

Can Austria „feed“ itself in a post-fossil world?

Ernst Schriefl (energieautark consulting gmbh)

Christian Lauk (Institut für Soziale Ökologie)

Gerald Kalt, Lukas Kranzl (Energy Economics Group)

ERSCP 2012

2.-4.5.2012

Bregenz

DI Dr. Ernst Schriefl
energieautark consulting gmbh
Hauptstraße 27/3
A-1140 Wien
Tel.: +43-1-5771568-12
Fax: +43-11-650-849.873.6
ernst.schriefl@energieautark.at
www.energieautark.at



Main research question

Under which conditions can Austria supply itself with

- food
- energy
- wood materials
- synthetic carbon materials

without using fossil resources?

Methodology

Scenarios (resp. scenario-combinations)

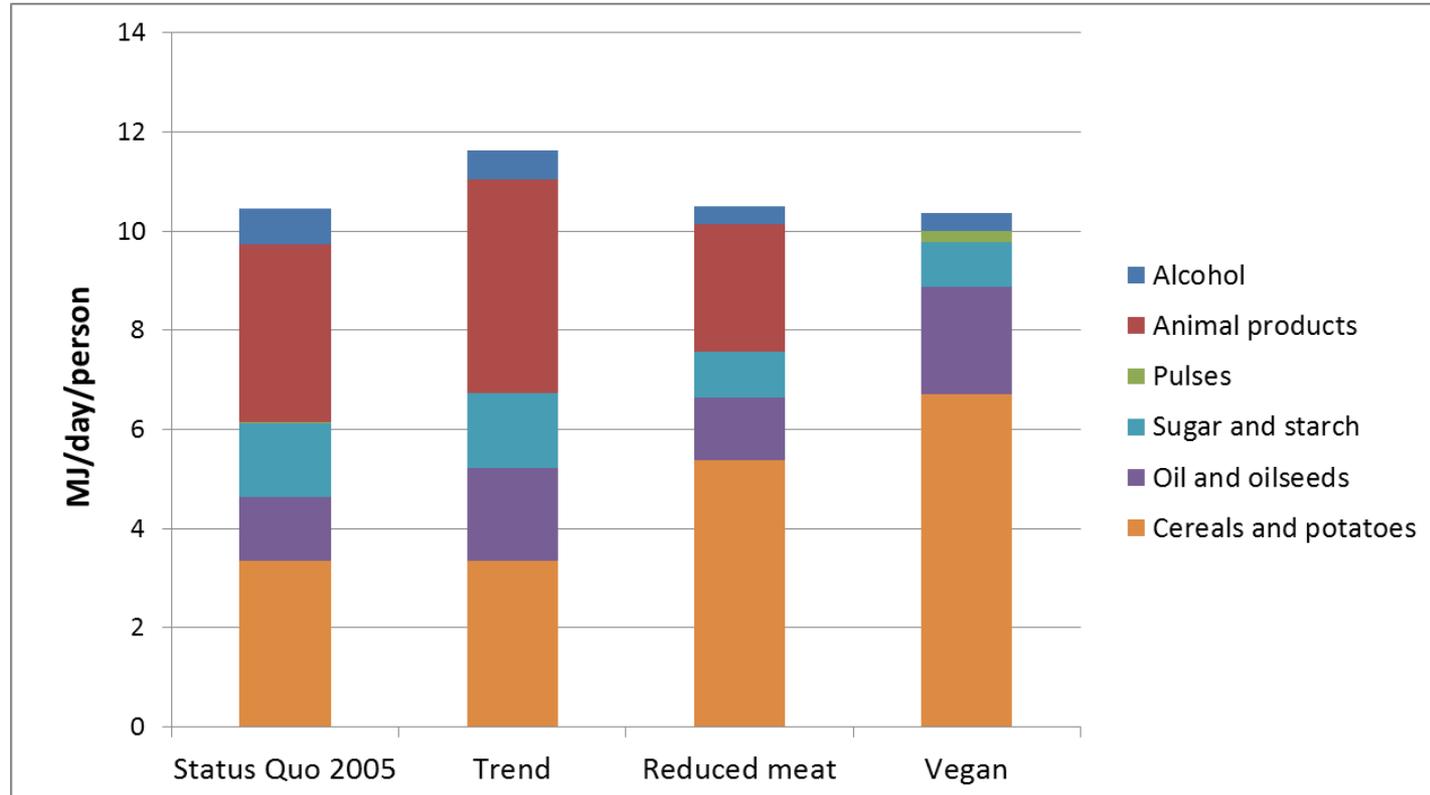
- > demand for food, energy, synthetic and wood materials
- > biomass demand
- > land demand („biophysical option space“)

