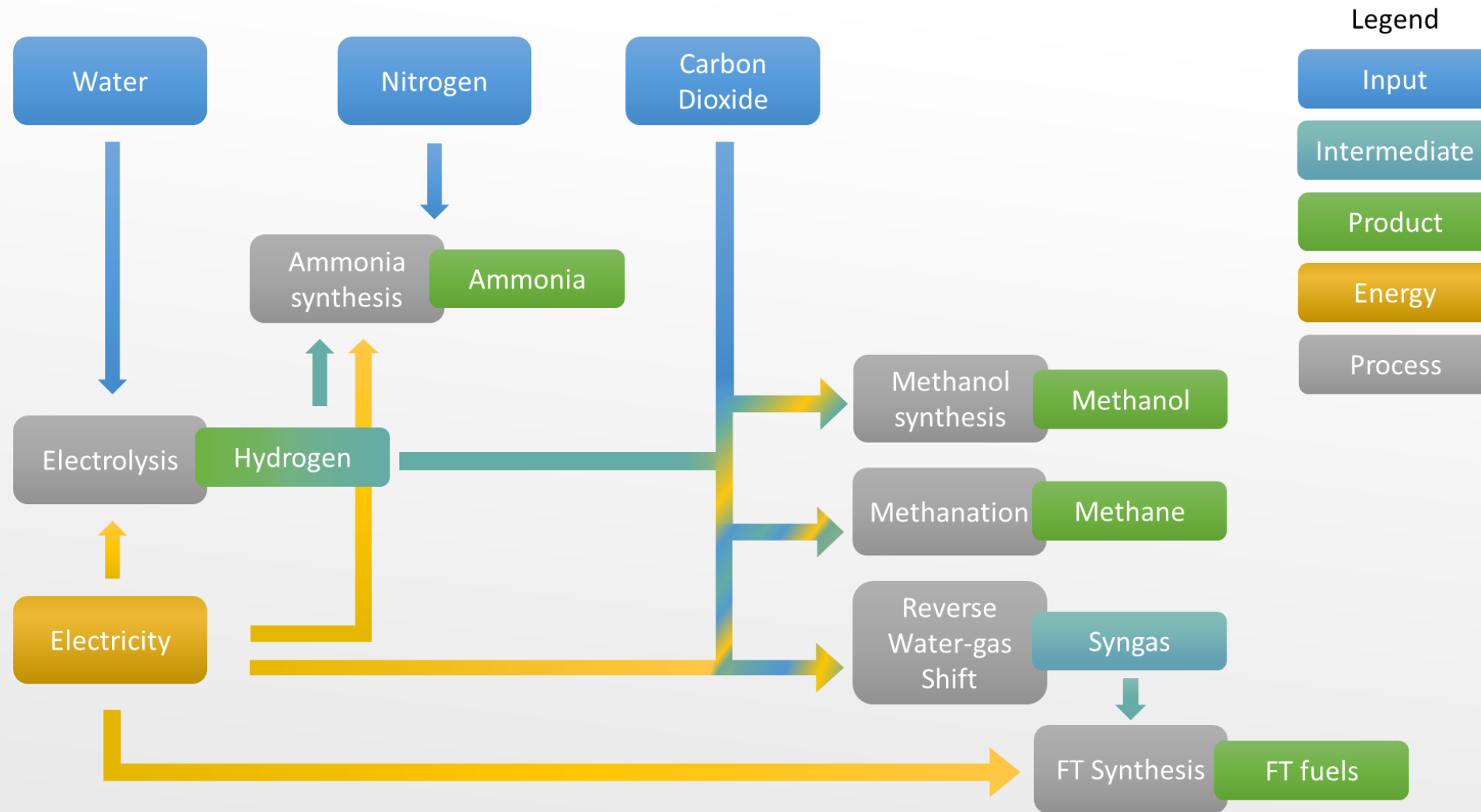
Content



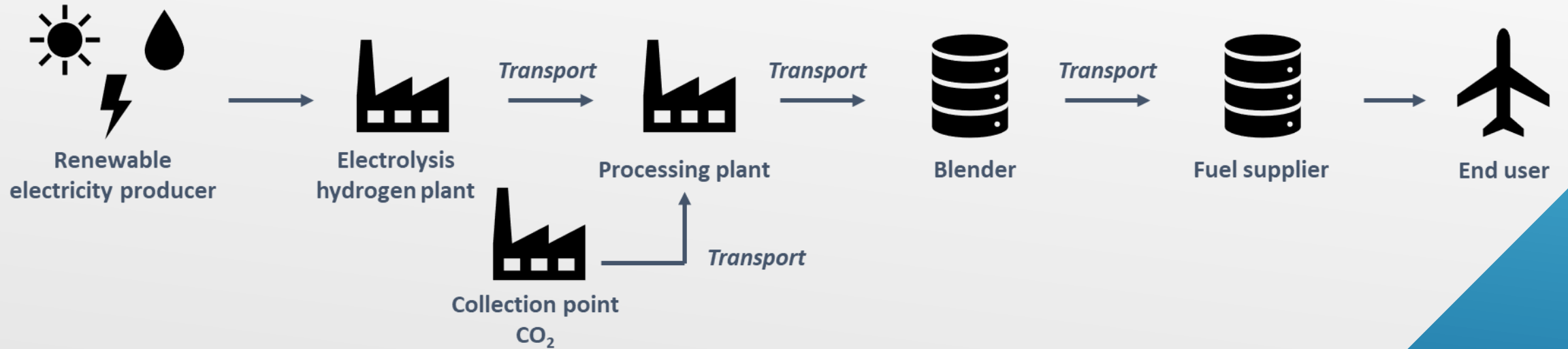
- ▶ E-fuel supply chains
- ▶ Policy frameworks for E-fuels
- ▶ Improvements to certification for E-fuels
- ▶ Conclusions and future work

E-FUELS SUPPLY CHAINS





WHAT ARE E-FUEL PATHWAYS?