Priorities for land allocation:

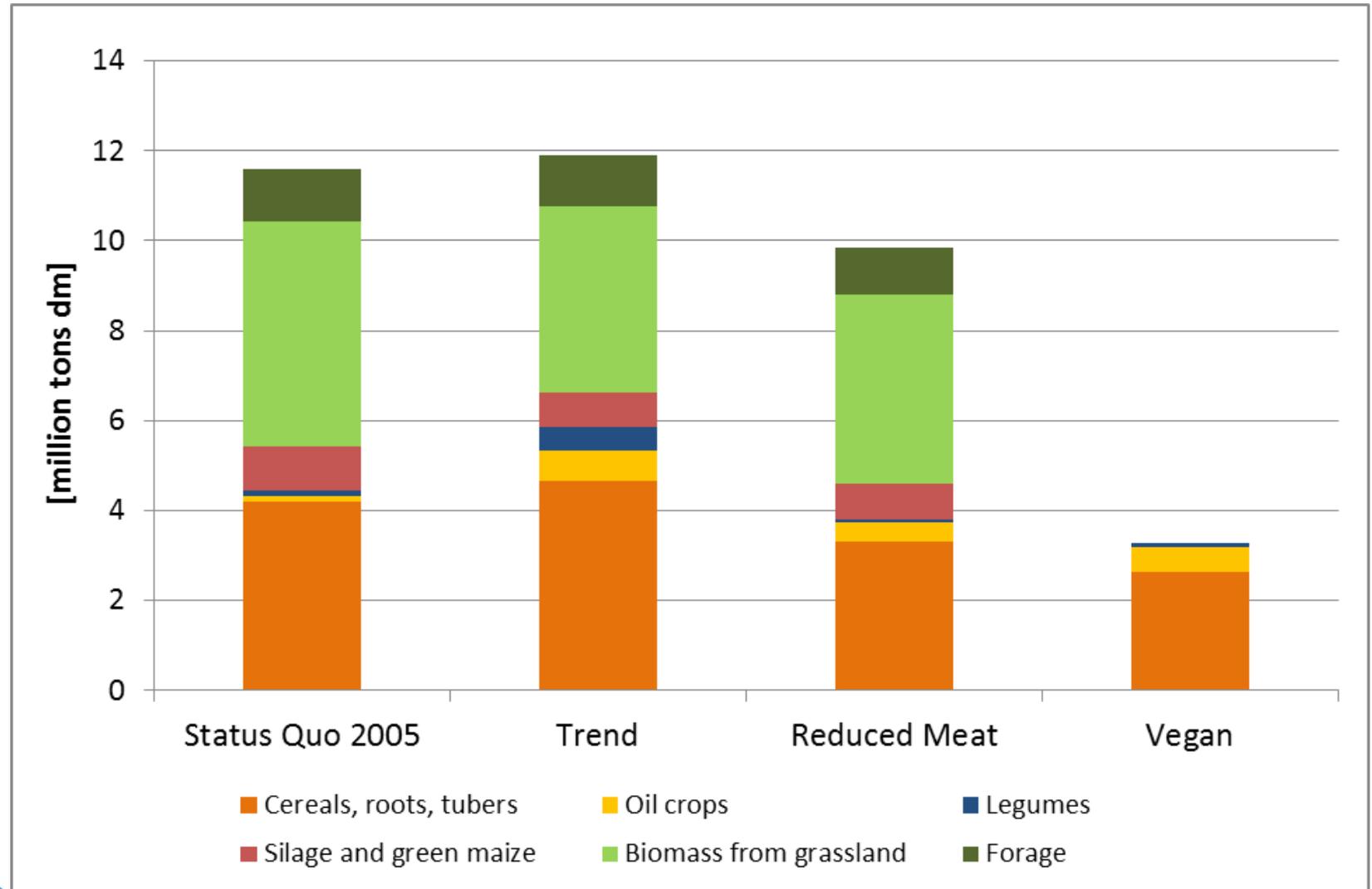
- 1.food
- 2.synthetic materials
- 3.bioenergy

Nutrition scenarios

- Trend
- Reduced meat
- Vegan



Biomass demand for food



Food – Biophysical option space

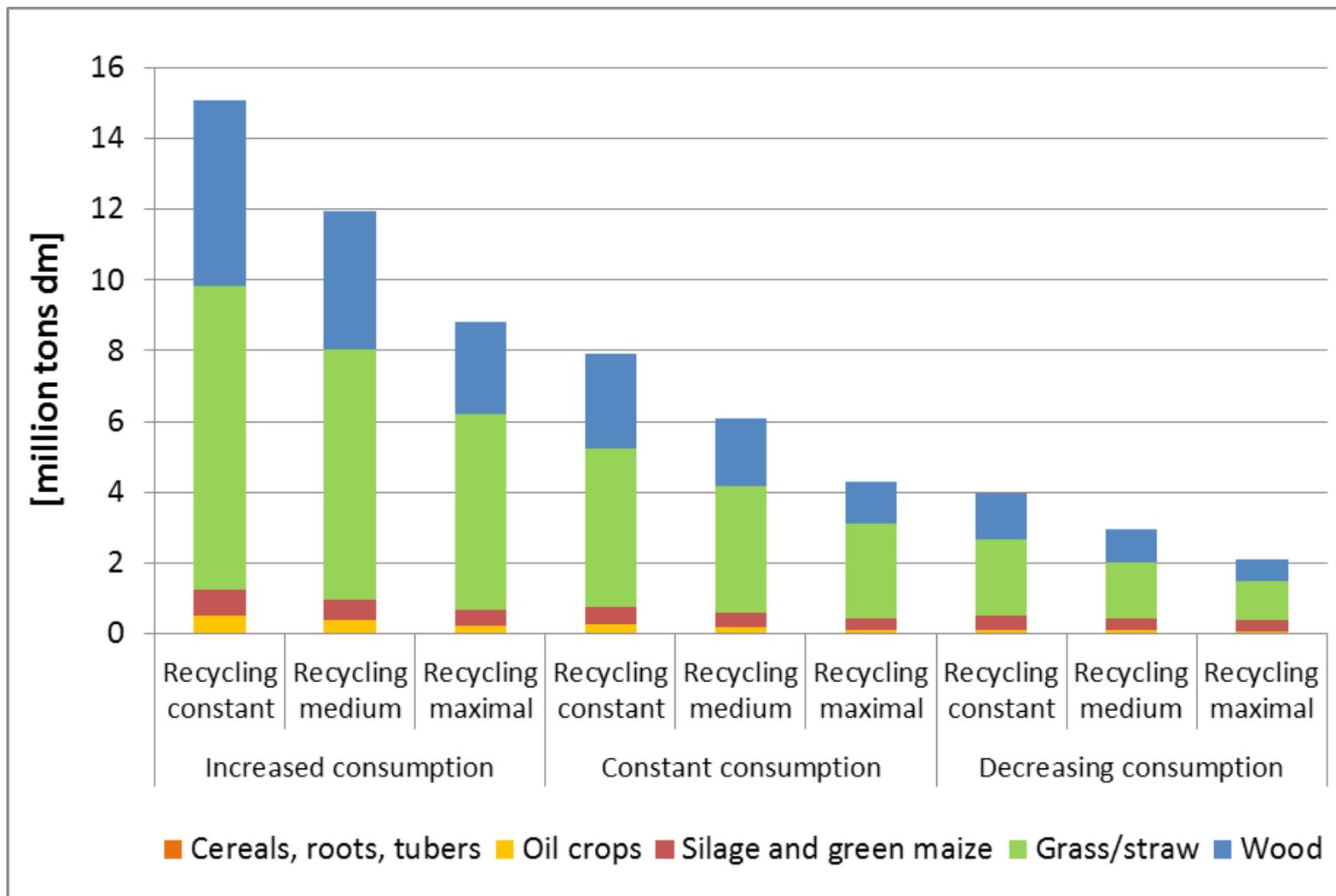
	Yields	Increasing	Constant	Organic
Diet	Trade Balance			
Trend	Balanced	+	-	-
	Constant	+	+/-	-
Reduced Meat	Balanced	+	+	+/-
	Constant	+	+	+
Vegan	Balanced	+	+	+
	Constant	+	+	+