BIOFUEL VS E-FUEL SUPPLY CHAINS

- ▶ Low-carbon policy
 - ▶ North-American policies, such as CA's and BC's LCFS
 - ▶ Crediting low-carbon pathways
 - ▶ Definition based on **fuel pathway**
- ▶ RE consumption policy
 - ▶ EU policies, such as the REDII
 - ▶ Requiring consumption of additional renewable energy
 - ▶ Definition based on **energy input**
- ▶ Different definitions will not lead to commoditization

DIFFERENT DEFINITIONS...
...DIFFERENT POLICY ORIENTATION

POLICY FRAMEWORKS FOR E-FUELS





- ▶ EU-REDII: **Renewable** fuels of non-biological origin (RFNBOs)
- ▶ European countries have implemented RFNBO criteria differently
 - ▶ UK: Mass balance
 - ▶ NL: Physical segregation
- ▶ E-fuel certification allowed but “on hold” until **delegated acts**:
 - ▶ GHG emission savings calculation methodology
 - ▶ Additionality framework

EU RENEWABLE ENERGY DIRECTIVE II



- ▶ Hydrogen pathways
 - ▶ Support of hydrogen as an **alternative for fossil fuels**
 - ▶ Focus on potential to reduce Carbon Intensity (CI)
- ▶ Other E-fuels not explicitly mentioned
- ▶ Relevant policy mechanisms
 - ▶ Book & claim for Zero-CI electricity for electrolysis
 - ▶ Smart electrolysis
 - ▶ Support of Hydrogen Refueling Infrastructure (HRI)

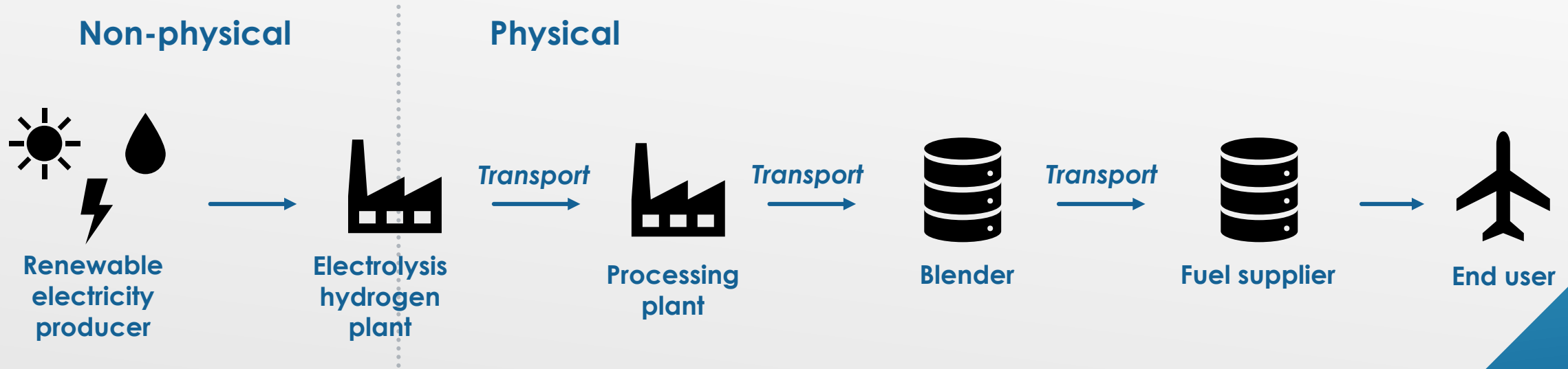
CALIFORNIAN LCFS

IMPROVEMENTS TO CERTIFICATION FOR E-FUELS



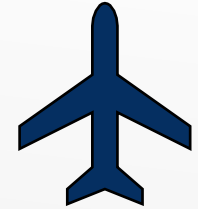
- ▶ Risks related to the **non-physical** part of the supply chain:
 - ▶ Criteria for information on used electricity
 - ▶ An **energy balance** should be added to E-fuel certification

- ▶ Risks related to the **physical** part of the supply chain:
 - ▶ Complexity and intractability
 - ▶ Fraud protection by incorporating E-fuel certification in **database**



REDUCE RISKS RELATED TO RE IN E-FUELS

- ▶ Upcoming: International transport sectors
 - ▶ E-fuels can play important role in decarbonization
 - ▶ Aviation and maritime transport require an international framework
 - ▶ Scaling adds challenges to integrity of policy framework
- ▶ International database?



INTERNATIONAL E-FUEL FRAMEWORK?

CONCLUSIONS & FUTURE WORK



- ▶ E-fuels are defined differently
 - ▶ Different policy orientations
 - ▶ Renewable energy or Carbon intensity
- ▶ Improvements to E-fuel certification
 - ▶ An **energy balance** could overcome risks related to the **non-physical** part
 - ▶ A **database** could overcome risks related to the **physical** part

CONCLUSIONS

- ▶ Harmonize definitions between policy frameworks
 - ▶ Standardization of pathways leads to commodities
 - ▶ Uniform commodities would stimulate international trade
- ▶ Harmonization of criteria for target compliance
 - ▶ Prevent double counting of RE and GHG emission reductions
- ▶ Develop integer framework for international transport sectors
 - ▶ Explore possibilities for a database

FUTURE WORK

THANK YOU FOR YOUR ATTENTION