Scenarios for synthetic materials

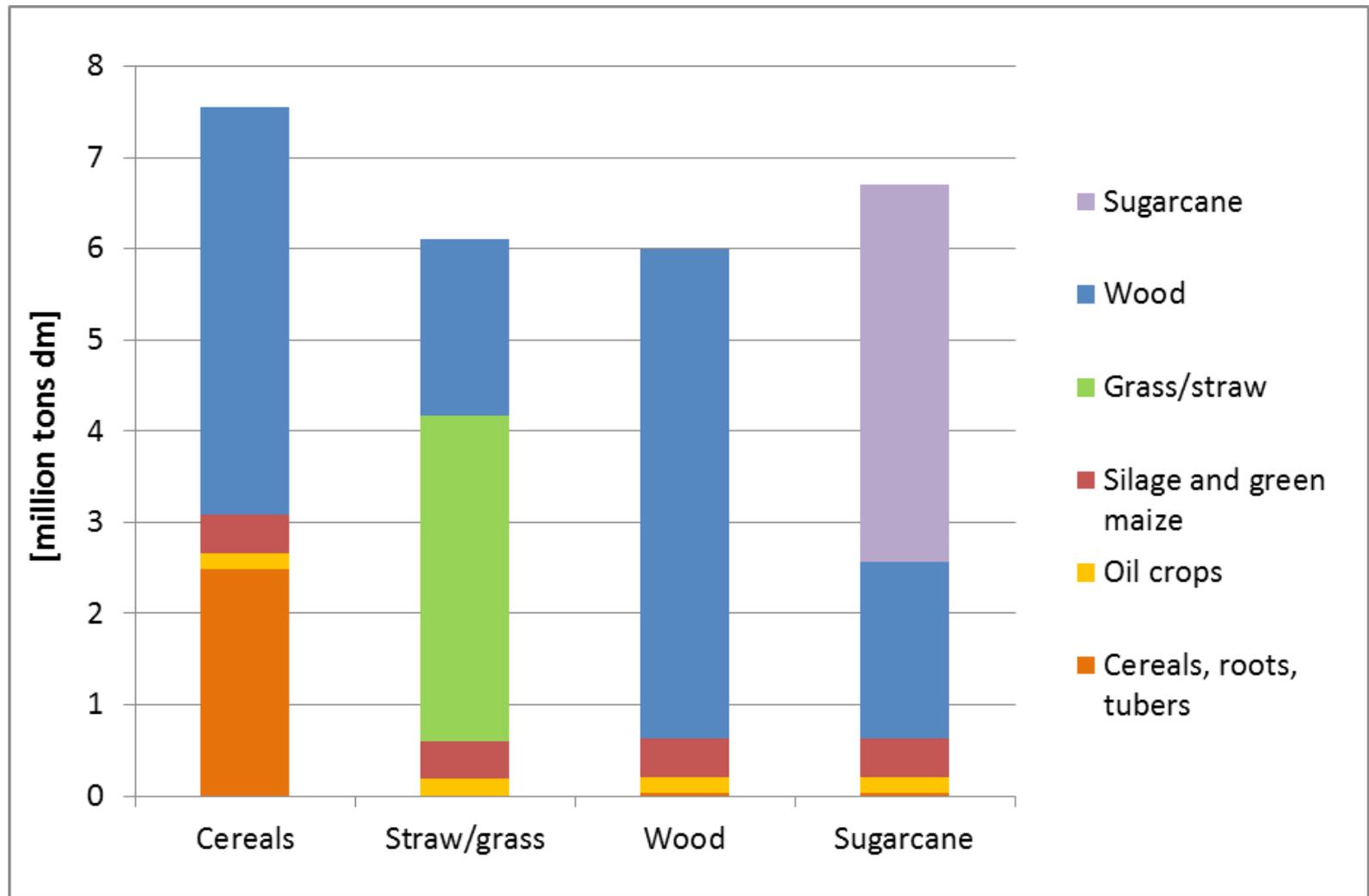
Scenarios regarding production of synthetic materials differ in:

- consumption levels (growth (+100%), constant, decline (-50%))
- recycling ratios (constant, medium (44%), high (75%))
- main source of raw materials (corn, straw/grass, wood, sugar cane)

Biomass demand – synthetic materials (1)



Biomass demand – synthetic materials (2)



Combining food & synthetic materials production – biophysical option space

	Focus Feedstock ►	Maize	Grass/Straw	Wood	Sugarcane
Consumption ▼	Recycling ▼				
Growing	Low	-	-	-	-
	Medium	-	-	-	+/-
	Maximal	-	-	+	+
Constant	Low	-	+/-	+	+
	Medium	-	+/-	+	+
	Maximal	+/-	+	+	+
Decreasing	Low	+/-	+	+	+
	Medium	+	+	+	+
	Maximal	+	+	+	+

Assumptions: constant yields per hectare, intensive forestry, reduced meat consumption

Energy autonomy scenarios

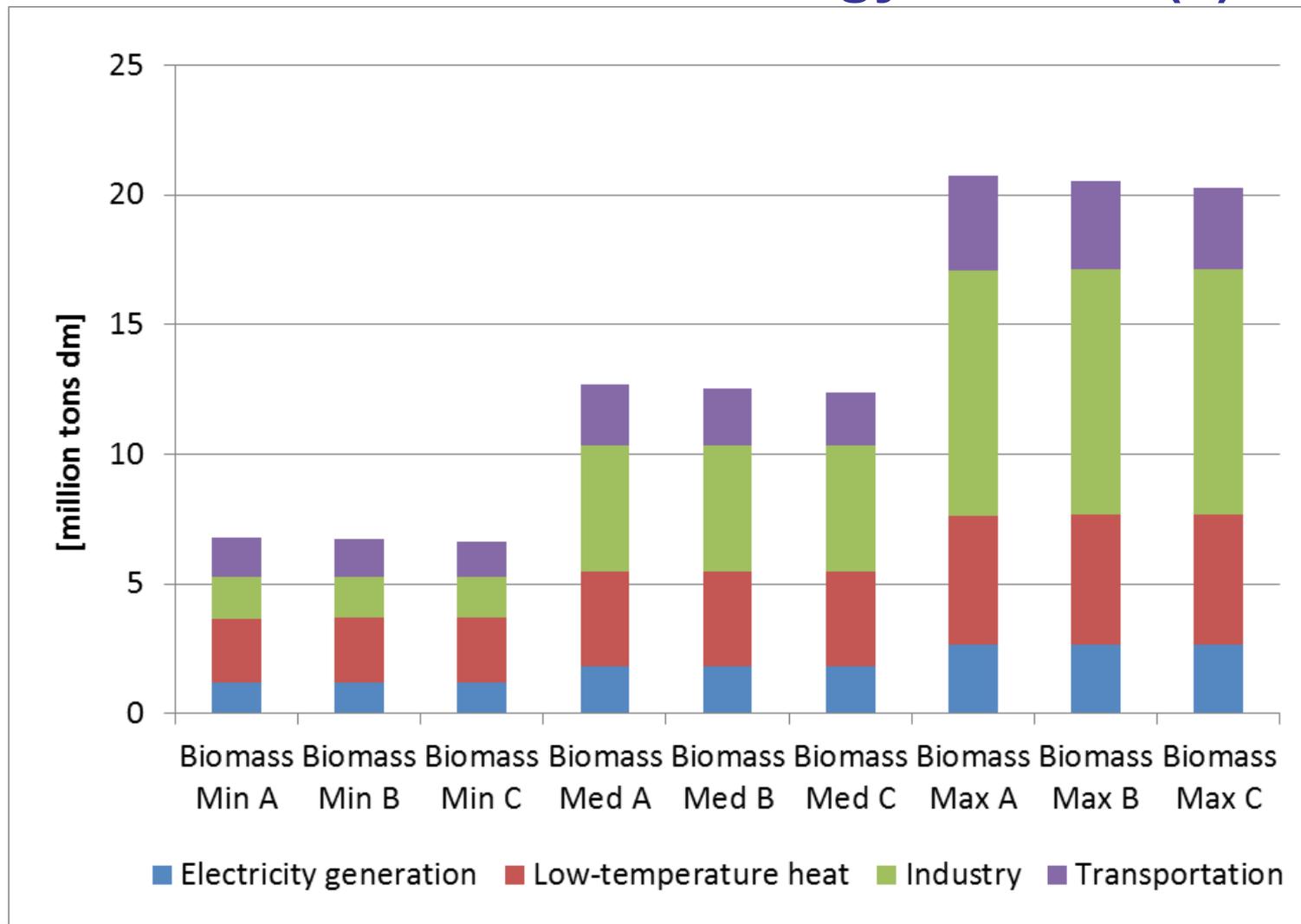
Energy autonomy scenarios differ in:

- energy demand/energy service level
- energy efficiency
- Technology choice

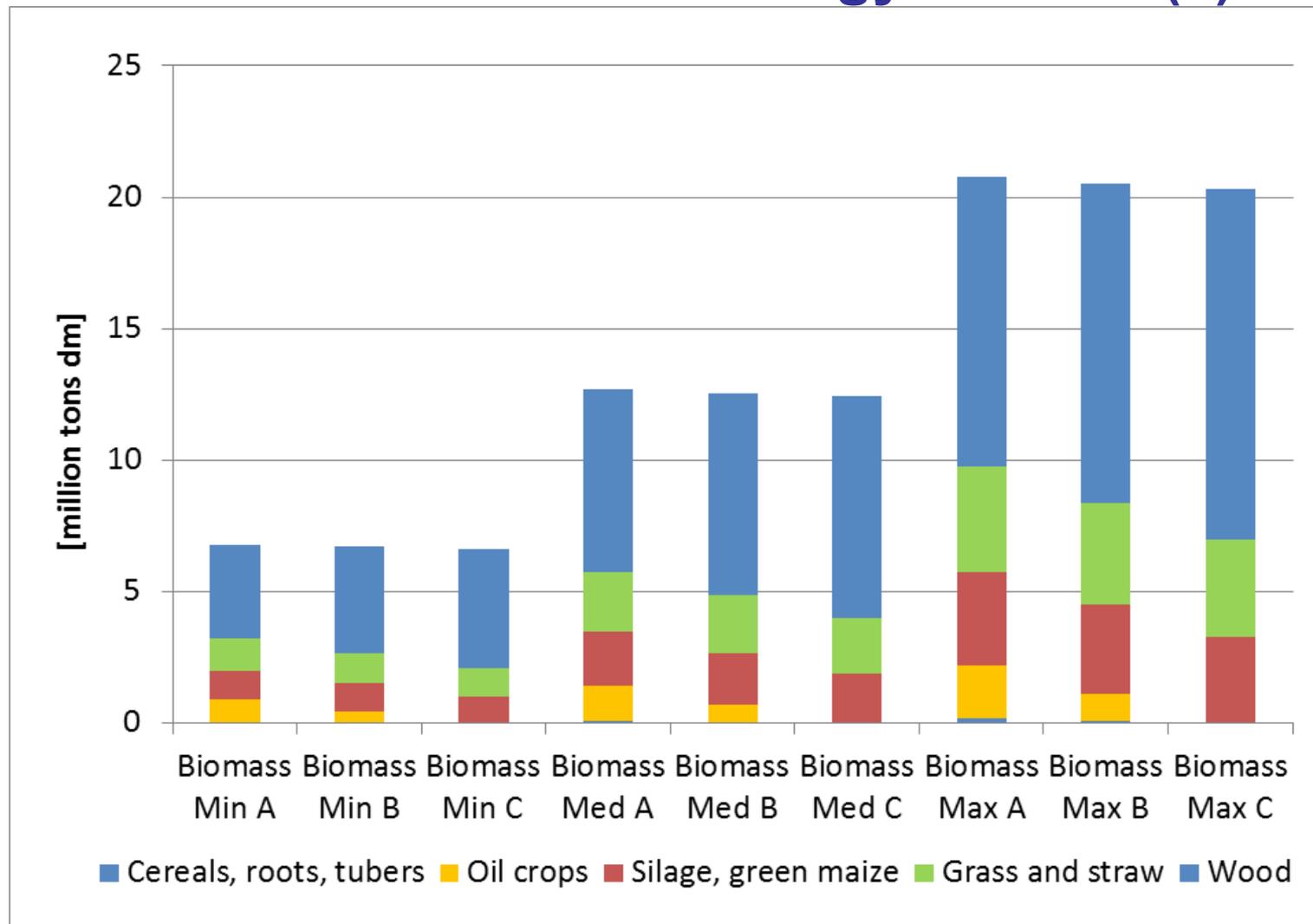
Three main energy autonomy scenarios are distinguished:

Biomass Min, Biomass Med, Biomass Max

Biomass demand for energy carriers (1)



Biomass demand for energy carriers (2)



Combining all biomass usages (1)

Assumptions:

- Medium recycling ratio (44%) in all combined scenarios
- No scenarios with sugar cane as main resource for synthetic materials
- Balanced foreign trade
- Consistent combinations regarding biomass demand for energy and materials: “Biomass Max” scenario is combined with scenario with growing consumption level (for synthetic carbon materials); Biomass Med – constant material consumption; Biomass Min – declining material consumption

Combining all biomass usages (2)

Yields ▼	Consumption ▼	Focus feedstock ►	Maize	Grass/straw/ wood	Wood
		Diet ▼			
Organic	Decreasing	Vegan	-	-	-
Constant	Growing	Trend	-	-	-
		Reduced meat	-	-	-
		Vegan	-	-	-
	Constant	Trend	-	-	-
		Reduced meat	-	-	-
		Vegan	-	+/-	-
	Decreasing	Trend	-	-	-
		Reduced meat	-	+/-	+
		Vegan	-	+	+
	Increasing	Growing	Trend	-	-
Reduced meat			-	-	-
Vegan			-	-	-
Constant		Trend	-	-	-
		Reduced meat	-	+/-	-
		Vegan	-	+	+/-
Decreasing		Trend	-	+/-	+
		Reduced meat	+/-	+	+
		Vegan	+	+	+

Main conclusions (1)

- Potential biomass demand for the biogenic production of synthetic carbon materials adds a considerable amount to the overall biomass demand.
- No biophysical possibility for an increasing consumption of bioenergy and biomaterials.
- Constant consumption of biogenic energy and materials is only possible under the condition of strongly increasing crop yields, a drastic reduction of meat consumption and an increased use of wood, straw and grass for the production of bioenergy (excluding case of vegan diet).

Main conclusions (2)

- Without additional net imports of biomass, the domestic consumption of energy and materials by the Austrian population can only be met if consumption levels and meat consumption decrease considerably, while yields remain at least on current levels.

Thank you for your attention!

Project “Save Our Surface”:

www.umweltbuero-klagenfurt.at/sos/